



# BIOMASS ACTION PLAN

THE NETHERLANDS



# **Biomass Action Plan**

**‘working together on bio-energy’**

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# **Introduction**

The government has set ambitious targets for the production of renewable energy. In order to achieve these targets, the contribution from bio-energy must increase further. However, in practice the realisation of bio-energy projects is confronted with a number of problems. This Action Plan aims to solve these problems and sets out specific actions for the government and market parties to tackle them.



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# 1. Why an Action Plan for Biomass?

Energy from biomass currently forms the most important contribution to the domestic production of renewable energy in the Netherlands. The total renewable energy production in the Netherlands amounted to 48 PJ (amount of primary energy saved) in 2002. The share of renewable energy in the total energy supply therefore amounted to 1.5%. Of this 48 PJ, about 37 PJ (77%) was accounted for by bio-energy. The contribution of bio-energy will have to increase further in order to achieve the ambitious targets the government has set for the short term.

In practice we are seeing only slow progress on renewable energy in the Netherlands. This applies also to bio-energy. Investors are cautious about developing and realising bio-energy projects. This is largely due to the number of hurdles that need to be overcome in order to get a project actually up and running. The aim of this Action Plan is to identify these problem areas and solve them through well-targeted actions.

The role of biomass in Dutch energy supply in the long term is being tackled in the transition approach through the subproject entitled 'Biomass 2040'. Within that framework a number of practical experiments will be started up to concretise further our visions for the future. These experiments will also make a clear link with the short term. The Second Chamber of the Dutch Parliament will be informed of the transition approach during the spring of 2004.

## 2. Potential contribution of bio-energy to the targets

The purpose of this Action Plan is to create an climate on investment that enables biomass to make the maximum contribution to renewable electricity and energy targets for 2010 and 2020.

Based on a number of scenario calculations, studies and information from a large number of market parties, an estimate has been made of the maximum contribution of bio-energy in 2010. Since this Action Plan focuses on the short term, the contribution of bio-energy in 2020 will be part of the report on the transition approach.

This estimate is shown in Table 1, using the term 'biomass technology combination' (BTC). The BTC shows the most common combinations of biomass flows and conversion techniques at present, and what these are expected to be in the future.

The expectation is that the maximum contribution of bio-energy could be 83 to 97 PJ in 2010. The biggest contribution will be made by waste incineration plants and the use of biomass in coal-fired power stations (approx. 54 PJ). The remaining 29 to 43 PJ will come largely from small-scale plants. A further explanation of the individual figures, is presented in Appendix 1.

An essential precondition for this is that sufficient biomass is available and contractable. Without a sufficient quantity of high-quality and affordable biomass, the expected production cannot be achieved. Based on the Marsroute study<sup>1</sup> on the supply of biomass, in principle we expect there to be a sufficient supply of biomass in the Netherlands until 2010. For the long term, imports will be

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<sup>1</sup> NOVEM, 2002; EWAB Marsroute, Availability of biomass and waste (NOVEM, 2002; EWAB Marsroute, *Beschikbaarheid van biomassa en afval*)

necessary. Incidentally, there may also be imports in the short term prompted by the market preference for particular types of biomass flows.

*Table 1: Maximum contribution of Biomass technology combinations in 2010*

Biomass BTCs	Biomass input	2010	
		Electricity (TWh)	Energy (PJ)
Waste incineration, AVI	Household waste (HHA)	1.81	20
Additional combustion of biomass in coal-fired power stations	Dry, high-calorific Secondary fuels Import of biomass	3.8	34
Landfill gas	HHA	0.15	2
Wood combustion -> heat	Wood residues	0	7
BIO-CHP (Combined Heat and Power) fermentation	Manure, wet organic waste, household organic waste and waste water	0.6 – 0.7	4 – 6
Bio-CHP combustion, gasification	Prunings, VGI residual flows, wood residues, chicken manure	2	8 – 18
Transport fuels	Various	-----	8 – 10
<b>Total Biomass</b>		<b>8.36-8.46</b>	<b>83 – 97</b>

### **3. Problems and actions**

The bottlenecks that have been identified for bio-energy have been divided into six problem areas: financial and economic problems, problems relating to licences, communication, the supply and availability of biomass, problems relating to knowledge and technology, and problems relating to the 'level playing field within the EU'. Actions will be set out for each problem area. Appendix 2 contains a time frame for them.

