

## Summary

### Improving the energy efficiency of the petroleum industry in the Netherlands - Overall report

#### Background

As part of the so-called MEE agreement, a negotiated long-term agreement on improving the energy efficiency of EU ETS industries in the Netherlands, the five Dutch oil refineries affiliated in the Netherlands Petroleum Industry Association VNPI have inventoried options for reducing their energy consumption. A broad perspective was thereby adopted, encompassing not only energy savings at the refineries themselves but also measures elsewhere in the petroleum chain in the Netherlands.

To this end three studies have been carried out, with the following aims:

- to identify savings options at the refineries themselves, including cogeneration (KBC, 2008);
- to provide a detailed analysis of cogeneration potential at Dutch refineries (Davidse, 2010);
- to identify a broad spectrum of other savings options in the chain beyond the refineries (CE, 2010).

The present report, prepared at the request of NL Agency, integrates the results of the three studies. It provides a comprehensive picture of the potential savings to be achieved in the petroleum chain, insight into the feasibility of the aspirations of the MEE agreement, and a review of the steps required to realise the available potential.

#### Estimate of total savings potential

The savings potentials calculated in the three studies cannot simply be summed to a single figure. In the first place the studies overlap to a certain degree, particularly with regard to potential cogeneration capacity, and impinge reciprocally on each other's potential. In addition, they vary in terms of the premises adopted and the detail in which the various measures have been examined.

This report first describes how these differences were handled. It is then calculated that the maximum technical savings potential theoretically achievable on the basis of the three studies is about 60 PJ, or around 40% of total energy consumption at Dutch refineries. The cost-effective savings potential, i.e. that achievable using measures with a payback of around five years at most, is estimated in the present study at about 28 PJ, or some 19% of total refinery energy consumption.



The bulk of this cost-effective potential can be realised with the following measures:

- a range of options for improving energy efficiency within refineries;
- on-site cogeneration at refineries;
- supplying CO<sub>2</sub> and heat from refineries and hydrogen plants to other industries, to the built environment and to greenhouse horticulture;
- use of biomass as a feedstock at refineries.

### **Conclusion**

Given the cost-effective potential identified, it will be hard, though not entirely impossible, to secure the target set in the MEE agreement (20% savings on the basis of cost-effective measures). It will mean implementing every single one of the cost-effective measures identified, with the savings potential estimated for each indeed being attained.

### **Recommendations**

A number of measures, particularly those at the refineries themselves (including cogeneration and co-use of biomass as a refinery feedstock), can be further elaborated and implemented by refinery operators. The national government can also contribute to realising the available cost-effective potential, though. It can boost that potential, moreover, by reviewing some of its policies, particularly those relating to cogeneration and biofuels. It is therefore recommended that further research be undertaken to assess the scope and overall desirability of such policy changes.

The supply of heat and CO<sub>2</sub> to other industries, the built environment and greenhouse horticulture are activities involving multiple parties and a collaborative process therefore needs to be established. These options also require solid feasibility studies, to identify opportunities and barriers and calculate costs and benefits. If the results of these various exploratory programmes prove positive, parties can move on to the implementation phase. The government's role in all of this will be to facilitate.

It is also recommended that the progress of the various programmes be monitored and subjected to an interim review.

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