

SUMMARY

This study assesses the possibilities and consequences of the implementation in Lithuania of two new directives adopted after the completion of Lithuania's preliminary negotiations with the European Commission in the sphere of environmental protection.

Directive 2001/80/EC On the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants (LCPs) and Directive 2001/81/EC On National Emission Ceilings for Certain Atmospheric Pollutants seek to limit emissions of the atmospheric pollutants, sulphur dioxide and nitrogen oxides, which cause processes of acidification, as well as to reduce emissions into the air of substances giving rise to eutrophication and ozone.

Under Directive 2001/80/EC, atmospheric pollution from LCPs can be controlled in two ways:

- By determining the limit value of each emitted pollutant that separate installations may not exceed, or
- By ensuring compliance of existing plants with the general national plans of emission reduction from LCPs.

Under Directive 2001/81/EC, member states must reduce annual emissions of SO₂, NO_x, VOC and NH₃ by the year 2010 at the latest. The directive defines national emission ceilings as the maximum amount of a substance (expressed in kilotonnes), which may be emitted from a Member State in a calendar year. By 1 October 2002 Member States have to draw up programmes for the progressive reduction of national emissions, implementation of which would result in the attainment of the set levels of emissions by the year 2010.

As envisioned in the terms of reference, this study is based on the results of the project "Environmental Requirements to the Energy Sector" funded by the Danish Energy Agency. Also a review has been carried out of a recent study by the European Commission with regard to the decrease of emissions from large combustion plants as a result of the adoption of the new directive. In addition, by way of comparison the study describes how the problem of the implementation of the aforementioned directives is being or is intended to be solved in the neighbouring countries.

Economic development in Lithuania has a great impact on the successful implementation of both directives under our consideration. The implementation of the LCP directive is primarily linked with the prospects of the energy sector, as LCPs in the industry sector make up a small part, and the implementation of this directive in such plants does not constitute a problem. The directive on national emission ceilings, apart from the sectors mentioned above, is related to several other sectors: transport and agriculture, even though

the impact of the latter sectors on emissions of pollutants regulated by the directive is not significant.

The reorganisation and modernisation of Lithuania's economy over the last decade have caused a decrease in operations of different industries, which has also had a direct impact on emissions of pollutants into the air. Changes in industry have been of a particularly great influence. For example, pollution with sulphur dioxide, whose main source is the sectors of industry and energy, decreased nearly 5-fold from 1990 to 2000.

Legal gap assessment

The directives under consideration are related to a number of national laws.

The requirements of Directive 2001/80/EC have already been partially transposed into appropriate Lithuanian legislation. However, a possibility must yet be envisioned for the application to LCPs of the directive's second method of implementation: plans of emission reduction from LCPs, and amendment of the provision stipulating mandatory continuous measurements of emissions for installations of a certain size.

The national law does not yet have a standardising document, which transposes the requirements of Directive 2001/81/EC. The Ministry of Environment intends to prepare laws in the second quarter of 2002 implementing the directive's requirements.

Development of national plan for emissions from LCPs

The LCP directive may be implemented in two main ways. This study recommends implementing the directive by employing the second method: the general national plan of emission reduction. This method would be less costly due to lower operational expenses for fuel, as it would be possible to burn petroleum residue or orimulsion with sulphur content of more than 1 % by mixing them with gas or biomass. However, the methodology of drawing up this plan, whose key guidelines are presented in the directive, is faulty in its essence for Lithuania due to the country's specific situation with regard to the shutdown of the Ignalina Nuclear Power Plant (INPP). The directive instructs to apply the conditions of energy production of 1996-2000 for achieving emission results by the year 2010. Therefore a proposal is made in the process of future technical consultations with the EC to seek a modification of the methodology of calculating national emissions from LCPs. The study offers a different method for calculating total emissions.

It is the opinion of the authors of this study that a suggestion could be made to calculate the total limit emissions based on an assumption that the volume of power generated by the Ignalina Nuclear Power Plant and used for the country's needs would have been produced not by this plant but by the plants that operated in 2000 and had large combustion installations.

