

## **Paper on Harmonisation with EU legislation in the Czech republic: transposition of the 2001/80 Directive on the limitation of emissions of certain pollutants into the air from large combustion plants**

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### **Introduction**

#### **History of air protection in the Czech Republic**

Emission limit values for large and medium-sized combustion plants and conditions for protection of the air were stipulated in the Czech Republic in the year 1991 in Measure of the Federal Environmental Committee concerning the Act on Air, No. 309/1991 Coll. This Measure specified emission limit values for sulphur dioxide, nitrogen oxides, particles and carbon monoxide for combustion plants with rated thermal output of 0.2 MW and greater.

In 1997, part of the Measure concerning emissions was repealed through Decree of the Ministry of the Environment of CR No. 117/1997 Coll. This Decree stipulated emission limit values for individual types of combustion plants, laid down the requirements for their operation, keeping of operational records, emission measurements and also requirements for the quality of fuels from the viewpoint of their sulphur content. The Decree was amended in 2000.

Implementation of the emission limit values and other requirements stipulated in the above-specified regulations has led to an order-of-magnitude reduction of emissions of particles and sulphur dioxide and to a marked decrease in emissions of other pollutants. Emissions of sulphur dioxide in the year 2001 were 4 times lower than in the year 1995, while emissions of particles were 3.5 times lower. A substantial, although not as high a reduction has been achieved in the reduction of emissions of nitrogen oxides.

In Annex No. 2, Part 1 "Fuel and energy industry", of Decree No. 117/1997 Coll. air protection conditions were imposed for all plants whose rated thermal output exceeded 0.2 MW. Decree No. 117/1997 Coll. adopted the vast majority of emission limit values and conditions for operation of pollution sources from the Measure of the Federal Environmental Committee, whose concepts followed, in particular, from air protection legislation in Germany, namely the TA LUFT regulation, and for large boilers, from the Regulation of the Germany on large combustion plants.

Undoubtedly, these limits have fulfilled their purpose as they have led to a substantial reduction in annual national emissions of a number of pollutants. The vast majority of plants complied with the new limits within the deadline laid down by the Act on air of December 31, 1998.

As a result of the above-mentioned measures, the following reductions in emissions from existing plants in the Czech Republic were achieved between 1996 and 2000.

Table 1: Emission reduction of pollutants in the Czech Republic

Year	PM	SO <sub>2</sub>	NO <sub>x</sub>
1996	100,00%	100,00%	100,00%
1997	56,09%	71,71%	92,84%
1998	31,98%	41,73%	83,10%
1999	10,89%	22,63%	76,79%
2000	9,70%	24,96%	87,08%

Implementation of the Decree has also contributed to fulfillment of international commitments in the area of air pollution. This is valid, in particular, for the Geneva Convention on Long-range Trans-boundary Air Pollution (CLRTAP).

