Long-Term Agreements on energy efficiency in the Netherlands

Results of 2007

Contents

This brochure contains the results of the Long-Term Agreements (LTAs) for energy efficiency for the year 2007. The report provides an overview of the energy management measures taken by Dutch companies and the results they have achieved.

On the 1st of July 2008 the long term agreement (MJA3) energy efficiency was signed in the VNO-NCW building.

LTA3 is on the way!

There wasn't much time to celebrate. Fifteenth anniversary or not, we had to roll up our sleeves last year. 2007 wasn't only the year of our anniversary, it was also the year in which the cabinet introduced its new policy plans. They included ambitious objectives in the field of climate and energy, set down in the programme of activities entitled *Schoon en Zuinig* (Clean and Efficient). That led to the *Duurzaamheidsakkoord* (sustainability agreement) in which VNO-NCW, MKB Nederland and LTO make clear agreements with the national government.

LTA1 and LTA2

One of the most important tools for achieving these objectives is the long-term agreement on energy efficiency (LTA). Over the past 15 years LTA1 and LTA2 have led to an overall energy efficiency improvement of more than 2% per year; at the end of 2007 there are more than nine hundred participating companies from almost 30 sectors. This result draws great attention from other countries. The fact that companies and institutions voluntarily work together with each other and with the government on such a scale wins much international praise.

Another factor for success: LTA is constantly evolving. The first covenants focused primarily on process efficiency. By now energy management outside the direct process is also an important point of interest for the LTA2 participants. This year we even added a little extra: the intensification, broadening and extending of the LTA2 covenant. That led to LTA3, which has a term of validity until 2020. The first signatures were recently added (see photo). Another important milestone.

3,9% in 2007

This report focuses on the results of 2007; a successful year. The overall energy efficiency improved by 3.9%, more than twice as much as in 2006 (1.9%). The broadening themes contributed substantially to this: sustainable energy (19%) and energy efficient product development (29%), in addition to process efficiency (52%). This year's energy efficiency shows a clear annual fluctuation with the influences of material conservation and decreased energy consumption during production – both EEPD measures. The long-term average this year is 2.3%, which is in line with expectations. A steadily increasing number of participants have also embedded energy management in their operational management (93%). Furthermore, LTA leads to more insight into the possibilities of restricting CO_2 emission.

Role of the government

Voluntary, but not without obligation. That is the central idea of LTA. A combination of freedom and result-orientation. The government at a greater distance and the business community at the wheel. Which does not mean to say that the government takes no responsibility. Quite the opposite, in fact. Various Ministries think along actively with LTA and regularly meet with sectors and companies. They come up with ideas for solutions, possibilities for subsidies and other support. But it is the companies and branch organizations themselves that set to work with concrete measures.

What precisely does the government do?

In the context of LTA participating companies, branch organizations and the government make long-term agreements: objectives with commitments. The government parties are the national government, the provinces and the municipalities. Four Ministries are involved in the project on behalf of the national government. They have appointed SenterNovem as independent expert agency to facilitate and monitor the project.

SenterNovem helps companies with such matters as drawing up an energy efficiency plan, introducing energy management and organizing business days. SenterNovem advises the departments about policy pre-conditions so that the LTA participants know where they stand and are not snowed under by bureaucratic red tape. As licence-granting authorities under the Environmental Management Act, the provinces and municipalities are closely involved in approving the energy efficiency plans drawn up by the companies.

Freedom of action

This typically Dutch way of working is paying off. Together the government and the business community seek concrete conservation measures. Not polarization, but common sense, realism and freedom of action. This pragmatic approach has survived various Cabinets and recessions during the past fifteen years. The support for sustainable enterprise has become even stronger.

Participation LTA (monitoring)

Industrial sectors, food industry, services sectors, transport sector and LTA1

At the end of 2007 there are 895 companies participating in LTA2. The LTA1 sectors represent 38 companies. The financial sector (banks and insurance companies) did not report in the 'year of transition' 2007; the sector is waiting for LTA3 to start after LTA1 has ended. Of the 895 participating LTA2 companies, 835 submitted monitoring figures for 2007 (93%). Owing to circumstances the remaining companies (7%) were unable to supply the monitoring data in time. The companies that did supply data did so by way of the so-called e-MJV an electronic Environmental Annual Report.

The 38 LTA1 institutions have made sector-specific agreements about the method of monitoring; 35 supplied figures for 2007 (92%). The LTA2 sectors consume 173 PJ of energy in 2007. The LTA1 sectors represent 11 PJ. That means that together they consume 184 PJ.

LTA

The Long-term Agreements on energy efficiency are agreements between the government and companies and institutions about the more effective and efficient use of energy.

LTA1

This 'Long-term agreement on energy efficiency' has a term that runs from 1989 to 2000. During this time companies make systematic efforts to improve energy efficiency. The efforts in that period led to the desired improvements in energy efficiency.

LTA2

The 'Long-term agreement on energy efficiency 2001-2012' (LTA2) is a sequel to the success of the LTA1. Companies can contribute to improvement of the energy efficiency in their branch by:

- taking certain cost-effective measures to improve the energy efficiency within their organization(s);
- systematic energy management at the company;
- taking measures in the field of expansion themes.

Primary agricultural sectors

The sectors Greenhouse Horticulture, Flower Bulb Growers and Mushroom Growers use approximately 116 PJ of energy in 2007. The *Greenhouse Horticulture* sector has its own covenant: The Greenhouse Horticulture and the Environment Covenant" (GlaMi). All (approximately 5,500) greenhouse horticulture businesses annually report a single total energy consumption figure. In addition the Landbouw Economisch Instituut (LEI)(economic insitute for agriculture) maps out the annual energy performance per sector by means of the Energy Monitor Greenhouse Horticulture. This concerns the energy efficiency, the CO_2 emission and the share of sustainable energy. This is done on the basis of multiple sources including individual business data.

The sectors *Flower Bulb Growers* and *Mushroom Growers* each work with a sector-specific LTA. At the end of the first covenant period (2006) both sectors signed a second covenant: LTA-e+ (2007-2011). The Flower Bulb Growers signed as a whole sector; about a third of the Mushroom Growers (74) signed the new covenant.

The aim of the covenant is to improve the energy efficiency by 11% in 2011 compared to the year of reference 2006. In addition the covenant aims at realizing a share of sustainably generated energy of 6.4% in 2011. By now three sectors are part of the covenant Clean and Efficient Agricultural Sectors, to which several agricultural sectors are affiliated.

The 'Productschap Tuinbouw' (commodity board for horticulture) asks all flower bulb growers for energy data. Questionnaires are sent to about 1,400 growers. At the middle of June 439 filled-in lists are available for monitoring. At that time no data is available from a group of companies comparable to those from the first LTA-e. As a result there is also no estimate of the CO_2 emission for 2007. The Steering Committee decided to continue collecting energy data. The monitoring report will be compiled later on this year. That means that there is no sector text available for this sector.

"Considerable conservation can be realized if makers, transporters and packagers work together"

JOHANNES DIJKSTRA

Smarter packaging as eye-opener

IF COFFEE MAKERS DRY THEIR GROUND COFFEE IN THE COSTA RICAN SUN, THAT CONSERVES A GREAT DEAL OF ENERGY FOR THE DUTCH COFFEE-ROASTING HOUSES. BECAUSE THE WATER IS EVAPORATED FROM THE COFFEE, THE TRANSPORT WEIGHT IS MUCH LOWER AND THE TRANSPORT (BY SHIP) REQUIRES LESS FUEL. THAT IS STILL IN THE FUTURE. AT THE MOMENT THE LTA FOCUS LIES WITHIN THE NATIONAL BORDERS. COFFEE MAKERS ARE TURNING THEIR MINDS TO ENERGY-SAVING PACKAGING. "THE WHOLE CHAIN IS THINKING ALONG".

Coffee-roasting house Drie Mollen in Bolsward (in the northern province of Friesland) is getting an increasing number of questions about the sustainability of their packaging, notices KAM co-ordinator Johannes Dijkstra. Consumers want to know *if* and *how* the company works with sustainable packaging. The coffee-roasting house works with various brands of coffee, of which Max Havelaar and Gala are probably the best known. The company also supplies ground coffee to wholesalers in the catering industry and to several supermarket chains.

"Awareness among our customers is growing", explains Dijkstra. "And certainly not only among Max Havelaar customers. We are getting questions from all sorts of customers, not only about 'fair trade' coffee, but also about the plastic that we use. What is it made of and is it environmentally-friendly. These are questions that Drie Mollen has been concerned with for some time. They had no real answers, until... "Like our colleagues in the sector we had been asking ourselves for some time if we could make our packaging more energy-efficient. However, as we did not have the necessary expertise we put the issue on a back burner. Until SenterNovem came up with the suggestion to take a closer look at the amount of energy that packaging costs and what can be done to reduce that."

Conservation opportunities

In consultation with the researchers, Dijkstra ended up with three concrete opportunities for conservation: narrower strips of foil, thinner foil and smaller bags for coffee pads. "We had an idea that that would save energy, but we did not know if that was actually the case or how much energy could be saved." The experts worked it out. The results showed that the coffee-roasting house could save a substantial amount of energy with "smarter packaging". Depending on the specific situation the conservation could amount to as much as 2.7 MJ per kilogram of coffee. "We were pleasantly surprised. Considerable conservation can be realized if makers, transporters and packagers work together."

