

# Long term agreements on energy efficiency in industry

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## Synopsis

Dutch industrial sectors, agreed to improve their energy efficiency by 20% over the period 1989 - 2000. Results show that they have made fair progress and that savings outweigh the investments substantially.

## Abstract

Over the past years a particular version of Voluntary Agreements has been developed in the Netherlands. These agreements focus on energy efficiency: "Long Term Agreements on Energy Efficiency" (LTA's) and are strictly monitored.

This type of agreement was first applied in sectors of industry. Later on it also found its way to services and commercial sectors.

LTA's are primarily agreements between the government (Ministry of Economic Affairs) and representatives from economic sectors. The process to come to an LTA usually takes a few years. Once it is effective, it puts energy efficiency into focus in many individual companies. A variety of activities are undertaken to improve the sector's energy efficiency. As LTA's focus on particular sectors, they are (in content) highly dedicated to the characteristics of the sectors.

In this program different parties agree to pursue the same target, although their primary motives may be different. Government primarily aims for an emission reduction of carbon-dioxide, while industry primarily is driven by cost benefits and the expectation that future regulation can be prevented by active participation. Currently, about 90% of industrial energy consumption is covered by LTA's.

An intensive monitoring process assures that achievements are made visible. From this monitoring we see that in the year 1995 the energy efficiency improved by 10%, with respect to the reference year 1989. This meets the expectations of the program.

In the year 2000, annual savings of about 1500 million Guilders for the Dutch industry are anticipated. This implies that the Dutch industry improves its performance compared with international competition. The LTA's offer a framework that also looks promising to be continued after expiration of the first target-year (2000).

## 1 Introduction

Voluntary Agreements (VA's) are a powerful instrument to stimulate developments in national societies into a socially desirable direction. An environmental VA may broadly be defined as:

*An agreement between government and a sector in the national economy to facilitate voluntary action with a desirable social outcome, encouraged by the government. This action is undertaken by the participant, based on the participant's self interest.*

In the Netherlands a special form of VA's is developed over the past years: Long Term Agreements on Energy Efficiency (LTAs).

In these LTA's, sectors from industry (and services and commercial sectors) agree to improve their energy efficiency over a range of years, to meet a set goal in the year 2000.

In this case the government is represented by the Ministry of Economic Affairs. Novem -as a Government Agency- supports the process, assists the sectors and controls the monitoring.

### 1.1 Background

The National Environmental Policy Plan (1989) formulates the national policy for reduction of the emission of greenhouse gasses. The national target is a reduction of CO<sub>2</sub> emissions by 3 to 5 percent, in the year 2000, compared to the 1989 level. One of the means to that goal are the Long Term Agreements on Energy (LTAs). Reduction of energy consumption is seen to be largely congruent with reduction of CO<sub>2</sub> emissions, as by far the largest part the energy supply is based on fossil fuels. For other greenhouse gases, like methane and PFC's, other policy instruments apply to achieve reductions. The main regulatory instrument is The Environment Law that sets the framework for permits on industrial operations. Against this background the policy goal of the LTA's is to stimulate energy efficiency beyond existing trends, in a context of low energy prices, without resorting to new regulations.

### 1.2 Scope

The first LTAs were signed in 1992 and as of 1 January 1997, the status is:

- 30 LTAs with industry associations;
- about 1000 industrial companies participate within LTA's;
- over 90% coverage of industrial primary energy consumption;
- target for energy efficiency improvement over the period 1989-2000 is 20%;
- by the end of 1995 the energy efficiency improvement actually came out at 10%;
- 6 LTA's with groups of users in services sectors.

## 2 Methodology

### *Participants and process*

Prior to the signature of an LTA, the feasibility of the target to be specified in the agreement is assessed. Potential signatories are consulted to check their willingness to participate in such an agreement.

In general the following steps lead to signature:

- 1- The government agency (Novem) approaches the industry for a preliminary assessment of its energy efficiency potential.
- 2- The industry association develops a Letter of Intent to undertake energy efficiency improvement, addressed to the Ministry of Economic Affairs.
- 3- Novem makes an inventory of economically viable measures (acceptable pay back period) that can be undertaken in major companies within the industry association. This provides the basis for the target for energy efficiency improvement.
- 4- The LTA is signed by the industry association, the ministry of Economic Affairs and Novem. Individual companies express their participation by accession letters.

The measures needed to achieve the objectives of an LTA are set out in the "Long Term Plan for Improvement of Energy Efficiency". This plan is the basis for the LTA. It must be flexible to respond to unexpected developments in market economics and technology.

