

Calculation of profits from the sale of saved allowances by ČEZ in the CR

Summary

Allowance savings in the year 2005 are composed of two parts. Profit is calculated through the simple subtraction of costs related to allowance savings from the yields acquired from their sale. While the yield from the sale of allowances is basically the same methodically for each part of the savings, i.e. the number of allowances multiplied by the price, the nature of cost calculations is different for every part of the savings. The individual parts of allowance savings are as follows

1. Reducing emission intensity of electricity production

This factor comprises two components:

- Reducing emission intensity in production from coal through dispatching and shutdown of power plants and implementation of energy savings
- Substitution of production at coal power plants with production from renewable and nuclear sources

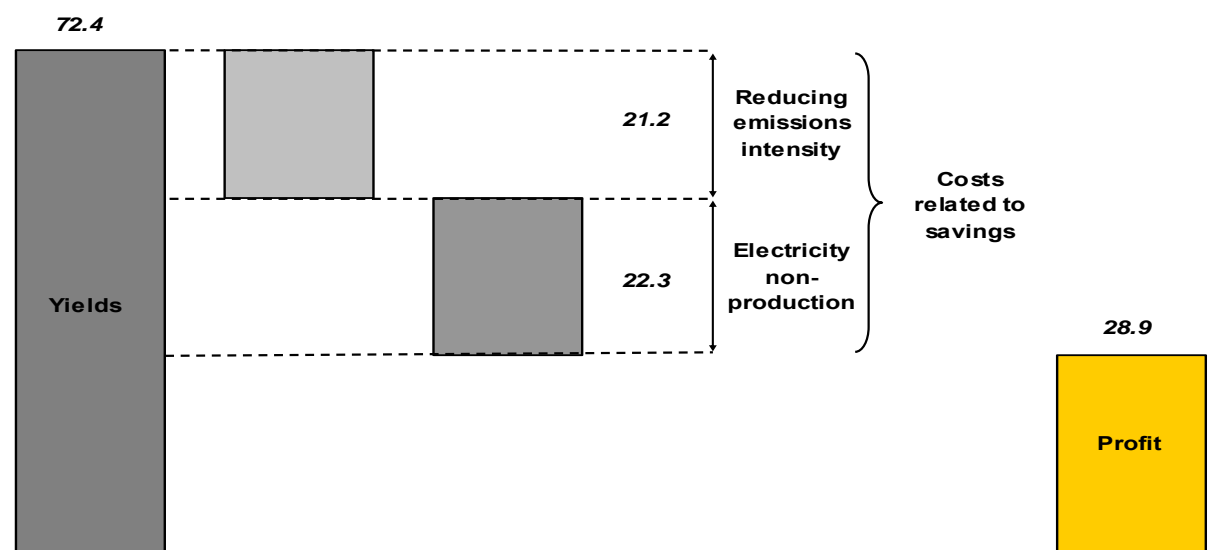
2. Non-production of electricity at coal power plants

The table below summarises the individual yield and cost items:

		Emission reduction (Mt)	Cost (mil. €)	Yield (mil. €)	Profit (mil. €)
1	Improvement of emission factor	1.480	21.2	28.9	7.7
2	Electricity not produced	2.637	22.3	43.5	21.2
	Total	4.117	43.5	72.4	28.9

It follows from the summarised table that in 2005, ČEZ's facilities included in the emissions trading scheme released **4.117 million tonnes** less of CO₂ than the number of allowances allocated by the allocation plan (the allocation was 36 867 184 allowances, while emissions in 2005 reached a level of 32 750 326 tonnes of CO₂). Given an average sale price of 16.5 €, the sale of this excess profit before tax (hereinafter profit) amounts to a volume of **€ 28.9 million**. The method of calculating the individual parts is described in detail below.

Procedure for stipulating profits from allowances (mil. €)



1. Reducing emission intensity in production from coal through dispatching and shutdown of power plants and implementation of energy savings

1.1. Calculation of savings

Quantification of the impact of this component is calculated based on a comparison of the emission factor in 2004 (i.e. before the launch of the EU ETS) and the emission factor in 2005 (when the impact of the EU ETS is already apparent).