A similar study will be carried out this year at Simon Lévelt. This study will focus more emphatically on energy conservation and efficiency *in* the packaging material. Mikkel Lévelt, managing director of the Haarlem coffee-roasting house, is interested to see the results. "It is very nice that the packaging experts are prepared to help us, because this isn't our core business." ■

Key figures LTA

At the end of 2007 26 sectors are participating in LTA2. The universities are not yet reporting in the e-MJV environment of the LTA2 monitoring. Consequently, they are not included in the analyses in the general chapters. At the end of 2007 a pilot project was started at five universities in working with the e-EAR environment, in the build-up to the full conversion of all services sectors to working electronically. An important point for attention in this context: determining a suitable monitoring index. Officially, the Netherlands Railways (NS) comes under LTA1 but they use the same monitoring method as the LTA2 companies. For that reason we have included the NS in the analyses.

We distinguish between five clusters within the LTA sectors: the industrial sectors, the food sector, the services sectors, the transport sector and the LTA1 (supermarkets).

The universities join LTA2 in 2007 at the end of their LTA1 period. The Higher Professional Education (HBO) signs a separate covenant, the 'Sustainable HBO Charter' (part of which informally follows the LTA2 system). The financial institutions (banks and insurance companies) make the switch from LTA1 to LTA3.

Only the universities are eligible for an analysis of the services sectors. The 'transport sector' is made up of the various institutions of the Netherlands Railways. Only the supermarkets still remain as LTA1 sector.

The Greenhouse Horticulture sector has its own covenant: the 'Covenant Greenhouse Horticulture and Environment' (GlaMi). Other agricultural sectors include the Flower Bulb Growers and the Mushroom Growers.

Results

We present the results primarily on the basis of the energy efficiency improvement and the energy management measures taken. The avoided CO_2 emission is mentioned as a derived effect of the energy efficiency improvement. The results per sector are also reported in this way.
Table 1 shows the key figures of the monitoring for 2007. The figures for the agricultural sectors are not included because, as we have said, the cluster makes use of a different monitoring system.

Energy consumption

(Final / Secondary) energy consumption	The amount of energy - for example electricity, gas, heating, oil - that is used by the companies, expressed in Joules (J).
Primary energy consumption	This is the amount of energy needed to produce the desired secondary energy (for example the amount of coal, oil and/or gas required to produce electricity).
TJ (Terajoules)	Unit for measuring energy consumption: 1 TJ = 10^{12} Joule.
PJ (Petajoules)	Unit for measuring energy consumption: 1 PJ = 10^{15} Joule. 1 PJ corresponds to the energy consumption of 12,000 households.

Table 1. Key figures LTA: energy consumption, energy efficiency improvement, avoided CO_2 emission and conservation through measures (in 2007)

	PRIMAIRY ENERGY CONSUMPTION 2007 (PJ)	TEI 2006-2007 (%)	AVOIDED CO_2 IN 2007 (KTON)	NEW MEASURES IN 2007 (PJ)
Asphalt industry	3,1	-1,49	38	0,03
Chemical industry	10,5	2,25	202	0,19
Fine ceramics industry[1]	1,7	-5,44	3	0,01
Foundries	2,7	11,30	106	0,36
Coarse ceramics industry	10,3	0,89	-7	0,14
Laundry industry	1,6	1,19	26	0,04
Sand-limestone and cellular concrete industry	1,4	1,88	1	0,07
Refrigeration and cold-storage sector	2,4	5,40	38	0,02
Non-ferrous metal industry	3,9	2,40	68	0,13
Oil and gas production industry	37,4	2,70	145	0,52
Surface treatment industry	1,7	6,40	16	0,04
Non branch related industry	13,4	13,50	297	1,94
Rubber and plastics processing industry	9,9	3,62	309	1,04
Tank storage industry	2,2	3,67	34	0,08
Carpet Industry	0,9	3,30	32	0,04
Textile industry	1,9	2,49	6	0,03
University Medical Centres	5,0	0,32	-27	0,10
Total industrial sectors	**109,9**	**3,96**	**1.287**	**4,77**
Potato processing industry	8,7	0,27	50	0,24
Cocoa industry	2,2	2,55	33	0,11
Vegetable and fruit processing industry	3,0	5,08	26	0,08
Coffee roasting industry	0,9	11,61	25	0,14
Margarine, Fats and Oils production industry	7,0	0,30	58	0,01
Flour manufacturers	1,3	0,92	-7	0,01
Meat processing industry	4,1	1,89	36	0,62
Dairy industry	17,7	2,73	76	0,00
Total food industry	**44,9**	**2,15**	**297**	**1,21**
Netherlands Railways[2]	13,3	6,00	323	0,92
Total transport sector	**13,3**	**6,00**	**323**	**0,92**
Total LTA2	**168,1**	**3,86**	**1.907**	**6,90**
Universities[3]	5,4	2,80	542	0,34
Higher Professional Education[4]	0,9	n.v.t.	n.v.t.	0,19
Supermarkets (LTA1)[5]	10,2	0,90	n.v.t.	0,49

[1] Provisional result [2] Year of reference 1997 [3] Year of reference 1996 [4] No Energy Efficiency Index, but Conservation Index [5] Year of reference 1995

RESULTS LTA

Energy efficiency improvement

Figure 1. Energy efficiency improvement per index for LTA2 sectors 2001-2007 (in %)

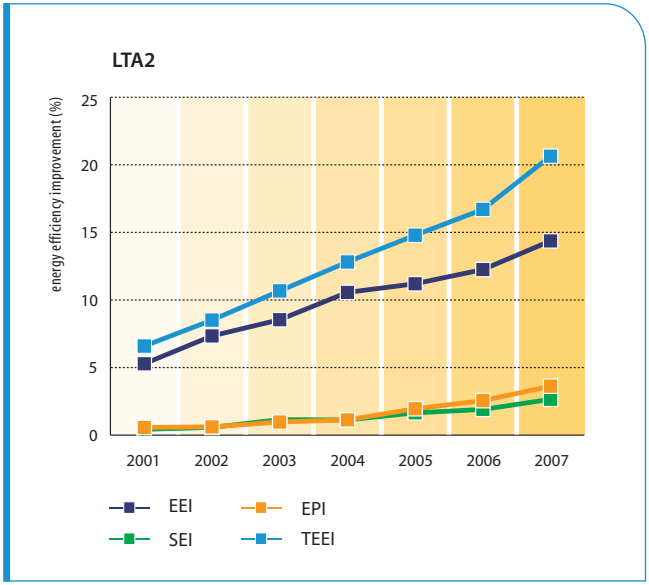
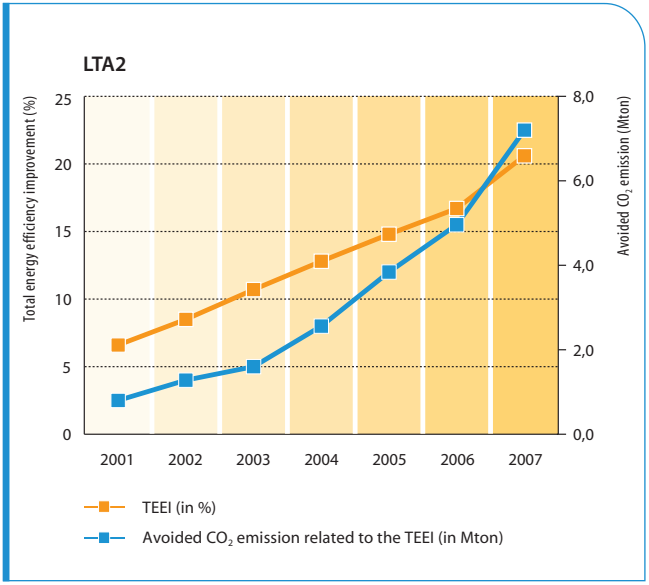


Figure 2. Avoided CO_2 emission related to the TEEI for LTA2 (2001-2007)



The total energy efficiency improvement of LTA2 comprises three indices: energy efficiency in the production process, sustainable energy and energy efficient product development. Together the index improvements add up to the total improvement.

The total energy efficiency improvement (TEEI) improves by 3.9% in 2007 compared to 2006. With that the TEEI reaches 20.6% at the end of 2007 compared to the year of reference 1998 (see **figure 1**). The average annual total energy efficiency improvement since 2001 amounts to 2.4%. 63% of this is accounted for by process efficiency. The share of the application of sustainable energy is 16%. Energy efficient product development is responsible for 21%.

The energy efficiency improvement in the production process rests on two pillars. On the one hand energy management measures lead to improved energy efficiency. On the other hand there are other influential factors, such as capacity occupation, the composition of raw materials and or the product specifications. The efficiency improvement in terms of sustainable energy and energy efficient product development is entirely ascribable to energy management measures. They have no influence on the energy consumption of the production *process* of the company, but on the energy consumption in the production *chain*.
In 2007 the volume of avoided CO_2 emission increases by 1.9 Mton. Since 2001 improvement of the total energy efficiency has led to an avoided CO_2 emission of 6.9 Mton. Annually, this works out at an average of almost 1 Mton of avoided CO_2 emission.

