

# Stakeholder event Recupel 2025

**Vrijdag 28 november 2025, 9.00 – 12.30 u.**

*Stripmuseum*

*Zandstraat 20, 1000 Brussel*



# Recupel on track 2024

**11,4 kg**  
per inwoner



=

**134.446 t**



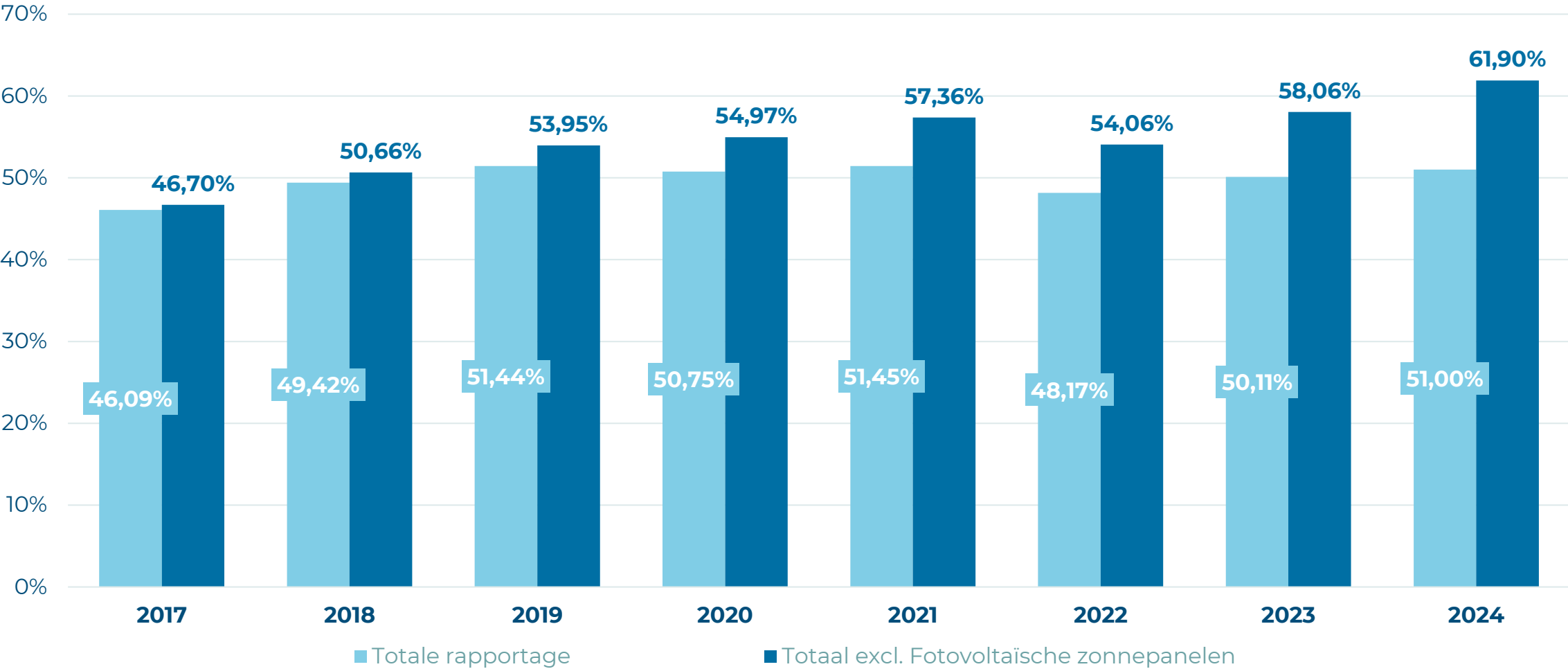
=

meer dan  
**85%**

van de materialen  
uit een  
elektrotoestel  
krijgt een tweede  
leven

+ 13.000 ton '24 vs. '20

# Inzamelingsdoel EU 65%



# Recuperatiepercentage in 2024



## Resultaten Recupel

**96,2 %**  
valorisatie  
(incl. hergebruik)

**85,1 %**  
hergebruik & recyclage

**10,2 %**  
energierecuperatie

**0,9 %**  
overige



ferro

95%

100%



non-ferro

95%

99,4%



plastics

50%

79,4%

80%

99,2%



overige

47,6%

recyclage

81,3%

valorisatie

 wettelijk doel

 resultaat (per materiaalstroom)



# Verwerking van afgedankte elektro

*Lorenzo Glorie (Recupel) en Grégory Lewis (Groep Comet)*



# Verwerking

- **Verwerkingsresultaten 2024**
- **Innovatieve bijdrage aan de circulaire economie bij Groep Comet**
- **Asbest en vuurvaste keramische vezels**
- **EU-benchmarking en Reptool**

# Recyclageresultaten Verwerkingsresultaten

# 2024



|                        | <u>2023</u> |          | <u>2024</u> |
|------------------------|-------------|----------|-------------|
| Hergebruik & recyclage | 83,1%       | +2%<br>➔ | 85,1%       |
| Overige recuperatie    | 12,3%       |          | 11,1%       |
| Stortplaats            | 4,2%        |          | 3,3%        |

## Materiële doelstellingen

### Recyclage

|                | Resultaat | Doel |
|----------------|-----------|------|
| Ferro          | 100%      | 95%  |
| Non-ferro      | 99,3%     | 95%  |
| Plastics (+3%) | 79,3%     | 50%  |

### Recuperatie

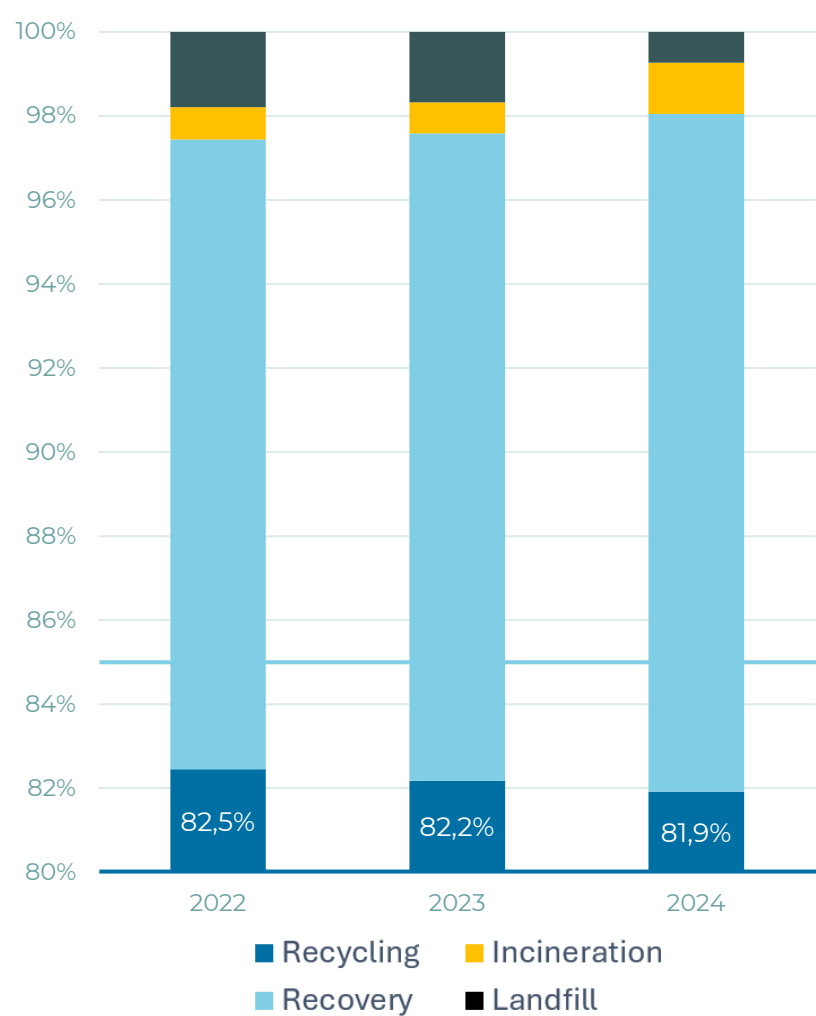
|                    | Resultaat | Doel |
|--------------------|-----------|------|
| Plastics           | 99,3%     | 80%  |
| Overige materialen | 81,3%     |      |