A Long-Term Plan starts with a description of the concerned sector and the role of energy within that sector. It includes:

- assessment of energy consumption in 1989, as "reference year";

- survey of opportunities for energy efficiency improvement;
- drafting of company energy plans;
- monitoring and energy management in each company;
- research and development on new low-energy technologies;
- demonstration projects for energy savings measures;
- market introduction of low-energy techniques;
- assistance to individual companies;
- transfer of know-how and information.

#### *Commitments/Targets*

The average target of LTA's is a 20% increase in energy efficiency by the year 2000, from 1989 levels. The signed LTA specifies the commitments of both Government and industry, including objectives, targets and how measures can be implemented. The government agrees not to introduce other regulations on energy efficiency in industry, and the industry voluntarily agrees to reduce its energy intensity.

The document signed by the parties starts with a recognition of the greenhouse issue and of the national objective of CO<sub>2</sub> emissions stabilisation in 1995 at the 1989 level, and a reduction by 3-5% in the year 2000. Based on the memorandum on Energy Conservation, the objective for industry is a 20% improvement in energy efficiency by the year 2000, from the 1989 level.

Each LTA is a contract under civil law and it is target based<sup>1</sup>.

#### *Defining energy efficiency*

The energy efficiency targets are defined as a percentage improvement in overall energy efficiency within each participating industry sector (with individual companies contributing different amounts to the target). The definition of Energy Efficiency Index is:

*The energy consumption in the year in question to produce the total output in that year, divided by the energy consumption that would have resulted had the same production been made with the energy efficiency in the year of reference (1989).*

For electricity consumption the primary input to electricity production is taken. The efficiency of electricity generation is assumed to be 40%.

Reducing final consumption of electricity by a certain amount thus contributes more to the energy efficiency of a plant than saving the same energy amount of natural gas.

This method creates an incentive to use cogeneration, to fully utilise the primary energy content of fuels. Calculation of the energy efficiency improvement excludes energy-carriers used as feedstock (non-energetic use) as these are volume related and not directly related to energy efficiency. Furthermore feedstock usually does not directly contribute to CO<sub>2</sub> emissions.

Production is defined differently for different sectors. In many industries, a stated weight of product can be used as an indicator, where little product change is expected until the end of the decade.

A value-added basis will be employed when such physical indicator is not applicable, e.g. for the manufacturing of electrical appliances.

In a third method the energy consumption per process step is taken as the basis for energy-efficiency (refineries). Each plant determines the energy requirements of specific process steps. Changes in energy requirements which might be considered "structural" (for example purchase of intermediary products previously manufactured within the plant) are separated from those which are purely efficiency based.

As part of the LTA's broad areas of action to improve energy efficiency are noted. Indicative contributions are made from measures such as energy management, combined heat and power, improved power generation, heat integration and modernisation of processes.

### *Commitments of the signatories and termination*

The commitments of the signatory parties vary from one agreement to another, depending on the specifics of the sector. Companies agree to work out an energy efficiency improvement plan, and improve energy efficiency as far as is practically and economically achievable, to contribute to the industry target.

Energy efficiency improvements don't have to be distributed equally among different sites of a same company. New facilities for instance usually show a better overall energy efficiency than older ones. This clause is not straightforward as provinces and municipalities have the authority to impose requirements to obtain operation permits, including energy efficiency requirements. Signatories to an LTA are considered to be in compliance with permit requirements concerning energy efficiency.

An energy saving plan and annual monitoring reports are mandatory for each company. Failure to provide one or the other is a valid reason to exclude that company from the LTA. The company will then be subject to normal existing regulations.

When an entire sector fails to meet the goal as agreed, and is not able to give a suitable explanation, the sector LTA as a whole can be terminated.

The industry association must actively support energy efficiency improvements among its members. It develops programs to that end, with the overall sectoral energy efficiency target as goal.

### *Government commitments/actions*

The Minister of Economic Affairs agrees to provide support to the program, including:

- Financial instruments aiming at industry: tax abatement can be granted if investments in energy efficient (or clean) technologies are realised. This scheme, however, applies to all companies, whether they are signatories to an LTA or not.
- Financial assistance within the framework of LTA, including various subsidy schemes.
- Increase of the above financial assistance if the programme is more promising than expected.
- Support in the form of a detailed audit of the industries' facilities. This includes an inventory of energy consuming equipment within plants, the specification of how energy is used, and the identification of cost effective energy efficient investments.
- Coordination of regulatory measures aimed at energy efficiency in industry, including requirements to obtain permits and energy taxes.

The government assures consistency and protection from new regulations aimed to improve energy efficiency. It also provides financial and technical support in exchange for voluntary participation.

Each agreement specifies that if significant policy changes were to occur before 2001, the parties may consider revision of the contents of the agreement. The contract may be terminated by either party if no consensus is achieved.