Energy efficiency

Energy efficiency	Energy efficiency is a relative concept that is described as 'the volume of useful production per unit of energy used'.
EEI (Energy Efficiency Improvement)	This improvement indicates to what extent LTA companies have managed to achieve energy efficiency by applying management measures in the production process.
SEI (Sustainable Energy Improvement)	This improvement indicates what results LTA companies have achieved through the use of sustainable energy.
EPI (Energy Efficient Product Development Improvement)	This improvement indicates what results LTA2 companies have achieved through the introduction of energy efficient products.
TEEI (Total Energy Efficiency Improvement)	This is the improvement in the TEEI compared to the previous monitoring year, unless stated otherwise. The formula is as follows: EEI + SEI + EPI = TEEI.

Avoided CO_2 emission

Vermeden CO_2-emissie	Avoided emission of CO_2 through lower energy consumption. This does not concern absolute numbers. The avoided CO_2 emission is calculated on the basis of the TEEI. The TEEI is a relative measure for the energy performance product unit.

"An essential aspect of energy issues: get them into practice as quickly as possible. Show what can be done"

STEF HUISMAN

Heading for the super greenhouse

"A GREENHOUSE IS SIMPLY A BIG SOLAR COLLECTOR. THE WHOLE CONSTRUCTION IS BUILT TO CATCH AS MUCH LIGHT AS POSSIBLE. THE TRICK IS TURN THAT INTO ENERGY." STEF HUISMAN WAS ONE OF THE FIRST GREENHOUSE GROWERS WITH AN ENERGY EFFICIENT GREENHOUSE. IN 2002 THE ENTREPRENEUR FROM HUISSEN BEGAN USING A GREENHOUSE SYSTEM BASED ON SOLAR ENERGY. WITH SUCCESS.

The process is relatively simple: the greenhouse is insulated in such a way that solar heat cannot escape. Heat exchangers then put the heat in contact with underground water. The warm water (20 degrees Celsius) is then stored at a depth of 20 to 30 meters below the ground between two layers of soil. During the cold winter months the warm water is pumped to the surface to heat the greenhouse and the areas around it.

From the beginning of 2000 the sector, which used to be one of the most energy-intensive sectors, started changing at a rapid rate. In the near future the sector will be heating entire housing estates with its residual heat. Potentially, at least. A lot needs to be done before that stage is reached. The innovation programme 'de Kas als Energiebron' (Greenhouse as Source of Energy) stimulates and co-ordinates the developments. The programme began five years ago.

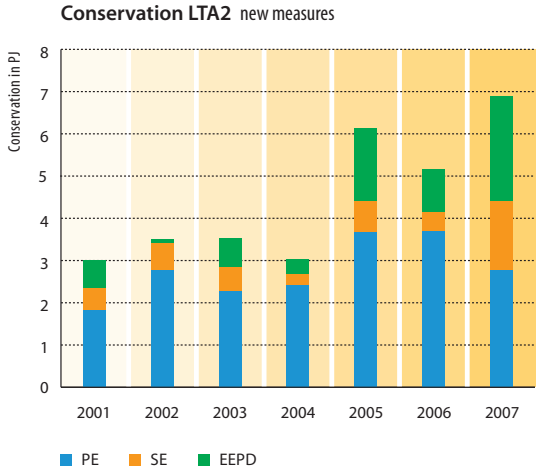
District heating

Huisman's greenhouse could well be an excellent example. The results are promising. In theory a so-called semi-closed greenhouse system like Huisman's is capable of providing 'low value' energy to surrounding housing estates in the form of district heating. But the logistic and technological conditions for that do not yet exist. Huisman: "We're still a long way away. The technology is still in its infancy. Distribution is a problem in itself. We will only get there if we tackle things correctly now." Mourits: "The top priority is to master the technique of production in the semi-closed greenhouses." ■

Energy management measures

Energy management measures make an important contribution to energy efficiency improvement. **Figure 3** shows the development of the conservation volume due to management measures. This concerns the *newly* realized conservation per year. The total conservation volume increases in 2007 thanks to the introduction of energy management measures. The process efficiency decreases compared to 2006. The share of sustainable energy increases substantially in 2007, largely because more sustainable energy is purchased. The share of energy efficient product development also increases considerably. It is virtually the same as the share of conservation through process efficiency.

Figure 3. Volume of conservation measures LTA2 sectors per year 2001-2007



Energy management measures: process efficiency

Conservation in process efficiency through measures

The process efficiency improves by 14.4% compared to the year of reference 1998. Compared to 2006 that is an improvement of 2.0%. On average the energy efficiency improvement as from 2001 is 1.5% annually. In total the process measures taken up until today have led to a total conservation of more than 19 PJ. Conservation through process efficiency not only occurs in the production process.

Energy conservation

Energy conservation	The performance of the same activities or the fulfilment of the same function with a lower energy consumption.
PE (Process Efficiency)	This concerns the conservation on (fossil) energy in internal operating processes, which makes an important contribution to the improvement in energy efficiency (EEI). Together with the other influences (see influencing factors), the management measures explain the change in efficiency.
Influencing factors	Influencing factors are factors inside and outside the organisation that influence the development of the actual energy consumption of the organisation.
ETs (Expansion Themes)	LTA2 companies do not only save (fossil) energy in their internal operating processes (process efficiency), but also widen their attention for energy to include sustainable energy (SE) and energy efficient product development (EEPD).
SE (Sustainable Energy)	This concerns energy applications that are generated from sustainable sources, such as solar and wind energy, hydro-electric power stations and energy from biomass. See also Expansion Themes.
EEPD (Energy Efficient Product Development)	EEPD concerns three aspects of energy management (see also Expansion Themes): Sustainable Products; Optimisation of Transport, Logistics and Chains; Sustainable Company Grounds.

Figure 4 shows a significant increase in conservation in buildings and utilities from 15% in 2006 to 21% in 2007. The conservation realized by the performance of strategic projects also increases (from 5% to 8%). The largest share (60%) of the energy efficiency improvement is still accounted for by energy management projects in production processes. This is a drop compared to 2006.

Conservation in process efficiency through other influences

The process efficiency improves more in 2007 compared to 2006 than in the year before, whereas the volume of conservation measures in the production process in 2007 lags behind the conservation in 2006. The reason is that the process efficiency is not only influenced by the energy management measures taken, but also by factors like capacity occupation, composition of raw materials and product specifications. The capacity occupation, in particular, has a positive effect on energy efficiency. Good operational management lies at the basis of this. The structural embedding of energy in the business process (energy management) can be an extra motivation to make the best possible use of the capacity.

Energy management measures: sustainable energy

In 2007 all the LTA2 sectors together realize a saving of 5.2 PJ through the use of sustainable energy (138 measures). In 2006 that was 3.5 PJ. At the end of 2007 the SEI had improved by 2.65% compared to the year of reference 1998. 0.73% of this was realized in the last year. On average the annual efficiency improvement through the use of sustainable energy is almost 0.38%. The development is shown in **figure 5**. The purchase of sustainable electricity is the primary cause of the substantial increase. The share of purchased sustainable electricity is 81% of the total conservation through sustainable energy. In 2006 this was 75%.

The differences between the sectors are big: 57% is realized by the industrial sectors. The food sector, too, and (in particular) the transport sector have also increased this year. Some major shifts occur due to the fact that companies are more readily inclined to switch to other – less expensive – energy supply contracts. The share of sustainable energy from residual currents and biomass amounts to 15% of the total saving through sustainable energy. Two thirds of this is realized by the food sector. The industrial sectors generate more energy from residual currents and biomass than in previous years.

Figure 4. Make-up of energy conservation through measures process efficiency in LTA2 sectors in 2007