During the past few years an analysis of problem areas specifically for biomass from waste has already been carried out by the government in collaboration with the industrial sector. For this purpose the Ministry of Housing, Spatial Planning and the Environment (Ministry of VROM) set up the Platform for Secondary Fuels in 2001, with the aim of accelerating the use of secondary fuels in power generation. Since this also involves energy production from biomass, the activities within this framework will be harmonised and integrated with those within the framework of this Action Plan.

#### **3.1 Financial and economic**

Investors in bio-energy projects may make use of a range of financial schemes, such as the Energy Investment Deduction (*Energy Investment Allowance - EIA*) and the CO<sub>2</sub> reduction plan. Two bottlenecks are relevant in relation to these financial schemes:

- amount and duration of renewable electricity subsidies
- high costs of heat projects

##### **Amount and duration of renewable electricity subsidies**

Because of its fiscal nature, the REB (Regulatory Energy Tax) did not provide certainty for several years in succession. Furthermore

the amount of the REB could vary from year to year, which meant that the return on investment was uncertain and consequently posed an extra risk on the invested capital. Since bio-energy projects generally involve large projects with a substantial investment, more certainty on the duration of subsidies should enable the investment climate to improve considerably.

#### **actions**

- On 1 July 2003 the Environmental Quality of Electricity Production Act (MEP) came into force, and serves to subsidise the generation of renewable energy. With the introduction of the MEP, the uneconomic part for most biomass technology combinations is removed. In addition, certainty is given for 10 years. Both aspects were in fact the starting point in the development of this instrument. For large-scale processing of biomass, this certainty is being restricted to three years as far as the subsidy-level is concerned, due to current fluctuations in the biomass price. During the evaluation of the MEP in the first half of 2004, it will be assessed how investment security can be increased to 10 years for this MEP category.
- Regular consultations will be held with those most directly involved concerning the feasibility of financing bio-energy projects and any problems that may arise with the existing instruments.
- In addition, any problems with the MEP schemes will be discussed within the framework of communication activities in relation to the introduction of the MEP.

### **High costs of heat projects**

There is big potential in the simultaneous generation of electricity and heat from biomass, and achieving this is essential in order to meet the renewable energy targets. In practice, however, we see that projects which deliver heat are difficult to realize. A possible reason is that, contrary to electricity, heat receives little or no incentives from the government. The problems to do with heat, however, are not merely whether or not to pay for heat. Heat delivery, partly in relation to the relatively high costs of a heat distribution network with related backup facilities, still form an intractable problem.

#### **action**

The Ministry of Economic Affairs is to carry out an exploratory study into the problem of heat, examining the heat potential for each BTC and where in the heat chain (generation, distribution and storage) bottlenecks occur and on what scale. Further decisions will then be taken based on the (social) costs and benefits.

### **3.2 Licenses**

When developing projects, initiators are confronted with complex legislation and regulations. For biomass this concerns in particular legislation on emissions, waste and manure. Initiators need the cooperation of local government as regards the necessary licences in these areas. Provincial and municipal authorities will have to weigh up the interests and ultimately come to a decision on spatial, building and environmental aspects. Three bottlenecks have been identified in the licensing procedure:

- licensing procedure is long and expensive

- unclear testing framework, lack of coordination between legislation and regulations and a large number of parties involved.
- lack of enforcement and sanctions if the competent authorities exceed statutory deadlines.

### **Licensing procedure is long and expensive**

Procedures for obtaining the correct licences are long and relatively expensive, particularly for small-scale biomass options. The principal cause of this is that the procedures and steps to be taken in these procedures are not often very clear.

Two actions will be initiated focusing especially on shortening the existing licensing procedures:

#### **actions**

- The Ministry of VROM, in cooperation with the Ministry of Economic Affairs, NOVEM and InfoMil, is developing process-oriented tools aimed at the licensing procedure. It concerns in particular the provision of information and mutual communication that is required during each stage of the procedure. In addition, a range of options to allow the process to proceed as smoothly as possible are being examined, such as checklists, 'standard licences', an info bulletin to keep the parties informed and setting up a pool of experts in the market who are 'stand-by' to give proactive support to both the licensing bodies and the initiators.
- In addition, from 2004 the NOVEM will monitor the actual practice of the licensing procedure. Based on this monitoring, it will be possible to identify where there is scope for improvement and where one can learn from others, so that we do not need to reinvent the wheel each time. This year a 'zero' measurement will be made that will serve as a reference.