➔ 96,2% van huishoudelijke AEEA gevaloriseerd

# Koelkasten en diepvriezers



## Verwerkingsresultaten - Recyclageresultaten



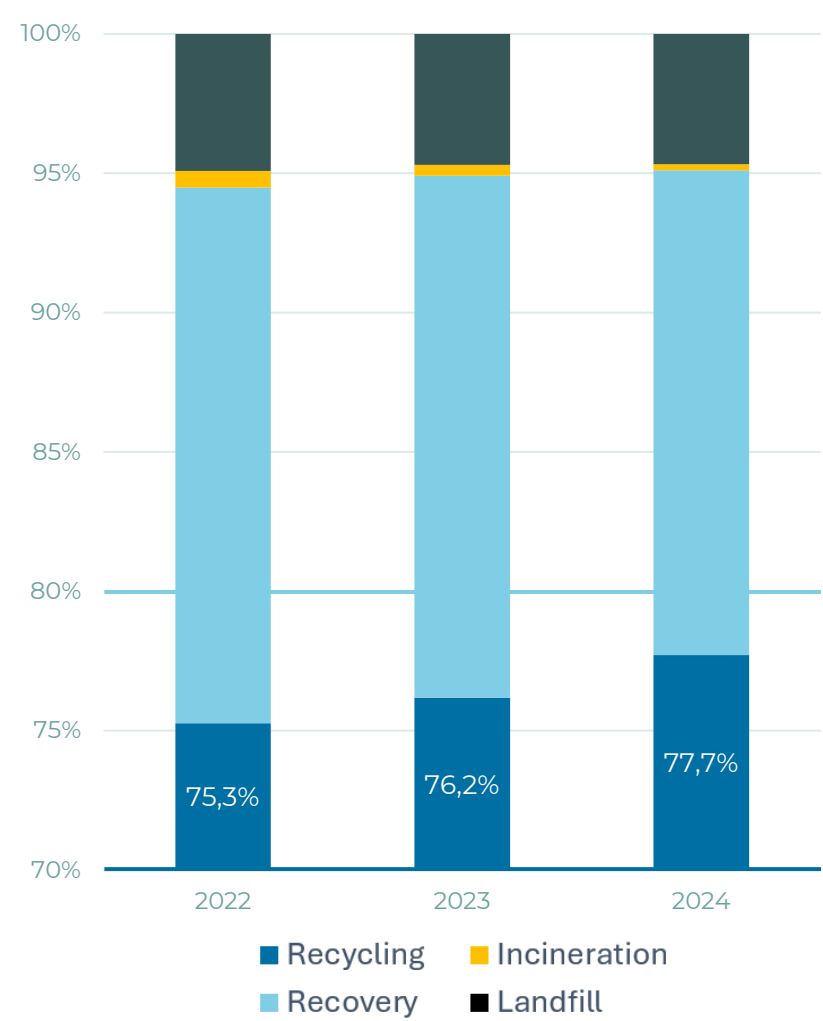
| Fractiesamenstelling (gewicht%) | 2022 | 2023 | 2024 |
|---------------------------------|------|------|------|
| Koel- en vriescombinatie        | 36%  | 35%  | 28%  |
| Koelkast                        | 36%  | 27%  | 30%  |
| Diepvriezer (alle vormen)       | 20%  | 20%  | 23%  |
| Droogkast met warmtepomp*       | 1%   | 9%   | 13%  |
| Boiler                          | 1%   | 3%   | 6%   |

|                                                                   |       |         |           |
|-------------------------------------------------------------------|-------|---------|-----------|
| Hergebruik (gecertificeerd)                                       | 0,8%  | - 0%    |           |
| Recyclage                                                         | 81,9% | ↓ -0,3% | → Overige |
| Recuperatie/Valorisatie                                           | 98,0% | ↑ +0,5% |           |
| Valorisatie van compressoren – Conventie van Bazel                |       |         |           |
| Grootste uitdaging: PUR-valorisatie (12%) Recuperatie > Recyclage |       |         |           |
| 2% niet-recupereerbaar: residu's van plastics/overige (glas)      |       |         |           |

# Televisies en schermen



## Verwerkingsresultaten - Recyclageresultaten



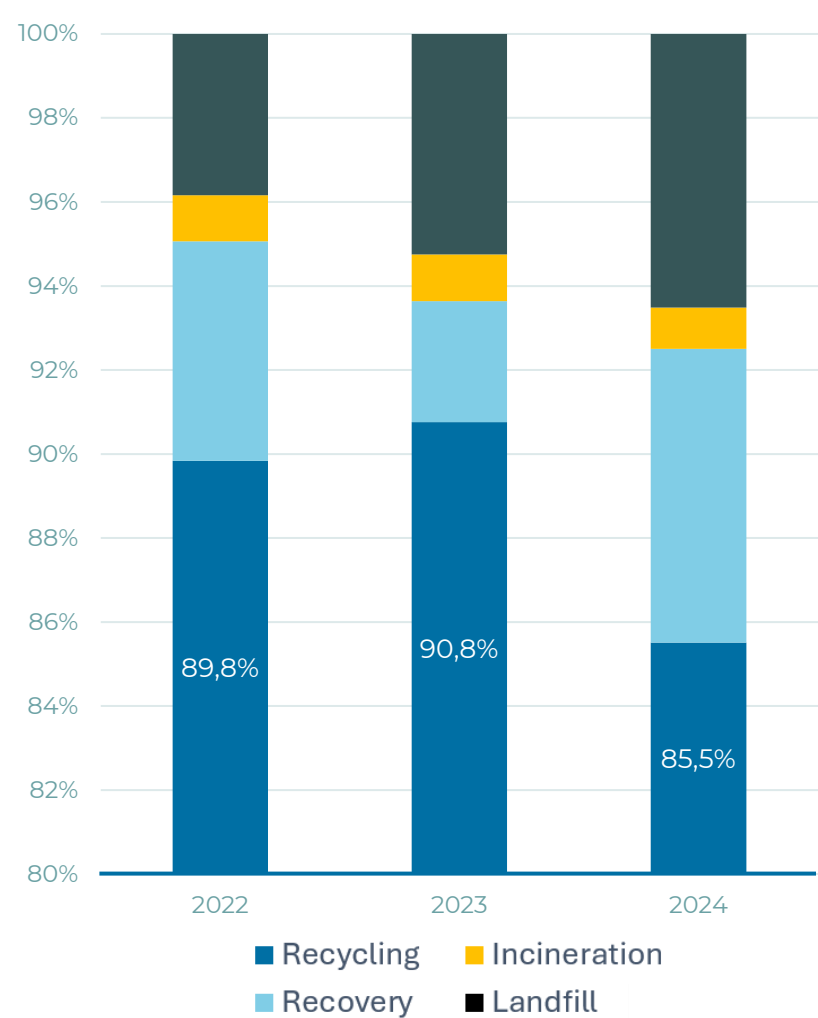
| Fractiesamenstelling (gewicht%) | 2022 | 2023 | 2024 |
|---------------------------------|------|------|------|
| TV (FPD)                        | 33%  | 41%  | 53%  |
| TV (CRT)                        | 44%  | 34%  | 26%  |
| Scherm (FPD)                    | 17%  | 20%  | 17%  |
| Scherm (CRT)                    | 6%   | 5%   | 4%   |

|                                                                                |           |         |           |
|--------------------------------------------------------------------------------|-----------|---------|-----------|
| Hergebruik (gecertificeerd)                                                    | 0,5%      | ↓ -0,2% |           |
| Recyclage                                                                      | 77,7%     | ↑ +1,5% | → Fe/N-Fe |
| Recuperatie/Valorisatie                                                        | 95,1%     | ↑ +0,2% |           |
| Dynamische samenstelling                                                       | 30%       | 70%     |           |
|                                                                                | CRT (-9%) | FPD     | 43% LCD   |
|                                                                                |           |         | 27% LED   |
| Uitdagingen: Pb-Kosten, complexe plastics                                      |           |         |           |
| 4,9% niet-recupereerbaar: Pb/Hg-gecontamineerde fracties, capacitors, residu's |           |         |           |

# Lampen



## Verwerkingsresultaten - Recyclageresultaten



| Fractiesamenstelling (gewicht%) | 2022 | 2023 | 2024 |
|---------------------------------|------|------|------|
| TL-lampen                       | 63%  | 67%  | 63%  |
| CFL-lampen                      | 9%   | 7%   | 9%   |
| Andere gasontladingslampen      | 9%   | 6%   | 6%   |
| Ledlampen                       | 4%   | 6%   | 9%   |