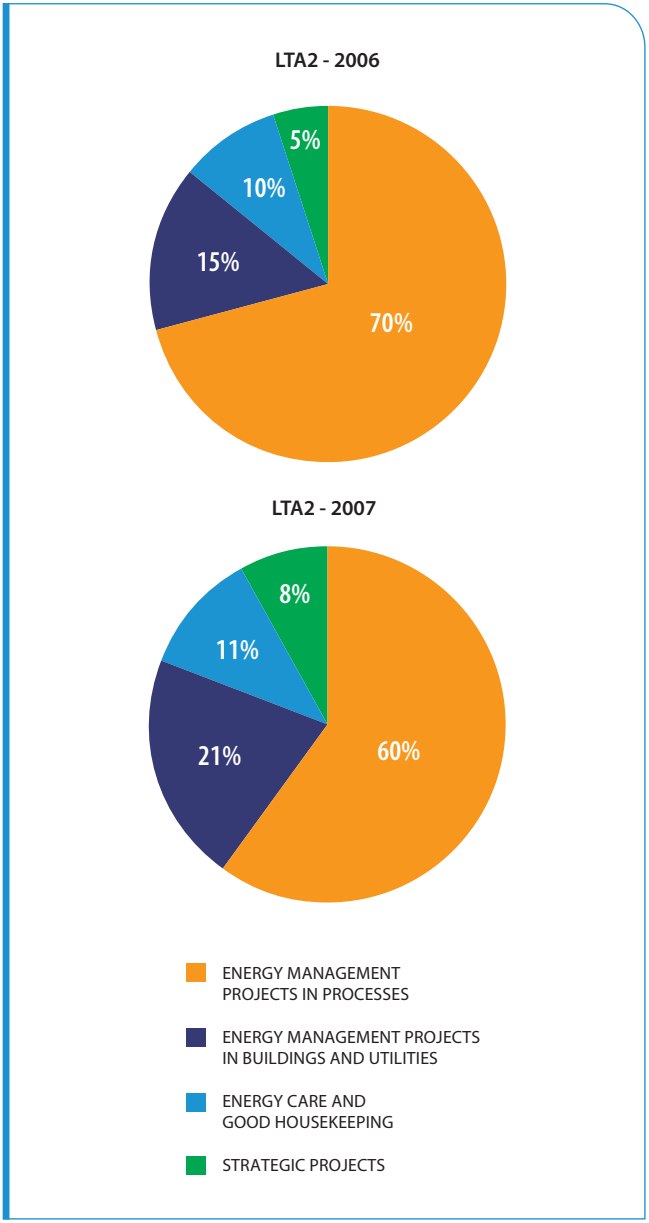


Figure 5. Development of sustainable energy

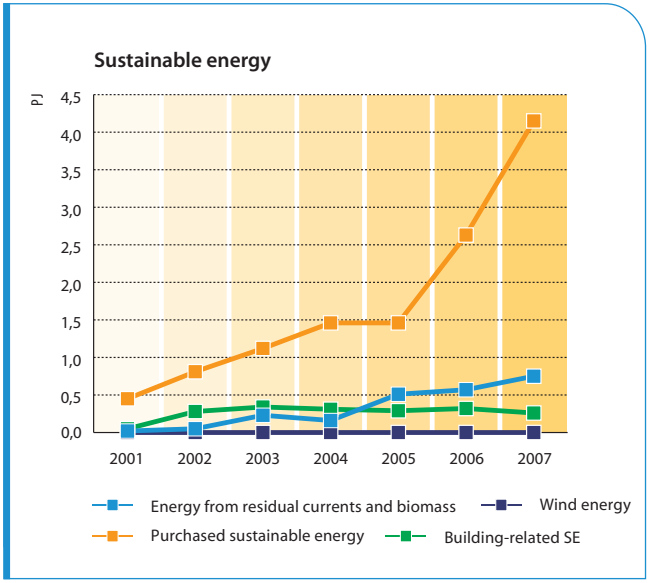
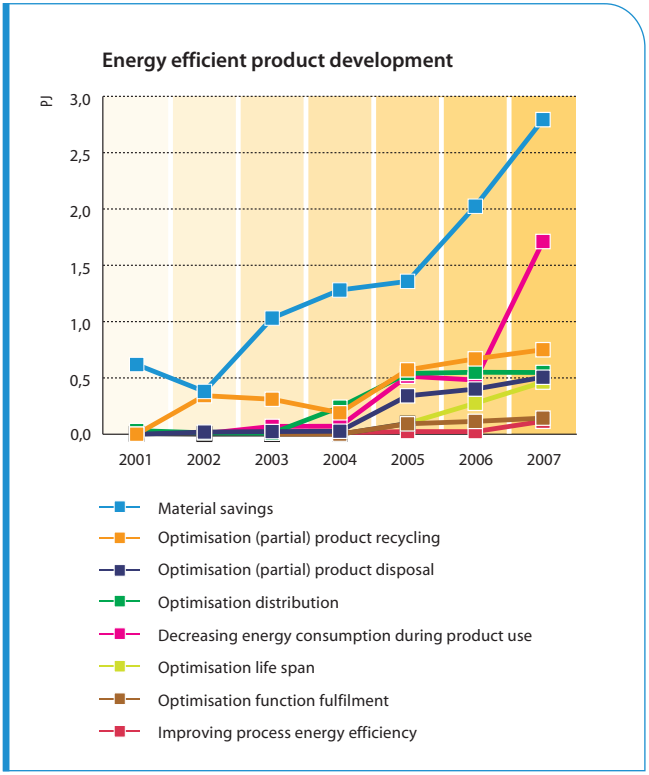


Figure 6. Development energy efficient product development



Energy management measures: energy efficient product development

A saving of 7.0 PJ is realized through energy efficient product development (EEPD) (425 measures). In 2006 that was 4.5 PJ. This increase is realized over the whole breadth of the sector. At the end of 2007 the EPI improves by 3.6% compared to the year of reference 1998. 1.1% of this is realized in 2007. On average the energy efficiency through EEPD improves by almost 0.5% per year.

Figure 6 shows that the different categories have an upward trend. The greatest increase occurs in 'decreasing energy consumption during product use' and 'material savings'. Here again the differences between the sectors are big. Basically four industrial sectors are responsible for most of the energy saving through energy efficient product development in the period 2001-2007: foundries, rubber & plastics processing industry, carpet industry and non branch related industry. During the first few years of LTA2 most of the attention in the context of energy efficient product development was focused on 'material savings'. In 2007 the realized saving is spread evenly among all categories.

If we look at the absolute increase in saving in the *industrial sectors* we see that many savings are realized by: material savings, optimisation (partial) product recycling, optimisation (partial) product disposal, optimisation life span, improving process energy efficiency and decreasing energy consumption during product use.

In the food sector a great deal of headway was made by: material savings, optimisation (partial) product recycling, optimisation (partial) product disposal, optimisation distribution and optimisation function fulfilment.

Energy management

Figure 7. Percentage of companies the comply with the Energy Management criteria (2001-2007)

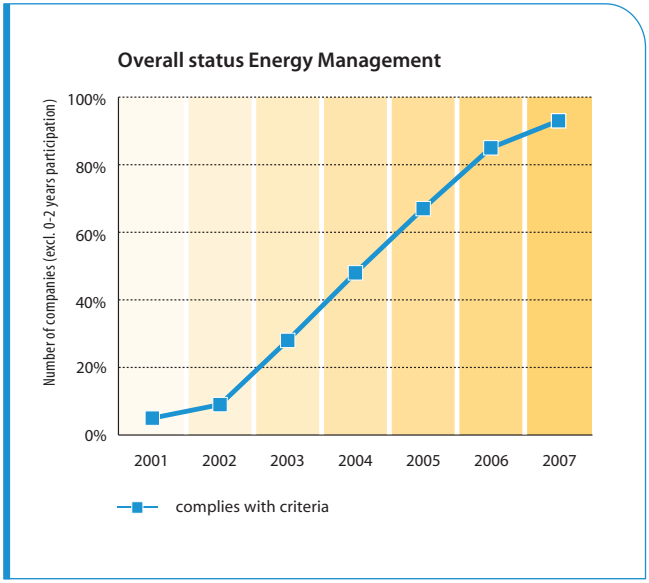
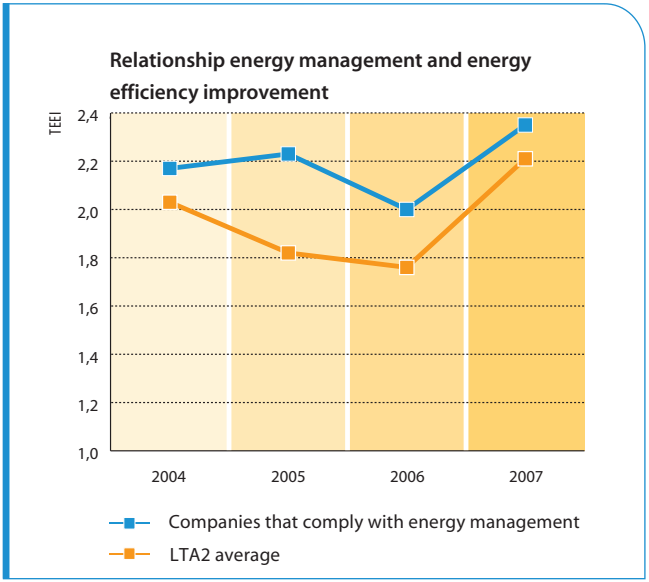


Figure 8. Energy management and energy efficiency improvement (2004-2007)



Energy management is a compulsory element in the LTA2 covenant. By now 93% of the LTA2 companies that have been participants for two years or longer have introduced energy management. They also comply with the criteria of the BasicCheck Energy Management.

Agreements have been made with the remaining companies about when they will comply with the compulsory energy management. In a few cases the covenant has been annulled. **Figure 7** gives an insight into the increase in the share of companies that comply with these criteria.

Relationship energy management and energy efficiency improvement

Energy management offers companies a handle on how to structurally reduce energy consumption. **Figure 8** shows the results of an analysis at 757 companies into the relationship between energy management and energy efficiency improvement. The figure shows that the companies that have introduced energy management realize a considerable energy efficiency improvement. That shows that energy management is a useful tool for safeguarding the effectiveness of the measures in the long term. It is also a fact that companies that have ISO14001 certification, in which energy management is incorporated, realize significantly higher levels of energy efficiency improvement than companies that merely have a good system of energy management.

European standard

Within a few years a European standard will replace the Reference Energy Management. The tools for energy management developed in the context of LTA will be largely taken over in the new development. The reason for this is that these tools are practical and can be used in a concrete manner, not only by large companies but especially also by smaller ones.

Energy Management

Energy Management	Taking organisational, technical and behavioural measures in a structural and economic way in order to minimise energy consumption.
Reference Energy Management	The framework that indicates an optimal energy management system.
BasicCheck Energy Management	A tool for performing a quality check on the energy management system.

