

**FOR A FAIR  
COAL – NATURAL GAS  
COMPETITION  
THROUGH A PROPORTIONAL SAVING  
ON COAL SOLD**

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of  
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## 0 Introduction

An initial study, “For a fair coal-natural gas competition” [6], was sent to various Administrations participating in the Climate Summit in Paris, next December.

They showed great interest in the study through comments and questions, which we would like to answer.

## 1 Purpose of the study

We propose a geopolitics for **coal pricing** in order to establish a long-term competitive balance between natural gas (NG) and coal on the energy market, reduce CO<sub>2</sub> emissions, orient investments towards target energy resources, and complement CO<sub>2</sub> emission trading systems (ETS).

## 2 Summary

Coal and natural gas (NG) are both used to generate electricity.

KWh from coal is, in many regions, more economical but its CO<sub>2</sub> emissions are approximately two times higher.

The study evaluates a **coal pricing** method that would make kWh-GN competitive to kWh-coal by applying a proportional saving on coal produced. Such saving would be entrusted to an International Investment Fund whose mission would be to fund investments intended to reduce CO<sub>2</sub> emissions from power plants.

Through this, we hope to contribute to the establishment of a **coal pricing** method demanded from companies and banks by the World Bank within the scope of the Climate Summit initiated by the Secretary General of the United Nations, Mr. Ban Ki-moon.

## 3 Background

Like natural gas (NG), the coal used for the production of electricity releases approximately twice as much CO<sub>2</sub> into the atmosphere as NG. The lack of a geopolitics for **coal pricing** did not allow establishing a competitive balance between natural gas and coal. An advantage resulted in favour of coal, which not only is clearly more competitive for many regions, but also clearly more polluting due to its higher CO<sub>2</sub> emissions.

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How to establish a competition with equal chances for natural gas and coal is the issue raised by this study. Before proposing an alternative to taxing, let us evaluate the coal price which would allow a fair competition between NG and coal.

## 4 Balanced competition between coal-energy and NG-energy

The study [1] of the International Energy Agency (IEA) mentions the cost of electricity produced from coal and NG. A cost bracket is given for both of these alternatives. The lowest costs are selected hereafter :

. for coal : \$0.0294/kWh in 2008

. for NG : \$0.0358/kWh in 2008

The difference of \$0.0064/kWh in 2008 in favour of coal is assumed to be the same *today*.

The *current* difference, varying from one region to another, is not evaluated by our study.

It can be priced based on the European Commission's study [2].

This cost difference can be reduced by taking into account the different emissions of both these energies.

The cost of the kWh-coal is currently lower than that of the kWh-NG. However, these emissions are higher. They represent a surplus. A price applied to this surplus of CO<sub>2</sub> emissions would allow obtaining for NG a cost for a kWh equal to that of coal.

What should this price be equal to ?

The cost difference of \$0.0064/kWh between the kWh-coal and the kWh-NG should be equal to the cost of the *surplus* of the CO<sub>2</sub> emissions resulting from coal.

According to the IEA [3], the CO<sub>2</sub> emissions are evaluated at :

0.92 kg CO<sub>2</sub>/kWh for coal

0.40 kg CO<sub>2</sub>/kWh for NG

The *surplus* of 0.52 kg.CO<sub>2</sub>/kWh emitted by coal should be equal to \$0.0064/kWh for an equivalence of the cost for electricity produced by coal compared to that by natural gas. This leads to a cost for the CO<sub>2</sub> *surplus* from coal of \$12.30/t.

The *surplus* of the emissions from coal compared to those from NG is thus  $0.52/0.40 \times 100$ , that is, 56.5 % of the total emissions from coal.

A *pricing method for excess CO<sub>2</sub> emissions* of 12,30 \$/t would lead to an equal opportunity to compete for NG and coal and a reduction of hundreds of tons of CO<sub>2</sub>. The *corresponding pricing for coal* is calculated below. In this case, we propose a **saving per ton of coal** placed on the market.

## 5 Proposal for calculating the level of saving per ton of coal

Considering an agreement should be obtained from *all regions*, we propose for coal mine operators to pay an International Banks Consortium(IBC) representative of all regions their stakes to an Investment Fund on a pro rata basis of coal placed on the market ?

This represents a **saving** for coal mine operators to profitable investments reducing CO2 emissions, including, for example:

- Passive energy buildings,
- High efficiency thermal power stations providing coal gasification rather than combustion and possibly incorporating CO2 sequestration [4],
- Interconnection of regional electricity networks,
- Development of renewable energy,
- Storage of electricity per excess time in the form of chemical products,
- Desalination of seawater using wind or photovoltaic energy.

Most of these are projects demanding significant capital and technical, financial and political cooperation from many countries.

What would be the amount of these contributions?

- For
- an annual world market of 7.7 billion metric tonnes of coal/year [5] ;
  - an average content of 75% carbon in the coal ;
  - a ratio of molecular weight of CO2/atomic weight of Carbon 44/12 ;
  - a surplus of CO2 emissions from coal compared to those from NG of 56.5% of the coal weight ;
  - a contribution of 12.3 \$/t.CO2 in surplus ;

the Investment Fund would collect

$$7.700.000.000 \text{ t. coal/year} \times 0,75 \text{ t. C/t. coal} \times 44 \text{ t.CO2/12 t. C} \times 0,565 \times 12,3 \text{ \$/t.CO2}$$

$$= 147.156.000.000 \text{ \$/year}$$

i.e. 147.156.000.000 \$ for a production of 7.700.000.000 t. coal, which represents

**a saving of 19,1 \$/t. coal.**

A unanimous agreement is likely to be obtained, if not for this level of saving, for a lower level. The main point is not only the value, but also the acceptance of the principle by all regions, since the value of the saving rate can be adjusted depending on the future context. It would be a further step towards geopolitics on energy.

For a *level of saving reduced to 5\$/t. coal* and

a production of 7.700.000.000 t. coal /year

**saving would be 38,5 billion \$/year** intended for profitable projects reducing CO2 emissions.

IBC would be responsible for managing the Investment Fund and would, as a priority, convert coal operators' stakes into shares or corporate bonds to target energy resources.

## References

[1] International Energy Agency (IEA), Nuclear Energy Agency (NEA) - Projected Costs of Generating Electricity - 2010 Edition – Executive Summary

[2] European Commission – Energy prices and costs report - 17.03.2014

[3] International Energy Agency (IEA), CO2 emissions from fuel combustion, Highlights - 2010 Edition

[4] U.S. Department of Energy (DOE) – Fossil Energy - How Gasification Power Plants Work - January 2010

[5] OECD/IEA – Medium Term Coal Market Report 2013 – Executive Summary

[6] Probatex – For a fair coal-natural gas competition – July 2014