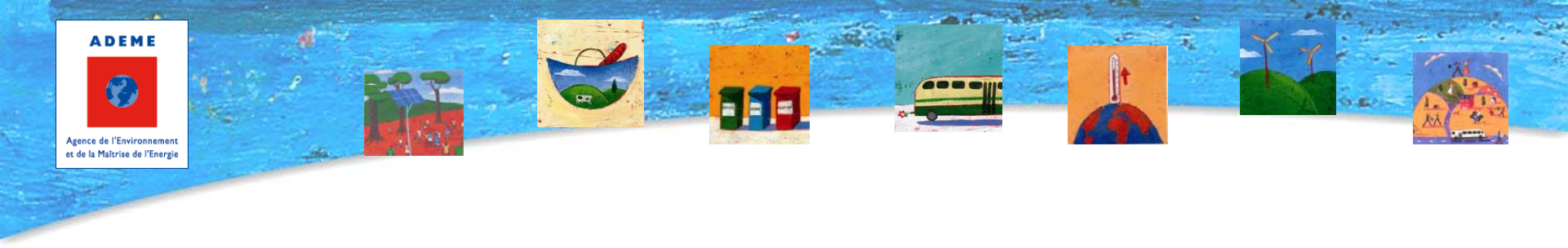

Category 2: metal industry

Emmanuel FIANI

French Agency for Environment and Energy Management - ADEME

Leader of the expert panel on category 2







Conclusions of our 3rd meeting in 2008

- First round of information to assess the need for revision.
- Some major shortcomings were identified (release routes, old data, missing sub-categories).
- New data were identified.
- New evidence also identified regarding possible new subcategories/classes, especially those relevant for developing countries
- Further investigation is needed to refine current toolkit data
- Expert panel was established







2009 workplan of the expert panel

•To carry out a more comprehensive collection of data and/or field studies in developing countries.

•To scrutinize new data available on POPs emissions from the metallurgical sector.

• What it is not: a comprehensive review of all data published for the last years

• What it is: a first attempt to refine toolkit data and, if needed, to set priorities







Content

- Importance of the metal industry in the toolkit

- Publications provided by the panel. Synthesis of usable data for toolkit re-assessment.

- Proposals for 2010 intersessionnal workplan







The metal industry in the toolkit

•A category which covers a significant part of the toolkit (34 pages – 12 sub-categories).

•Many metals are produced through very different processes and from very different raw materials.
8 metals are directly covered by the subcategories
+ shredders + thermal wire reclamation

•Some of the highest EFs
Eg: subcategory 2.g.1 : EF = 1000 µgTEQ/t

(a) Iron ore sintering (3 classes)

1. Grochowaslki et al – 2006

- No APC? (c. 2?): dioxins/air=1.41 – 1.10 µgTEQ/t → lower?
- HCB/air and PCB/air → new

2. Wang et al – 2009
4 sites
- ESP (c. 2?): dioxins/air=2.27 µg TEQ / t feedstock → ?
- ESP + FF (c. 3): 1.26 – 6.42 – 6.95 µgTEQ/t feedstock → ?

3. Jin et al – 2009
No description (c. ?). 15 samples.
Dioxins/residues=0.14 – 3.21 µgTEQ/t →higher?

(b) Coke production (2 classes)

1. Wang et al – 2009

- No APC (c. 1): dioxins/air = 0.253 µgTEQ/t feedstock → ?

2. Liu et al – 2009

8 sites. 2 loading techniques. 2 cooling systems. FF on all (c. 2)

- Dioxins/air = 28.9 ng TEQ / t → lower
- PCB/air → new
- HCB/air → air
- PeCB/air →air

(c) Iron and steel production and foundries (3 sub-subcategories)

(c) 1. Iron and steel making (1)

1. Grochowaslki et al – 2006

- Blast f. /no APC? (c. 4?): dioxins/air=0.01 µgTEQ/t → same?
- BOF (c. 3): dioxins/air = 0.02 µgTEQ/t → lower
- EAF (c. 1 or 2): dioxins/air=0.62 µgTEQ/t → lower
- PCB/air and HCB/air → new

2. Wang et al – 2009

5 sites. F on all (c. 2)

- Dioxins/air=from 10.4 to 77.7 ng TEQ / t feedstock → ?







(c) Iron and steel production and foundries (3 sub-subcategories)

(c) 1. Iron and steel making (2)

3. Odabasi et al – 2009

EAF. Without scrap pre-heating (c. 1)

- PCBs(41)/air=3.8 mg/t (no TEQ) → new

EAF. With scrap pre-heating (c. 1)

- PCBs(41)/air= 128 mg/t (no TEQ) → new

4. Merz – 2004

EAF with FF (c. 2)

- Dioxins/air= 0.30 – 0.59 µgTEQ/t → lower

5. Classification issues raised by Uruguay

Multiple combinations with regard to scrap input, process, APC

(c) Iron and steel production and foundries (3 sub-subcategories)

(c) 2. Iron foundries (1)

1. Grochowaslki et al – 2006

Hot air cupola w/ good APC (c. 4)

- Dioxins/air 0.06 – 4.11 µgTEQ/t → higher?

Iron casting – gas rotary kiln (c. 2?)

- Dioxins/air= 0.02 µgTEQ/t → lower?

EAF/steel casting

- Dioxins/air= 0.03 µgTEQ/t → ?