"The PI scan showed that a new process could be highly profitable"

TOM STOFFER

Using new processes to build synthetic resins

A PROCESS CAN ALWAYS BE IMPROVED, ALSO FROM AN ENERGY POINT OF VIEW. THAT IS THE MAIN IDEA BEHIND PROCESS INTENSIFICATION. A FEW YEARS AGO DSM DEVELOPED A SO-CALLED PI QUICKSCAN. THE SCAN GIVES COMPANIES A VERY QUICK INSIGHT INTO POSSIBLE IMPROVEMENTS. A NUMBER OF PROCESSES AT NUPLEX RESINS WERE SCANNED IN THIS WAY. TOM STOFFER, MANAGER PROCESS TECHNOLOGY: "THAT GAVE US A NUMBER OF GOOD IDEAS, SOME OF THEM PRETTY 'EXOTIC'."

In the Netherlands Nuplex has research laboratories in Bergen op Zoom and Wageningen and a major plant in Bergen op Zoom. SenterNovem carried out a PI scan at the latter location. Nuplex supplies synthetic resins for various applications. Binding agents that are used in various topcoats, paints and varnishes. The resins ultimately end up in the finishing coats of cupboards, cars, ships, oil rigs, trains and aeroplanes.

The synthetic resins are made from all sorts of raw materials in a so-called *batch process*. A process in which various 'ingredients' are mixed together in a tank and heated. The resulting chemical reaction produces a new substance. Nuplex makes virtually all its resins in this way. Although more than four hundred different products come out of the huge vats, the PI scan concentrated on the processes involving two resin families: the so-called *polycondensation* resins and the *polyaddition* resins.

Chemical assembly line

According to Stoffer there are better opportunities for improving the polyaddition process, and the scan substantiated this. "Well-known polyaddition resins are, for example, the acrylic resins. The PI scan showed that a new process could be highly profitable." That is also in line with the Nuplex's ideas of switching from a batch process to a continual process for this product group, a sort of chemical assembly line.

Another potent PI suggestion: diverting heat from the cooling tanks to warm up the storage tanks. "The heat of the resin in the cooling tanks can be as much as 260 degrees. That heat must be dissipated. It would be great if we could put it to use in other parts of the tank plant. We are going to try to put that into practice." ■

Rules imposed by the EU

ESD

The current LTA monitoring method consists of a number of parts: process efficiency (PE), sustainable energy (SEI) and energy efficient product development (EEPD). Each of these has a specific calculation for energy management and energy efficiency improvement.

Since 2007 the Netherlands must comply with Directive 2006/32/EG of 5 April 2006 in connection with energy efficiency in end-use and energy services (ESD directive). The required adjustments are intended to realize a lowering of the administrative burden for companies. The current LTA monitoring method will be geared to this directive.

This is a good time to hold the entire LTA monitoring method up against the light. The current method will continue to be used as far as its various parts are concerned. However, the elements of the method will be shown more unequivocally and with more transparency. Possible adjustments to the LTA monitoring method will be discussed in the LTA platform.

Emission trade

On 1 January 2005 the European trading scheme for CO_2 emission allowances started (Emissions Trading Scheme, or ETS). Companies that come under the ETS may emit a certain amount of CO_2. If a company needs to emit more CO_2 than its allowances it will have to buy extra allowances or else reduce its emission. The trading system is flexible: companies may buy and sell emission allowances. The NEA (Netherlands Emission Authority) supervises the system. The system means that ETS companies have a CO_2 ceiling or cap. Against that is the fact that no additional requirements are set for these companies with respect to their energy and electricity consumption.

Certain LTA2 companies also come under the ETS. That has consequences for their performance in terms of the LTA. These companies have the same obligations as the 'normal' LTA companies. The only difference is that the competent authority – the municipality or province – does not play a role in monitoring the performance. The competent authority may not set any requirements for the companies' energy consumption, and that includes the energy conservation plan (ECP). In such cases SenterNovem monitors the ECP.

"Energy prices are rising, so the savings are even more attractive"

HARRIE OZINGA

Liquid aluminium: a vat of opportunities

BY TRANSPORTING ALUMINIUM IN LIQUID FORM THE NON FERROUS METAL INDUSTRY CAN SAVE A GREAT DEAL OF ENERGY. NO MORE MELTING, SOLIDIFYING AND MELTING AGAIN. OUR EAST EUROPEAN NEIGHBOURS GAVE BEEN DOING IT FOR YEARS! BUT TRANSPORTING RED HOT METAL MEANS ADAPTING THE METHOD OF TRANSPORTATION AND THE OPERATIONAL MANAGEMENT. TO ACHIEVE THAT THE DUTCH LOGISTICS CHAIN WILL HAVE TO BE RESHUFFELED. BUT WHO WILL TAKE THE FIRST STEP? WE SPOKE WITH PROJECT MANAGER HARRIE OZINGA OF THE ASSOCIATION FOR THE NETHERLANDS METAL INDUSTRY (VNMI).

When transporting aluminium in a liquid state it is loaded directly from the melting-furnace into the tanker at a temperature of 800 degrees. The liquid aluminium is transported in three large, heavy kettles, each with a capacity of six tons. "They're like huge thermos flasks." The tanker transports the liquid metal to the customers where it is used in various ways in the production process.

To the layman it may sound like a spectacular innovation, but transporting aluminium in liquid state is not new. It has been common practice in Germany for years. Particularly in the Ruhr area. Ozinga knows why that is. "The suppliers of the motorcar industry have always been strongly represented in Germany. Those companies need a great deal of aluminium of the same alloying. It is a big advantage in terms of logistics and production."

Idea

A feasibility study completed at the beginning of 2007 showed that leaving out the process steps solidifying and then remelting the aluminium resulted in considerable savings. Fewer personnel and less energy is required. Ozinga: "The cautious estimates of the feasibility study assume a saving of about 800,000 euros per 10,000 tons of liquid aluminium. Limited investments have been deducted from this saving. Energy prices have risen appreciably since 2007, so the savings are even more attractive."

Before that point is reached, however, there is still a lot to be done. Ozinga: "The challenge for the coming period is to organize trial deliveries of liquid aluminium. To do that the companies will have to convert their ambitions into actual investments." ■

RESULT PER CLUSTER OF SECTORS

Total overview

The results per cluster of the LTA sectors are presented below in the following order: industrial sectors, food industry, services sectors, transport sector, LTA1 and agricultural sectors. In **table 2** the efficiency improvements of all indices in 2007 are given, compared to 2006 and compared to the year of reference 1998.

Divergent years of reference apply for a number of sectors: universities (1996), Netherlands Railways (1997) and supermarkets (1995). Agriculture has not been included in the table because the cluster makes use of a different monitoring system.

Table 2. Efficiency improvements of all indices (in % points): (2006-2007 and 1998-2007)

SECTOR	EEI		SEI		EPI		TEEI	
	2006-2007	1998-2007	2006-2007	1998-2007	2006-2007	1998-2007	2006-2007	1998-2007
Asphalt industry	-0,58	9,68	-0,01	0,18	-0,90	7,00	-1,49	16,86
Chemical industry	1,64	16,48	0,55	8,30	0,06	0,41	2,25	25,19
Fine ceramics industry[5]	-5,44	2,80	0,00	0,00	0,00	0,00	-5,44	2,80
Foundries	1,10	18,00	0,00	0,00	10,23	19,82	11,30	37,80
Coarse ceramics industry	1,43	12,21	0,00	0,00	-0,54	3,89	0,89	16,10
Laundry industry	1,53	19,52	0,03	0,03	-0,37	1,33	1,19	20,88
Sand-limestone and cellular concrete industry	1,88	5,51	0,00	0,00	0,00	0,00	1,88	5,51
Refrigeration and cold-storage sector	5,40	18,00	-0,03	0,29	0,00	0,00	5,40	18,30
Non-ferrous metal industry	0,90	7,90	0,18	3,25	1,27	11,43	2,40	22,60
Oil and gas production industry	2,62	23,24	0,00	0,02	0,08	0,11	2,70	23,36
Surface treatment industry	6,80	13,19	-0,84	0,00	0,50	0,52	6,40	13,72
Non branch related industry	3,10	13,05	4,50	7,96	5,90	8,71	13,50	29,72
Rubber and plastics processing industry	0,02	10,67	-1,88	3,16	5,48	30,52	3,62	44,35
Tank storage industry	3,65	19,48	0,00	0,00	0,02	0,02	3,67	19,50
Carpet Industry	-0,33	21,45	0,66	7,51	2,97	17,42	3,30	46,38
Textile industry	3,17	8,09	-0,69	0,54	0,00	0,01	2,49	8,64
University Medical Centres	0,60	-7,93	-0,28	0,21	0,00	0,01	0,32	-7,71
Industrial sectors	**2,13**	**16,16**	**0,30**	**2,23**	**1,53**	**5,27**	**3,96**	**23,66**
Potato processing industry	0,08	3,62	0,18	3,07	0,00	0,00	0,27	6,70
Cocoa industry	2,55	18,31	0,00	0,00	0,00	0,00	2,55	18,31
Vegetable and fruit processing industry	4,43	12,04	0,15	0,51	0,50	0,64	5,08	13,19
Coffee roasting industry	9,54	10,72	-0,91	13,14	2,98	3,01	11,61	26,87
Margarine, Fats and Oils production industry	-0,10	11,93	0,32	0,66	0,13	0,13	0,30	12,72
Flour manufacturers	0,92	-7,93	0,00	0,00	0,00	0,00	0,92	-7,93
Meat processing industry	2,93	10,39	-1,05	0,45	0,00	0,62	1,89	11,46
Dairy industry	1,35	8,27	0,86	0,97	0,51	0,59	2,73	9,84
Food industry	**1,51**	**8,66**	**0,33**	**1,42**	**0,31**	**0,41**	**2,15**	**10,50**
Netherlands Railways	0,60	16,30	5,35	9,80	0,00	0,00	6,00	26,10
Transport sector	**0,60**	**16,30**	**5,35**	**9,80**	**0,00**	**0,00**	**6,00**	**26,10**
Total LTA2	**1,99**	**14,37**	**0,73**	**2,65**	**1,14**	**3,62**	**3,86**	**20,64**
Universities	2,50	4,50	0,30	1,80	0,00	0,00	2,80	6,30
Supermarkets (LTA1)	-0,20	4,20	1,10	3,10	n.v.t.	n.v.t.	0,90	7,30

