# COMPETITION LAW AND PUBLIC INTERESTS: THE DUTCH AGREEMENT ON COAL-FIRED POWER PLANTS[1]

*Erik Kloosterhuis*[2] *& Machiel Mulder*[3]

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## ABSTRACT

Agreements between firms to jointly reduce production capacity generally violate competition law, unless the adverse effects on competition are sufficiently compensated by efficiencies directly resulting from such agreements. This is the so-called efficiency defence. This paper analyses how environmental benefits can be included in such a defence. We apply this analysis to a proposed agreement to advance by a few years the planned closure of a number of coal-fired power plants in the Netherlands. Using a welfare-economic approach, we state that environmental benefits can be taken into account in an efficiency defence. However, in the applicable legal framework sufficient benefits must fall to the consumers that are negatively affected by the agreement. We conclude that the environmental benefits of closing the coal-fired power plants are significantly smaller than the loss of consumer welfare resulting from the increase in the electricity price. Hence, under our analysis the agreement on the closure of the coal-fired plants would not be in conformity with competition law.

JEL: D40; H40; K21; L44

## I. INTRODUCTION

In order to foster the transition towards a more "sustainable" energy industry in the Netherlands, a large group of over 40 stakeholders recently entered into an agreement to implement a number of measures (hereafter: the Energy Deal).[4] The group of stakeholders

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[2] Authority for Consumers & Markets, The Netherlands. E-mail: erik.kloosterhuis@acm.nl.
[3] Authority for Consumers & Markets, The Netherlands and Faculty of Economics and Business, University of Groningen, The Netherlands. E-mail: machiel.mulder@acm.nl.
[4] SER (Social Economic Council), Energieakkoord voor duurzame groei (Energy Deal for sustainable growth), The Hague, September 2014. The SER is a tripartite body representing industry, trade unions and independent experts appointed by the government. It has traditionally played an important role in the governance of the Dutch economy. This can be seen as an expression of what in Dutch is called the '*polder-*' or '*overleg-economie*', a

includes employer organisations, labour unions, environmental NGO's, consumer organisations, central, regional and local governments and last but not least representative organisations of energy firms. The Energy Deal is intended to improve the efficiency of energy use, to foster the development of renewable-energy capacity and to reduce the dependence on fossil fuels. The Energy Deal includes a package of policy measures: some are meant to give incentives to energy users, such as an increase in the energy tax on residential energy use, or to give incentives to energy producers, such as subsidies for offshore wind parks, while others are intended to reduce the costs of energy producers, such as the abolishment of the tax on the use of coal by electricity firms.

From a competition-policy perspective, one specific measure is particularly relevant: the agreement to advance the closure of 5 relatively old coal-fired power plants by a few years (hereafter: the Agreement).[5] These plants, which were built in the 1980s, have a higher rate of environmental pollution (in particular of $CO_2$, $SO_2$, $NO_X$, and small particulate matter) than more recently built coal-fired power plants, gas-fired plants and, of course, renewable generation techniques as wind power plants and solar cells. Over the past decades, however, the degree of pollution by the old coal-fired plants has already declined because of a number of retrofit investments, such as in installations to desulphurize emissions. Closing these plants may nevertheless result in less environmental damage.[6] This reduction in environmental damage can be seen as a public interest, since that damage is, from a welfare-economic point of view, an externality which is not taken into account by the producers in the absence of government regulation. On the other hand, the closure of the coal-fired power plants may create costs as well. The aggregated generation capacity of these plants is about 2500 MW, which is about 10% of the total generation capacity in the Netherlands. As this is a significant share, one could expect that the agreement to remove the capacity from the market has an

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governance system in which mutual consultations leading to consensus are the preferred method of steering the national economy. This model is challenged from time to time, but "sooner or later the Dutch will return to negotiating with each other again" (The Economist, *Reform in the Netherlands: going Dutch*, 7 October 2004).

[5] The 5 plants to be closed earlier are: Amer 8 owned by RWE (645 MW) to be closed in 2016 instead of 2017, Borssele owned by Delta (406 MW) to be closed in 2016 instead of 2021, Maasvlakte I and Maasvlakte II owned by E.ON (520 MW each) to be closed in 2017 instead of 2021 and Gelderland 13 owned by GdF (602) to be closed in 2016 instead of 2017. The years of the planned closure are based on ECN, Effecten van versneld sluiten van de vijf oudste kolencentrales ('Effects of earlier closure of the five oldest coal-based power plants'), Amsterdam, September 2013. Note that a number of new coal-fired plants of in total 3,400 MW are becoming operational in the Dutch market. In addition, the capacity of wind and solar power plants is increasing. Because of these investments as well as the reduction in demand caused by the economic crisis, the level of total installed capacity is significantly above peak demand, depressing electricity prices.

[6] The damage caused by $CO_2$ consists of its contribution to climate change. $SO_2$, $NO_x$ and small particulate matter have an effect on acid rain, which damages many parts of the environment, such as forests and buildings. They may also cause lung damage and other illnesses. In addition, coal-fired power generation may contribute to the formation of smog.

impact on competition and the electricity price.

In this paper we explore how the environmental benefits resulting from the closure of the coal-fired plants can be used in an assessment from a competition-law perspective.[7] For our method of analysis we refer to the position paper on competition and sustainability recently published by the Authority for Consumers & Markets (ACM).[8] In that paper, ACM proposes an approach on how to include environmental effects in a competition analysis. Based on that paper, we will first discuss how environmental benefits can be taken into account in the legal framework (Section II). Then we will apply this framework to the case of the above agreement by conducting an economic analysis in which we quantify both the damage for consumers as a result of higher prices and the environmental benefits to these same consumers (Section III). In Section IV, finally, we present our conclusions as well as some reflections on the applicability of our analysis in other cases.