### Geen selectie voor hergebruik

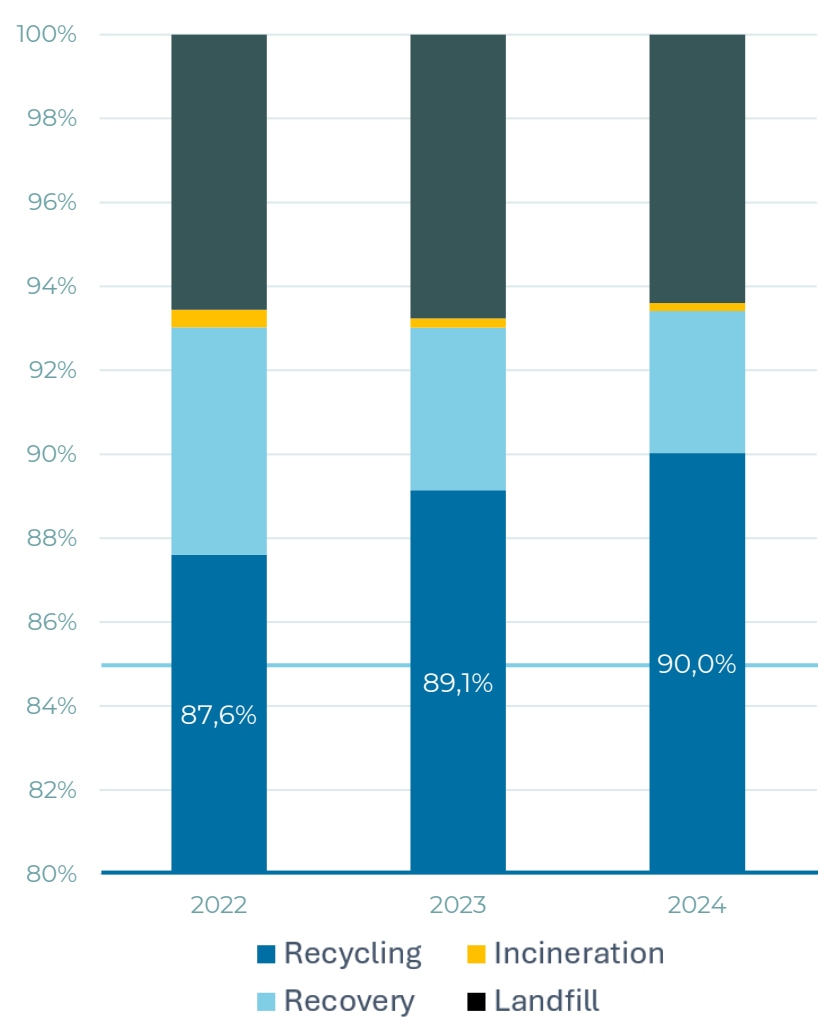
|                         |       |           |                         |
|-------------------------|-------|-----------|-------------------------|
| Recyclage               | 85,5% | ↓↓ -5,25% | → Glas                  |
| Recuperatie/Valorisatie | 92,5% | ↓ -1,1%   |                         |
| Stortplaats             | 6,5%  | ↑ +1,3%   | → Glas/plastics/overige |

Uitdagingen: sortering en verwerking van ledlampen, variabele samenstelling, valorisatie van glas (geen TL-productie meer)

Conservatieve methode voor de verwerking van GDL



## Verwerkingsresultaten - Recyclageresultaten



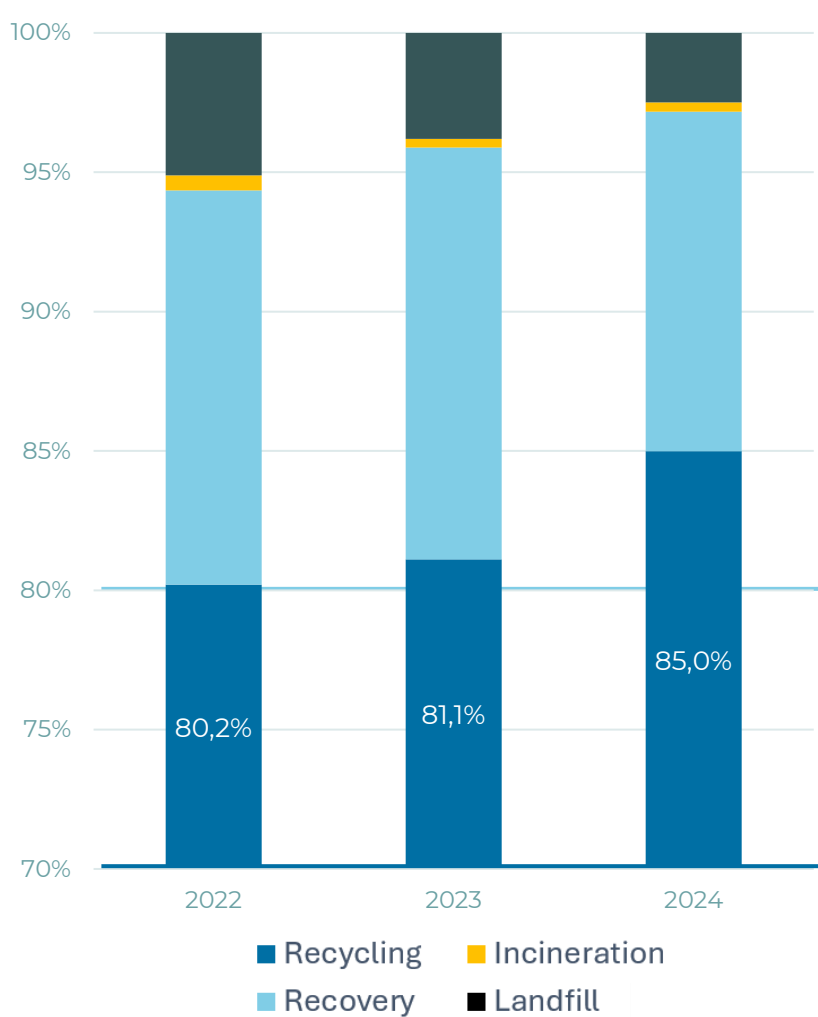
| Fractiesamenstelling (gewicht%)     | 2022 | 2023 | 2024 |
|-------------------------------------|------|------|------|
| Wasmachine                          | 55%  | 57%  | 67%  |
| Vaatwasser (zonder warmtepomp)      | 28%  | 24%  | 20%  |
| Oven/microgolfoven/combinatie (int) | 7%   | 8%   | 6%   |
| Droogkast zonder warmtepomp         | 7%   | 5%   | 4%   |
| Kookplaat                           | 3%   | 4%   | 3%   |

|                                                                                                            |       |          |                      |
|------------------------------------------------------------------------------------------------------------|-------|----------|----------------------|
| Hergebruik (gecertificeerd)                                                                                | 2,2%  | ↓ - 0,2% |                      |
| Recyclage                                                                                                  | 90,0% | ↑ +0,9%  | → Plastics & overige |
| Recuperatie/Valorisatie                                                                                    | 93,4% | ↑ +0,4%  |                      |
| Samenstelling: vervuiling, Fe↑                                                                             |       |          |                      |
| > 6% niet-recupereerbaar: anorganische fractie (ballast), complexe plastics, residu's, pluis, kabelfractie |       |          |                      |

# Overige apparaten



## Verwerkingsresultaten - Recyclageresultaten



| Fractiesamenstelling (gewicht%) | 2022 | 2023 | 2024 |
|---------------------------------|------|------|------|
| Oven/microgolfoven/combinatie   | 8%   | 8%   | 9%   |
| Armatuur                        | 7%   | 6%   | 7%   |
| Multifunctioneel apparaat       | 6%   | 6%   | 7%   |
| Stofzuiger                      | 6%   | 6%   | 6%   |
| Luidsprekers                    | 4%   | 4%   | 4%   |

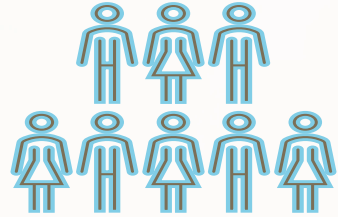
|                                                                               |       |          |                    |
|-------------------------------------------------------------------------------|-------|----------|--------------------|
| Hergebruik (gecertificeerd)                                                   | 3,2%  | ↓ -0,1%  |                    |
| Recyclage                                                                     | 85,0% | ↑↑ +3,9% | → Plastics/overige |
| Recuperatie/Valorisatie                                                       | 97,2% | ↑ +1,3%  |                    |
| Stortplaats                                                                   | 2,5%  | ↓ -1,3%  |                    |
| Uitdagingen: depollutie en gevaarlijk afval, samenstelling (Fe↓ / plastics ↑) |       |          |                    |
| 2,8% niet-recupereerbaar: residu's (plastics/overige), gevaarlijk afval       |       |          |                    |