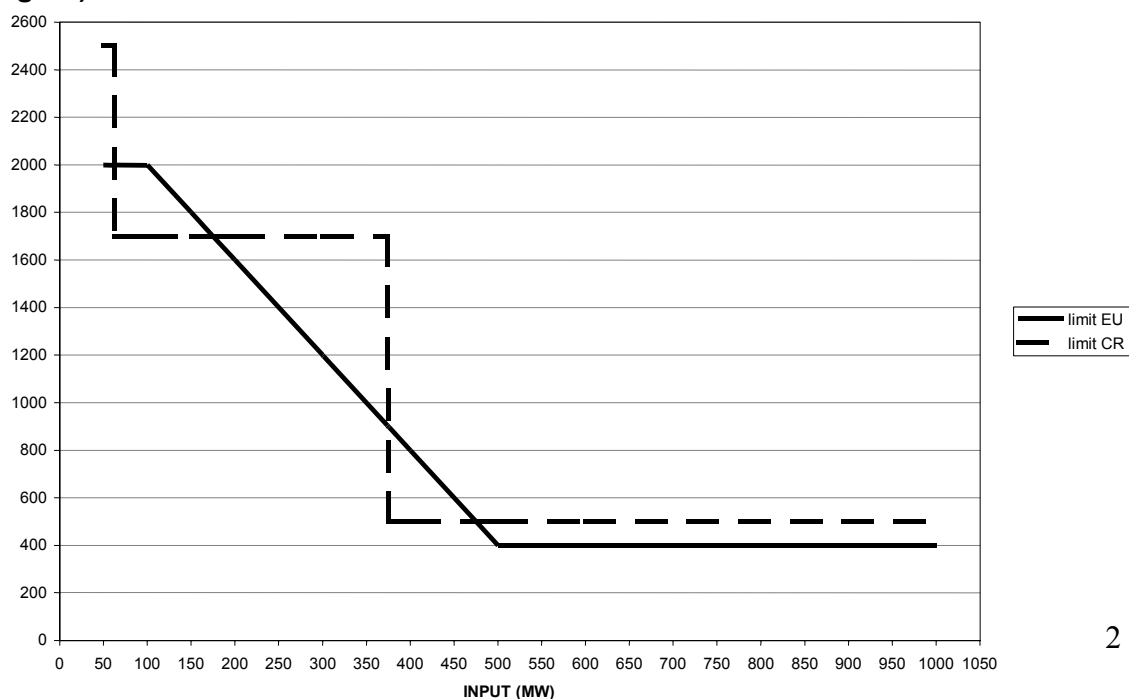
## Main Subject

### Transposition of the 2001/80 Directive on the limitation of emissions of certain pollutants into the air from large combustion plants in the Czech republic

In 1988, the European Union issued Directive No. 88/609/EC. In comparison with the national legislation in the Czech Republic is concerned exclusively with combustion plants with thermal input exceeding 50 MW. These plants have a substantial contribution to long-range transport of air pollution.

A comparison of the Czech and EU approach is in the following graph.

**Comparison of emission limits for SO<sub>2</sub> in the EU and the Czech Republic**  
limit (mg/m<sup>3</sup>)



In contrast with the national legislation of the Czech Republic, which imposed emission limits on plants without regard to the date of their establishment, Directive No. 88/609/EC defined emission limit values only for plants that were approved for construction after July 1, 1987.

The term thermal input was not specified in Act on Air No. 309/1991 Coll., as amended. This term was introduced by the new Act on Clean Air Protection and Amendment of Some Other Acts, No. 86/2002 Coll.

The amended 88/609/EEC Directive - 2001/80/EC Directive also applies to plants that were built before July 1, 1987; emissions from these plants must be limited from 2008. Transposition of the new Directive to the national legislation of the Czech Republic has been very complicated, as it required a combination of elements of valid legislation with EC regulations.

There were almost no problems with plants which were constructed after the above-mentioned deadline (July 1, 1987). In this case, the Czech Republic only requested two transitional periods. The biggest problem concerning the transposition represented the group of plants constructed before July 1, 1987.

Directive No. 2001/80/EC lays down, in particular (Article 4), the following rules: New combustion plants must meet the emission limit values (ELVs) given in the Directive. For 'existing' plants (i.e. those in operation pre-1987), Member States can choose to meet the obligations by either:

- Complying with ELVs for NO<sub>x</sub>, SO<sub>2</sub>, and particles.
- Operating within a 'National Plan'. That would set an annual national level of emissions calculated by applying the ELV approach to existing plants on the basis of those plants' average actual operating hours, fuel used and thermal input, over the 5 years to 2000.

The Parliament of the Czech Republic has opted for the second variant of reducing emissions from existing plants, which is undoubtedly more effective from the financial point of view. Indeed, it followed from negotiations between representatives of operators and representatives of the Ministry of the Environment that 12 operators could encounter problems in complying with the requirements of the Directive in case of application of emission limit values.

Employees of the Ministry of the Environment have repeatedly verified the ability of operators of plants to comply with the new Directive. The most important issue appeared to be connected with the combustion of local solid fuels, lignite and black coal. The majority of plants whose operators will have to carry out the necessary measures for compliance with stricter requirements use this type of fuel.

However, certain operators who have already introduced desulphurisation units are also experiencing difficulties in complying with emission limit values for sulphur dioxide, because these units are not sufficiently effective to comply with the new requirements. Furthermore, full amortization has not yet been achieved.