For all three:

PCB/air and HCB/air → new







(c) Iron and steel production and foundries (3 sub-subcategories)

(c) 2. Iron foundries (2)

2. Merz – 2004
Induction furnaces w/ FF (c. 4). 7 samples.
•Dioxins/air= from 0.0058 to 0.14 µgTEQ/t → same

Induction furnaces without FF (c. ?). 2 samples
•Dioxins/air= 0.011 - 89 µgTEQ/t → new?

(c) 3. Hot-dip galvanizing plants
No new information provided.

(d) Copper production

1. Grochowaslki et al – 2006
Primary w. H2SO4 prod. (c. 5).
- Dioxins/air= 0.002 – 0.004 – 0.005 µgTEQ/t → same
- PCB/air and HCB/air → new

Cu scrap smelting (c. ?)
- Dioxins/air= 0.007 µgTEQ/t → ?
- PCB/air and HCB/air → new

2. Wang et al
Secondary w. FF (c. 2)
- Dioxins/air= 9.64 µgTEQ/t feedstock → ?







(d) Copper production

3. Ba et al – 2009
Secondary copper w. FF. Med to large plants (c. 2).
- Dioxins/air= 14.8 µgTEQ/t → same
- PCB/air = 98.1 ngTEQ/t → new

4. Hung et al - 2009
Secondary from sludge. FF + AC (c. 3)
- Dioxins/air= 0.1 – 0.7 ngTEQ/m3 → ?

5. Classification issues raised by Uruguay
No classification according to fuel type.
Same comment for Al production and iron foundries.

(e) Aluminium production

1. Grochowaslki et al – 2006
Al2. Pre-heating? APC?
- Dioxins/air= from 0.34 to 8.65 µgTEQ/t → lower?
- PCB/air and HCB/air → new

2. Wang et al - 2009
Al2 w. FF (c. 3)
- Dioxins/air= 0.935 – 36.4 µgTEQ/t feedstock → ?

3. Heinisch et al – 2006
Process using hexachloroethane → need for HCB EF
Still used? Class 1 would fit?







(e) Aluminium production

4. Ba et al – 2009
Al2 w. FF (c. 3)
- Dioxins/air= 2.65 µgTEQ/t → same
- PCB/air = 193 ngTEQ/t → new

5. Merz - 2004
Al2 – gas-fired/induction w. FF (c. 3)
- Dioxins/air= 0.0027 to 0.54 µgTEQ/t → lower

Al2 – swarf drying (c. 6)
- Dioxins/air= 0.2 µgTEQ/t → same

Mixed Al/Cu – rotary/reverberatory (c. ?)
- Dioxins/air= 4.9 – 17 µgTEQ/t →cat. J?







(f) Lead production

1. Ba et al – 2009

Pb2. 3 sites. No description (c. ?)

- Dioxins+PCB-DL/air= 0.646 µgTEQ/t → ? / new







(g) Zinc production

1. Grochowalski et al – 2006
Primary zinc (c. 5)
- Dioxins/air → new
- PCB and HCB/air → new

Zn casting (c. 4?)
- Dioxins/air = 0.02 µgTEQ/t → lower?

2. Chi et al – 2008
Waelz kilns. Unit as ng/kg EAF dust treated.
Data for c. 1, 2 and 3 (dioxins/air)

3. Ba et al – 2009
Secondary zinc. No description (c. ?)
Dioxins+PCB/air = 52.3 µgTEQ/t (PCB=2.8%) →?/new for PCB







(h) Brass and bronze production

1. Merz et al – 2004

Secondary copper/brass. Induction furnace w. FF (c. 3)

- Dioxins/air = 0.0053-0.017 µgTEQ/t → lower

Secondary Bronze casting. Induction without FF (c. 2?)

- Dioxins/air = 0.16 µgTEQ/t → lower?

(i) Magnesium production

No new information provided







(j) Other non-ferrous metal production

1. Jin et al – 2009
Nickel prod.
Dioxins/Residues = not detected

2. Merz et al - 2004
Manganese prod. Induction w. FF.
- Dioxins/air= 0.17 µgTEQ/t → lower

(k) Shredders

1. Schleicher et al – 2009
DL-PCBs/air = 0.55 ngTEQ/m3
M-PCBs/air = 12.3 µgTEQ/m3
Information available for conversion into EF.







(I) Thermal wire reclamation

1. Markus al – 2009
(e-waste recycling – open burning of wires to recover metals)
dioxins/land = 800 µg/kg soil (no TEQ)







Conclusions on the 2009 intersessional work

- First attempt to synthesize new data for category 2 review
- A dozen publications provided and used for comparison with current EFs in the toolkit
- Many new, usable and recent information on nearly all sub-categories of the metal sector
- Some shortcomings still need to be tackled. For instance, diffuse emissions.
- Further work is needed to gather and digest more data







What needs to be done in 2010

• To develop an excel sheet specific to category 2, based on categories 3 and 6 experience. Short-term priority.

• To collect more data, especially on sub-categories where there is lack of information. France may achieve a literature survey.

•To identify/allocate new sub-categories or classes which are relevant for developing countries (eg artisinal metallurgy, e-waste recycling). To initiate measurement projects, if needed.

•The group may wish to set priorities.

• Final aim = first proposal for revised EFs in 2011