EUROFER
The European Steel Association

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The EU steel industry is committed to fully contribute with all data available to fair and achievable benchmarks for the steel industry

Steel makers extract the iron from iron ore and transform it into steel by using carbon in the form of coal and coke. In this process coal and coke are unavoidably transformed into gas mixtures/process gases which are called *waste gases* under the EU ETS directive. Instead of being flared, these gases are usually collected and used for heat and electricity production – hence saving primary energy resources and millions of tonnes of CO_2; the use of waste gases of the steel industry avoids the emission of about 50 Million tons of CO_2 annually in the EU.

Carbon balance versus energy balance approach

For the purposes of establishing benchmarks for the implementation of the current EU ETS directive EUROFER proposed in 2010 a simple methodology based on carbon balance which requires a limited amount of data. The methodology ***assigns all carbon*** contained in the waste gases to the CO_2 intensity of the steel making process which gives rise to the waste gases.

This methodology is compatible with the directive itself which says that 'No free allocation shall be made in respect of any electricity production, except for […] electricity produced from waste gases.' This provision reflects the fact that waste gases are an unavoidable consequence of the steel making processes. So no distinction is necessary as to the use of the gases. Furthermore, the real carbon efficiency of these processes can only be established by including all of the CO_2 contained in the waste gases in the CO_2 intensity of the steel making process which gives rise to the waste gases. Because of the complexity of the waste gas flows and their measuring, the EUROFER methodology does not require detailed waste gas related data to establish CO_2-intensities. Such methodology is based on the ***carbon balance approach,*** i.e. it calculates the CO_2 intensity by adding on one side all carbon introduced into the production process (e.g. coal, coke, anthracite, oil, plastics, graphite electrodes, natural gas, limestone, dolomite and others) and on the other side by deducting the carbon contained in the carbon bearing material flows that leave the considered production process and are not waste gases (e.g. steel, slags, dusts, sledges and others). This approach is less complex because the number of flows to be accounted for is limited and the resulting CO_2-values are more robust.

However, based on a recommendation by its consultants (***Ecofys***/Fraunhofer Institut) DG Environment later decided to use an ***energy based*** methodology which assigns only a part of the carbon contained in the waste gases to the CO_2 intensity of the steel making process which gives rise to the waste gases. The other part should be assigned to the CO_2 intensity of the users of waste gases. This other part would be quantified by establishing the energy content of a waste gas, calculating the volume of natural gas containing the same energy content (***"natural gas equivalent"***) and eventually calculating the CO_2 which would be released by the combustion of this hypothetical amount of natural gas. Moreover, the energy based methodology has the disadvantage that diffuse or some practically unmeasurable emissions are not accounted for in the allocation whereas they are included in the verification. As a consequence the benchmark values of waste gas generating processes are lower than actually achievable.

Benchmarks determination requires accurate data

Despite EUROFER's view that the energy balance-based approach is contrary to the provision of the EU ETS Directive on waste gases, the approach also introduced a significant practical problem. Whilst in the EUROFER model only the prime carbon bearing flows had to be measured and data for the assessment of the benchmarks were fully available, the proposal of the Commission's consultants required in addition the measurement of waste gas flows and all energy flows within, into and from a benchmark system boundary. This means also heat, electricity and steam must be accounted for and balanced against the carbon to derive at CO_2-intensities. The complexity of energy flows in an integrated steel making site, the lack of reliable volume, energy and CO_2 data for such flows when they do not leave the site (only sold waste gases are to certain extent monitored properly) and the significant differences of respective site configurations make this impossible.

During the multiple meetings and discussion with the EU Commission/EU Commission's consultant EUROFER explained the difficulties of providing the data requested by the Commission. For the reference period 2007/2008 ***the kind of data demanded by the proposal of the Commission's consultants were largely not available*** - this mainly for technical reasons: ***the data were not measured or where monitored they were usually not measured with enough precision***.

