

Recovery and recycling

Vital to metal's sustainability

Recycling Seminar
Study group's meetings
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The use of metals

- ◆ Society is highly dependant on the use of metals
 - Infrastructure, energy transmission, mobility & transport, information & communication, food supply,...
- ◆ Demand is likely to rise
 - Growth of population and life expectancy
 - Per capita income
- ◆ Products and services must be delivered with minimum resource use and waste generation

Legal obligation or business opportunity ?

- ◆ Increasing trend to legislate waste prevention and recycling, especially in the in the EU but also Worldwide
 - EU Commission
 - « *towards a thematic strategy on the prevention and recycling of waste* »
- ◆ Business opportunity
 - Desirable raw materials
 - ◆ Economic benefits
 - ◆ Saving resources and energy

Recycling business

Well established market

- developed spontaneously
- without any public incentives



Recycling is a key element
of the metal's industry 'sustainability'

We have a strong (SD) message....

'Metals are fully recyclable !'



Allow for 100 % recycling without any
downgrading of the material

... but, how efficient are we ?

and

is there still room for recycling optimisation ?

Current situation

- Claim that achievements of metals and alloys recycling outstanding, *but difficult to demonstrate & communicate*
- No harmonized views on recycling rates definitions
- Various recycling rates, but more confusing than informative
- Recycling rates often used in a wrong context
 - performance of metals recycling may be underestimated
 - potential for increasing metals recycling may be overestimated

Study group's initiative

Create a project team among metals industries
to harmonize recycling definitions
and provide guidance on the way to
evaluating recycling rates



Recycling Project Team

- ◆ Study group's: Lead & Zinc, Copper, Nickel
- ◆ Metal associations: Eurometaux, Eurofer and representatives of all major NF metals, including: Cu, Zn, Al, Pb, Ni, ... and Steel