[5] Provisional result

Industrial sectors

Figure 9. Energy efficiency improvement per index for industrial sectors 2001-2007 (in %)

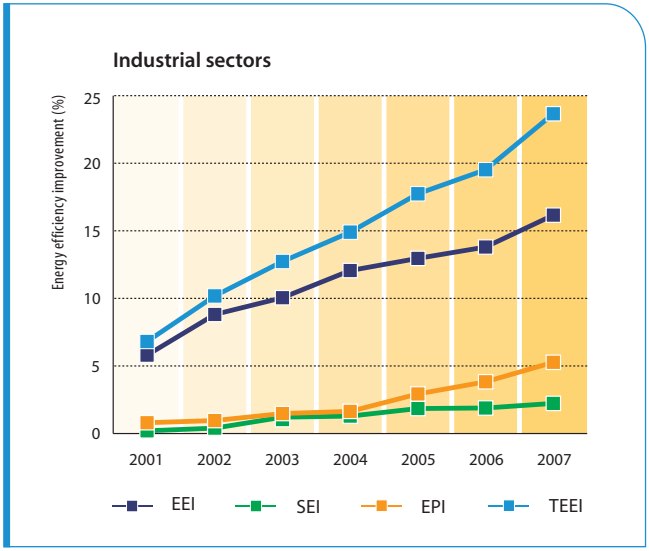
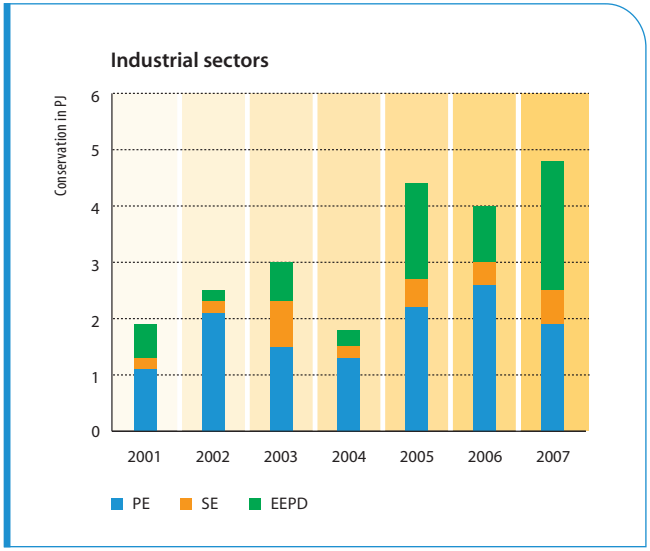


Figure 10. Volume conservation measures (in PJ) industrial sectors 2001-2007



Energy consumption

The energy consumption of the 17 industrial sectors in 2007 amounts to 110 PJ. That means that the industrial sectors account for 64% of the energy consumption of the LTA2 sectors.

Energy efficiency improvement

For the industrial sectors the TEEI improves by 23.7% at the end of 2007 compared to the year of reference 1998. 4.0% point of this is realized during the last year. During the covenant period an average TEEI per year is realized of 2.9%.

The process efficiency has a share of 63% in the TEEI. Sustainable energy accounts for 11% and energy efficient product development for 26%.

In 2007 the volume of avoided CO_2 emission increases by 1.3 Mton. Since 2001 improvement of the total energy efficiency has led to the avoidance of 4.7 Mton of CO_2-emission. On average this amounts to almost 0.65 Mton of CO_2 emission annually.

Energy management measures

In 2007 conservation through investments in energy efficient product development, in particular, increase compared to 2006. The conservation through the use of sustainable energy also increases slightly.

Figure 10 shows the development of the conservation volume for the industrial sectors during the course of the covenant period. This concerns the newly realized conservation for each year.

"Energy management has become something that goes without saying. Ten years ago that was very different"

ELS SONNEMANS

Energy management distances itself from woolly image

"YOU TEND TO THINK THAT YOU'VE MASTERED THE BUILDINGS, IN TERMS OF ENERGY. BUT THAT'S A PITFALL. IF AN EXPERT COMES TO TAKE A FRESH LOOK AT THINGS IT QUICKLY BECOMES APPARENT THAT A LOT OF ENERGY CAN STILL BE SAVED. AND THE ENERGY PRICES ARE STILL RISING; MEASURES THAT USED NOT TO BE FEASIBLE HAVE SUDDENLY BECOME WORTHWHILE." IN SHORT: ELS SONNEMANS, POLICY ADVISOR FOR ENERGY AT THE UMC ST RADBOUD IS KEEPING ON HER TOES.

The UMC in Nijmegen is expanding rapidly. That leads to a more intensive use of the buildings: more patients and (outpatients') treatments per square metre. The result is higher energy consumption, despite successful energy efficiency measures. This situation is intensified by developments in the medical field; more use of scanning and ECG equipment, for example. Add to that the increasing use of ICT at work and the outcome is clear: the UMCs score lower on the 'LTA scale' than many other sectors.

Els Sonnemans is disappointed about the low score but feels that it is inevitable. "Energy has a high priority, but medical considerations obviously count for more in a hospital. We must have electricity at all times. Everything at the 24-hour company is geared to the patients. The patients may be in the spotlight, but there's a lot going on in the background as well. Energy management, for example. Our energy management measures ensure that our energy consumption is kept as low as possible. That can be seen from our conservation index. Sometimes all those indices can be confusing, but LTA is an excellent benchmark; the scores keep us on our toes."

Enthusiastic

Another advantage: working together with other medical centres. That motivates. "The UMCs are all hard at work on energy efficiency. Basically, we are all facing the same challenge. We inform and enthuse each other." Sonnemans has noticed during the LTA meetings that the 'woolly image' of the subject at the institutions has vanished. The energy co-ordinators get a great deal of support. "Energy management has become something that goes without saying. I can talk with anyone in the organization about energy. Ten years ago that was very different." ■

Food industry

Figure 11. Energy efficiency improvement per index for the food industry 2001-2007 (in %)

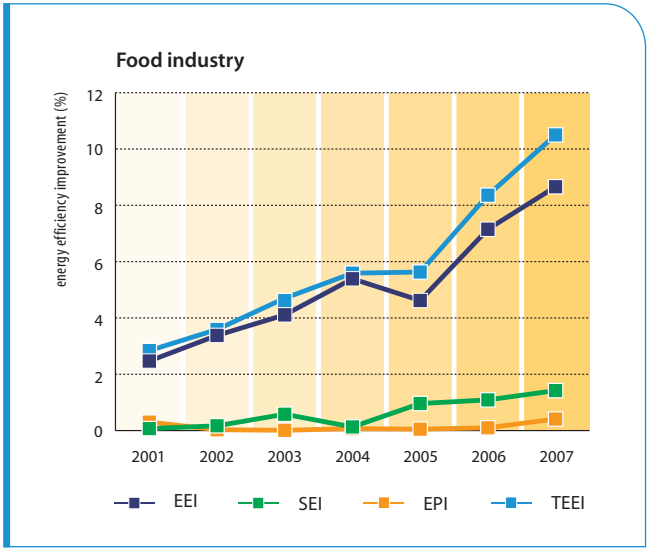
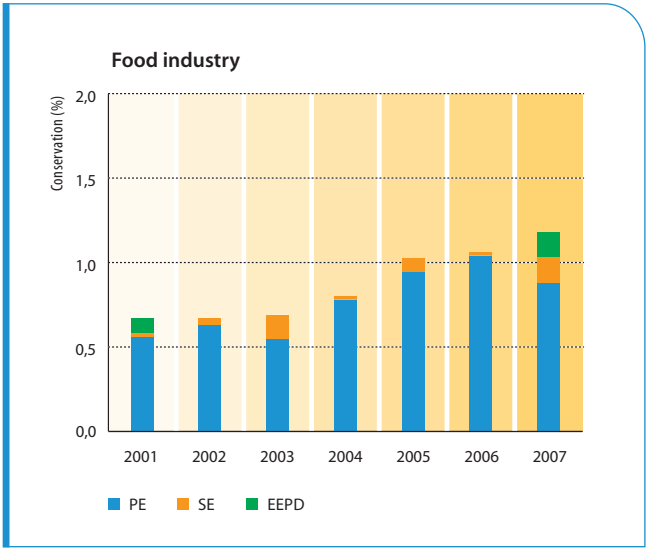


Figure 12. Volume conservation measures (in PJ) food industry 2001-2007



Energy consumption

The energy consumption of the eight sectors in the food sector amounts to 45 PJ in 2007. That is 26% of the energy consumption of the LTA2 sectors.

