
ArcelorMittal
7th Annual Workshop on
Greenhouse Gas Emission Trading
Paris October 9th 2007

Steel industry highlights

- Steel together with cement and wood are the big 3 of the materials used by mankind
- Change in steel consumption is closely linked to economic growth in developing countries
  - 75-99' world production ~ 800 Mt/y
  - Awakening of China since 2000 ⇨growth steel use 7% per year
  - World production ~ 1250 Mt in 2006 – 2000 Mt before 2020
- Only 450 Mt/y can be made out of scrap ⇨ Growth to be covered by primary production emitting 2-4 t CO_2/t
- Steel accounts for ~ 6% of World CO_2 emissions

Addressing the Climate Challenge

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- The steel industry has to move forward to cut its emissions
  - Ultimately technology will provide the solution (ULCOS & CCS)
  - ETS with absolute Caps lack positive incentive for innovation: high CO_2 cost does not help if competitiveness is affected

- Steel industry needs policies that are likely to become Global
  - Developing countries will not accept a cap on their activity
  - Developing countries need policies to move them in the right direction without distorting global markets

Paving the Future - ULCOS

- Breakthrough technologies for Ultra Low CO_2 Steelmaking
  - European project with 48 partners, part of IISI worldwide project
  - Targeting at least 50% reduction of primary iron emissions
  - 59 M€ for a 5 year program initiated in 2005
- Four solutions selected for further study
  - New Direct Reduction + CCS
  - New Blast furnace + CCS
  - Smelting Reduction + CCS
  - Electrolysis - Electricity based
- Pilot/demonstration phase starting 2010 (?)>x100 M€ per route
- Solutions will be (?)>50 €/t more expensive than today – How to finance?

Problems with Absolute Caps on CO_2

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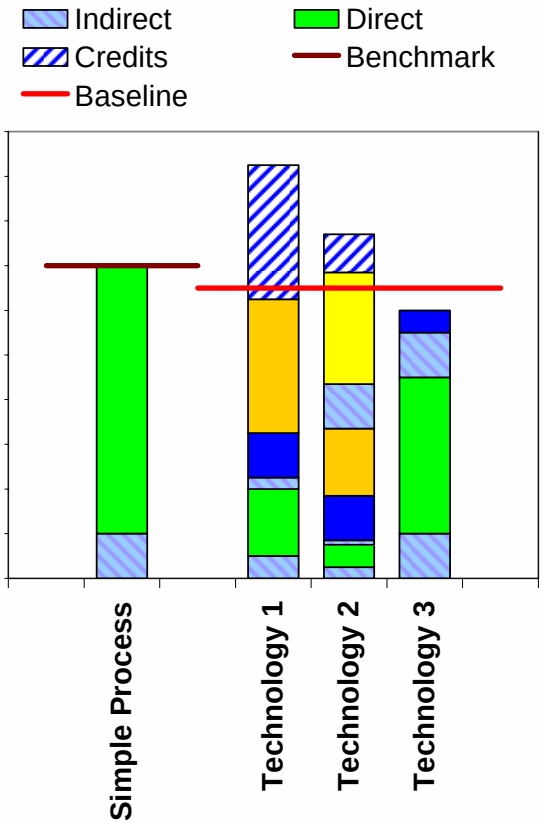
- **Distorts competition**: between industries & materials with different cycles
- **Loss of competitiveness of affected industry** vis-à-vis third countries
- **Failure to effectively reduce emissions**
  - Absolute Caps only target direct emissions – results in delocalisation of emissions outside the trading space and increased global GHG emissions
- **Failure to reward improvements** or recognise past efforts
- **No** sustainable **incentive for innovation**
- **Operational difficulties** due to the allocation system
- **Huge and unjustified increase** of electricity costs
- Unattractive to 3rd countries therefore **unlikely to be globalised**

Going Global – Sectoral Approach

- Industry was asked to think about a sector wide approach to help reduce the CO_2 problem in a cost effecive way
- EU steel industry worked three years to develop a proposal supported by all steel makers
- Basis of every policy is a tool to compare and identify the most CO_2 efficient ways of making steel
  - Complexity of steel production routes sets a challenge
  - A sensible approach needs to address:
    - CO_2 not Energy – CO_2 inefficiencies are too easy to hide
    - Indirect & Upstream emissions – 'Simple' benchmarking doesn't work
    - Recycled & Primary steels need a separate treatment
- Development of a generally accepted baseline calculation model is a significant achievement

Difficulties comparing performances



- A one step process producing a single product can be easily benchmarked
- Steel is the result of a chain of processes
  - Influencing each other
  - With many indirect emissions on different stages
  - Using different technologies
  - Producing simultaneously several co-products deserving to be credited
- To compare, the entire production chain is to be integrated
  - The individual contribution needs to be compared to a ‘baseline’

Three rules for the ‘baseline’ calculation

1. **Every product has a unique upstream CO_2 value** corresponding to the average performance of the group

   Electricity: 370 kg CO_2/MWh; Steam: 180 kg CO_2/t; Pellets: 115 kg CO_2/t; DRI: 760 kg CO_2/t; Burnt lime: 1 150 kg CO_2/t…

2. **by-products, substituting other products**:
   1. Energetic by-products: the real CO_2 emission when **using** the product except when it is higher than the emission of the substituted product