# Bijdrage innovatie aan de circulaire economie bij Comet Groep

Gregory Lewis, Groep Comet



# Comet Group



556 medewerkers

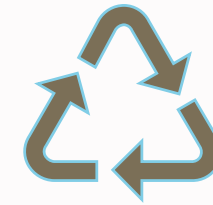


378 payroll  
+ 44 inschakeling  
+ 41 VTE interim/jaar



79 payroll  
+ 6 inschakeling  
+ 8 VTE interim/jaar

## MATERIALEN

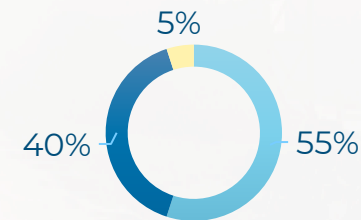


1.200.000 t, waarvan 800.000 t metaal



OMZET: 400 miljoen

## TRANSPORT



■ WEG ■ WATER  
■ SPOOR

# Evolutie feedstock



ELV met  
verbrandingsmotor



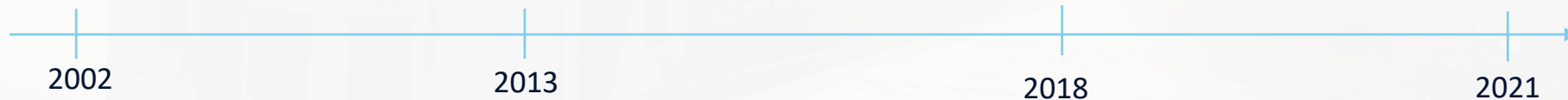
Plug-in & hybride ELV



Micromobiliteit



FCEV



# Increasing complexity

R&D support :

- Continuous increase R&R rates
- Adaptation of processes to feedstock evolution
- Upgrades of outputs materials

|              |        |               |        |              |        |            |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
|--------------|--------|---------------|--------|--------------|--------|------------|--------|------------|--------|-----------|--------|------------|--------|--------------|--------|-------------|--------|-------------|--------|--|--|--|--|
|              |        |               |        |              |        |            |        |            |        | 13        | IIIA   | 14         | IVA    | 15           | VA     | 16          | VIA    | 17          | VIIA   |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | 5         | 10.81  | 6          | 12.011 | 7            | 14.007 | 8           | 15.999 | 9           | 18.998 |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | <b>B</b>  |        | <b>C</b>   |        | <b>N</b>     |        | <b>O</b>    |        | <b>F</b>    |        |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | BORE      |        | CARBONE    |        | AZOTE        |        | OXYGÈNE     |        | FLUOR       |        |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | 13        | 26.982 | 14         | 28.085 | 15           | 30.974 | 16          | 32.06  | 17          | 35.45  |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | <b>Al</b> |        | <b>Si</b>  |        | <b>P</b>     |        | <b>S</b>    |        | <b>Cl</b>   |        |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        | ALUMINIUM |        | SILICIUM   |        | PHOSPHORE    |        | SOUFRE      |        | CHLORE      |        |  |  |  |  |
| IIIB         | 4      | IVB           | 5      | VB           | 6      | VIB        | 7      | VII        | VIII   | 9         | X      | 11         | IB     | 12           | IIIB   |             |        |             |        |  |  |  |  |
| 21           | 44.956 | 22            | 47.867 | 23           | 50.942 | 24         | 51.996 | 25         | 54.938 | 26        | 55.845 | 27         | 58.933 | 28           | 58.693 | 29          | 63.546 | 30          | 65.38  |  |  |  |  |
| <b>Sc</b>    |        | <b>Ti</b>     |        | <b>V</b>     |        | <b>Cr</b>  |        | <b>Mn</b>  |        | <b>Fe</b> |        | <b>Co</b>  |        | <b>Ni</b>    |        | <b>Cu</b>   |        | <b>Zn</b>   |        |  |  |  |  |
| SCANDIUM     |        | TITANE        |        | VANADIUM     |        | CHROME     |        | MANGANESE  |        | FER       |        | COBALT     |        | NICKEL       |        | CUIVRE      |        | ZINC        |        |  |  |  |  |
| 39           | 88.906 | 40            | 91.224 | 41           | 92.906 | 42         | 95.95  | 43         | (98)   | 44        | 101.07 | 45         | 102.91 | 46           | 106.42 | 47          | 107.87 | 48          | 112.41 |  |  |  |  |
| <b>Y</b>     |        | <b>Zr</b>     |        | <b>Nb</b>    |        | <b>Mo</b>  |        | <b>Tc</b>  |        | <b>Ru</b> |        | <b>Rh</b>  |        | <b>Pd</b>    |        | <b>Ag</b>   |        | <b>Cd</b>   |        |  |  |  |  |
| YTRIUM       |        | ZIRCONIUM     |        | NIOBIUM      |        | MOLYBDÈNE  |        | TECHNETIUM |        | RUTHENIUM |        | RHODIUM    |        | PALLADIUM    |        | ARGENT      |        | CADMIUM     |        |  |  |  |  |
| 72           | 178.49 | 73            | 180.95 | 74           | 183.84 | 75         | 186.21 | 76         | 190.23 | 77        | 192.22 | 78         | 195.08 | 79           | 196.97 | 80          | 200.59 | 81          | 204.38 |  |  |  |  |
| <b>La-Lu</b> |        | <b>Hf</b>     |        | <b>Ta</b>    |        | <b>W</b>   |        | <b>Re</b>  |        | <b>Os</b> |        | <b>Ir</b>  |        | <b>Pt</b>    |        | <b>Au</b>   |        | <b>Hg</b>   |        |  |  |  |  |
| LANTHANIDES  |        | HAFNIUM       |        | TANTALE      |        | TUNGSTÈNE  |        | RHÈNIUM    |        | OSMIUM    |        | IRIDIUM    |        | PLATINE      |        | OR          |        | MERCURE     |        |  |  |  |  |
| 104          | (267)  | 105           | (268)  | 106          | (271)  | 107        | (272)  | 108        | (277)  | 109       | (276)  | 110        | (281)  | 111          | (280)  | 112         | (285)  | 113         | (285)  |  |  |  |  |
| <b>Ac-Lr</b> |        | <b>Rf</b>     |        | <b>Db</b>    |        | <b>Sg</b>  |        | <b>Bh</b>  |        | <b>Hs</b> |        | <b>Mt</b>  |        | <b>Ds</b>    |        | <b>Rg</b>   |        | <b>Cn</b>   |        |  |  |  |  |
| ACTINIDES    |        | RUTHERFORDIUM |        | DUBNIUM      |        | SEABORGIUM |        | BOHRRIUM   |        | HASSIUM   |        | MEITNERIUM |        | DARMSTADTIUM |        | ROENTGENIUM |        | COPERNICIUM |        |  |  |  |  |
|              |        |               |        |              |        |            |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| LANTHANIDES  |        |               |        |              |        |            |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| 57           | 138.91 | 58            | 140.12 | 59           | 140.91 | 60         | 144.24 | 61         | (145)  | 62        | 150.36 | 63         | 151.96 | 64           | 157.25 | 65          | 158.93 | 66          | 162.50 |  |  |  |  |
| <b>La</b>    |        | <b>Ce</b>     |        | <b>Pr</b>    |        | <b>Nd</b>  |        | <b>Pm</b>  |        | <b>Sm</b> |        | <b>Eu</b>  |        | <b>Gd</b>    |        | <b>Tb</b>   |        | <b>Dy</b>   |        |  |  |  |  |
| LANTHANE     |        | CÉRIUM        |        | PRASÉODYME   |        | NÉODYME    |        | PROMÉTHIUM |        | SAMARIUM  |        | EUROPIUM   |        | GADOLINIUM   |        | TERBIUM     |        | DYSPROSIUM  |        |  |  |  |  |
| 67           | 164.93 | 68            | 167.26 | 69           | 168.93 | 70         | 173.0  |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| <b>Ho</b>    |        | <b>Er</b>     |        | <b>Tm</b>    |        | <b>Yb</b>  |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| HOLMIUM      |        | ERBIUM        |        | THULIUM      |        | YTTÉRIUM   |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| ACTINIDES    |        |               |        |              |        |            |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| 89           | (227)  | 90            | 232.04 | 91           | 231.04 | 92         | 238.03 | 93         | (237)  | 94        | (244)  | 95         | (243)  | 96           | (247)  | 97          | (247)  | 98          | (251)  |  |  |  |  |
| <b>Ac</b>    |        | <b>Th</b>     |        | <b>Pa</b>    |        | <b>U</b>   |        | <b>Np</b>  |        | <b>Pu</b> |        | <b>Am</b>  |        | <b>Cm</b>    |        | <b>Bk</b>   |        | <b>Cf</b>   |        |  |  |  |  |
| ACTINIUM     |        | THORIUM       |        | PROTACTINIUM |        | URANIUM    |        | NEPTUNIUM  |        | PLUTONIUM |        | AMÉRICIUM  |        | CURIUM       |        | BERKÉLIUM   |        | CALIFORNIUM |        |  |  |  |  |
| 99           | (252)  | 100           | (257)  | 101          | (258)  | 102        | (259)  |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| <b>Es</b>    |        | <b>Fm</b>     |        | <b>Md</b>    |        | <b>No</b>  |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |
| EINSTEINIUM  |        | FERMIUM       |        | MENDELÉVIUM  |        | NOBÉLIUM   |        |            |        |           |        |            |        |              |        |             |        |             |        |  |  |  |  |