### **Unclear testing framework, lack of coordination between legislation and regulations and a large number of parties involved**

Many laws and rules are applicable to biomass projects, while it is unclear exactly what the testing framework is. When is a raw material a waste product and what emission requirements apply? In addition, some areas of policy are not properly coordinated with each other, at least insufficiently visible to market parties. Biomass use is encouraged through energy policy, whereas the manure and emissions policies in fact discourage the use of some flows. Moreover, various parties form the competent authorities for these laws and rules, each one with its own interpretation.

#### **actions**

- A further investigation into the complex of legislation and regulations concerning biomass, including the M.E.R. (environmental assessment report) process, is required. Also examining options on shortening or simplifying procedures and seeing whether more integral decision-making procedures can be achieved. After this the recommendations for improvement will be implemented where possible under the direction of the interdepartmental committee on market regulation. In doing so we can join up with the subproject on problems in gas extraction and wind energy and the VROM operation 'Recalibration of regulations'.
- During the course of this year, VROM will ensure that the so-called 'white' and 'yellow' lists will be completed and published. These lists contain the categories of biomass and waste flows according to origin and quality, with a view to the

applicable emission regime. The 'white' list concerns flows that can be categorised as 'clean' as regards emissions, while the 'yellow' list concerns flows falling outside the 'clean' category.

- Finally, a working group of experts, including representatives from VROM, the Ministry of Agriculture, Nature and Food Quality (LNV), the LNV Expertise Centre, NOVEM, PDE, PBE and the Ministry of Economic Affairs, has started making a list of problems concerning co-fermentation in relation to the manure legislation in the Netherlands. Particularly in the licensing procedures based on the manure legislation a number of issues are not properly coordinated,. This working group will submit its recommendations to the Integral Manure Consultation (IMOVE), consisting of representatives from national, provincial and municipal authorities and water boards. If there is any reason to modify the policy, the Ministry of LNV together with the Ministries of VROM and Economic Affairs will draw up a policy letter.

### **Lack of enforcement and sanctions if the competent authorities exceed statutory deadlines**

The statutory licensing deadlines are often exceeded without this having any consequences for the competent authorities. This leads to uncertainty and higher costs for initiators. In addition, the dumping prohibition is not always enforced, as a result of which less biomass becomes available for generating power.

### **actions**

The Ministry of VROM will examine whether the bottlenecks brought up by the market concerning the exceeding of deadlines and enforcement are of a structural nature. If this is the case, the competent authorities will be asked to improve their procedures. The VROM inspection will be asked to include supervisory action

in the work plan that focuses on this, whereby we note that all this must be considered in relation to other supervisory activities formulated at that moment in the VROM Compliance Strategy.

### **3.3 Communication**

When realising projects, initiators are increasingly confronted with the fact that there is still a great deal of confusion and misunderstanding about biomass. For example, it is not always clear exactly what biomass is and doubts are being increasingly expressed about its sustainable character. After all, there are many biomass flows with different levels of environmental impact in the chain, which leads to a lack of social acceptance and consequently forms a barrier to the investment climate. Better communication about biomass, partly supported by the results of the discussion on sustainability, should increase social consensus. The actions will focus above all on solving the following bottlenecks:

- lack of knowledge among consumers
- lack of knowledge and reference framework among the competent authorities
- confusion about the sustainability of biomass

#### **Lack of knowledge among consumers**

Contrary to forms of energy such as wind and solar energy, the consumer is not familiar with bio-energy and lacks the knowledge and understanding of its usefulness and the necessity for it. This is further exacerbated by the lack of clear communication about the term 'bio-energy'. Environmental organisations do not believe all bio-energy options to be equally sustainable and make their views known in the press. Energy companies present themselves to the consumer in their marketing activities on bio-energy in widely varying ways. Some companies do not sell bio-energy as renewable

energy, which leads to a sense of uncertainty and confusion among consumers.