## II. LEGAL FRAMEWORK

The fundamental components of the legal framework for assessing the agreement are given by section 6 of the Dutch Competition Act (hereafter referred to by its Dutch abbreviation: Mw) and Article 101 of the Treaty on the Functioning of the European Union (TFEU). These provisions imply that agreements between competitors to reduce production capacity are in principle a violation of competition law, unless the agreement meets 4 cumulative conditions for exception[9]. Together we call these conditions the efficiency defence.[10] The conditions in this defence are the following:

1. the agreement contributes to improving production, distribution or technical or economic progress;
2. consumers must receive a fair share of the resulting benefits;
3. the restrictions must be indispensable to the attainment of these objectives;
4. the agreement must not eliminate competition of a substantial part of the product in question.[11]

[7] On September 26 2013 the Authority for Consumers and Markets published an opinion comprising an informal assessment of the Agreement from a competition law perspective. The authors of the present paper were involved in the preparation of this opinion.

[8] ACM, Position Paper Competition and Sustainability, December 2013 ; available in English at www.acm.nl.

[9] Section 6 (3) Mw and Article 101 (3) TFEU.

10 The expression ‘efficiency defence’ is more commonly used in merger cases but is very similar to the legal test for restrictive agreements in the Dutch and the European competition legislation that we apply in the present paper.

[11] Guidelines of the European Commission on the application of Article 81(3) [nowadays: 101 (3)] of the Treaty, OJ 101/97, 27-4-2004 (hereafter: Article 101(3) guidelines) par. 3.2. Generally, the responsibility to

Important categories of cooperation-agreements that may meet these 4 conditions are R&D agreements, specialisation agreements and a variety of distribution agreements. 'Naked' cartels that only aim to raise prices, restrict output or divide markets will usually not qualify for an exception because they do not meet the requirements of these conditions.

We take the view that it is plausible that section 6 Mw and Article 101 TFEU apply in the present case. In general, agreements to reduce capacity belong to the most severe cartel agreements that fall within the realm of these provisions. An additional requirement for Article 101 to apply is, that the agreement may affect trade between member states. For this it is relevant that the Dutch electricity market is strongly connected to neighbouring markets.[12] Hence, for the purpose of the present analysis we conclude that both section 6 Mw and Article 101 TFEU apply to the agreement. This means that the agreement to jointly reduce generation capacity is likely to be at odds with competition law unless there are sufficient compensatory efficiencies present. This is the question that we will analyse now.

*First condition of the efficiency defence*

The first step in analysing the efficiency defence is to determine the benefits in terms of production, distribution or technical or economic progress. As a short-hand definition of these gains, we use the term 'efficiency gains'.[13] The efficiency gains that can be taken into account can be divided into cost efficiencies and qualitative efficiencies. Qualitative efficiencies can materialise in better products, a better distribution of products or a greater variety of products.[14] The European Commission acknowledges that efficiencies may materialise with a time-lag in the case of dynamic efficiency.[15]

The key issue now is whether a public interest can also be seen as an efficiency gain. The case law on this is limited. In 'Metropole', the General Court, as it is now called, ruled in general terms that the Commission, in granting an exemption under Article 101(3), could base itself on considerations of public interest. The public interest at stake in this case was that everyone should have access to a wide spectrum of television programs under equal conditions. Furthermore, in the cases 'Metro Saba I' and 'Matra', the European courts ruled

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prove that an agreement that restricts competition is in conformity with these four conditions rests on the undertakings concerned. Because of the the public importance of the agreement and, more generally speaking, of the SER Energy Deal, ACM carried out its own assessment of the anticipated effects of the agreement.

[12] See e.g. M. Mulder and L. Schoonbeek, *Decomposing changes in competition in the Dutch electricity market through the residual supply index*, Energy Economics 39(2013), 100-107

[13] Interestingly, this short-hand term is used for the same purpose by the General Court in GlaxoSmithKline v. Commission, T-168/01, 27-9-2006, par. 247.

[14] Article 101(3) guidelines par. 59-72.

[15] Article 101(3) guidelines par 87.

that factors like the promotion of employment are in itself not enough to qualify as a public interest, but that they are only relevant as far as they translate into cost savings and other efficiency gains. This has led the Commission to conclude that goals pursued by other Treaty provisions than the competition rules can only be taken into account to the extent that they can be subsumed under the four conditions of Article 101(3).

A widely discussed question in legal literature is, whether the inclusion of public interests, such as environmental benefits, in a competition assessment should follow directly from the so-called 'integrating provisions'.[16] Article 11 TFEU requires for instance that "*Environmental protection requirements must be integrated into the definition and implementation of the Union policies and activities, in particular with a view to sustainable development*". An examination of this discussion would be beyond the scope of the present paper, but we assume that this provision does not require the taking of environmental protection into account in a degree that goes beyond the limits of article 101(3). It is submitted that our approach is not in conflict with article 11. As far as environmental protection can be promoted through the market we see no reason to derogate from a normal application of competition rules. On the other hand, our analysis implies that where the market fails and an agreement can resolve this failure, thus promoting welfare, this can be taken into account in an efficiency defence assessment.

Furthermore, we observe that, with respect to the first condition, Article 101(3) envisages an exception in favour of agreements which contribute to promoting technical or economic progress etc. in general, without requiring a specific link with specific markets.[17] Hence, we conclude that the efficiency gains do not need to materialise on the relevant market or markets of the agreement (i.e. the economic activities which are subject of the agreement).

Our presumption is therefore, that article 101(3) provides a framework to assess the possible benefits of competition restricting agreements on welfare and welfare only. This will be one of the principles that we apply in the assessment of the agreement.

Another important issue for the present case is which requirements apply concerning the link between the agreement and the efficiencies. As said, the agreement forms part of the Energy Deal, which has a much wider scope than the agreement. So the question arises which

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[16] See e.g. C. Townley, *Article 81 EC and Public Policy*, Hart Publishing (2009), S. Kingston, *Greening EU Competition Law and Policy*, Cambridge University Press (2012), B. van Rompuy, *Economic Efficiency: The Sole concern of Modern Antitrust Policy? Non-Efficiency Considerations under Article 101TFEU* Wolters Kluwer (2012).