Costs

The implementation of Directive 2001/81/EC on National Emission Ceilings for Certain Atmospheric Pollutants will require an additional 150,000 litas in administrative expenses for various one-time tasks (review of the methodology of preparation of annual inventories of national emissions and of the methodology of determination of projections for SO₂, NO_x VOC and NH₃ emission quantities until 2010, evaluation of exceedance of the 1990 critical loads by pollutants that cause acidification, determination of critical load projections for the year 2010, and assessment of critical levels of ground-level ozone as set forth in the directive and determination of projections for the year 2010), and permanent expenses for two additional positions. However, there will be no need for investments.

The implementation of Directive 2001/80/EC will require additional training for specialists of the regional departments of the Ministry of Environment, but the highest costs are related to future investments.

The main investments will have to be designated for the conversion of the existing large combustion installations to run on a different type of fuel, their modernisation and additional required gas pipelines. Moreover, investments will be needed to continuously monitor the fulfilment of commitments in the sphere of air pollution.

Two main scenarios have been used to calculate investment costs. Scenario I is based on the results of the (COWI) project funded by the Danish Energy Agency. Scenario II includes subsequent calculations done at the Energy Institute, as well as other corrections and amendments of costs. Among such costs are also expenses for equipment designed for desulphurisation of flue gas at the Vilnius and the Kaunas thermal power plants. These expenses are required to ensure the work of the aforementioned plants in the event that the supply of gas by a single source were disrupted for some reasons. In addition, Scenario II takes into account also other expenses that are not solely related to energy producing enterprises, for example, expenses needed for building gas pipelines.

Therefore, the inclusion of investments for the construction of gas pipelines into the expenses of implementing the LCP directive would bring the total investments up to more than LTL 2bn. The implementation of actions under Scenario II, apart from expenses for gas pipelines, but taking into account additional expenses at the thermal power plants in Vilnius and Kaunas and the Lithuanian Thermal Power Plant (LTPP), would cost around LTL 1.8bn.

The table below shows the total costs of implementing the LCP directive.

LCP directive's implementation costs

<i>Components of costs</i>	<i>Amount (LTL m)</i>	
	<i>Scenario I</i>	<i>Scenario II</i>
Total investment cost	880	2.300
Annual investment cost	130	280

Change in annual expenses for operation and maintenance	83	100
Total annualised cost after Directive's implementation	230	400

Impact on prices

The conversion of boiler houses to use biomass should not increase the production price significantly. At the six boiler houses under consideration (Rokiškis, Raseiniai, Varėna, Beržė, Mazeikiai and Simega enterprise), for which expenses were calculated, the increase of the heat cost will account for no more than 1-1.5 percent, should all costs be financed from loans.

The calculations related to the Lithuanian Power Plant allow assessing a possible increase in electricity prices after achieving the measures on the implementation of the LCP directive. The preparation of the LPP to operate at full capacity and the installation of appropriate environmental protection measures have the greatest impact on consumers. Under Scenario I, the price increase would constitute 6-10 percent compared to the current prices. In case of Scenario II, the increase would already make up approximately 10-15 percent of the existing electricity price in the event that loans are obtained to compensate the investments. Should 50 percent of investments come in the form of assistance, the increase of expenses for electricity at the end of the implementation period of Scenario II would be 2.4 cents/kWh.

The direct impact of the implementation of the LCP directive under our consideration in the industry sector will possibly be felt by the heat-only Simega enterprise that has no gas supply and the Mazeikiai oil refinery. Certainly, the indirect impact through increased electricity prices is possible on a large number of Lithuanian industrial enterprises, especially those whose production is power consuming. Nevertheless, since expenses for electricity do not constitute a material portion of the overall costs of industrial production, a ten-percent increase in electricity prices would not actually mean a significant influence on the cost of production in the majority of industries.

The table below summarises the differences of heat and electricity costs under different funding scenarios.