Comparison of the emission factors is indicated in the following table:

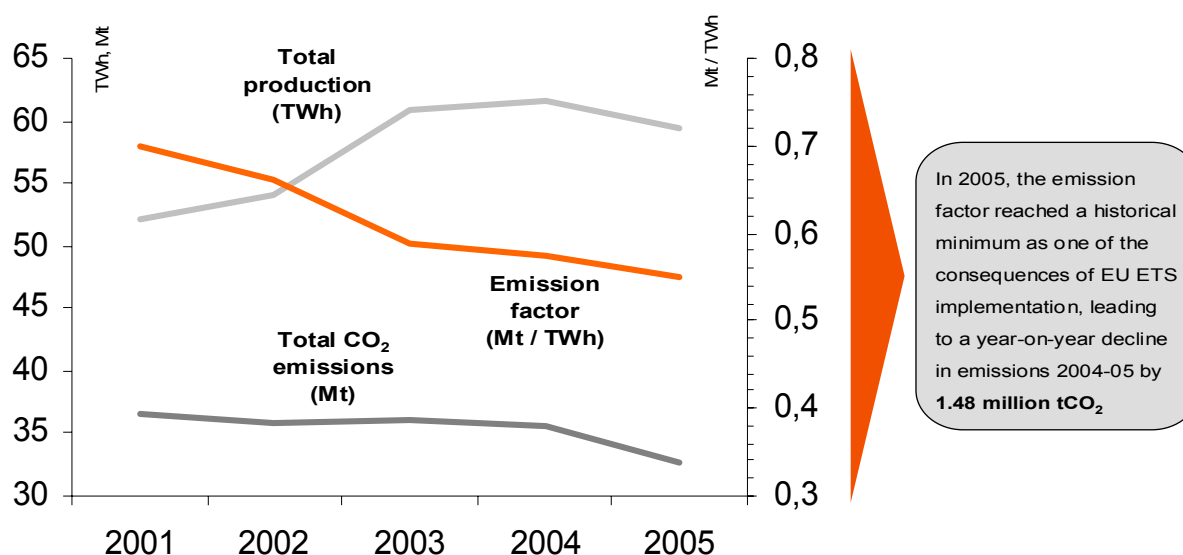
	2001	2002	2003	2004	2005
Total production (TWh)	52.162	54.118	60.934	61.602	59.470
CO ₂ * emissions (Mt)	36.515	35.890	36.083	35.647	32.750
Emission factor	0.700	0.660	0.589	0.576	0.551

* CO₂ emissions are converted so as to be cleared of the impact of the change in the monitoring and reporting methodology induced by the launch of the EU ETS (see the introduction to Part 2.)

Emission reductions achieved through an improvement of the emission factor are based on a comparison of the real level of emissions in 2005 and the level of emissions that would occur if the emission factor had not been improved, i.e.:

Reduction = (production in 2005 * emission factor 2004) – emissions in 2005 = **1 480 095 t CO₂**.

Thanks to an improvement in electricity production efficiency, a total of 1 480 095 allowances were saved.



1.2. Calculation of profits

By multiplying the volume of savings by the average sale price of allowances, i.e. 16.5 euros, we calculate the yield which totals **€ 28.9 million**.

The calculation of costs includes only the extra costs incurred directly in consequence of EU ETS operation. A number of measures at power plants were planned regardless of the EU ETS, but were accelerated in consequence of the EU ETS – in terms of cost calculation, only the effect of this acceleration is accounted for (time value of money). At the same time, it must be noted that a number of investment measures implemented or launched in 2005 will bring emission reductions only in upcoming years. In 2005, there is a substantial prevalence of emission savings achieved through the dispatching of power plants and optimisation of their operation. The cost item for this factor also includes costs related to the implementation and operation of the EU ETS at ČEZ (implementation of monitoring standards, system administration, emissions verification). Costs induced by the EU ETS system totalled € 21.2 million in 2005.

Costs can be classified in the following manner (mil. €):

Investment induced by EU ETS	13.7
Costs of investments (time value of money)	7.3
Human resources – capacity development	0.17
Verification of emissions	0.03
Total	21.2

In terms of concrete measures at power plants, they comprise the following measures, which include investments and the time value of money, where relevant (mil. €):