In particular EUROFER raised the following difficulties with an increased emphasis on waste gas flows:

- Increased error propagation by the increased number of flows to monitor.
- Increased costs for analysis and volume measurement, should the needed monitoring devices be installed.
- Increased complexity of system boundary definition.
- Diffuse, difficult to measure or unmeasurable emissions

It is also worth stressing that the highest tier in the Monitoring and Reporting Regulation requires the uncertainty for activity data to be below 1.5%. Steel companies are already struggling to keep within this limit with the carbon mass balance at site level. The level of uncertainty increases when the uncertainty affecting the carbon analysis of input and output flows is being added. Should the calculation be based on waste gases volumes, energy and carbon content, the level of uncertainty would be so high it is incompatible with existing monitoring and reporting rules[1].

Against this background, EUROFER did provide data according the carbon balance methodology. The figures were included in benchmark curves derived from a data collection performed by the consultant PTAI and verified by the consultant SGS. However, following the opinion of the EU Commission's consultants while also arguing that the steel industry was not willing to deliver the requested data, the EU Commission calculated the benchmark values for coke and hot metal using literature data from the BREF document of 2001 instead of defining the benchmark values using the

[1] It's worth noting at this stage that the 0.5%/1%/1.5% flat rate benchmark reduction proposed in the draft revision of the EU ETS Directive of July 2015 is below the level of uncertainty affecting the CO_2 emission measurements. In other words, any observed CO_2 intensity improvement of about 1% is likely to be due to the measurement error rather than to technical improvement. Even more so if the benchmarks are based on the energy balance of the process.

robust CO_2 intensity distribution curves provided by EUROFER. Due to that, several companies have launched legal challenges to the existing benchmarks through national courts and also one legal case to request access to the background information used by the Commission for the benchmarking decision.

However, the EU steel sector is committed to continue its efforts to improve resource efficiency and foster sustainable development in Europe. **Therefore EUROFER would welcome an open discussion with the EU Commission on the methodology for assessment of the benchmarks - this also to ensure that the necessary data are known and available where possible**.

For information:

Steel processes give rise to unavoidable but useful process gases

Steel makers extract the iron from iron ore and transform it into steel by using carbon in the form of coal and coke. In this process coal and coke are ***unavoidably*** transformed into gas mixtures/process gases which are called ***waste gases*** under the EU ETS directive.

Waste gases arise during the production of coke, hot metal and steel. They have varying carbon content and calorific value over time, which may be used. In this ***waste gases differ from commercial fuels***. These variations are rooted in the operation and raw materials of the related processes. Waste gases are usually recovered on site for heat production. However, heat consuming units are mostly not well-aligned to waste gas production for technical reasons - either because of the differences in capacity or because flows are not perfectly matching over time. Since waste gases cannot be stored for a long period, the most technically and economically efficient alternative is to send them to a power plant. ***Electricity production from waste gases is therefore not demand-driven but supply-driven***. This means that this type of electricity production is not a comparable player in the electricity market. This was one of the reasons why there is – in steel industry's opinion – a full exemption for electricity from waste gases.

The collection and use of these waste gases contribute considerably to sustainable use of resources. In fact, because in steel making the same carbon unit is at first exploited with regard to its chemical potential (when it is used to extract iron from the iron ore) and afterwards with regard to its energy potential (when the waste gases are combusted) a ***resource-saving effect is achieved when waste gases are collected and used***. Instead of using coal for steel production and natural gas for the production of heat or electricity, the carbon in the coal is used for both purposes thereby removing the need to consume natural gas.

Hence, if electricity is produced from waste gases this does not result in any additional CO_2-emissions for the electricity production, because all the CO_2 released by the combustion of the waste gases has been caused by the steel production and this CO_2 will be released anyway, independently if there would be electricity produced from the waste gases or not. In this respect the use of waste gases could be addressed as being "CO_2-neutral".