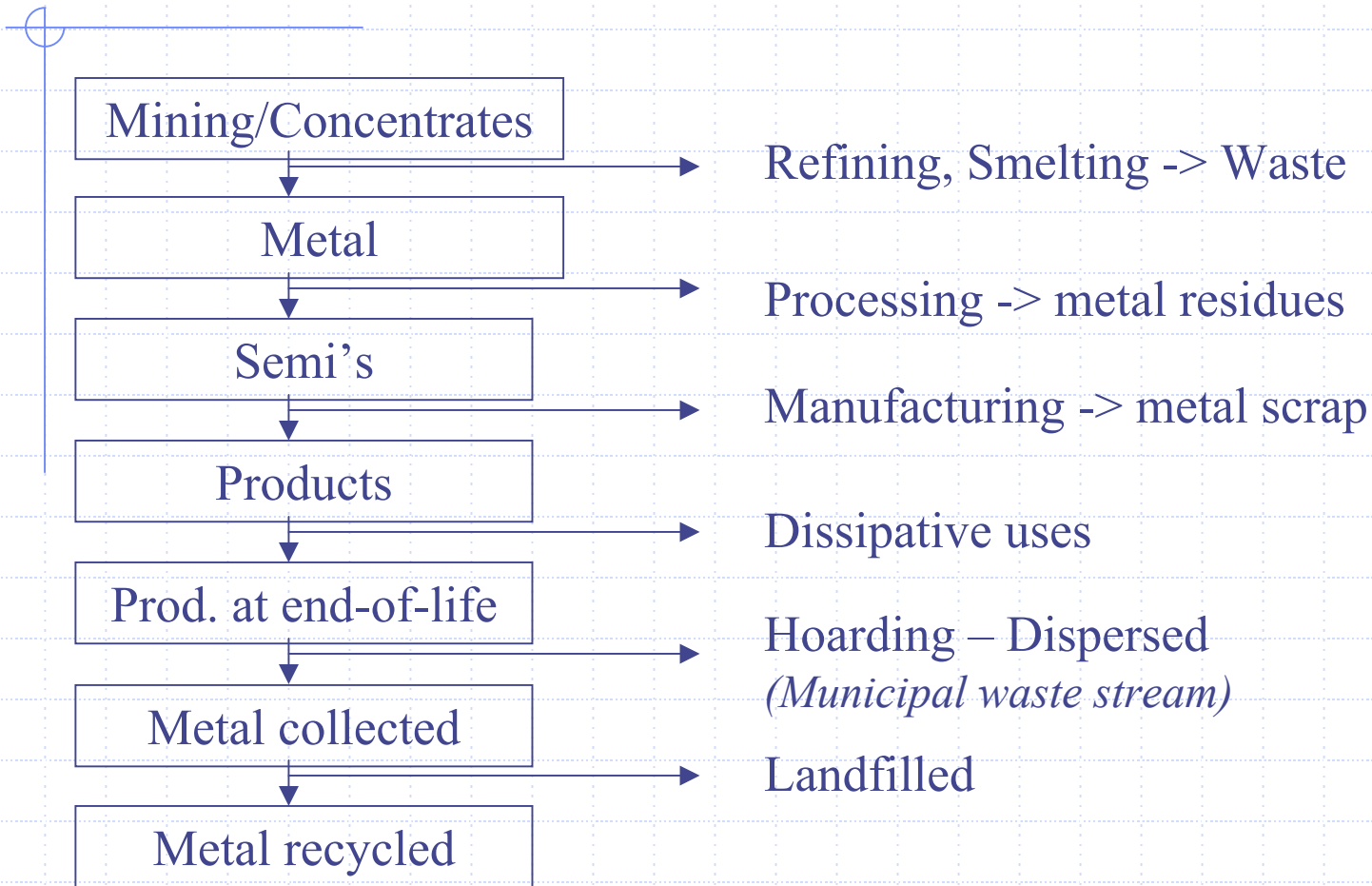
Project team objective

- Develop consistent recycling rates definitions, shared by whole NFM Industry
 - Short term: define recycling rates for the metals industry
 - Mid term: Provide data (numbers, statistics) on recycling rates
 - Longer term: Ensure proper communication to all stakeholders