Exceptionally, operators encountered problems in compliance with emission limit values for particles and nitrogen oxides.

Difficulties in implementation of the Directive are also caused by the fact that setting the emission limit value for a plant sometimes requires adding up the inputs of individual units that form parts of the plant.

With the option for the national emission reduction plan, the number of problematic plants was reduced and a transitional period was not required for them. Reduction in emissions from these problematic plants is dealt with in the framework of the National Program to Decrease Emissions of Particles, Sulphur dioxide and Nitrogen Oxides from Existing Very Large Combustion Stationary Sources of Air Pollution No. 112/2004 Coll. (National Program).

At the present time, operators are usually able to comply with emission limit values for nitrogen oxides through primary modifications of the combustion process. After 2015, compliance with these limits, given the stricter requirements, will be more demanding and will require secondary measures.

As has already been mentioned, the Czech Republic has applied emission limits to all existing plants (similar to 2001/80/EC) since 1998 (i.e. 10 years before the entry into force of the new LCP Directive). However, aggregation of thermal inputs to set emission limits had not been realised by that time. On the other hand, emission limits in the Czech environmental legislation are in some cases more stringent than EU limits, for example, in the case of fluid boilers ( $500 \text{ mg/m}^3$ ) for all levels of thermal input.

Desulphurisation units were set up in most of the plants incinerating solid fuels during 1996-2000. Also, substitution of fuels was realised. Use of gaseous fuels is increasing continuously as liquid fuels (mainly heavy fuel oils) are currently replaced by gaseous fuels.

Nearly 50 billion CZK was invested to achieve the emission limits setting by the Czech national legislation during the period 1995 – 2000. It is estimated that costs for implementation of the National Program will be lower by an order of magnitude than if the emission limits were applied.

The regulation of Government Order No. 352/2002, setting forth emission limit values and other requirements for the operation of combustion stationary sources of air pollution, transposes Directive 2001/80/EC and adopts the provisions of Decree No.117/1997 Coll., as amended, which are concerned with large, medium and small-sized combustion sources of air pollution; the Regulation also sets out principles for elaborating the national emission reduction plan.

These principles are further specified in the Government Order setting forth the National Program to decrease emissions of particles, sulphur dioxide and nitrogen oxides from existing very large combustion stationary sources of air pollution No. 112/2004 Coll. (National Program)

There are 111 existing large combustion plants included in the National Program. It is anticipated that emissions of SO<sub>2</sub> will have to be reduced by 7 thousand tones between 2000 and 2008 while current measures regarding NO<sub>x</sub> and particles will ensure compliance with the directive in 2008.

The Government Order sets emission ceilings for particles, sulphur dioxide and nitrogen oxides for individual existing large combustion plants by 2008. They were calculated using the following methodology:

- a) For each year (1996 to 2000), the amount of heat input was established for the plants for each type of fuel burnt (product of heating value of the fuel and its amount).
- b) The average heat input to the plant was established for each type of fuel during the period from 1996 to 2000.
- c) The amount of combustion products was established for the average amount of heat input from each type of fuel (by measurement or calculation).
- d) The result was divided by the average number of hours of operation of the plant in the period from 1996 to 2000, thus yielding the average amount of combustion products per hour.
- e) The amount of combustion products was multiplied by the average emission limit value laid down in Government Order No. 352/2002 for new especially large combustion plant for the given fuel and the average hours of operation of the plant.

f) The values for individual fuels were added up.

The following values of national emission ceilings for the entire group of existing large combustion plants which must be complied with by January 1, 2008 were set down by adding up the individual emission ceilings for particles, sulphur dioxide and nitrogen oxides for all 111 monitored LCPs. The results are in the following table.