# 2020 – Extractie van zeldzame aardmetalen

- Extractie van permanente REE-magneten uit elektromotoren

|          |          |           |               |           |            |           |           |            |             |             |             |           |           |           |
|----------|----------|-----------|---------------|-----------|------------|-----------|-----------|------------|-------------|-------------|-------------|-----------|-----------|-----------|
| 87 (223) | 88 (226) | 89-103    | 104 (267)     | 105 (268) | 106 (271)  | 107 (272) | 108 (277) | 109 (276)  | 110 (281)   | 111 (280)   | 112 (285)   | 113 (285) | 114 (287) | 115 (288) |
| Fr       | Ra       | Ac-Lr     | Rf            | Db        | Sg         | Bh        | Hs        | Mt         | Ds          | Rg          | Cn          | Nh        | Fl        | Mc        |
| FRANCIUM | RADIUM   | Actinides | RUTHERFORDIUM | DUBNIUM   | SEABORGIUM | BOHRNIUM  | HASSIUM   | MEITNERIUM | DARMSTADIUM | ROENTGENIUM | COPERNICIUM | NIHONIUM  | FLEROVIUM | MOSCOVIUM |

|             |           |            |           |            |           |           |            |           |            |           |           |           |           |           |
|-------------|-----------|------------|-----------|------------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|
| LANTHANIDES |           |            |           |            |           |           |            |           |            |           |           |           |           |           |
| 57 138.91   | 58 140.12 | 59 140.91  | 60 144.24 | 61 (145)   | 62 150.36 | 63 151.96 | 64 157.25  | 65 158.93 | 66 162.50  | 67 164.93 | 68 167.26 | 69 168.93 | 70 170.03 | 71 174.97 |
| La          | Ce        | Pr         | Nd        | Pm         | Sm        | Eu        | Gd         | Tb        | Dy         | Ho        | Er        | Tm        | Yb        | Lu        |
| LANTHANE    | CERIUM    | PRASEODYME | NEODYME   | PROMETHIUM | SAMARIUM  | EUROPIUM  | GADOLINIUM | TERBIUM   | DYSPROSIUM | HOLMIUM   | ERBBIUM   | THULIUM   | YTERBIUM  | LUTETIUM  |



Depolluted hybrid vehicles  
1.2 kg of magnets/vehicle



REE magnets rotor  
Manual pre-dismantling



REE magnets wheels  
Feed material



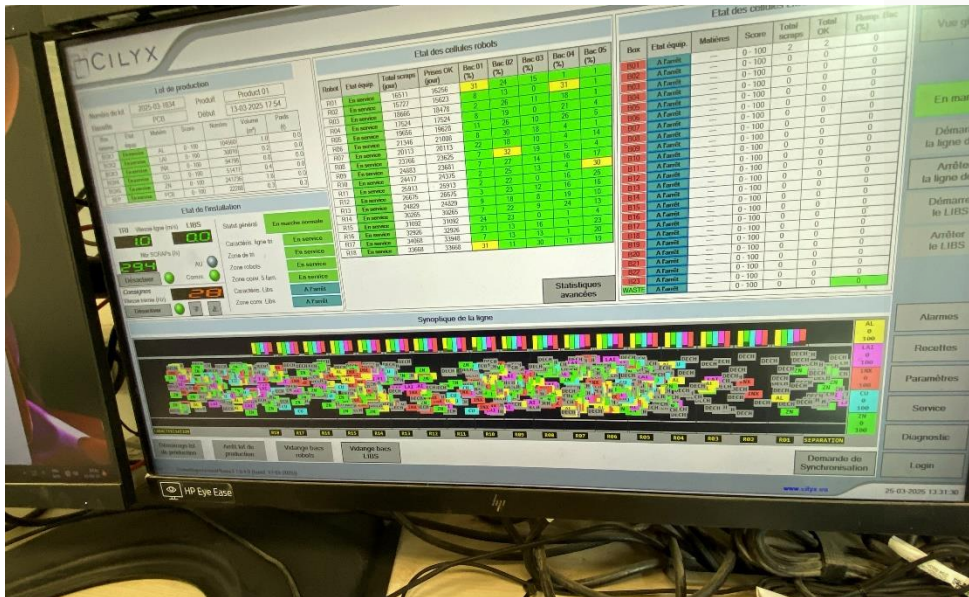
NdFeB magnets  
Feed of the hydro process



# 2022 - Sortering van legeringen

- Geautomatiseerde en gerobotiseerde sorteerfabriek voor metaal opgestart in 2022
- Intern ontwikkeld proces op basis van AI

|   |                  |           |             |           |           |           |            |           |           |           |           |           |           |           |           |           |           |
|---|------------------|-----------|-------------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|   | LITHIUM BERKLIUM |           |             |           |           |           |            |           |           |           |           |           |           |           |           |           |           |
|   | 11 22.990        | 12 24.305 |             |           |           |           |            |           |           |           |           |           |           |           |           |           |           |
| 3 | Na               | Mg        |             |           |           |           |            |           |           |           |           |           |           |           |           |           |           |
|   | SODIUM           | MAGNÉSIUM | 3           | IIIB      | 4         | IVB       | 5          | VB        | 6         | VIB       | 7         | VIIIB     | 8         | VIIIB     |           |           | 10        |
| 4 | 19 39.098        | 20 40.078 | 21 44.956   | 22 47.867 | 23 50.942 | 24 51.996 | 25 54.938  | 26 55.845 | 27 58.933 | 28 58.693 | 29 63.546 | 30 65.38  | 31 69.723 | 32 72.64  | 33 74.922 | 34 78.971 | 35 85.468 |
|   | K                | Ca        | Sc          | Ti        | V         | Cr        | Mn         | Fe        | Co        | Ni        | Cu        | Zn        | Ga        | Ge        | As        | Se        | Br        |
|   | POTASSIUM        | CALCIUM   | SCANDIUM    | TITANE    | VANADIUM  | CHROME    | MANGANESE  | FER       | COBALT    | NICKEL    | CUivre    | ZINC      | GALLIUM   | GERMANIUM | ARSENIC   | SELENIUM  | BROMINE   |
| 5 | 37 85.468        | 38 87.62  | 39 88.906   | 40 91.224 | 41 92.906 | 42 95.95  | 43 98.906  | 44 101.07 | 45 102.91 | 46 106.42 | 47 107.87 | 48 112.41 | 49 114.82 | 50 118.71 | 51 121.76 | 52 127.60 | 53 127.60 |
|   | Rb               | Sr        | Y           | Zr        | Nb        | Mo        | Tc         | Ru        | Rh        | Pd        | Ag        | Cd        | In        | Sn        | Sb        | Te        | I         |
|   | RUBIDIUM         | STRONTIUM | YTRIUM      | ZIRCONIUM | NIObIUM   | MOLYBDÈNE | TECHNETIUM | RUTHÉNIUM | RHODIUM   | PALLADIUM | ARGENT    | CADMIUM   | INDIUM    | ÉTAIN     | ANTIMOÏNE | TÉLUR     | IODINE    |
| 6 | 55 132.91        | 56 137.33 | 57-71       | 72 178.49 | 73 180.95 | 74 183.84 | 75 186.21  | 76 190.23 | 77 192.22 | 78 195.08 | 79 196.97 | 80 200.59 | 81 204.38 | 82 207.2  | 83 208.98 | 84 208.98 | 85 208.98 |
|   | Cs               | Ba        | La-Lu       | Hf        | Ta        | W         | Re         | Os        | Ir        | Pt        | Au        | Hg        | Tl        | Pb        | Bi        | Po        | At        |
|   | CÉSIUM           | BARYUM    | Lanthanides | HAFNIUM   | TANTALE   | TUNGSTÈNE | RHÉNIUM    | OSMIUM    | IRIDIUM   | PLATINE   | OR        | MERCURE   | THALLIUM  | PLOMB     | BISMUTH   | POLOÏNE   | ASTATINE  |