Energy efficiency improvement

At the end of 2007 the TEEI in the food sector improves by 10.5% compared to the year of reference 1998. 2.2% point of this is realized in the last year. That is an average of 1.2 % per year.

Process efficiency accounts for 74% of this improvement. Sustainable energy accounts for 20% of the energy efficiency improvement and energy efficient product development for 6%. **Figure 11** shows the development of the index improvements for the covenant period.

The volume of avoided CO_2 emission in 2007 increases by 0.3 Mton. Since 2001 improvement of the total energy efficiency has led to an avoided CO_2 emission of 1.0 Mton. Annually, this works out at an average of almost 0.14 Mton.

Energy management measures

Figure 12 shows the development of the conservation volume of the measures for the food sector. This concerns the *newly* realized conservation per year.

"Optimization of the energy housekeeping is a continuous process, just like quality care and personnel management"

ALLARD LEERTOUWER

"Energy management plan is the backbone"

AS ENVIRONMENTAL CO-ORDINATOR AT DELTA LLOYD, ALLARD LEERTOUWER WORKS ON THE IMPROVEMENT OF ENERGY EFFICIENCY. FROM ENERGY-EFFICIENT HF-LIGHTING AND MOTION DETECTORS TO MAKING AGREEMENTS WITH SUPPLIERS AND IN-COMPANY TECHNICIANS. HIS MOTTO: EVERY LITTLE BIT HELPS. BUT OFFICE RENOVATIONS ARE THE BEST TIME TO GAIN MAJOR ENERGY VICTORIES. "I TRY TO MAKE THE BEST POSSIBLE USE OF THOSE MOMENTS."

Socially responsible enterprise is high on the agenda at the Delta Lloyd Group. It is embedded in the organization. In that way the insurance company wants to make a positive contribution to the community and to the environment. The objective of CO_2-neutral enterprise is a part of this. Since 2006 the organization has been compensating the CO_2 emission of its motor fleet, aeroplane travel and the energy consumption of its buildings. The CO_2 emission in 2007 was 130 tons. The compensation: a number of climate-friendly projects in Africa, India, Sri Lanka and China. In our own country the Delta Lloyd Group supports various environmental projects, including the production of 'green cement'.

So much for the activities 'outside the gates'. With the LTA process the company focuses primarily on the own organization and the direct stakeholders. Allard Leertouwer has been coordinating the energy policy for several years. The most important trump card according to him: the energy conservation plan (ECP). "We have drawn up an ECP for the whole group and for each individual location. The plan contains all concrete measures that we take and are going to take. An excellent handle to help flesh out our policy. For me, that structure is the backbone of LTA."

In-company technician

Motion detection has also been introduced; if no-one is in a room, the lights go out by themselves. A number of locations also have daylight regulation. A number? "For major changes you often have to wait for renovations. You can then replace windows and equipment and insulate offices. Office renovations are the best time to gain major energy victories. I try to make the best possible use of those moments." ■

Services sectors

The services sectors include two educational and two financial sectors. the universities, Higher Professional Education (HBO), banks and insurance companies.
All 14 universities formally joined LTA2 in June 2007 and are expected to move on to LTA3. Negotiations are currently underway with the banks, insurance companies and the HBO about their officially joining LTA3.

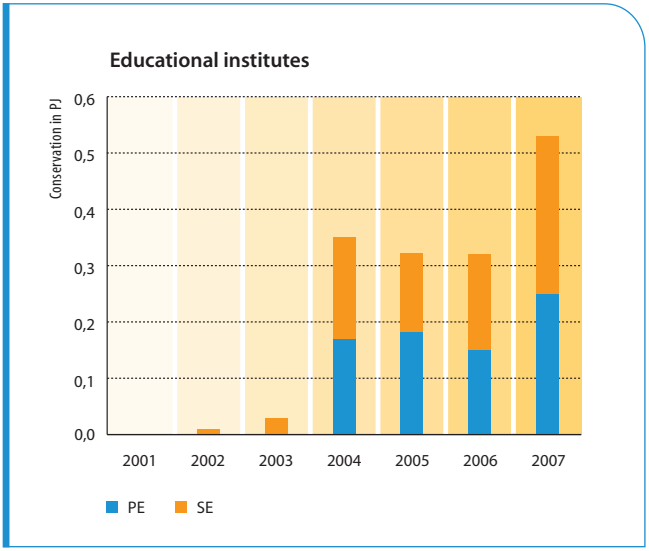
The Higher Professional Education (HBO) works under the 'Handvest Duurzaamheid HBO' ('Sustainable HBO Charter') of which the paragraph about internal environmental planning is identical in terms of content to the LTA2 system. That means that 14 higher educational institutes are informally active in an LTA context. They represent more than 60% of the energy consumption in the sector and almost 60% of the number of enrolled students. After the HBO has officially joined LTA3 the co-operation with the universities in the field of energy management will be intensified. There will also continue to be a link between LTA3 and the 'Sustainable HBO Charter' in the future. That will ensure an interesting link between LTA3 and the primary educational process.

Banks and insurance companies have been working together for a long time and want to switch to a single joint LTA Financial Service Providers. For them participation in LTA3 means a continuation of LTA1. Three banks and insurance companies formally joined LTA2 in 2007.

The HBO institutes only report through the Conservation Index and not through the (T)EEI. The financial institutions do not report about 2007 either. That means that only the universities are left for the presentation of total energy efficiency improvement.

Figure 13 does show the conservation volume for both educational sectors through energy management measures that were taken. It can be seen that there is a large increase of sustainable energy, which is the result of the purchasing of sustainable electricity. We expect to be able to report on the energy conservation of the financial service providers next year.

Figure 13. Volume conservation measures educational institutes 2001-2007



Transport sector

The transport sector has only one participating sector: the Netherlands Railways (NS). **Figure 14** shows the development of the energy efficiency improvement and the avoided CO_2 emission for the NS institutions.

Energy efficiency

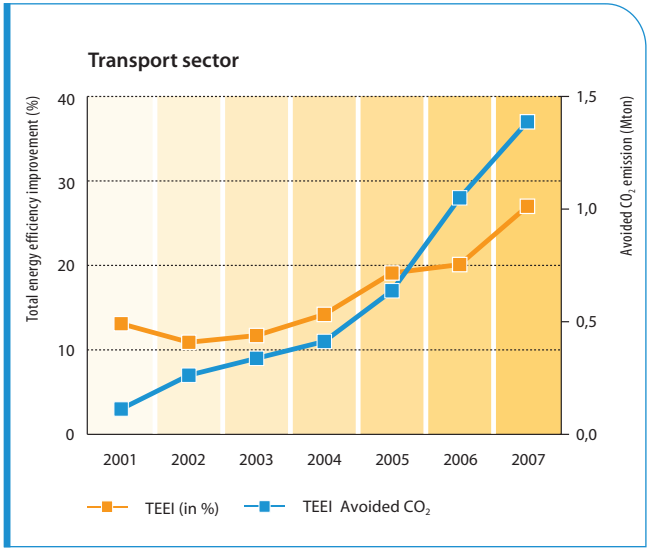
In 2007 the energy efficiency improved by 16.3% compared to 1997. The NS originally wanted to realize an 11% energy efficiency improvement by 2010. That objective has already been amply met. The NS is also comfortably on course to reach its new objective (20% energy efficiency improvement by 2010) with an improvement of 0.6% compared to 2006.

The total avoided CO_2 emission in 2007 compared to 1997 is 323 Kton: 206 Kton through efficiency improvement and 117 Kton through the purchase of green electricity.

Expansion themes

Together, the NS and ProRail use 12.2% more sustainable energy in 2007 than in 1997. NS Reizigers purchases 11% of its traction energy from sustainable sources, in particular by means of buying Guaranties of Origin. Nedtrain and the combination NS Stations/ProRail both purchase 22% of their total energy as green energy in the form of green electricity.

Figure 14. Avoided CO_2 emission in relation to TEEI for the transport sector



LTA1 (supermarkets)

The supermarkets are the only remaining LTA1 sector. The covenant with this sector runs until 2010. Figure 15 shows the development of the energy efficiency improvement up to and including 2007.

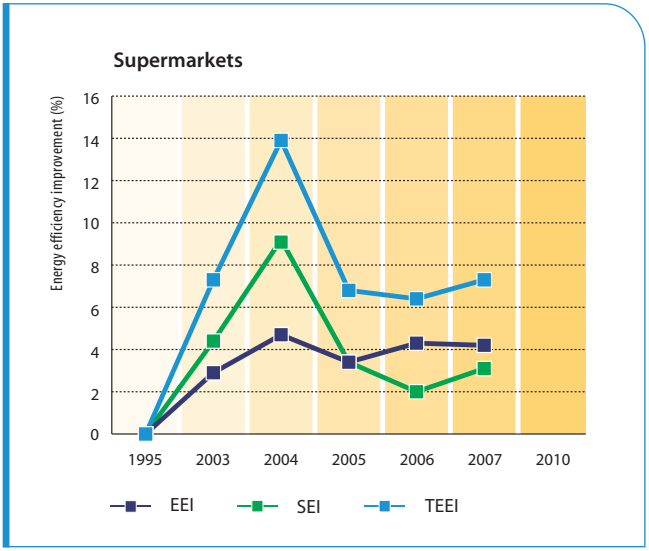
Energy efficiency

The total energy efficiency (TEEI) improves by 7.3% in 2007 compared to the year of reference 1995. That is an improvement of 0.9% compared to 2006. Covering of cooling units and freezers during the day could reduce energy consumption further, but this seldom applied. Most of the efficiency is realized in the processes.