Additional heat and electricity costs due to LCP directive's implementation under different financing scenarios

<i>Average additional costs (ct/kWh)</i>	<i>100 percent of investments from loans</i>	<i>50 percent of investments from loans</i>	<i>0 percent of investments from loans</i>
Heat production at boiler houses ¹	~1	0	0
Electricity production at	3.6	2.4	1.1

Lithuanian Power Plant ² (Scenario II)			
--	--	--	--

Source: Calculations of ¹Danish project and authors of ²this study

Affordability

In case of Scenario I, annual investments until the year 2010 would constitute nearly LTL 120m. If an assumption were made that the government will contribute at least 20 percent of the investments, the government's burden would equal LTL 24m per year. According to Scenario II, the government's contribution planned under the same conditions should come to approximately LTL 54m per year until desulphurisation equipment is installed at the thermal power plants of Vilnius and Kaunas. Later, until the Lithuanian Power Plant is ready to start operations in line with the directive's requirements, the government's annual allocations under the same conditions should constitute around LTL 37m. Should the financing conditions be different, the government's contribution would be adjusted accordingly.

The possible obtainment of loans for the restructuring of boiler houses by the local governments within whose jurisdiction the facilities under our consideration are located should not considerably increase the borrowing limit, as the amounts required to restructure separate boiler houses are not high.

The investments at the Lithuanian Power Plant will have a greater impact on the population's ability to pay. If an assumption is made that income of households on average will continue growing as before (a total increase of about 40 percent by the year 2010), a 10-15 percent increase in electricity costs at the earliest starting from the year 2010 should not cause great problems to an average Lithuanian resident. Certainly, the implementation of this EU law is one of a great number of other steps for implementing the *acquis*, and the aggregate burden of the implementation of all directives may become overly large per capita in Lithuania.

Financing

It is recommended to apply for ISPA assistance concerning the restructuring of boiler houses. The LPP restructuring, which requires the largest portion of the investment funds, may be viewed as a part of the overall package for the closure of the Ignalina Nuclear Power Plant or as a potential ISPA investment project.

Consequences of breach of requirements

Member States that do not fulfil their commitments assumed in the sphere of environmental protection are threatened with sanctions from European Union institutions. Both administrative and legal measures may be applied. Therefore, if certain LCPs were incapable of implementing the Directive's requirements within the prescribed term, the fairest solution would be to apply to the European Commission for a transition period only for the specific large combustion installations.

Benefits of Directives' implementation

Evaluating the benefit of the implementation of the subject directives, we must limit ourselves only to its identification in terms of quality. From a financial perspective, the evaluation of an improvement of environmental protection is extremely complicated. The reduction of SO₂ and NO_x emissions will have a major impact on the health of the population. The implementation of the directives will be beneficial to the sectors of agriculture, forestry and fisheries. Economic benefit should also be gained by industries or enterprises, which manufacture, supply and sell cleaner technologies, fuel and equipment for the removal of pollutants. The benefit will also be enhanced by the reduced level of transboundary pollution.

Conclusions

It is stated in the conclusions that due to a dramatic decrease of emissions over the past decade, which are regulated by Directive 2001/81/EC on the National Emission Ceilings for Certain Atmospheric Pollutants, the implementation of this directive in Lithuania is not expected to cause any major problems. The implementation of this directive will require certain additional institutional abilities and administrative and legal actions. However, the implementation of this directive does not require a transitional period.

The implementation of Directive 2001/80/EC On the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants is problematic due to an uncertainty in the strategy for the development of the energy sector by the year 2010 and potentially high investment costs.

After the INPP is decommissioned, the implementation of this directive will require large investment costs, especially for the Lithuanian Power Plant. If the required investment funds were utilised regularly in requisite amounts (approximately LTL 18m per year under Scenario II) until the year 2010, no application for a transition period in implementing the directive would be necessary. However, due, firstly, to the questionable energy strategy until the year 2010, secondly, to indefinite sources of financing of large investments, and, thirdly, to the possibly insufficient ability to prepare and fulfil large investment projects, the decision concerning the period of transition for the implementation of the LCP directive in Lithuania should be made at a later date, after the above listed conditions are clarified. Realistically, this can be accomplished in 2005-2006.