#### **actions**

Market parties, especially energy companies, to ensure:

- Better mutual harmonisation of existing information activities focusing on unanimity in their message towards the consumer.
- Intensification of information provision about the term 'bio-energy' towards the consumer.

#### **Lack of knowledge and reference framework among the competent authorities**

It is not only the consumer who has a limited knowledge of bio-energy. Sub-authorities too, both the policymakers and 'the competent authorities', are not always aware of the ins and outs of bio-energy, which leads to a cautious approach in licensing procedures, causing delays in the procedures themselves. It would appear difficult for the competent authorities to learn proactively about all the details of bio-energy. An extensive area of policy has to be covered and the question is which bio-energy projects a government official will come across during his career. In addition, only a relatively small number of bio-energy projects have been realised to date in the Netherlands, so that there is not yet much experience as regards licensing in this area.

**action**

- The Ministry of Economic Affairs is to publicise its policy on bio-energy more clearly by drawing up targeted communication for policymakers and competent authorities.
- In addition, the Ministry of Economic Affairs will explore the options for reaching agreements with provincial and municipal authorities in order to realise more bio-energy projects in the Netherlands. These could involve incorporating agreements on bio-energy in BANS (Administrative Accord New Style, or the 'Climate Accord').

**Sustainability of biomass**

Doubts are being expressed, especially among environmental groups, about the sustainability of biomass, particularly the biomass from waste. The mere fact that biomass is renewable and does not add any net extra CO<sub>2</sub> into the atmosphere is not sufficient for a number of organisations. Because of the other (negative) environmental characteristics of some flows, some organisations refuse to cooperate in projects.

**action**

The discussion on the sustainability of biomass will be tackled within the framework of a transition to sustainable energy management, 'project biomass transition'. The intention is for Non Governmental Organisations (NGOs) and market parties to reach further agreements on this.

### **3.4 Availability of Biomass**

Initiators will only proceed to build or modify plants if there is an adequate supply of biomass, which furthermore can be contracted at a competitive and reasonable price in the long term. This is still hardly the case in practice. The following bottlenecks play a role:

- lack of a transparent market
- lack of product specifications
- biomass-supply too small, irregular, diffuse and not of constant quality

#### **Lack of a transparent market**

There is still no genuine raw materials market for biomass. Supply and demand are not in proper balance and there is no efficient allocation of the various biomass flows. This means in practice that certain flows either do not become available or are used in places where it would have been better, from an energy point of view, for them to have been used elsewhere.

#### **action**

- A number of test projects will be started up in the near future in order to increase the marketability of biomass. These tests will examine the options and impracticabilities of an open marketplace on the Internet, or a limited marketplace for specific flows.
- In addition, as part of the transition to a sustainable energy management a project will be started up within the biomass

transition project for developing a transparent marketplace. A business plan will be drawn up for this with stakeholders who want to invest in a trading platform.

### **Lack of product specifications**

There are still no clear systems for describing the biomass product. As a result, the quality of the biomass product is often at issue, partly because of the wide diversity of biomass flows. Better product specification will benefit business operations as well as the licensing and marketability of the product towards the customer.

### **action**

- The market will examine whether it can achieve a nationally accepted classification and/or standardisation of biomass categories linked to a particular technology that is accepted nationally and applicable in practice. This could be done based on classification lists already produced (NEN/NTA) and/or the white and yellow lists already mentioned earlier. In addition, the market will define threshold values for contamination of biomass (sand, iron, etc.) which will form part of the above-mentioned standard.
- The government will examine to what extent the above-mentioned product specifications would be applicable in the licensing procedure.

### **Supply too small, irregular and not of constant quality**

Biomass flows that do become available are of varying quality and composition, are irregular in their availability and often available in only small quantities. This makes conversion difficult and necessitates extensive pre-treatment processes.

**action**

The market will start channelling flows, such as through central collection points for specific biomass flows. From here the biomass can be collected, traded and distributed. The quality of the product can then be guaranteed better (by means of certification) from these points. All this is in line with the agreements made within the BANS framework, the aim of which is to increase availability within the region.