      BF-gas: emits 270 kg CO_2/GJ and replaces Nat. gas 56 kg CO_2/GJ
      => BF-gas receives 56 kg CO_2/GJ; pig iron is charged with 214 kg CO_2/GJ
   2. Material by-products: the effective CO2 cost when **producing** one marginal unit except when it is higher than the emission of the substituted product

      granulated slag replaces clinker costing 900 kg CO_2/t => BF-slag receives 550 kg CO_2/t

      crystallized slag replaces granulates costing 0 kg CO_2 /t => BF-slag receives 0 kg CO_2/t; pig iron is charged with 550 kg CO_2/t slag

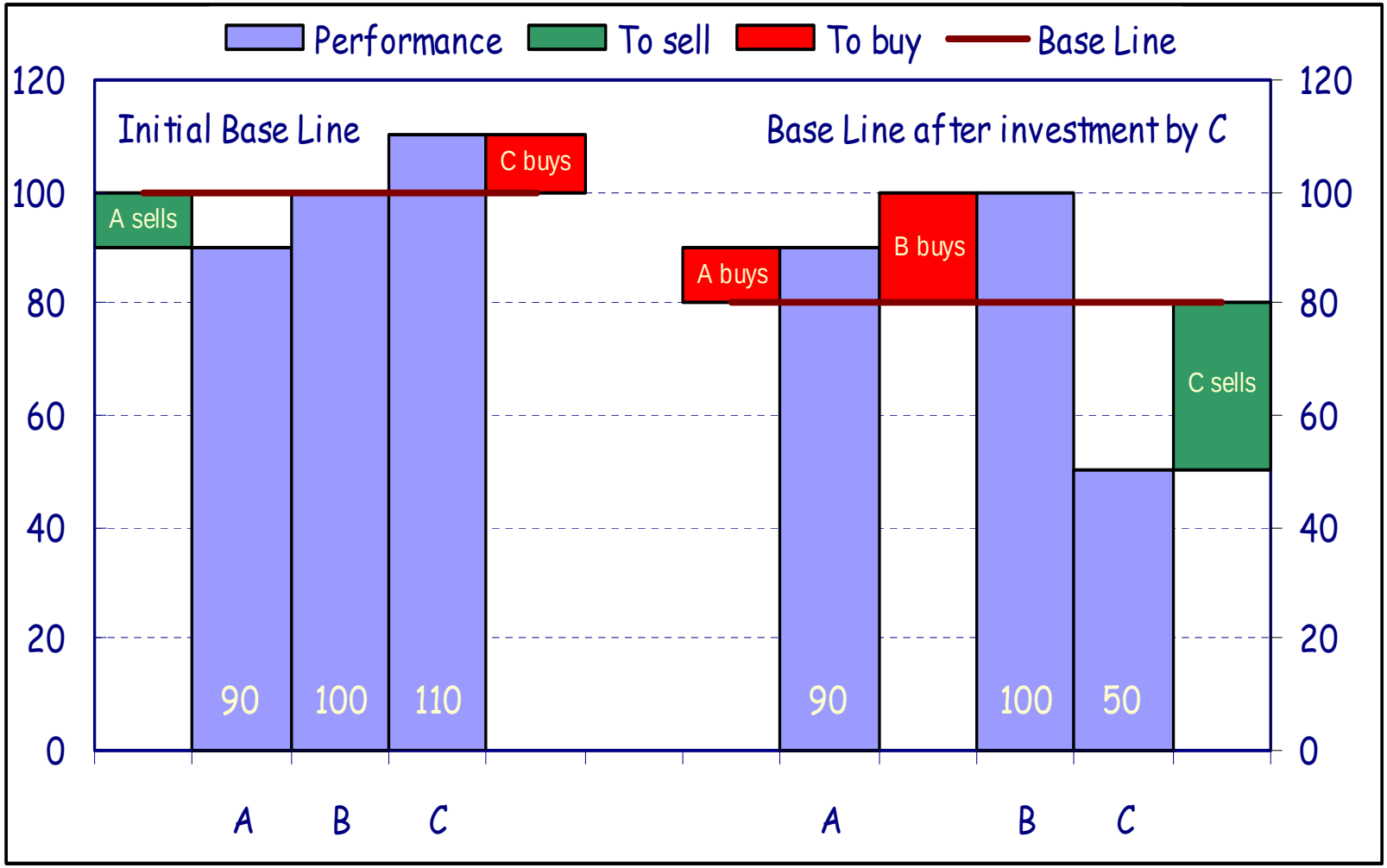
3. **Wastes** have no upstream

   Material recuperated containing fossil carbon that is destroyed in the process are charged with their entire fossil CO_2 potential (plastics, tires)

Characteristics of the Baseline System

- **A mandatory emission trading scheme** for the steel sector
- **Baseline is the weighted average** in terms of emissions per tonne of production of the total sector (performance of overall output vs. individual activity)
- System includes **all emissions**, both direct and indirect
  - The baseline can serve as the basis for the allocation of allowances
  - The evolution of the baseline could also be **targeted**
- **Performance of each operator is compared against the baseline**
  - As long as they perform worse than the baseline operators must pay for allocations traded from operators performing better than the baseline
- **Offers a clear incentive to invest in improvements**
  - Operators receive a clear and understandable signal on the direction to follow
- Provides a big **incentive for innovation**
- **Linking with existing trading systems** could greatly simplify implementation & enhance efficiency

Baseline System: Functioning



Conclusions

- Steel industry developed a proposal in great detail which is workable and has great potential
- It is encouraging that sectoral approaches have become part of the debate now
  - It is generally recognized now that global commodities need an adapted approach
- Developing countries seem open to the approach: no limit to growth – positive incentive for good performance
  - It will take an international leader to get developing countries onboard
- Baseline system could be linked to systems with an absolute Cap if a solution is found for changes in activity & indirect/direct

Thank you for your attention

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