[17] Case T-86/95, Compagie générale maritime and others vs. Commission, 28-2-2002 par. 343. As will be discussed below, a certain link with the relevant market is however required with respect to the second condition of the efficiency defence.

costs and benefits should be taken into account in the assessment of the agreement. This question must be answered by checking the *causality* between the agreement and the costs and benefits.[18] On the basis of this criterion we take into account all costs and benefits that directly and causally follow from the agreement. This implies that we exclude those costs and benefits of the Energy Deal that a) require an active involvement of other parties (e.g. governmental subsidies) ) or b) that the parties have subjectively linked to the agreement, such as investments in wind-power plants

*Second condition of the efficiency defence*

After having defined the scope of the efficiency defence, we have to consider what is meant by the 'fair share for consumers' in the second condition. We follow the approach of the European Commission that it is necessary that the consumers concerned are at least compensated for the negative impact caused to them by the agreement. This interpretation allows that the net benefit for the consumers that are directly harmed by the agreement (the consumers in the relevant market) is zero but not less than zero. We believe that this interpretation is reasonable taking note of the fact that the welfare gain that has to be established, in applying the first condition, for society as a whole must manifestly be positive.

So the second principle that we apply in the assessment of this case is, that the consumers that are harmed by the agreement must receive enough benefits resulting from that agreement to neutralise that harm. Note that the consumers here not only refer to residential end-users, but also to firms which consume electricity.[19] Note also that the consumers must be compensated as a group; it is not required that every individual consumer is sufficiently compensated.[20]

A key element in using this framework on environmental benefits is that the benefits of the agreement occur outside the product market where the negative effects appear. After all, these effects appear on different 'markets' than the product market which is the object of the agreement. These effects will, however, affect the same group of consumers and that is why we can include them in the analysis of the effects of the agreement on the welfare of the electricity consumers.

18 Article 101(3) guidelines par. 53-54.

[19] Article 101(3) guidelines Par. 84

[20] When we apply this framework on environmental benefits, the usual, common-sense economic 'dictionary' falls short, as environmental effects are not traded on markets. From a welfare-economic perspective, however, these effects may belong to the welfare function of consumers. In Section III we will further discuss the valuation of environmental effects.

*Third and fourth condition of the efficiency defence*

For a complete assessment of the agreement, it is also necessary to consider whether the agreement is not more restrictive than necessary for the attainment of the benefits. This is in essence a proportionality or indispensability test. In addition, the agreement must not fully eliminate competition, which means that competitive forces in the relevant market must remain functioning to a sufficient degree. It is interesting to note that in the past these two conditions were more or less the core of the efficiency defence test.[21] As long as an agreement was not more restrictive than necessary and competition was not eliminated, the presence of efficiencies and the pass-on of a fair share thereof to the consumers were relatively easily accepted. Under influence of the 'more economic approach' from 2004 onwards the focus seems to have shifted to a more elaborate assessment of the efficiencies themselves as well as of the pass-on to consumers.[22] In the present case there is no need to investigate the third and fourth condition, because we find that the net welfare gains for consumers are likely negative.

## III. ECONOMIC ANALYSIS

For the overall assessment of the economic effects of the agreement to advance the closure of 5 coal-fired power plants, we apply a welfare-economic perspective. More specifically, we estimate the costs and benefits in terms of consumer surplus, which is technically speaking equal to the aggregated area below the demand curve less the actual financial expenditure on the good. This definition makes immediately clear that an increase of the price of a good reduces consumer welfare. More implicitly, this definition also clarifies that a good does not need to have a market price before entering the welfare function of consumers. Consumers may have a willingness-to-pay for goods which are not traded on markets, such as the quality of air or water. A reduction in this quality may, therefore, have a negative effect on consumer welfare. This implies that the economic analysis of costs and benefits is not fundamentally affected by the existence or absence of market prices. Of course, relatively more effort has to be made to include non-priced effects in the economic analysis, but the economic literature provides a number of techniques to deal with this issue.[23]

Below, we first go into the analysis of the impact of the closure of the coal-fired power plants on competition in the electricity market and on the wholesale electricity prices. Then

[21] K.J. Cseres, *The Controversies of the Consumer Welfare Standard*, The Competition Law Review (3)(2007),121-173 p 161.
[22] S. Kingston, op. cit. p. 265.
[23] See e.g. R. Perman, Y. Ma, J. McGilvray and M. Common, *Natural Resources & Environmental Economics*, Prentice Hall, 2nd edition (1999)

we discuss the valuation of the environmental effects in financial terms. We conclude this section by presenting the net effects on consumer surplus for a number of scenarios.

### A. Impact on competition and price

The impact of a removal of production capacity from the market depends on the competitive position of that capacity, i.e. its position within the merit order, as well as the relative level of total demand. A removal of production capacity means that a part of the supply curve shifts to the left. In electricity markets, this effect is called the merit-order effect. If the removed capacity has relatively low marginal production costs, the demand has to be frequently met by other capacities having higher marginal costs. In such a case, the average annual effect on prices can be significant. On the other hand, the effect on prices can be negligible if the removal refers to production units which have relatively high marginal costs. In that case, a price effect only emerges if the market is tight, i.e. if total demand exceeds the aggregated capacity of all other production units. Although such a price effect can be relatively strong because of the scarcity effect in these hours, on an annual basis, however, the price effect is likely modest.