### **3.5 Technology and Knowledge**

The following bottleneck plays a role in the area of technology and knowledge:

- diversity and complexity of (new) technologies

#### **Diversity and complexity of (new) technologies**

A wide range of complex technologies is available for incineration/combustion, gasification or fermentation. This makes it very difficult for the investor to make a choice for certain technologies. As things may sometimes go wrong when applying this complex technology, investors are often cautious. It is also made more difficult to grant licences for bio-energy projects because of the complexity and diversity of techniques.

#### **actions**

Market parties, in cooperation with technology institutions, will develop initiatives for exchanging knowledge and experience between themselves, aiming to make clear what technology can best be used for what type of biomass flow and with as few risks as possible. In this way the parties can learn from each other and each other's mistakes so that the wheel does not need to be reinvented each time. The following matters will be tackled:

- Organise meetings and excursions with speakers from the sector
- Draw up a list of proven combinations of technology and biomass input
- Draw up protocols on problems and solutions

The exchange of knowledge is also a specific item on the agenda within the context of the transition biomass project, and is part of the transition experiments which have yet to be started up. There will be further co-ordination in this area too where necessary.

### **3.6 Level playing field**

The following bottleneck plays a role relating to the level playing field within the European Union:

- differences in implementation, compliance and enforcement by EU member states on emissions, waste management and legislation

#### **Differences in implementation, compliance and enforcement by EU member states on emissions, waste management and legislation**

Almost all the players involved, both the market and government, agree that we need to work towards a level playing field in Europe as regards waste. For the government this means that a high level of environmental protection with waste management must remain guaranteed, even in an increasingly internationalised waste market. For the business sector, the rules on waste must be uniform and may not lead to unfair competition, i.e. have a disruptive effect on market forces.

#### **action**

Realising a level playing field for waste management is a policy objective laid down in the National Waste Management Plan (LAP), which has been in force since 3 March 2003.

In order to continue to guarantee continual and high-quality waste management in an increasingly internationalised waste market, the Netherlands aims to create a level playing field in the EU with a high level of environmental protection. Promoting a level playing field can be concretised in a number of subjects in which the Netherlands would like to see more harmonisation:

- Harmonisation within the EU concerning the following aspects:
  - Unambiguous interpretation of relevant terms and definitions;
  - Harmonised implementation and enforcement of EU regulations;
  - Harmonisation of waste processing levels;
  - Harmonisation and integration of waste policy and regulations with other areas of policy.
- Equivalent policy starting points and use of tools in the Netherlands, Germany, Belgium and France focusing specifically on open borders for disposable flammable waste in 2006.

The guiding principle with the activities aimed at achieving a level playing field for waste management is to strengthen the exchange of knowledge and information. The Ministry of VROM is to set up a platform for a level playing field to channel activities and encourage more cooperation between the government and the business sector.

## 4. Implementation and management actions

The Bio-energy Realisation Umbrella Platform (*Bio-Energie Realisatie Koepel - BERK*) is to be set up for implementing this Action Plan. The purpose of this umbrella platform is to monitor coherence between the various actions, since many parties are involved and many economic, social, technical and administrative factors affect the success of this Action Plan. Such an umbrella platform has been in place for biomass from waste since 2001 (The Platform for Secondary Fuels). A number of the participating parties on this platform will be approached for the BERK. In order to prevent any overlap between these two forums, the intention is to integrate these platforms in the future, particularly where the same bottlenecks and actions are concerned.

All relevant parties who support the Action Plan are represented in the BERK. Participants in the BERK are represented at a decision-making level. The tasks of the BERK include:

- Monitoring the progress of implementation of the Action Plan
- Coordination of activities arising from the Action Plan
- Establish and evaluate if necessary the (interim) results achieved
- Monitor the progress of bio-energy realisation, modifying and/or updating the Action Plan if necessary
- Monitor compliance of the agreements in the Action Plan
- Concretise, implement and monitor actions through working groups and secretariat

The BERK working groups which implement these actions met for the first time just before or just after the summer and came to some agreements on working plans. BERK will start up officially in the autumn, although a number of the actions described have already

been started. The Time Frame in Appendix 2 shows when certain actions are to be started and when the action must be completed.