Measures	EU ETS effect
EME – reconstruction of the black oil station, reduction of own consumption	0.25
EME – reconstruction of LJ K 11 heater drive EMĚ III	0.29
ETI – upgrade of TG 5 at ETI 1	0.49
ETI – reconstruction of feeding pumps	0.48
ETI – reconstruction of cooling pumps	0.32
EPO – reconstruction (new TG)	0.83
EDE – replacement of main feeding pumps	1.16
ECH – reconstruction of boilers	0.01
ECH – replacement of main feeding pumps	1.16
ELE – replacement of 110 MW turbine in block B4	0.02
ETU – reconstruction of Ljungstrom sealing	0.05
Optimisation of the setting portfolio	1.35
ETU – complex repairs	6.37
ETE – upgrade and increase of efficiency	3.09
ETE – shortening of the GO with increased availability	0.01
ETE – harmonisation of the block cooling mode	0.10
EDU + ETE – increased availability	0.35
Maintenance of efficiency of expiring facilities	4.69
TOTAL	21.02

After subtracting costs from yields, we get a profit of € 7.7 million.

2. Non-production of electricity implemented at coal power plants

2.1. Calculation of emissions

In the course of 2005, the method for emissions monitoring became stricter; this particularly concerned the stipulation of carbon content in fuel based on laboratory analyses (not by calculation using aggregated tabular values) including analysis of the calorific value, oxidation and emission factor. By comparison of the value reported according to the new method required within the EU ETS and the tabular values used in the past, it is possible to determine a difference of about 6% in the method, which is about 2.2 million allowances from the allowances allocated to ČEZ for the year 2005.

Although these 2.2 million allowances are in some sense extra allowances, ČEZ was not over-allocated in reality. The total allocation to ČEZ was 36.8 million allowances, while the real expected needs of ČEZ in 2005 were about 37.5 million allowances. This real need is calculated as follows:

- If the EU ETS system was not in place, or if the market prices for allowances were not sufficiently motivating, ČEZ would release at least 1.48 millions tonnes more of CO₂ into the air in 2005 than was really the case (reduction of emissions in production of the emission factor – see Part 1).
- Another expected need is represented by unrealised exports in the amount of 3 TWh, which is about 3.3 TWh of electricity in terms of production. This is the value of the year-on-year decline in exports compared to 2004, and from the perspective of allocations it was relevant to believe that the value of exports in 2005 would at least equal exports in 2004 (this is a conservative estimate; like domestic consumption, exports may be expected to rise given developments in Europe). Exports were not realised because after taking into account all the relevant parameters (in particular allowance prices and the price of cross-border profiles), they were not economically attractive. Given that low-emission sources (atom, water) are used in the basic regimen, the increase of production would be realised in coal power plants, whose emission factor is set at a level of 1.000 for easier use. Hence we achieve emission reductions in the volume of 3.30 million tonnes of CO₂ from non-production as a result of the decline in exports.
- Had ČEZ failed to adapt its behaviour to the motivational incentives of the EU ETS and realised the same volume of exports as in 2004, it would have used up the volume of allowances in 2005 calculated in the following manner: Needed volume of allowances (in millions) = 32.75 [real emissions in 2005] + (1.48) [savings in production] + 3.30 [unrealised production] = 37.53.

Simple subtraction of the allowances needed to cover expected emissions defined according to the principles above (i.e. 37.53 million allowances) from the allocation granted to ČEZ within the framework of the NAP (36.87 million allowances) results in a volume of about 0.66 million allowances that ČEZ would be short in 2005.

Hence, in the context of the purpose of quantifying profits, all the saved allowances remaining from the total savings can be considered the effect of non-production of electricity (4 116 858 after deducting the impact of the factors described in Part 1), which amounts to **2 636 763** allowances (4 116 858 – 1 480 095 = 2 636 763).

2.2. Calculation of profits

By multiplying the volume of savings (2 636 763) by the average sale price of allowances for 16.5 euro, we calculate the yield which totals **€ 43.5 million**.

It follows from this calculation that 2 636 763 tonnes of CO₂ were not released because production was not realised at the power plants, representing a lost business opportunity.

In terms of production, this level of emissions represents **2 637 703 MWh** of electricity not produced. For calculation of the costs, the following values are used:

Average variable costs per MWh for production from coal in 2005	€ 21.0
Average price per MWh of electricity from coal in 2005*	€ 29.5
Lost margin per MWh of electricity from coal not produced	€ 8.5

* The average price deduced from the export opportunity price (price in Germany minus the price of cross-border profiles)

Thus costs for this factor are calculated using the following formula:

$$2\,636\,763 \text{ MWh} * 8.5 \text{ €/MWh} = \text{€ } 22.3 \text{ million}$$

After subtracting costs from yields, we get a profit of **€ 21.2 million**.