From this brief theoretical analysis, we learn that to estimate the price effect of the closure of the power plants, we have to determine the relative marginal costs as well the relative level of total demand. For this purpose the Energy Research Centre Netherlands (ECN) was requested to make a quantitative analysis of the Dutch electricity market using a number of scenarios on the relative fuel prices and the level of electricity demand.[24] The model ECN used was POWERS, which is a micro-simulation model describing the dispatch of all power plants available in the Dutch market given exogenous values for fuel prices, electricity demand and supply coming from neighbouring countries.[25] The model distinguishes off peak and peak periods in each week in each year. For each of these periods, the electricity price is determined as an endogenous variable, resulting from the restriction that the demand should be equal to the aggregated supply from domestic generators and net import. The inclusion of import and export relationships results in the price effects of domestic events, such as the closure of the coal-fired power plants, being partly exported to the neighbouring countries, which reduces the domestic effect. By including import and

[24] ECN, Effecten van versneld sluiten van de vijf oudste kolencentrales (‘Effects of earlier closure of the five oldest coal-based power plants’), Amsterdam, September 2013.

[25] For a description of this model, see: ECN, Kerncentrale Borssele na 2013: Gevolgen van beëindiging of voortzetting van de bedrijfsvoering (‘Nuclear power plant *Borssele* after 2013: Consequences of closure or continuation of the business’), November 2005.

export, the model guarantees that cross-border effects are taken into account, although the relevant market is still considered to be the national market. Note that the magnitude of the cross-border effects depends on the size of the import and export capacity to Germany, Norway, Belgium and the United Kingdom as well as the net supply curves in these countries.[26]

The first step in the quantitative analysis is to define the scenarios on external circumstances, in particular the fuel prices and growth of electricity demand. Our Baseline Scenario is equal to the baseline scenario used by ECN/PBL in their overall assessment of the Energy Deal.[27] In addition, we define a number of Alternative Scenarios as a sensitivity check. These scenarios refer to the period 2016 – 2021+ as the first closure of a plant is expected to occur in 2016 and the last one in 2021. We add two years to the period of analysis (2022 and 2023) to see whether there are any effects after the last plant will be closed.

**Table 1.** Assumptions on fuel prices, electricity demand and offshore wind parks (Baseline Scenario)

| | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|---|---|---|
| Price of coal *(euro/GJ)* | 3.3 | 3.3 | 3.4 | 3.4 | 3.4 | 3.4 | 3.5 | 3.5 |
| Price of gas *(euro/m$^3$)* | 0.245 | 0.258 | 0.27 | 0.282 | 0.293 | 0.299 | 0.304 | 0.309 |
| Price of $CO_2$ *(euro/ton)* | 8.4 | 9.0 | 9.6 | 10.2 | 10.8 | 11.7 | 12.6 | 13.5 |
| Electricity demand *(TWh)* | 124.1 | 125.3 | 126.5 | 127.8 | 129.2 | 128.9 | 128.7 | 128.4 |
| Offshore wind *(GW)* | 0.958 | 0.959 | 1.359 | 2.109 | 3.542 | 3.5 | 3.5 | 5.4 |

*Source:* ECN (2013)

In the Baseline Scenario it is assumed that the price of coal will increase slightly from 3.3 euro/GJ in 2016 to 3.5 euro/GJ in 2023, while the price of natural gas rises from 0.245 euro/m$^3$ in 2016 to 0.309 euro/m$^3$ in 2023 (Table 1). These assumptions are based on long-

[26] The relevance of international trade for the competition analysis was, for instance, also recognized in the analysis of the takeover of the Dutch incumbent Essent by the German utility RWE. The total size of the Dutch technical import capacity grew by about 6 GW in 2012, which is equal to about 25% of the total domestic generation capacity.

[27] ECN/PBL, Het Energieakkoord: wat gaat het betekenen? ('The Energy Deal: what are the consequences?'), September 2013.

term price projections recently made by the PBL/ECN.[28] As the relative fuel prices may have a significant effect on the relative position of different plants in the merit order, we define Alternative Scenario I in which we assume that both the price of coal and the price of gas remain on the 2016 level, resulting in relatively lower gas prices (Table 2).

**Table 2.** Assumptions on gas and coal price in Alternative Scenario 1

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|
| Price of coal *(euro/GJ)* | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| Price of gas *(euro/$m^3$)* | 0.228 | 0.228 | 0.228 | 0.228 | 0.228 | 0.228 | 0.228 | 0.228 |

*Source:* ECN (2013)

Regarding the price of $CO_2$ permits we assume that this price will increase from 8.4 euro/ton in 2016 to 13.5 euro/ton in 2023. As this price affects the relative position of different type of plants in the merit order, it is important also to analyse the sensitivity of the results to a different assumption. Therefore we define Alternative Scenario II in which the price of $CO_2$ permits stays at the present level of about 5 euro/ton (Table 3). Note that for the other variables, this scenario is equal to the Baseline Scenario.

**Table 3.** Assumptions on the price of $CO_2$ in Alternative Scenario II

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|
| Price of $CO_2$ *(euro/ton)* | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |

*Source:* ECN (2013)

The merit-order effect also depends on the presence of other types of power plants, in particular wind parks. The higher the size of total installed wind capacity, the less the conventional plants will be dispatched, given the fact that the marginal costs of wind electricity are negligible, placing wind parks at the left side of the supply curve. In the Baseline Scenario we assume that the total installed generation capacity of offshore wind parks will develop according the objectives of the parties in the Energy-Deal. This means that the offshore-wind capacity increases from about 1 GW in 2016 to about 5 GW in 2023. To

[28] PBL/ECN [Planbureau voor de Leefomgeving (PBL) and Energieonderzoek Centrum Nederland (ECN)], Actualisatie Referentieraming Energie en Emissies 2012 ('Latest data on the baseline scenario of energy and emission for the period 2012-2020'), Bilthoven/Amsterdam, 2012.

place these numbers in perspective: 5 GW is 5000 MW which is twice as much as the aggregated capacity of the 5 coal-fired power plants which are subject to the agreement. In the Alternative Scenario III we assume that the deployment of wind parks will be less successful, resulting in a growth of 0.2 GW in 2016 to 4.4 GW in 2023.