### *LTA's and other energy policy measures*

In 1994 the government decided to cut the subsidy on cogeneration. Industry has not shown a desire to step out of the agreements in response to the cut in subsidy schemes.

In 1996 the government introduced a so called carbon-tax. This tax is bound to a limit such that most industries are hardly affected. Nevertheless industry shows great difficulty to accept this new tax.

The government in turn introduced a new tax abatement scheme for energy efficiency investments (effective 1 January 1997).

### *Time period*

Work on LTA's started in 1990, with the first agreement signed in May 1992 (iron and steel industry). Negotiation of an agreement typically takes one to two years, from the letter of intent to signature.

In the early years, some industries felt that the period until the year 2000 was too long, prone to too many uncer-

tainties to be covered by an agreement. So they set intermediate targets for the year 1995. Being open to international markets, industry is reluctant to sign an agreement with a real long term target.

This partly explains why an agreement on absolute CO<sub>2</sub> emissions might not be reached: industry sectors would have to forecast their growth over a relatively long period.

The main reason to refuse an agreement on absolute CO<sub>2</sub> emissions is of course that industry is not prepared to restrict the production volume when market demand grows.

#### *Monitoring and reporting*

Each year, companies must report to government on the previous year's energy efficiency index, the amounts of energy purchased and net primary energy used, including a survey of applied corrections for:

- energy to meet more stringent environment, safety or health requirements;
- changes in energy consumption to meet changed product specifications;
- changes in energy consumption due to change in manufactured or purchased intermediary materials.

These three items, represent changes not driven by energy efficiency. They are eliminated from the calculation if specified in the LTA and agreed by all parties.

Actually these corrections do amount to not more than a few tenths of a percentage-point.

An annual report is prepared by representatives of all signatories to make the progress public. This and other forms of publicity inform the public and provides recognition for industries that successfully improve their energy efficiency.

Novem supports this process as an independent agency, and assures quality and objectivity of the figures produced.

## 2 Results

As of January 1<sup>st</sup> 1997, 30 LTA's are effective in industry sectors and 6 in the services sectors. 8 LTA's are concluded later than 1994. First monitoring reports from these sectors (over the year 1996) will become available in the year 1997.

Based on monitoring reports from 22 LTA's the average EEI in 1995 turns out to be 90%. The 22 LTA's from which monitoring reports are available cover more than 70% of the industrial energy consumption.

The figure below shows how the EEI develops over the years.

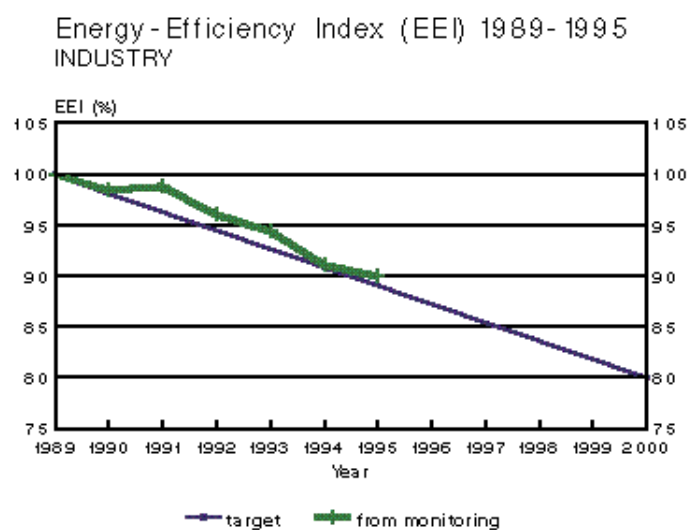


Figure 1. Course of Energy-efficiency Index (EEI) over past years, actual value (from monitoring) versus target.

From this we conclude that actual energy efficiency in the industry is developing according to the targets set for the year 2000.

Industry sectors demonstrate a positive perception of the LTA approach. In an evaluation they expressed their support to the approach and until now no sector stepped out of an agreement. This opens the perspective to continue along the track, after the original target date (year 2000) expires. The contents of the agreements can be adapted, the basic mechanism stays the same.

The impact on economy can be assessed globally. An improvement of energy efficiency of 20% on primary energy input to the industry yields a saving of about 150 PJ. With present price levels for energy, this represents a value of about 1500 million Guilders. These savings from the national economy will repeat each year, from the year 2000 onwards. A rough estimation of total costs over the period 1989-2000 shows that the savings outweigh the costs by far. The figure below shows a rough input/output model, in terms of costs/benefits.