## List of abbreviations

AVI	<i>Afval Verbrandings Installaties</i> (Waste Incineration Plants)
BANS	<i>Bestuurlijk Akkoord Nieuwe Stijl</i> (Administrative Accord New Style)
BERK	<i>Bio-Energie Realisatie Koepel</i> (Bio-Energy Realisation Umbrella Platform)
BTC	<i>BiomassaTechniek Combinatie</i> (Biomass Technology Combination)
EIA	<i>Energie-Investerings Aftrek</i> (Energy Investment Allowance)
EU	European Union
GFT	<i>Groente-, Fruit- en Tuinafval</i> (Household organic waste)
IMOVE	<i>Integraal Mest Overleg</i> (Integral Manure Consultation)
LAP	<i>Landelijk AfvalbeheersPlan</i> (National Waste Management Plan)
MEP	<i>Milieukwaliteits Elektriciteits Productie</i> (Environmental Quality Electricity Production Act)
MER	<i>Milieu Effect Rapportage</i> (Environmental Effect Report)
NGO	Non-Governmental Organisation
NEN	<i>Nederlands Normalisatie Instituut</i> (Netherlands Standardisation Institute)
NTA	<i>Nederlands Technische Afspraken</i> (Netherlands Technological Agreements)
PBE	<i>Platform Bio-Energie</i> (Bio-energy Platform)
PDE	<i>Projectbureau Duurzame Energie</i> (Project Bureau for Renewable Energy)

VGI	<i>Voedings- en Genotsmiddelen Industrie</i> (Food and Luxury Foods Industry)
WKK	<i>Warmte Kracht Koppeling</i> (CHP – Combined Heat and Power)

# **Appendix 1: Explanation of table 1**

## **Waste incineration plants**

The existing 11 waste incineration plants, or AVI's, in the Netherlands currently make a substantial contribution to renewable energy, because 50% of the total energy produced is regarded as renewable. In 2000 the total energy production was 23 PJ, which means that 11.5 PJ is renewable. The aim of the AVI covenant was to achieve 5.3 PJ extra production. At present there are expansion plans for AVI's which may be feasible with the envisaged MEP allowance within the frameworks of the LAP, so that a production of 40 PJ from the 11 existing waste incineration plants before 2010 would seem realistic; this is 20 PJ renewable, corresponding to an electricity production of 1.81 TWh.

## **Large-scale cogeneration of biomass**

According to the coal covenant, it is expected that the 6 production companies in the period from 2008-2012 will install a biomass capacity of 503 MWe, resulting in a CO<sub>2</sub> reduction of 3.2 Mtons. Assuming 7500 operating hours, the total electricity production will be 3.77 TWh. Since it concerns here power generation savings at a coal-fired power station, about 34 PJ of fossil energy will be saved with an output of about 40% ( $3.77 \times 3.6/0.40$ ).

## **Landfill gas**

In the Netherlands there is a prohibition on dumping combustible waste. Stricter compliance with this and a further rise in dumping rates are expected to lead to a decline in landfill gas production. However, there is a delaying factor in this decline, because total production covers a period of roughly 20 years. Due to better extraction and use, we are assuming for the time being a production of renewable energy of 2 PJ.

### **Waste water fermentation, household organic waste fermentation and manure (co)fermentation:**

No significant increase is expected with waste water purification, which will remain constant at about 3 PJ. On the other hand, there is extra space in the coming years for the fermentation of organic waste flows, from the Food and Luxury Foods industry and wet household waste, such as organic waste. 1.5 million tons of household organic waste is now available but this is largely composted. There are only 2 fermentation plants in the Netherlands with an output of 1 GWh or 2 PJ in 2000. A number of plants are due for replacement during this decade, so that with an improvement in business operations and a tripling of use, production could be increased to 0.3 PJ. For the VGI sector too, more wet flows can be converted into energy through fermentation. This can be done on site, but also in combination with manure, as described below under co-fermentation. A production of 0.5 PJ is estimated for 2010. This value can be realised in the coming years through stand-alone or co-fermentation and depends on regulations and legislation.

Developments in this sector of manure fermentation have been dominated in the last few years by a tightening up of manure policy. Apart from the fact that less manure may be produced in the Netherlands, other applications for processing manure will need to be found. Of the total available volume of manure of 7500 ktons in 2010, 0.3 TWh of electricity can be generated, or  $(0.3 \times 3.6 / 0.55 =) 2$  PJ. If the heat from these plants is also used, this could rise to 3 PJ.