# 2023 – Upgrade van koper

|    |    |        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 2  | 3      | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  |
| 1s | 2s | 2p     | 3s  | 3p  | 4s  | 4p  | 5s  | 5p  | 6s  | 6p  | 7s  | 7p  | 8s  | 8p  | 9s  | 9p  | 10s |
| 19 | 20 | 21     | 22  | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 30  | 31  | 32  | 33  | 34  | 35  | 36  |
| K  | Ca | Sc     | Ti  | V   | Cr  | Mn  | Fe  | Co  | Ni  | Cu  | Zn  | Ga  | Ge  | As  | Se  | Br  | Kr  |
| 37 | 38 | 39     | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 53  | 54  |
| Rb | Sr | Y      | Zr  | Nb  | Mo  | Tc  | Ru  | Rh  | Pd  | Ag  | Cd  | In  | Sn  | Sb  | Te  | I   | Xe  |
| 55 | 56 | 57-71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  | 81  | 82  | 83  | 84  | 85  | 86  |
| Cs | Ba | La-Lu  | Hf  | Ta  | W   | Re  | Os  | Ir  | Pt  | Au  | Hg  | Tl  | Pb  | Bi  | Po  | At  | Rn  |
| 87 | 88 | 89-103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |
| Fr | Ra | Ac-Lr  | Rf  | Db  | Sg  | Bh  | Hs  | Mt  | Ds  | Rg  | Cn  | Nh  | Fl  | Mc  | Lv  | Ts  | Og  |
| Fr | Ra | Ac-Lr  | Rf  | Db  | Sg  | Bh  | Hs  | Mt  | Ds  | Rg  | Cn  | Nh  | Fl  | Mc  | Lv  | Ts  | Og  |

- Hydrometallurgiefabriek voor koper opgestart in 2023
- Recuperatie van koper uit low-grade residu's van mechanische separatie
- Productie van koperkathodes met een hoge zuiverheidsgraad



# 2024 – Printplaten

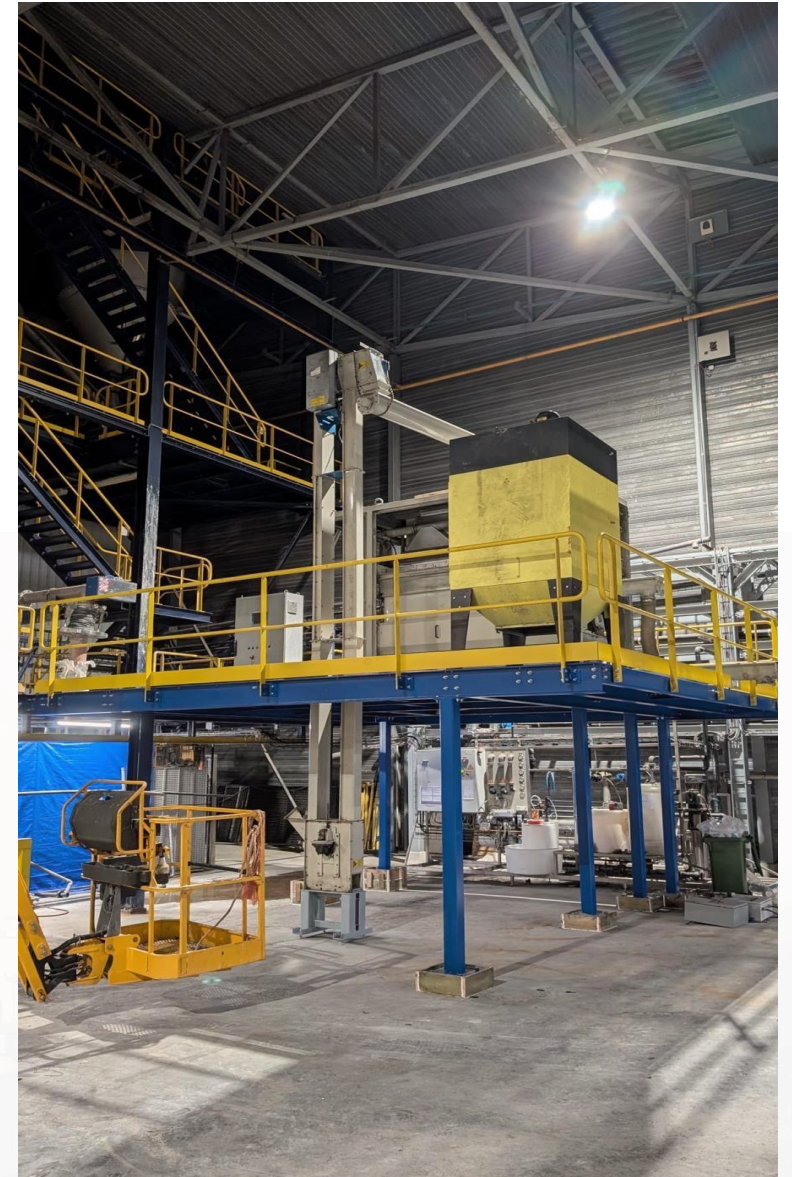
|   |                             |  |                              |  |                               |  |                              |  |                            |  |                             |  |                              |  |                              |  |                            |  |                              |  |                           |  |                            |  |                             |  |                             |  |    |  |    |  |    |  |     |  |           |  |          |  |
|---|-----------------------------|--|------------------------------|--|-------------------------------|--|------------------------------|--|----------------------------|--|-----------------------------|--|------------------------------|--|------------------------------|--|----------------------------|--|------------------------------|--|---------------------------|--|----------------------------|--|-----------------------------|--|-----------------------------|--|----|--|----|--|----|--|-----|--|-----------|--|----------|--|
|   | LITHIUM                     |  | BERYLLIUM                    |  |                               |  |                              |  |                            |  |                             |  |                              |  |                              |  |                            |  |                              |  | BORE                      |  | CARBONE                    |  |                             |  |                             |  |    |  |    |  |    |  |     |  |           |  |          |  |
| 3 | 11 22.990<br>Na<br>SODIUM   |  | 12 24.305<br>Mg<br>MAGNÉSIUM |  | 3                             |  | IIIB                         |  | 4                          |  | IVB                         |  | 5                            |  | VB                           |  | 6                          |  | VIB                          |  | 7                         |  | VIIB                       |  | 8                           |  | 9                           |  | 10 |  | 11 |  | 12 |  | IIB |  | ALUMINIUM |  | SILICIUM |  |
| 4 | 19 39.098<br>K<br>POTASSIUM |  | 20 40.078<br>Ca<br>CALCIUM   |  | 21 44.956<br>Sc<br>SCANDIUM   |  | 22 47.867<br>Ti<br>TITANE    |  | 23 50.942<br>V<br>VANADIUM |  | 24 51.996<br>Cr<br>CHROME   |  | 25 54.938<br>Mn<br>MANGANESE |  | 26 55.845<br>Fe<br>FER       |  | 27 58.933<br>Co<br>COBALT  |  | 28 58.693<br>Ni<br>NICKEL    |  | 29 63.546<br>Cu<br>CUIVRE |  | 30 65.38<br>Zn<br>ZINC     |  | 31 69.723<br>Ga<br>GALLIUM  |  | 32 72.64<br>Ge<br>GERMANIUM |  |    |  |    |  |    |  |     |  |           |  |          |  |
| 5 | 37 85.468<br>Rb<br>RUBIDIUM |  | 38 87.62<br>Sr<br>STRONTIUM  |  | 39 88.906<br>Y<br>YTTRIUM     |  | 40 91.224<br>Zr<br>ZIRCONIUM |  | 41 92.906<br>Nb<br>NIOBIUM |  | 42 95.95<br>Mo<br>MOLYBDÈNE |  | 43 (98)<br>Tc<br>TECHNÉTIUM  |  | 44 101.07<br>Ru<br>RUTHÉNIUM |  | 45 102.91<br>Rh<br>RHODIUM |  | 46 106.42<br>Pd<br>PALLADIUM |  | 47 107.87<br>Ag<br>ARGENT |  | 48 112.41<br>Cd<br>CADMIUM |  | 49 114.82<br>In<br>INDIUM   |  | 50 118.71<br>Sn<br>ÉTAIN    |  |    |  |    |  |    |  |     |  |           |  |          |  |
| 6 | 55 132.91<br>Cs<br>CÉSIIUM  |  | 56 137.33<br>Ba<br>BARYUM    |  | 57-71<br>La-Lu<br>Lanthanides |  | 72 178.49<br>Hf<br>HAFNIUM   |  | 73 180.95<br>Ta<br>TANTALE |  | 74 183.84<br>W<br>TUNGSTÈNE |  | 75 186.21<br>Re<br>RHÉNIUM   |  | 76 190.23<br>Os<br>OSMIUM    |  | 77 192.22<br>Ir<br>IRIDIUM |  | 78 195.08<br>Pt<br>PLATINE   |  | 79 196.97<br>Au<br>OR     |  | 80 200.59<br>Hg<br>MERCURE |  | 81 204.38<br>Tl<br>THALLIUM |  | 82 207.2<br>Pb<br>PLOMB     |  |    |  |    |  |    |  |     |  |           |  |          |  |