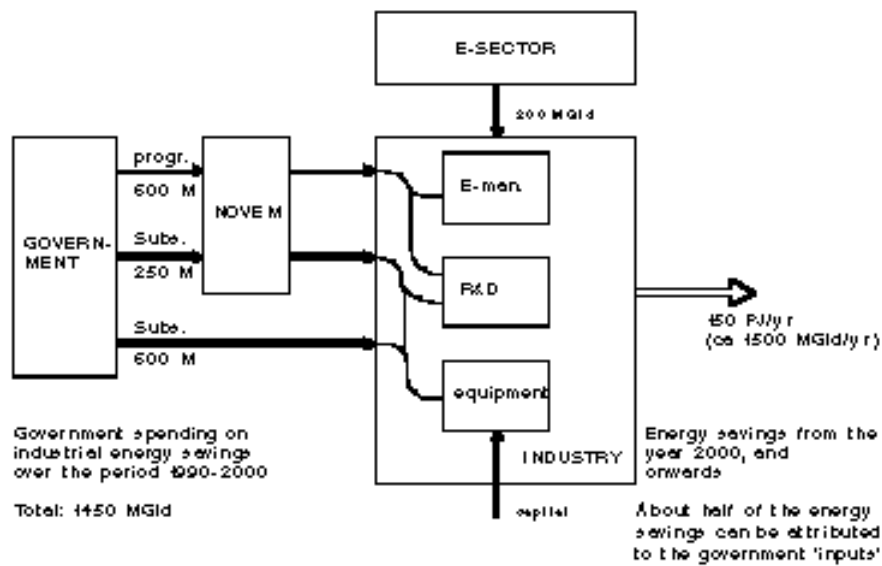


Figure 2. The LTA process seen as an input/output box

The table in chapter 6 (at the end of this paper) gives an overview of all the sectors participating in LTA's in the Netherlands.

### 3 Conclusions

The implementation of “Long Term Agreements on Energy Efficiency” as developed in the Netherlands appears to work out well. Energy efficiency develops according to expectations and no contract has been terminated. CO<sub>2</sub> emissions are reduced substantially with respect to what they would have been when the same production would have been made with the 1989 energy efficiency. Volume growth however leads to a limited growth in absolute CO<sub>2</sub> emissions.

Dutch industry continues to improve its performance and becomes more competitive. Energy cost savings outweigh the funds that the government makes available within the framework of LTA's.

## 4 Endnotes

<sup>1</sup> Target based LTA's comprise negotiated targets that are legally binding and which pre-empt future regulatory requirements, or are tied to a strong regulatory threat.

## 5 References

Johann G. T. Flint: Results of the Long Term Agreement in the textile industry in the Netherlands  
(Other submitted paper for ECEE Summer Study)

## 6 Tables

Table 1: sectors participating in the Dutch LTA's

LTA-SECTOR	PRIM.ENERGY CONS. (PJ) (CBS '89)	TARGET % EN.EFF.IMPR (year 2000)	DATE LTA CONCLUDED (yr/mnth)	NR LTA SETTLE- MENTS
Meat processing	5.8	20	93/09	52
Vegetable & fruit processing	3.0	20	93/10	27
Potato-processing industry	0.5	20	96/06	19
Margarines, fats, oils	7.6	22	93/06	27
Diary industry	18.1	20	94/07	94
Sugar industry	8.7	20	93/09	5
Coffee-roasting industry	1.5	15/20	94/05	8
Breweries	4.0	18	93/10	18
Soft drinks industry	1.0	20	96/07	7
Building ceramics industry	8.8	20	93/10	67
Fine_grained ceramics industry	3.1	20	94/04	22
Asphalt industry	2.5	20	95/11	68
Calcium-silicate brick ind.	1.2	20	92/11	11
Cement industry	11.0	20	92/07	3
Glass industry	11.1	20	92/07	6
Philip	10.8	25	93/05	62
Chemicals industry	310.0	20	93/11	84
Oil refineries	161.2	10	95/09	5
Oil and gas production	39.0	20	96/06	8
Textile industry	8.2	20	92/10	46
Paper industry	33.5	20	93/05	26
Rubber processing industry	2.2	20	94/11	23
Plastics processing industry	10.2	20	94/12	62
Iron and steel industry	58.5	20	92/05	2
Non-ferrous metals industry	8.0	15	93/10	20
Iron foundries	2.0	16	95/06	24
Surface treatment	1.5	20	96/03	150
Industrial washing	1.7	20	94/06	70
Refrigeration and cold storage	2.2	28	96/03	83
Carpet industry	1.0	20	96/06	14
	737.9			1113
Health care sector	27.0	30	94/06	800
Secondary Vocational Education	4.0	30	94/12	450
Higher Vocational Education	2.0	30	96/02	250
Banking sector	6.0	25	96/12	3500
Royal Dutch Airlines (KLM)	1.0	28	94/10	1
Amsterdam Airport (Schiphol)	1.0	28	94/11	1
	41.0			5002
	779.9			6115