Will metals still be the driver for WEEE recycling?

Norbert Zonneveld
Executive Secretary

EERA members

- Members treat > 2,200,000 tonnes of WEEE/year
- Total turnover in 2013 of ± € 900 million
- 38 companies; > 100 subsidiaries
- 33 treatment companies
- 4 smelters
- 2 downstream recyclers
- 2 re-use companies
- European wide

www.eera-recyclers.com
Miniaturization


Google Glass - 2014.
## Complexity

### Elements used nowadays in E&E industry

- **Energy storage**
  - Connectivity
  - Energy saving
  - Catalysis (fuel cells)

- **Electricity generation and storage**
  - Elements specific to nuclear electricity generation
  - Photovoltaics
  - Permanent magnets for windmills and electrical hybrid cars

- **Lighting**
  - Superconductors

---

### Elements used by our ancestors 100 years ago

<table>
<thead>
<tr>
<th>Li</th>
<th>Be</th>
<th>B</th>
<th>C</th>
<th>N</th>
<th>O</th>
<th>F</th>
<th>Ne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
<td>Mg</td>
<td>Al</td>
<td>Si</td>
<td>P</td>
<td>S</td>
<td>Cl</td>
<td>Ar</td>
</tr>
<tr>
<td>K</td>
<td>Ca</td>
<td>Sc</td>
<td>Ti</td>
<td>V</td>
<td>Cr</td>
<td>Mn</td>
<td>Fe</td>
</tr>
<tr>
<td>Rb</td>
<td>Sr</td>
<td>Y</td>
<td>Zr</td>
<td>Nb</td>
<td>Mo</td>
<td>Te</td>
<td>Ru</td>
</tr>
<tr>
<td>Cs</td>
<td>Ba</td>
<td>La</td>
<td>Hf</td>
<td>Ta</td>
<td>W</td>
<td>Re</td>
<td>Os</td>
</tr>
<tr>
<td>Fr</td>
<td>Ra</td>
<td>Ac</td>
<td>Pf</td>
<td>Db</td>
<td>Sg</td>
<td>Bh</td>
<td>Hs</td>
</tr>
</tbody>
</table>

### Lanthanides (Rare earth elements)

- Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |

### Actinides

- Th | Pa | U  | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr

---

15 October 2014

**International Metals Recycling Seminar**
Can 80 % be recovered?

Shorter life cycles

Source: Display Search Quarterly Advanced Global TV Shipment and Forecast Report
Cost reduction

Source HP - 2012

Cost Elements Laptop

Plastics ≈ 0.75%
Common Metals (e.g., Fe, Cu) ≈ 1.3%
Precious Metals ≈ 7.6%
Non Common Metals ≈ 0.07%

Selected Non Common Metals (% of Lsd):
- Ts 0.043%
- Nl 0.029%
- Ge 0.000003%
- GaAs 0.000005%

Cu ~ 4% of weight

What does it mean for recyclers?

<table>
<thead>
<tr>
<th>Consequences for recyclers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniaturisation</td>
</tr>
<tr>
<td>Less volumes especially in ICT and household appliances</td>
</tr>
</tbody>
</table>
## What does it mean for recyclers?

<table>
<thead>
<tr>
<th>Consequences for recyclers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Miniaturisation</strong></td>
</tr>
<tr>
<td>Less volumes especially in ICT and household appliances</td>
</tr>
<tr>
<td><strong>Complexity</strong></td>
</tr>
<tr>
<td>More difficult to separate materials:</td>
</tr>
<tr>
<td>• Costs for recycling will go up</td>
</tr>
<tr>
<td>• Purity of sub-streams will be difficult to reach</td>
</tr>
<tr>
<td>• Yield of sub-streams will be lower, higher loss of critical materials</td>
</tr>
<tr>
<td>• Recovery and recycling rates will be lower</td>
</tr>
<tr>
<td>• Earnings will be lower</td>
</tr>
</tbody>
</table>

**Shorter life cycles**

• Returns On Investments – ROI’s become critical.
• Unattractive industry to invest in.
What does it mean for recyclers?

<table>
<thead>
<tr>
<th>Consequences for recyclers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Miniaturisation</strong></td>
</tr>
<tr>
<td>Less volumes especially in ICT and household appliances</td>
</tr>
<tr>
<td><strong>Complexity</strong></td>
</tr>
<tr>
<td>More difficult to separate materials:</td>
</tr>
<tr>
<td>• Costs for recycling will go up</td>
</tr>
<tr>
<td>• Purity of sub-streams will be difficult to reach</td>
</tr>
<tr>
<td>• Yield of sub-streams will be lower, higher loss of critical materials</td>
</tr>
<tr>
<td>• Recovery and recycling rates will be lower</td>
</tr>
<tr>
<td>• Earnings will be lower</td>
</tr>
<tr>
<td><strong>Shorter life cycles</strong></td>
</tr>
<tr>
<td>• Returns On Investments – ROI’s become critical.</td>
</tr>
<tr>
<td>• Unattractive industry to invest in.</td>
</tr>
<tr>
<td><strong>Cost reduction</strong></td>
</tr>
<tr>
<td>• Low cost materials are applied i.e. lower returns</td>
</tr>
<tr>
<td>• More plastics, less metals -&gt; focus on plastic recovery techniques</td>
</tr>
</tbody>
</table>

Results so far?

- Currently **one third** of WEEE in the EU is being reported as separately collected and appropriately managed

- The remaining WEEE is either:
  1. collected by unregistered enterprises and properly treated
  2. collected by unregistered enterprises and improperly treated or even illegally exported abroad or
  3. disposed of as part of residual waste (e.g. to landfills or incinerators).
After 8 years 1/3 of what has been put on the market is collected and treated

Why is only 1/3?

Consumers (B2B + B2C)
- Curb site collection individuals
- Scrap metal trader collection
- Retailer collection point
- Municipal collection point

Export

(Waste bin)

(Treatment facilities)

(Scrap metal)

Processors/Traders

National registry
Take back systems

18 June 2014 3rd Copper Recycling Conference 15

15 October 2014 International Metals Recycling Seminar 16
Dear Friend,

We are a foreign trading cooperation with actual strength in Yunnan, We need to order many now. I'd like to send you the picture of our need ……………

Fulfilment of recyclers’ role

To fulfil the role as resources managers and job creators:

- Prevent export of untreated WEEE
- Create the ‘level playing field’ for fair competition
- Create added value in the WEEE recycling chain in Europe
- Create awareness that recycling will more and more come at a cost
Future for WEEE recycling industry

- Mismatch between expectations of the community/policymakers and the reality to run a profitable business.

- Innovative recycling processes are required, however
  - Return on investments are critical
  - Global competition
  - Secondary raw material market is bearish

- Non-harmonized legislation in EU 28 (even in one country) -> unlevelled playing field

- Export outside EU (even to non-OECD countries) is not controlled -> disruptive market prices

Circular economy

If Europe is serious with its strive for having a circular economy by saving resources and creating jobs, than:

- Export of untreated WEEE must be prevented

- The ‘level playing field’ for fair completion should be secured by means of standards,

- Innovations are needed to increase yield of materials,

- Economy should change in systems where costs for recycling are paid for and where non-sustainable products are discouraged.
Thank you for your attention.