# 2025 - Extractie van silicium

[illegible]

- Recyclage van PV-panelen sinds 2018
- Bouw testfabriek voor Si-extractie voltooid
- Eerste confirmatietests in december 2025



# Bedankt!



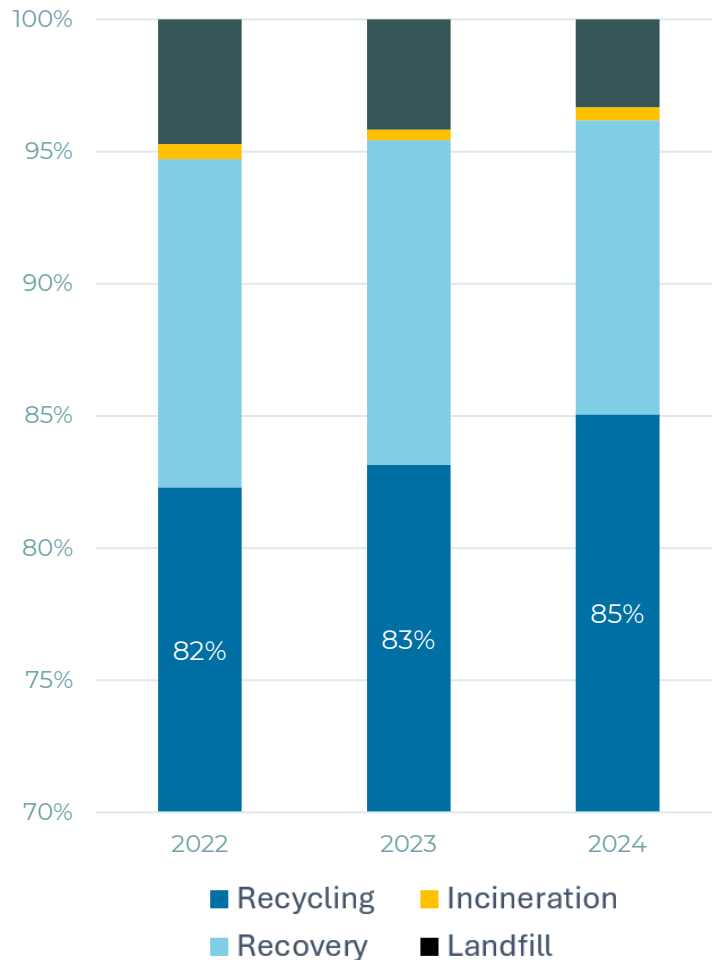
Gregory Lewis  
CIO, Groupe Comet  
[Gregory.lewis@groupecomet.com](mailto:Gregory.lewis@groupecomet.com)

# Recyclageresultaten Verwerkingsresultaten

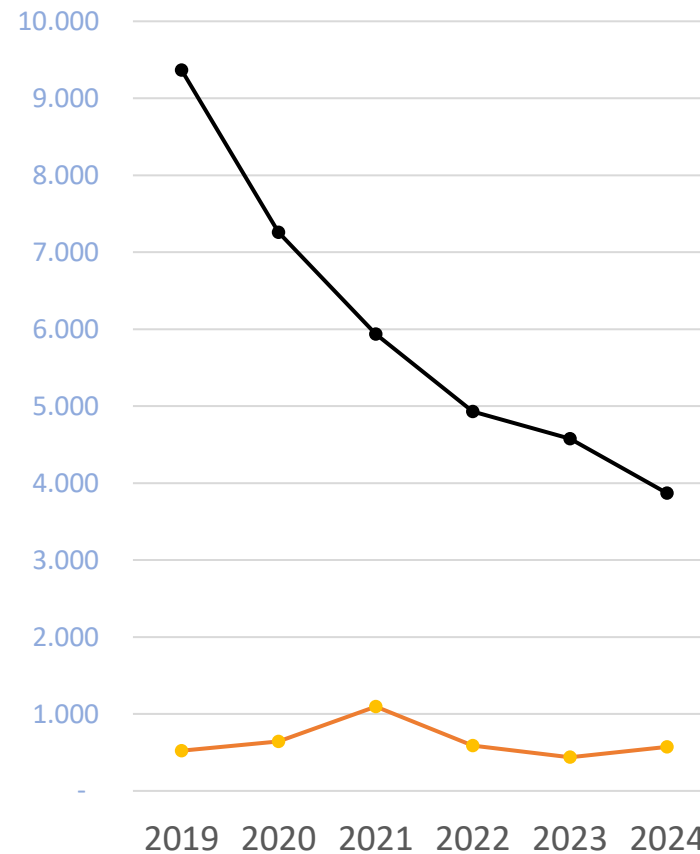
# 2024



## Totaal HH WEEE



## Verbranding & stortplaats (ton)



|               |                               |
|---------------|-------------------------------|
| Hergebruik    | Stabiel = 2,2% van inzameling |
| Recyclage ↑   | +1,9 %                        |
| Recuperatie   | ↑+0,8 %                       |
| Verbranding ↑ | +0,1 % (+135 t)               |
| Stortplaats ↓ | -0,9 %                        |
|               | -707 t = <u>3.868 t</u>       |

### Doel:

- Hergebruik, recyclage, recuperatie ↑
- Rapportagekwaliteit ↑



# Valorisatie gevaarlijk afval

## Nieuwe depollutieregels in lastenboek 2025

### Onveranderd

- Condensatoren > verbranding
- Batterijen > Bebat / Erkende operator
- Inkt
- Kwik
- Olie
- Koelgassen
- Loodglas



### Asbest

- Oude apparatuur
- AEEA dient zo goed als mogelijk te worden geïdentificeerd en gedemonteerd
- Gevaarlijke component wordt gestort
- Opleidingsattest 'eenvoudige handelingen'
- Respect van veiligheid & wetgeving



### Vuurvaste keramische vezels

- In kookplaten
- Moderne apparatuur die momenteel 100% wordt gestort
- Vuurvaste keramische vezels = categorie 2 carcinogeen!
- Sterk vermoeden dat blootstelling kanker veroorzaakt
- Gevestigde effecten: huid- en oogirritatie, nefast effect op ademhaling en longfunctie



# Kookplaten

## Volumereductie in 2 stappen

### Stap 1: identificatie inductiekookplaten

- Onderzoek Renewi E-Waste
- Ongeveer 1/3 van kookplaten
- Eenvoudige sortering op basis van aanwezigheid ventilatie



### Stap 2: demontage

- Onderzoek Renewi E-Waste / Comet
- Demontage in speciale zone / PBMs
- Breken glasplaat
- Identificatie VVKV-houdende isolaties