### **Small-scale wood combustion**

Estimates show that wood-burning in households and with wood-processing industry leads at present to savings of 7.4 PJ in fossil energy. It is expected that this can remain constant. However, in order to achieve this, an increase in output by increasing the use of wood-burning stoves instead of open hearths as well as new installations as a result of the

stricter emission requirements for industrial wood combustion will be required.

### **Chicken manure incineration / gasification**

For poultry manure, the expected availability in 2010 has been estimated at approximately 2000 ktons. At present this would seem to be a generous estimate, and in view of the developments in agriculture an availability of 1000 ktons would seem more realistic. If we assume an average electricity output of 0.5 kWh/kg poultry manure and 8000 operating hours a year, on the basis of the availability of 1000 ktons an average of 0.5 TWh could be generated in plants with a total capacity of 63 MWe. Assuming small-scale generation, we could imagine 25 power stations of 2.5 MWe or more, larger units such as 2 power stations of 25 MWe and 5 power stations of 2.5 MWe. With 0.5 TWh, ( $0.5 \times 3.6/0.55 =$ ) 3.2 PJ of fossil energy would be saved. Residual heat is also to be used in the project currently planned at Apeldoorn and Moerdijk, and the total contribution works out higher by a factor of 1.5, at 5 PJ. Should there indeed be 2000 ktons of chicken manure still available in 2010, the output could be even higher, namely 10 PJ.

These calculations do not take account of the objections, particularly from environmental groups, to the incineration of chicken manure.

### **Other decentralised bio-CHP**

Bio-CHP has potential applications with glasshouses, industry and built-up areas with heat networks. Expansion themes within the MJA agreements, the Glasshouse Environmental Covenant (*Glastuinbouw-Milieuconvenant* - *GLAMI* covenant) in glasshouse cultivation and increasing sustainability in the built-up area (Umbrella programme) are producing new initiatives in this sector. Examples of successful implementation are the bio-CHP power stations in Cuijk, Schijndel, de Lier and Lelystad which are already generating 1.5 PJ, using 250,000 tons of residual forestry products and 150,000 tons of clean wood offcuts. Both

these figures could be doubled, so that 5 PJ of biomass is still potentially available. With this the electricity output from these Dutch flows reaches 3 PJ, and 5 PJ with residual heat utilisation.

In addition, there is still considerable potential available from the Food and Luxury Foods industry, which could be harnessed to generate 2 PJ of electricity and 3 PJ with heat utilisation.

### **Transport fuels**

Total motor fuel consumption in the Netherlands amounted to about 400 PJ in 1999 [The Netherlands Energy Report 2000, ECN]. Without LPG this works out at about 370 PJ, so that the contribution according to the intended EU target value (for NL: 5.75%) must be about 21 PJ. If transport fuel consumption increases further, the contribution could also be higher. However, 5.75% is ambitious, although it is possible that part of this quantity arrives in the Netherlands as imported liquid fuel. At present 2%, corresponding to 8 - 10 PJ, would seem to be a reasonable assumption.

## Appendix 2: Time Frame for Actions

Action	Start of Action	End of Action
Bio-Energy Realisation Umbrella Platform	2003	2005
<b>Financial</b>		
Regular consultation	2003	2005
Evaluation of the MEP	2004	2005
Explore the problem of Renewable Heat	2004	2004
<b>Granting of licences</b>		
Standardise licensing process	2003	2004
Monitor licensing procedure	2003	2005
<ul style="list-style-type: none"> <li>• Explore licensing problem</li> <li>• Complete white and yellow list</li> <li>• Policy memo on sales opportunities for digestate</li> </ul>	2003 2003 2003	2004 2003 2004
Explore bottlenecks relating to enforcement and supervision	2003	2004
<b>Communication</b>		
Working group information	2003	2005
Explore opportunities for agreements with subsidiary authorities	2004	2005
Sustainability discussion	2003	2004
<b>Availability of Biomassa</b>		
Development of marketplace (including test projects)	2003	2005
Draw up standard product specifications	2003	2005
Collection points	2003	2005
<b>Technology and knowledge</b>		
Exchange of knowledge and experiences	2003	2005
<b>Level playing field in EU</b>		
Various actions focusing on improvement	2003	2005