**Table 4.** Assumptions on the size of offshore wind parks in Alternative Scenario III

| | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|---|---|---|
| Offshore wind *(GW)* | 0.228 | 0.928 | 0.928 | 1.378 | 1.978 | 2.7 | 3.5 | 4.4 |

*Source:* ECN (2013)

Having defined these scenarios, we can determine the impact on both prices and environment of advancing the closure of the 5 coal-fired power plants by a few years earlier . This calculation can be done by first analysing, for each of the above scenarios, the electricity price (on the day-ahead wholesale market) when these plants remain in operation until their initially expected year of closure and then doing the same analysis under the assumption of the earlier closure of the plants. The difference in the electricity price between these two variants is the price effect of the agreement of the electricity firms to advance the closure of these plants.

**Table 5.** Effect of advancing the closure of 5 coal-fired power plants on the electricity wholesale price (in euro/MWh, on average per year, per scenario)

| **Scenarios** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|---|---|---|
| Baseline scenario | 0.4 | 0.2 | 0.1 | 0.7 | 0.6 | 1.5 | 0.0 | 0.0 |
| Alternative Scenario I (lower fuel prices) | 0.5 | 0.7 | 0.4 | 0.7 | 0.5 | 0.5 | 0.0 | 0.0 |
| Alternative Scenario II (lower $CO_2$ price) | 0.2 | 0.1 | 0.9 | 0.7 | 0.5 | 1.4 | 0.0 | 0.0 |
| Alternative Scenario III (less offshore-wind capacity) | 0.7 | 0.3 | 0.1 | 0.5 | 0.5 | 1.1 | 0.0 | 0.0 |

*Source:* ECN (2013). The electricity wholesale price in the Baseline scenario is about 65 euro/MWh.

On average the wholesale electricity price rises by 0.6 euro/MWh in the Baseline Scenario, which is about 1% (Table 5). From year to year, the price impact differs as a result of the changing relative positions of power plants. In particular the relatively large price increase in 2021 can be attributed to the fact that coal has become relatively cheap which make coal-fired power plants more important. As a result, closure of these plants has a relatively large effect. In the Alternative Scenarios, the price impact differs from year to year, but the average effect over the whole period of analysis is not strongly affected: in all scenarios the electricity prices increases on average by about 0.6 euro/MWh.

To arrive at an estimate of the loss of consumer surplus we have to quantify the volume of the consumption that is affected by this price increase. From Table 1, we see that the aggregated level of estimated future electricity consumption in the Netherlands during the period of analysis increases from 124 to 128 TWh. If we multiply the annual price increase by the total estimated Dutch electricity consumption we arrive at a loss of consumer surplus of on average 75 million euro per year in the Baseline Scenario. In the Alternative Scenarios the average annual loss of consumer surplus is slightly lower (70 for I and III) or slightly higher (80 for II). This loss partly refers to the increase in the electricity bill of consumers, assuming that the rise in the wholesale price is passed on to the retail price. In addition, the decline in consumer surplus also refers to the increase in the price of electricity which is used as an input for the production of other goods and services and will in turn also affect the prices thereof.[29]

### B. Environmental effects

From the legal framework we have learned that one of the conditions that must be fulfilled is, that there are sufficient benefits for the group of consumers who also have to bear the costs of the agreement to at least compensate them for these costs. This appears to be the key question in this case. As this group consists of all inhabitants of the Netherlands, we have to analyse to what extent they benefit from the environmental effects of the earlier closure of the coal-fired power plants. In order to estimate the benefits, we first analyse the impact on the volume of the environmental emissions and then try to monetarize these unpriced effects.

The impact on the volume of the emissions for $SO_2$, $NO_x$ and small particulate matter (PM) follows directly from the POWERS model as this model includes all relevant technical characteristics of each plant in the Dutch electricity market. See Table 6 for the results for all scenarios.

Although the POWERS model also calculates the direct effect on the emissions of $CO_2$, this result does not refer to the ultimate impact on emissions of this greenhouse gas

[29]Although a part of the domestic electricity consumption is used to produce goods for exports, which implies that part of the price increase is also exported, the price of many imported goods will also rise because the electricity price in our neighbouring countries will also rise as result of the international integration of the electricity markets. Note, however, that legally the notion of 'consumers' refers to all buyers of a good, including businesses, which means that we may use the total domestic consumption of electricity as the measure of the volume of goods which price is affected.

because of the existence of the European Emissions Trading Scheme (ETS). The ETS is a cap-and-trade scheme, meaning that the aggregated level of emissions of all firms participating in this system is capped by a ceiling while each of the firms have the option to trade in order to buy or sell emission permits. In principle, the cap is meant to realise an overall emission reduction, while the possibility to trade is meant to improve the efficiency by which this reduction is realised. All major electricity firms in Europe are obliged to participate in the ETS. Because of this, any emission reduction realised by these firms can be used by them to either sell permits which they do not need any more or to decide to buy less permits. In both cases, the only effect of an emission reduction realised by the electricity firms is that the permit price declines in order to equalize the aggregated level of emissions to the cap. Hence, there is no net effect on emissions of $CO_2$, only an effect on the costs of emission reductions which have to be made within the ETS.[30] Below we will discuss how to value this effect.

The effects of emissions to the environment are so-called unpriced effects, which means that we have to monetarize them in order to include these effects in the cost-benefit analysis. The theoretical underpinning of the monetarization is given by the Hicksian compensating surplus which is the change in income needed to compensate for a change in relative prices in order to maintain the initial level of utility.[31] This compensation surplus can be seen as the amount consumers are willing to pay as compensation for an improvement in for instance the environment or the amount consumers require as compensation for a deterioration of the environment. The first amount is called the willingness-to-pay (WTP) and the second one the willingness-to-accept (WTA). The economic literature offers a number of valuation techniques for these WTP and WTA. These techniques can be distinguished in direct and indirect valuation methods.[32]

[30] A temporarily effect on $CO_2$ emissions occurs if firms wait to sell the surplus of permits resulting from the closure of the power plants. Such a delay may happen when firms expect that the permit price will rise with an annual percentage that is higher than the level of the applicable discount factor during the remaining years of the current allocation period, making it profitable for them to postpone the revenues of the selling the permits. As a result the current level of emissions would reduce, but the (near) future level of emissions would increase. Given the huge uncertainty about the precise impact of emissions on climate change, it is impossible to monetarize the environmental effect of such a time shift. In addition, the effects for Dutch consumers would in any case be negligible as will be discussed later on in this section.