Sustainable energy improvement (SEI)

3.1% of the purchased energy is from sustainable sources. The sector is also working on the processing of Category 3 food waste so that it can be used for the production of biogas in fermentation plants.

Figure 15. Energy efficiency improvement per index for supermarkets (LTA1) 1995-2010 (in %)



"The temperature of the product in the tank may not drop below a certain value"

HENNIE STANDAAR

Searching among the details

INDEPENDENT TANK STORAGE COMPANIES ARE AN INDISPENSIBLE LINK IN THE TRANSPORT CHAIN OF LIQUID SUBSTANCES. MILLIONS OF CUBIC METRES OF CHEMICAL PRODUCTS, OIL AND OTHER ENERGY CARRIERS ARE STORED IN HUGE TANKS. AS TEMPORARY MANAGERS, THE STORAGE COMPANIES HAVE FEW OPPORTUNITIES TO SAVE ENERGY. "WE SEARCH AMONG THE DETAILS, BUT MANY SMALL STEPS ALSO GET YOU A LONG WAY."

Every day thousands of new trucks are bought for use in China. It marks the explosive growth of the economy in the Far East. For many people that is too far away for them to be bothered about, but for the members of the Vereniging van Onafhankelijke Tank Opslag Bedrijven (VOTOB) (Association of Independent Tank Storage Companies) it means that there's work to be done. Secretary Hennie Standaar draws a parallel with the 16th and 17th centuries. "At that time the Netherlands depended to a substantial extent on the staple markets. Storage of and trade in goods from the colonies. The favourable geographic position has always remained one of the country's trump cards. We receive, manage and ship liquids in bulk all over the world."

The 'I' for 'independent' is the strong point of the sector. The tank storage companies are *dedicated* service providers in the transport chain. They do not have their own products and are only 'looking after' the chemical and vegetable liquids in their tanks. Standaar: "That independence is an economic strength but it also makes energy conservation difficult. Each customer has his own specific requirements. The temperature of the product in the tank may not drop below a certain value. That means that we must heat our tanks thoroughly and provide them with good thermal insulation. Energy is of secondary importance in that context."

Small steps

For the time being, then, energy saving at the VOTOB is done in small steps. The companies must find it in the details. Standaar: "Our members certainly do their best. Last year, in spite of the above-mentioned limitations, they managed to realize a collective energy reduction of 3.7% and their average for the last few years has been 2.2% per year. Their gains come from such aspects as optimising the planning of the storage in so far as that can be predicted. Since the nineties they have also been exchanging energy programmes with their neighbours; sometimes that also provides conservation opportunities. With small steps you can get a long way. We have already achieved the objectives of LTA3." ■

Agricultural sectors

All figures on greenhouse horticulture are provisional. They come from the 'Interim Report Energy Monitor Greenhouse Horticulture 2008' of the LEI.

Energy efficiency

Long-term agreements on energy efficiency have been made with three agricultural sectors: greenhouse horticulture, flower bulbs and mushrooms. Greenhouse horticulture is by far the largest absolute consumer of primary energy of the three (approx. 112 PJ). Flower bulbs (approx. 4.2 PJ) and mushrooms (approx. 1.4 PJ) use considerably less.

Greenhouse horticulture

The energy management in this sector is fairly complex. To meet the demand for energy in greenhouse horticulture fuel is converted into heat, electricity and CO_2. This takes place both within and outside the greenhouse horticultural sector. The sector uses a great deal of natural gas. It also purchases oil, heat and electricity.
The natural gas is not only burned in boilers, but is also increasingly being used in efficient gas engines (CHP). The CO_2, heat and electricity released in this process is used in the horticultural sector. The sector also sells electricity to parties outside the branch. CO_2 is used as nutriment for crops.

The long-term agreement on energy efficiency for the greenhouse horticultural sector is part of the covenant 'Greenhouse Horticulture and the Environment'. Entrepreneurs report a single consumption figure for energy per year. In addition, the Landbouw Economisch Instituut (LEI) (economic institute for agriculture) maps out the annual energy performance per sector via the Energy Monitor Greenhouse Horticulture. This concerns the energy efficiency, the CO_2 emission and the share of sustainable energy.

In the greenhouse horticultural sector the energy efficiency improved in the period from (the year of reference) 1980 up to and including 2007 by 60%. The share of sustainable energy in 2007 is 0.8%. Sustainable heat from solar energy is by now the primary form of sustainable energy.

Performed measures

As a large energy consumer, the greenhouse horticultural sector has been aware of the need for energy management for many years. A lot has already been done. The well-known and fully developed energy management measures are applied at virtually all the companies. Examples of such measures are better insulated greenhouses, energy screens, advanced climate computers, waste gas condensers and heat buffers.

The sector makes widespread use of cogeneration or combined heat and power (CHP). That is an ongoing development. From the beginning of 2008 between 2,200 and 2,300 MWe will be generated. That is an increase of 1,600 MWe in the space of three years. That corresponds to roughly three large power plants. As a result, the volume of purchased electricity is decreasing and the sale of electricity and the use of natural gas is increasing. The application of CHP in the greenhouse horticulture sector is efficient. More than 95% of the energy production in the form of electricity and heat is used profitably.

Since 2006 the sector has been the net supplier of electricity. That means a decrease in the primary fuel consumption. That in turn has a positive influence on the development of the energy efficiency.

The greenhouse horticultural sector actively seeks opportunities for (more) sustainable energy supplies. Fulfilling the demand for cold and heat storage in a sustainable way plays a central role here. In the transition programme 'Greenhouse as Source of Energy', the greenhouse horticultural sector formulates ambitions for 2020 together with the government. Entrepreneurs must be able to grow crops in all newly built greenhouses in a virtually energy-neutral (and economically feasible) way. Important methods of achieving this include: (semi) closed greenhouses, the use of terrestrial heat and more efficient lighting.

CO_2 emission

The total CO_2 emission in the greenhouse horticultural sector in 2007 is estimated at about 6.1 Mton. An increasing share of the CO_2 emission is

related to the sale of electricity to third parties. For 2007 this sale is estimated at 0.9 Mton. The share of the CO_2 emission that is related to crop growing is decreasing. In 2007 it amounts to approximately 5.2 Mton.

Flower Bulb Growers

On 28 March 2007 the Koninklijke Algemeene Vereeniging voor Bloembollencultuur (association of flower bulb growers), the Productschap Tuinbouw (commodity board for horticulture) and the Ministry of Agriculture, Nature and Food Quality sign an energy covenant (LTA-e+) for the second time. The duration of the new LTA-e is from 2007 up to and including 2011. The aim of the covenant is to improve the energy efficiency of the Flower Bulb Growers by 11% in 2011 compared to the year of reference 2006. In addition, the covenant aims at realizing a share of 6.4% of energy from sustainable resources in the year 2011.

The above-mentioned covenant is a collective long-term agreement on energy. That is why it was decided to ask all flower bulb growers for energy data through the Productschap Tuinbouw (commodity board for horticulture). Questionnaires were sent to approximately 1,400 growers. Up until now (mid-June 2008) 439 of the 630 completed forms that were sent back have been usable for the monitoring.

There is still no energy efficiency index and sustainable energy share available for the flower growers sector. That is because there is still no data available for a group of companies comparable to that of the first LTA-e. As a result there is also no estimate of the CO_2 emission of the sector for 2007. The Steering Committee decided to continue collecting energy data. It is expected that a monitoring report will become available during the next six months.

Mushroom sector

The first covenant LTA-e Mushroom Growers (1995-2006) is successfully completed in 2007. The new covenant is signed that same year: LTA-e+ (2007-2011). Of the 74 companies that sign the covenant, only 6 decide to withdraw. The average growing area and the average production per m^2 of the participating companies increase.

The total energy efficiency improves by 9.4% in 2007 compared to the year of reference 2005. With that the objective of 4.5% in 2007 is amply realized and the objective of 14.5% in 2011 appears to be within reach. The reduction in energy consumption is primarily caused by a reduction in the use of thermal energy per unit product. That in turn is a result of the increased yield per m^2 of production area.

Opportunities for saving energy are to be found particularly in the field of climate control in the production cells and (in the long term) in alternatives for steaming. In 2007 an energy saving checklist is developed; in 2008 the list is distributed among the entrepreneurs. The share of sustainable energy in the total energy consumption of the participants is 3.0%. This is an improvement of 2.7% compared to the year of reference 2005. The most commonly used forms of sustainable energy are the purchase of green electricity, ground pipes and geothermal heat pumps.

Acknowledgements

November 2008

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Complimentary copies of this brochure (2MJAF0809) can be ordered free of charge by www.postbus51.nl.

This brochure was published by SenterNovem and commissioned by the Ministry of Economic Affairs (www.minez.nl), the Ministry of Agriculture, Nature and Food Quality (www.minlnv.nl), the Ministry of Housing, Spatial Planning and the Environment (www.minvrom.nl) and the Ministry of Transport, Public Works and Water Management (www.minvenw.nl).