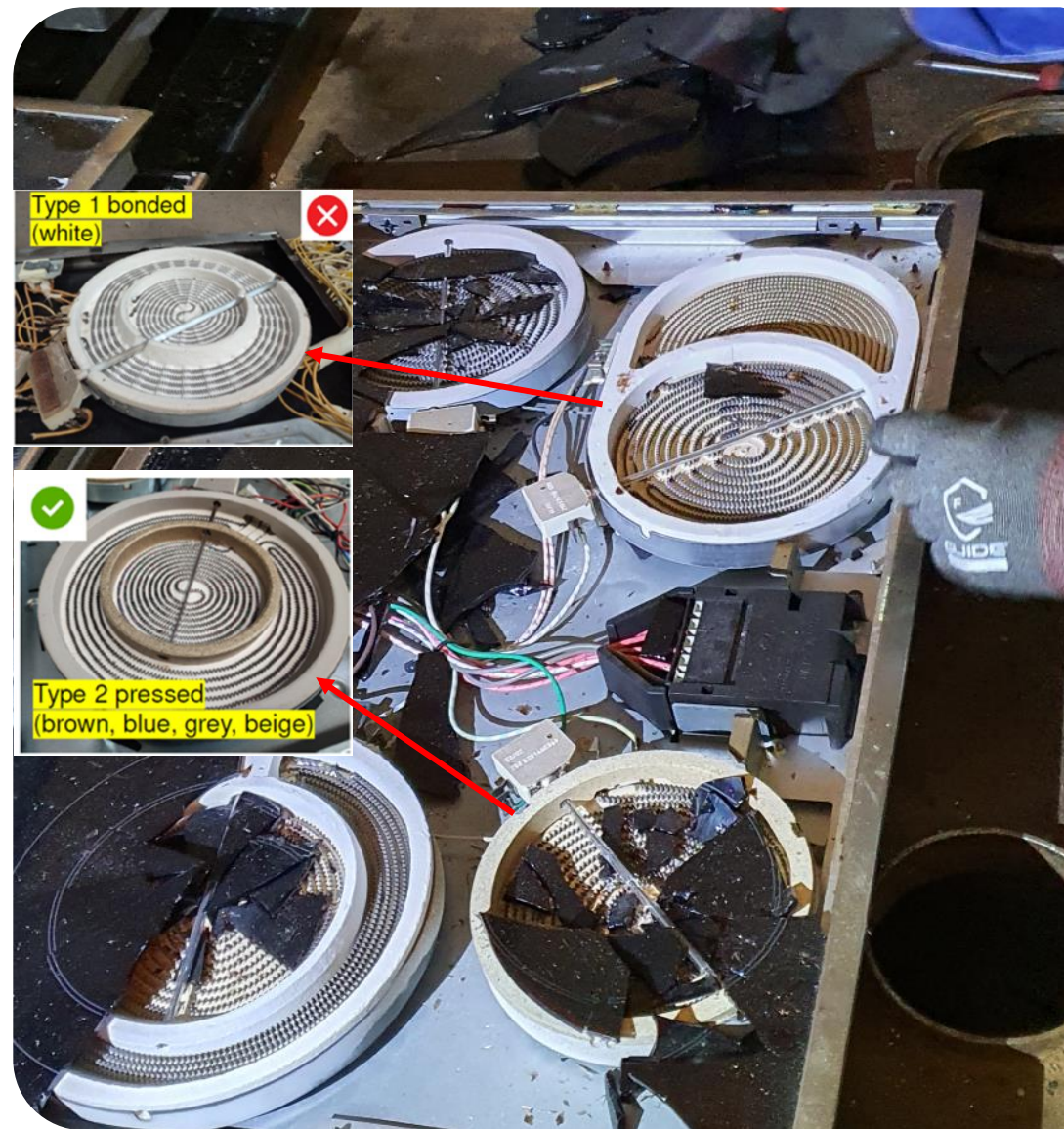
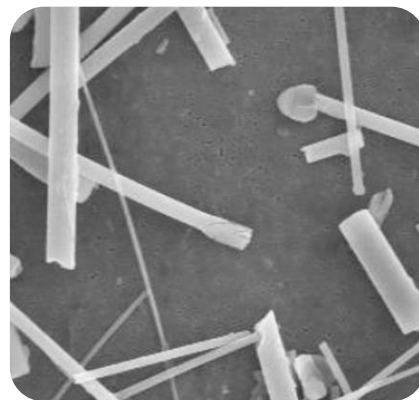
# Kookplaten - demontage

## Identificatie VVKV-houdende isolaties

2 types:

- Bruin/beige/blauw      Geperst en ongevaarlijk
- Wit      Losgebonden en gevaarlijk

Opgelet: zowel kookplaten als individuele verwarmingselementen kunnen beide bevatten!



# Effect op verwerkingsresultaat

Recyclage ↑

Storting ↓



## Asbest

- 0,2 - 0,3 % van OVE
- Volumereductie storting = 50% ?
- Valorisatie metalen

## Vuurvaste keramische vezels

- 0,8 - 0,9 % van OVE
- Volumereductie storting > 90%
- Valorisatie metalen
- Glasplaat (30-40%) moeilijk

## Resultaat

- Recyclage + 0,5 %
- Storting - 1 %

# EU-benchmarking

Hoe staat verwerking t.o.v. andere Europese landen?

- Vergelijking Recupel

- Recupel

GW



Onderscheid KW <> GW, inclusie zonnepanelen

KV



Samenstelling boilers, warmtepompen, airconditioning

TVM



Samenstelling CRT / Plasma / FPD-LCD / FPD-LED / WEEE2

OVE



SDA / ICT / WEEE2

LMP



Samenstelling GOL / LED, wetgeving

stichting  
**OPEN**

**EcoLogic**



**NORSIRK**

**SONS**  
eRecycling

Resultaten moeilijk vergelijkbaar

Moeilijkheden:

- Eurostat
  - Categorisatie
  - Audits
  - Procesverliezen
  - Lokale wetgeving
  - Reporting software
- Standaardisatie!

Vergelijking is moeilijk om diverse redenen...

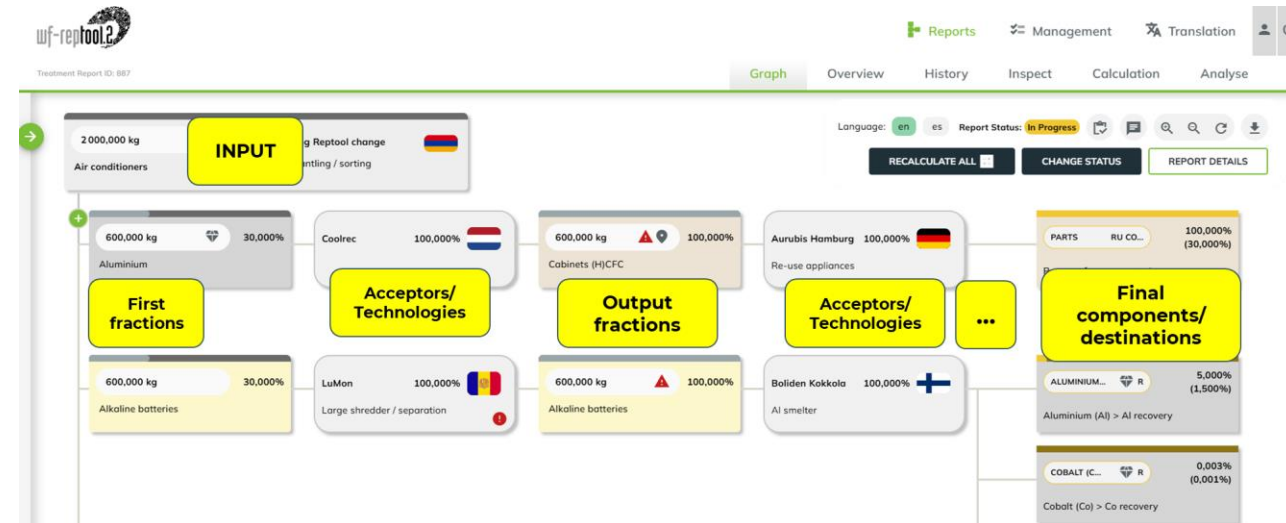
# Reptool v2



## WF-RepTool = Reporting tool for Treatment Operators

- Report per fractie / subfractie
- “First fractions”: na depollutie en eerste verwerking
- “Interim technology” en “Final technology”
- Final technology >> Final fractions
  - Type valorisatie: R, ER, OMR, TD, LD
  - Fe, Al, Cu, andere metalen, plastics, restmateriaal
  - Final destination = operator met land van bestemming (bewijsstukken)
  - Nieuw: detail over plastics (ABS/PS/PP/PC/PVC) + edelmetalen & CRMs

➔ Standaardisatie voor betere vergelijking



Calculate treatment results

| WF RepTool code | Name fraction                                       |
|-----------------|-----------------------------------------------------|
| 16 02 09* / 02  | PCB (suspect) capacitors                            |
| 16 02 14 / 01   | large (household) appliances shredder in be removed |
| 16 02 16 / 08   | stainless steel 'pure' from dismantling             |
| 16 02 16 / 10-1 | power supply cables                                 |
| 16 02 16 / 10-1 | shredder iron fraction from large shredder          |

# Vragen?

[lorenzo.glorie@recupel.be](mailto:lorenzo.glorie@recupel.be)

[www.recupel.be](http://www.recupel.be)