[31] See e.g. R. Perman, Y. Ma, J. McGilvray and M. Common, *Natural Resources & Environmental Economics*, Prentice Hall, 2nd edition (1999).

[32] See e.g. Agnar Sandmo, *The public economics of the environment*, The Oxford University Press (2000).

**Table 6.** Effect of advancing the closure of 5 coal-fired power plants on emissions of $CO_2$, $SO_2$, NOX and small particulate matter (per year, per scenario)

| | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|---|---|---|
| **$CO_2$** (Mton)* | | | | | | | | |
| Baseline | 4.1 | 3.4 | 5.7 | 5.9 | 4.5 | 4.7 | 0.0 | 0.0 |
| *Alternative Scenarios:* | | | | | | | | |
| I | 8.4 | 3.3 | 3.6 | 4.4 | 2.1 | 3.9 | 0.0 | 0.0 |
| II | 5.8 | 3.0 | 5.8 | 5.9 | 4.9 | 5.3 | 0.0 | 0.0 |
| III | 5.7 | 3.0 | 5.4 | 6.2 | 4.4 | 4.9 | 0.0 | 0.0 |
| **$SO_2$** (kton) | | | | | | | | |
| Baseline | 2.0 | 1.6 | 2.4 | 2.4 | 1.8 | 1.9 | 0.0 | 0.0 |
| *Alternative Scenarios:* | | | | | | | | |
| I | 2.7 | 1.4 | 2.0 | 2.0 | 1.6 | 1.5 | 0.0 | 0.0 |
| II | 2.6 | 1.4 | 2.4 | 2.4 | 2.0 | 2.0 | 0.0 | 0.0 |
| III | 2.8 | 1.5 | 2.3 | 2.6 | 1.8 | 1.9 | 0.0 | 0.0 |
| **$NO_x$** (kton) | | | | | | | | |
| Baseline | 1.4 | 1.3 | 1.9 | 1.9 | 1.3 | 1.4 | 0.0 | 0.0 |
| *Alternative Scenarios:* | | | | | | | | |
| I | 3.6 | 1.5 | 0.8 | 1.3 | -0.1 | 1.1 | 0.0 | 0.0 |
| II | 2.0 | 1.2 | 2.0 | 2.0 | 1.5 | 1.8 | 0.0 | 0.0 |
| III | 1.9 | 1.2 | 1.8 | 2.1 | 1.2 | 1.5 | 0.0 | 0.0 |
| **Small particulate matter (PM)** (kton) | | | | | | | | |
| Baseline | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| *Alternative Scenarios:* | | | | | | | | |
| I | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| II | 0.1 | 0.0 | 0.1 | 0.1 | ini | 0.1 | 0.0 | 0.0 |
| III | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |

*Source:* ECN (2013)
* The numbers refer to the direct effect, i.e. the effect on the emissions by the Dutch electricity producers. The indirect effect is zero because of the existence of the European Emissions Trading system.

The direct-valuation methods consist of techniques by which consumers are directly asked what value they attach to a specific good. These values may in principle be of any type, varying from use-value, existence value to option value. One of the techniques in this category is the contingent valuation method (CVM) in which respondents are asked to reflect on different hypothetical situations. Another example is choice modelling in which individuals are asked to express the value of specific options that have several environmental attributes in terms of another option which only involves a monetary payment. Note that these direct-valuation methods are characterized by using so-called stated preferences. Another direct-valuation method is based on production functions, meaning that they try to estimate the impact of a environmental change on consumers. This method is also called the dose-response method, which means that the effect is estimated of an emission (i.e. the dose) on for instance health of citizens (i.e. the response). Another method in this category is the avoided-cost method which measures the WTP or WTA on the basis of the costs which do not have to be made anymore. This method can be used when policy targets exists, since the value of any measure directed at realising those targets can be valued at the costs which do not have to be made anymore for that purpose.

**Treatment of the environmental effects: an overview**

The method of valuation differs between the four environmental effects because of different physical characteristics as well as different environmental policies.

1. The environmental effects of $SO_2$, $NO_x$ and small particulate matter occur on a regional level (i.e. in particular on air pollution), while $CO_2$ has an impact on the global environment (i.e. global warming). In the latter case, the location of an emission is not relevant for the geographical distribution of the environmental effects, while for the other gases the environmental effect in a certain region depends on the location of the emission. Consequently, the benefits of reducing emissions of $CO_2$ have to be shared on a global level which is the origin of the prisoners dilemma of climate policy: this policy is only efficient as well as effective if everyone contributes.
2. For $SO_2$ and $NO_x$, the Dutch government has national targets, which implies that the benefits of any emission reduction is equal to the marginal costs of reaching that target. In other words: because of the existence of these targets, an emission reduction does not result in an environmental effect, but has as effect that domestically less other reduction measures have to be taken.
3. For small particulate matter, the Dutch government does not have a national target, which implies that any reduction in the emission results in less environmental damage. Hence, the value of these reductions are equal to the marginal damage costs.
4. For $CO_2$, a policy target exists on European level which is implemented as the permit cap in the European Emissions Trading Scheme. Because of this scheme, the only benefit of reducing carbon emissions is that less other reduction measures have to be taken. Because this benefit has to be shared on a European level, the benefit for the Dutch electricity consumers of less emissions in the Dutch electricity industry is negligible.