Table 2

<b>Substance (Group of substances)</b>	<b>National emission ceiling (Thousand tones)</b>
Particles	13.989
Sulphur dioxide	150.631
Nitrogen oxides	129.544

Comparison of the calculated values of national emission ceilings for particles, sulphur dioxide and nitrogen oxides for the entire group of existing large combustion plants with values for the years 2000 and 2001 is given in the following table:

Table 3

Substance (group of substances)	Emission ceiling 2008 (thousand tones)	2000 emissions (thousand tones)	2001 emissions (thousand tones)	2002 emissions (thousand tones)
Particles	13.99	5.14	6.00	5.48
Sulphur dioxide	150.63	162.67	157.11	154.54
Nitrogen oxides	129.50	107.50	105.46	106.78

It follows from the data specified in the table that there is a possibility of non compliance with the directive 2001/80/ES only in the case of sulphur dioxide, where the overall national emissions are exceeded by 7 thousand tones.

The National Program stipulates the aim to reduce total annual emissions of nitrogen oxides (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>) and dust in all existing large combustion plants on the territory of the Czech Republic to a level responding to emission limit values for new plants as if they had been applied to the existing plants in operation in the year 2000, on the basis of average values over a real annual period of operation, used fuel and thermal input during the last 5 years of operation up to the year 2000 inclusive.

As a consequence of the shutdown of a plant included in the programme the total annual emissions of remaining plants which are included in the National Program must not increase. Within the framework of the National Program, under no circumstances can the facilities be exempted from the duty of keeping the provisions of relevant laws regulating air protection. Even after the date of 1 January 2008, operators must meet the emission limit values, which are valid for plants according to Annexes 1 and 2 of Government Order No. 352/2002 Coll.

The project and time schedule of reconstructions or other investment activities for compliance at least by 1 January 2008 with the emission ceilings at plants stipulated by the

air protection authority, shall be included in the Individual Plan of Emission Reduction of a single combustion plant. This plan will be controlled at least once a year.

More stringent emission ceilings and limit values at plants that fulfill the plan shall be set to the date of 1 January 2016.

In case of the permanent shutting down of any large combustion plant, this plant shall be removed from the National Program and the overall national emissions from large combustion plants on its fraction of emissions shall be decreased.

## Conclusions

There are two groups of plants covered by the National Program (Annex 1 and Annex 2 plants). The operators of Annex 1 plants continue in fulfilling the emission limits that are set by the current valid legislation. The second group has the obligation to reduce emissions. The Annex 1 plants are relatively small plants. For operators of these plants, it would be very difficult to comply with the new emission limits that are set by the 2001/80/EC directive. On the other hand, the second group (Annex 2 plants) is formed by big energy companies, which have substantial potential to reduce the emissions of sulphur dioxide and in this way fulfil the obligations resulting from the 2001/80/ES Directive. Reducing emissions from the Annex 2 group is efficient from the economic and also environmental point of view.

The operators of plants from the first group shall submit to the Regional Authorities a plan to decrease emissions of particles, sulphur dioxide and nitrogen oxides from large combustion plant for approval in accord with the provisions of § 5 (7) of the Act on air. It is the goal of the plan to maintain or decrease the current level of emissions.

In preparing the plan for the plants in Annex No. 1 to the Regulation, that burn solid fuels, it shall be assumed that the specific sulphur content of the fuels shall not increase above the average level for 2000 to 2002.

If this requirements cannot be met due to serious technical reasons, the individual emission reduction plan shall state measures through which the increase in sulphur dioxide emissions will be compensated or otherwise dealt with, including reasoning for this approach, with the exception of plants where these measures cannot be used for technical reasons. In these exceptional cases, it shall be possible to provide for a corresponding decrease in emissions from some other plant from Annex No. 1 or No.2 to this Regulation, assuming that this measure does not demonstrably lead to exceeding of the air quality limit values.

The operators of the Annex 2 plants shall submit to the Regional Authorities a plan for approval in accord with the provisions of § 5 (7) of the Act on air. It shall be the goal of the plan to decrease total annual emissions of sulphur dioxide from each large combustion plant. This decrease has been negotiated between representatives of big energy companies and the Air Protection Department of the Czech Ministry of Environment.

Some plants included in the National Programme may close by 2008. The Czech Republic will of course amend the National Program to take account of such changes.

Due to its flexibility, the national emission reduction plan enables costs for implementation of 2001/80/EC to be lower by an order of magnitude than if the emission limits were applied.

## References:

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