In the indirect-valuation methods, the value of a non-priced good is derived from the value of another good which has a market price. Hence, these methods use revealed preferences albeit not directly on the unpriced good. A clear example of this method is the travel-cost method, which measures how much travel costs people are making for visiting a natural park for example. Another example is the hedonistic-pricing method in which for instance the value of a natural park is derived from the relative prices of houses in the neighbourhood of that park compared to prices of houses in other regions. A caveat of the indirect-valuation method is that it can only be used when a direct relationship exists between the consumption of both goods: the priced and the non-priced one.

In the case of emissions of gasses, the indirect-valuation method cannot be used because no clear relations exist between the environmental effect and the prices of specific goods. The dose-response method, however, is generally used for these gasses. The avoided-cost method can also be used for those gases where explicit policy objectives exist. Since the latter holds for $CO_2$, $SO_2$ and $NO_X$, we use the avoided-cost method here.[33]

As mentioned above, for $CO_2$ there is no net effect on the environment because of the existence of the ETS. The permit price in this system can be seen as the shadow price based on the prevention-cost method. This means that the (only) benefit of an emission reduction following from the earlier closure of the coal-fired power plants is that less other emission-reduction measures have to be implemented within the ETS domain. The value of this effect is equal to the permit price times the emissions reduction presented in Table 6. This benefit, however, is enjoyed by all ETS participants in Europe, a group which is significantly bigger than the group of Dutch consumers who are affected by the increase in the electricity price. Therefore, following our legal framework, we cannot take these benefits on board in our analysis.

A similar way of reasoning should be followed if a number of permits reflecting the emission reduction were to withdrawn from the market, for instance by cancelling these permits at the Dutch Emissions Authority. In that case, a real environmental benefit would be realised, equal to the magnitude of the $CO_2$ emissions involved times the damage value of these emissions. From CE (2010) we can see that damage value may be much higher than the permit price in the ETS. Nevertheless, the value of the environmental benefit for the Dutch consumer is negligible as this value has to be shared with all consumers on global level.[34] This illustrates in a very simple way the prisoners dilemma of climate policy: without

[33] Although policy objectives exist for $SO_2$ and $NO_x$, these objectives are currently not restricting actual emissions as they are below the level of the objectives. The appropriate value of the shadow price according to the avoided-cost method would be zero then. On the other hand, any reduction realised will not be offset by an increase in emissions elsewhere, which means that the dose-response method may be used to value these emissions. These shadow prices are about twice as high. If we would apply these, the net effect on consumer surplus would reduce to levels of about – 20 million euro per year, which is still a negative welfare effect.

[34] Using a shadow price based on the marginal damage value of say 100 euro/ton, the total (annual) benefits of reducing 4.5 Mton would be 450 million euro on a global level. Assuming an equal allocation of this benefit among the global inhabitants, the Dutch share of the benefit would be 17 million/7 billion x 450 million euro = 1 million euro.

cooperation on a global level, climate policy is not efficient for individual countries. [35]

For small particulate matter there are no policy objectives in the Netherlands and, hence, we use the dose-response method to value the emissions of this environmental effect. Table 7 gives an overview of the method of valuation per gas and the respective shadow prices. [36] In the text box we summarize how we have dealt with the monetarization of each of the environmental effects.

**Table 7.** Shadow prices of environmental effects

| Environmental effect | Method of valuation | Price (euro/ton) |
|---|---|---|
| $CO_2$ | Prevention | 8.4 – 13.5 (see table 1) |
| $SO_2$ | Prevention | 5,400 |
| $NO_x$ | Prevention | 9,400 |
| Small particulate matter | Damage | 44,300 |

*Source: CE (2010); Warringa et al. (2013)*

Using the shadow prices mentioned in Table 7 as well as the reductions in the volume of the emissions for $SO_2$, $NO_x$ and small particulate matter which are given in Table 6, we are able to calculate the total benefit for consumers of these reductions. In the baseline scenario the annual average value of the benefits appears to be 30 million euro. In the alternative scenarios the benefits are slightly lower or higher.

### C. Net effect on consumer surplus

Having calculated both the increase in consumer expenditures because of the rise in the electricity price and the environmental benefits, we are able to determine the overall effect on consumer welfare. Table 8 shows that in all scenarios the net effect on consumer surplus is negative and varies between – 37 million per year to – 49 million euro per year.

In the scenario where in particular the gas price is lower (Alternative Scenario I), we see that both the impact on consumer expenditures and the environmental benefits are lower than in the Baseline scenario. This results from the fact that in this scenario gas-fired power plants are relatively more dispatched and as a result, the earlier closure of the coal-fired plants has a smaller impact. After all, owing to the lower gas price compared to the coal price, coal-fired units have become relatively less commercially attractive. We find the opposite effect

[35] See S. Barett, *Why cooperate? The incentive to supply global public goods*, Oxford University Press, 2007.
[36] See CE, *Handboek Schaduwprijzen; waardering en weging van emissies en milieueffecten* (2010) en G. Warringa, M. Blom en M. Afman, Effecten van de Regeling Groenprojecten, ESB, 98(4666): 490-493 (2013).

when the carbon-permit price is lower (Alternative Scenario II). In that scenario, coal-fired power plants have a relatively more profitable business-case, which means that an earlier closure of these plants results in higher costs for consumers, but also in more environmental benefits. This is precisely what we see in table 8. The net effect on consumer surplus, however, does not change much.

**Table 8.** Effect of advancing the closure of 5 coal-fired power plants on consumer surplus (in million euro per year, on average in 2016-2021)

| **Scenario** | **Expenditures on electricity** | **Environmental benefits** | **Net effect on consumer surplus** |
|---|---|---|---|
| Baseline | 75 | 30 | -45 |
| Alternative scenario I (lower fuel prices) | 70 | 25 | -45 |
| Alternative scenario II (lower CO2 prices) | 81 | 32 | -49 |
| Alternative scenario III (less offshore wind capacity) | 68 | 31 | -37 |

The net effect on consumer surplus is somewhat smaller when the offshore wind parks show a less successful development compared to that which  is assumed in the Baseline scenario. In this scenario, gas-fired power plants are relatively more important while the dispatch of coal-fired plants is hardly affected as they are still in the middle of the merit order. Because of the latter, the environmental effects are about equal in both scenarios. The impact on prices and consumer expenditures becomes, however, smaller when there is less wind owing to the fact that in this scenario coal-fired plants are less frequently price-setting plants. Hence, early closure of some these plants has on average a smaller impact on prices.

## IV. CONCLUSIONS

We have elaborated on the approach as was also followed by the ACM in its assessment of the proposed agreement of Dutch electricity producers to advance the closure of a number of coal-fired power plants. This approach implies that environmental benefits resulting from a competition-restrictive agreement can be taken into account in the assessment of the agreement. This is not uncontroversial. The antitrust community is in general reluctant to take issues on board that are labelled as ‘non-economic’, non-competition  or ‘non-efficiency’ considerations, because of the fear that this would considerably damage the effectiveness, consistency and predictability of antitrust policy. In principle, we agree with this cautionary approach. However, one of the problems in this discussion is that sometimes a wide variety of policy goals are taken together, including macro-economic policy goals and distributional or equity considerations. The fear is, that widening the narrow view on which efficiencies can be taken into account would open a Pandora's box. We think that this is not a valid argument to abstain from a critical reflection on the welfare criterion that can, or even should be applied in antitrust and that may lead to an inclusion of efficiencies that tend to be disregarded at present. In this respect, we stress the following points.

First, within economic science there is nothing controversial about the so-called broad welfare criterion that we have applied. This approach goes back to the 1920s with Pigou's masterpiece on welfare and economics[37] Since then, the economic science has provided a number of techniques on the valuation of the environmental effects. As a result, including environmental effects in economic analysis of, for instance, infrastructure projects has become the standard procedure.[38]

Second, we strictly adhere to the distributional condition which is implied in the second condition of section 6(3) Mw and Article 101(3) TFEU, as interpreted by the European Commission. This means that we require that the consumers in the relevant market which, as a group, are negatively affected by the agreement should at least be compensated for that harm by the benefits resulting from the agreement.

Third, the last-mentioned condition raises the question of which welfare standard is applicable. From the wording of section 6(3) Mw and Article 101(3) TFEU follows that the legislators have not chosen for an unqualified total welfare standard, but focus on consumer welfare. However, this condition does not imply that only benefits can be taken into account that are incorporated in the product that is the subject of the agreement itself. From a welfare-economic point of view it is clear that the utility that consumers derive from a good like electricity cannot be considered in isolation, without taking into account the effects that the production or consumption of this good may have on the availability of other valuable goods, like clean air. We submit that also from a legal point of view this approach is admissible, as the case law of the European Courts has never required a balancing *within* relevant markets. It

[37] A.C. Pigou, *The economics of welfare* (1920).

[38] For the Netherlands, this standard procedure is described in the so-called OEI-guideline which describes the method of conducting costs-benefit analysis of infrastructure projects.See Eijgenraam, C.J.J., C.C. Koopmans, Tang, P.J.G., Verster, A.C.P., *Evaluatie van infrastructuurprojecten; leidraad voor Kosten-batenanalyse, Deel I: Hoofdrapport Onderzoeksprogramma Economische Effecten Infrastructuur*, Den Haag (2000).

can also be observed that in recent decisions the European Commission carefully considers so called out-of-market efficiencies and takes them into account as far as they are to the benefit of the consumers that are harmed by the agreement.[39]

Based on this legal framework, we have analysed the effects of the agreement of the Dutch electricity producers to advance the closure of 5 coal-fired power plants. We find that the environmental benefits are significantly smaller than the rise in consumer expenditures on electricity. Hence, based on this analysis we cannot conclude that the agreement on the early closure of the coal-fired power plants would be in line with competition law.

We believe to have shown that it is possible to include environmental benefits in a competition analysis on the basis of sound economics, thereby staying within the limits of the applicable legal framework. The expectation of some, that an inclusion of these kind of ‘public’ benefits in a competition assessment will lead to unsolvable quantification problems and/or to a politicizing of antitrust law, cannot be confirmed by this case.[40] The more economic approach in European antitrust goes hand-in-hand with a growing focus on the efficiency defence. This can lead to complicated assessment and quantification problems. But it gives also a chance to reconsider and improve the welfare-economic underpinning of antitrust law and policy.

Nevertheless, one may doubt to what extent cartels which are meant to deliver environmental benefits can be in harmony with the competition law, because of the inherent characteristic of environmental problems happening on (relatively) large geographical scale. As a result, the benefits of any environmental agreement between firms are spread over a large group of individuals, while the costs have to be paid by the consumers directly buying the products of those firms. From this perspective, we conclude that agreements between private undertakings may often not be the best means to achieve environmental objectives.

[39] Most recently: Case COMP/AT.39595 *Continental/United/Lufthansa/Air Canada*, commitment decision of 23-05-2013 on basis of article 9 of Regulation (EC) 1/2003. See also: Alexander Italianer *Competitor agreements under EU competition law*, Speech for the 40th Annual Conference on International Antitrust Law and Policy, held at Fordham Competition Law Institute in New York, 26 September 2013.

[40] See e.g.: B.Y. Orbach, *The antitrust consumer welfare paradox*, Journal of Competition Law & Economics 7(1), P.J. Hammer, *Antitrust beyond competition: market failures, total welfare, and the challenge of intramarket second-best tradeoffs*, Michigan Law Review vol. 98:849 (2000), Office of Fair Trading, Article 101(3) – *A discussion of narrow versus broad definition of benefits, Discussion note for the OFT breakfast roundtable* (2010).