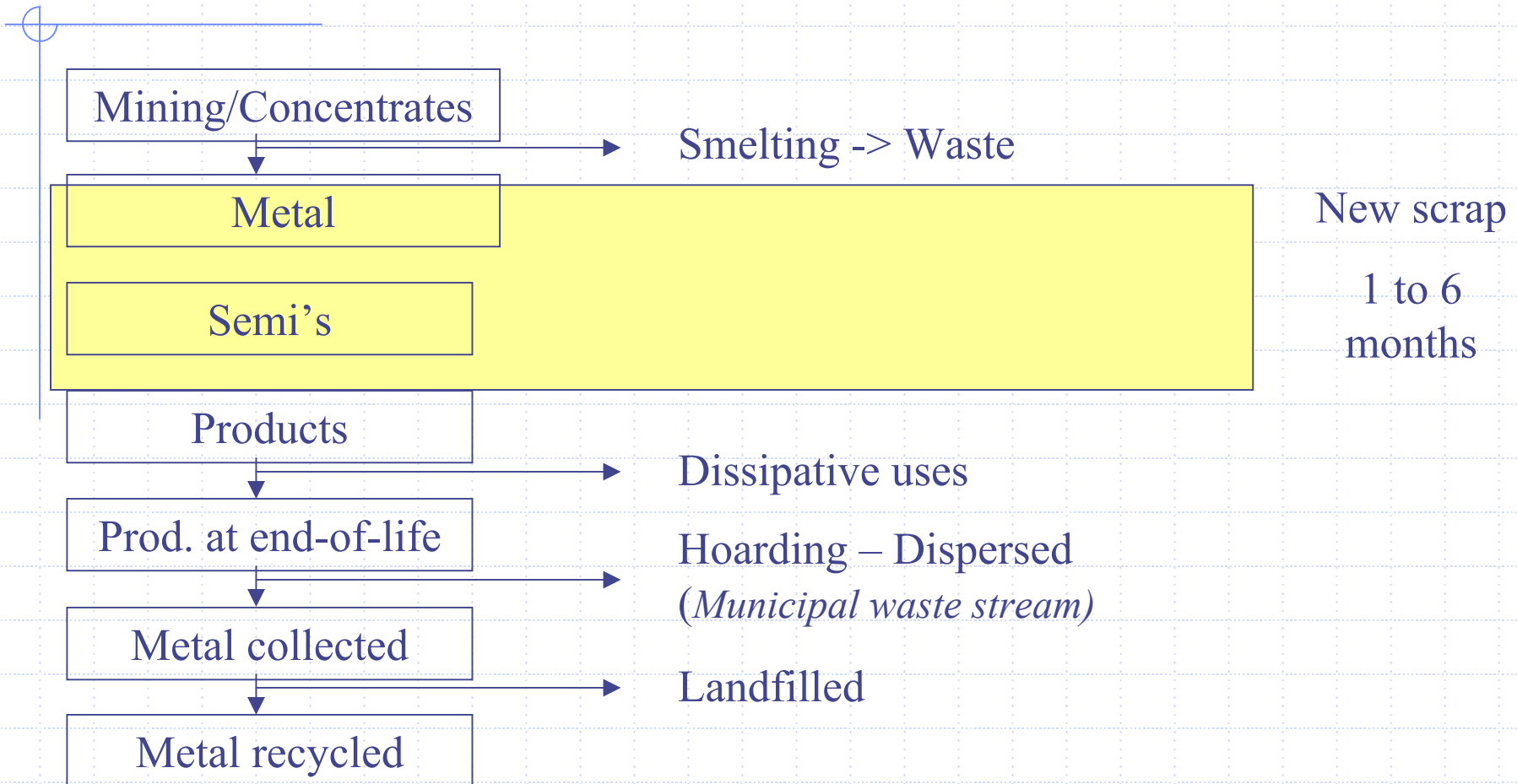


Life cycle and recycling rates

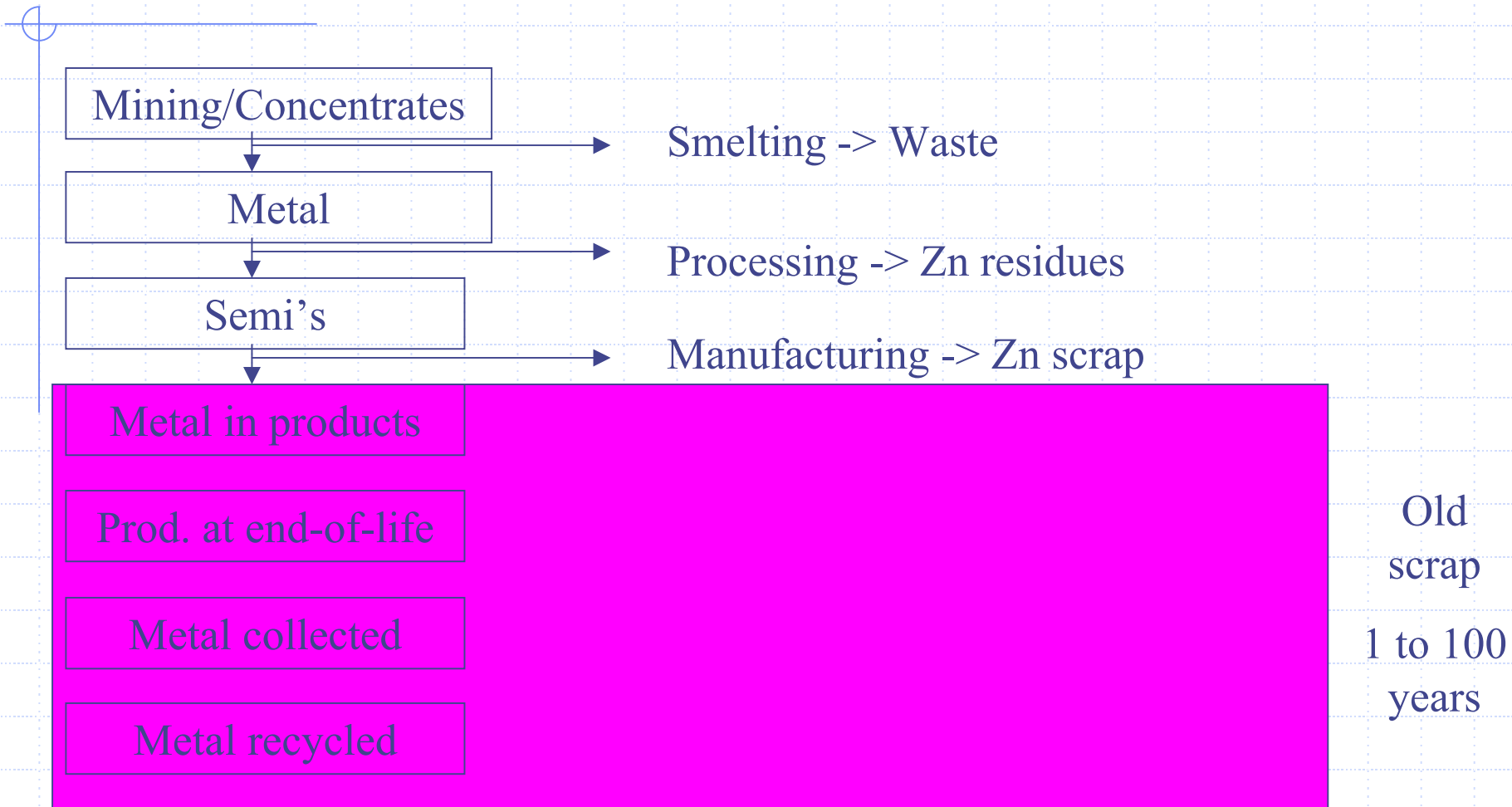
Life cycle



Life cycle



Life cycle



Collection & Recycling rates

Recycling input rate

$$\text{RIR} = \frac{\text{Metal recycled}}{\text{Total metal production}}$$

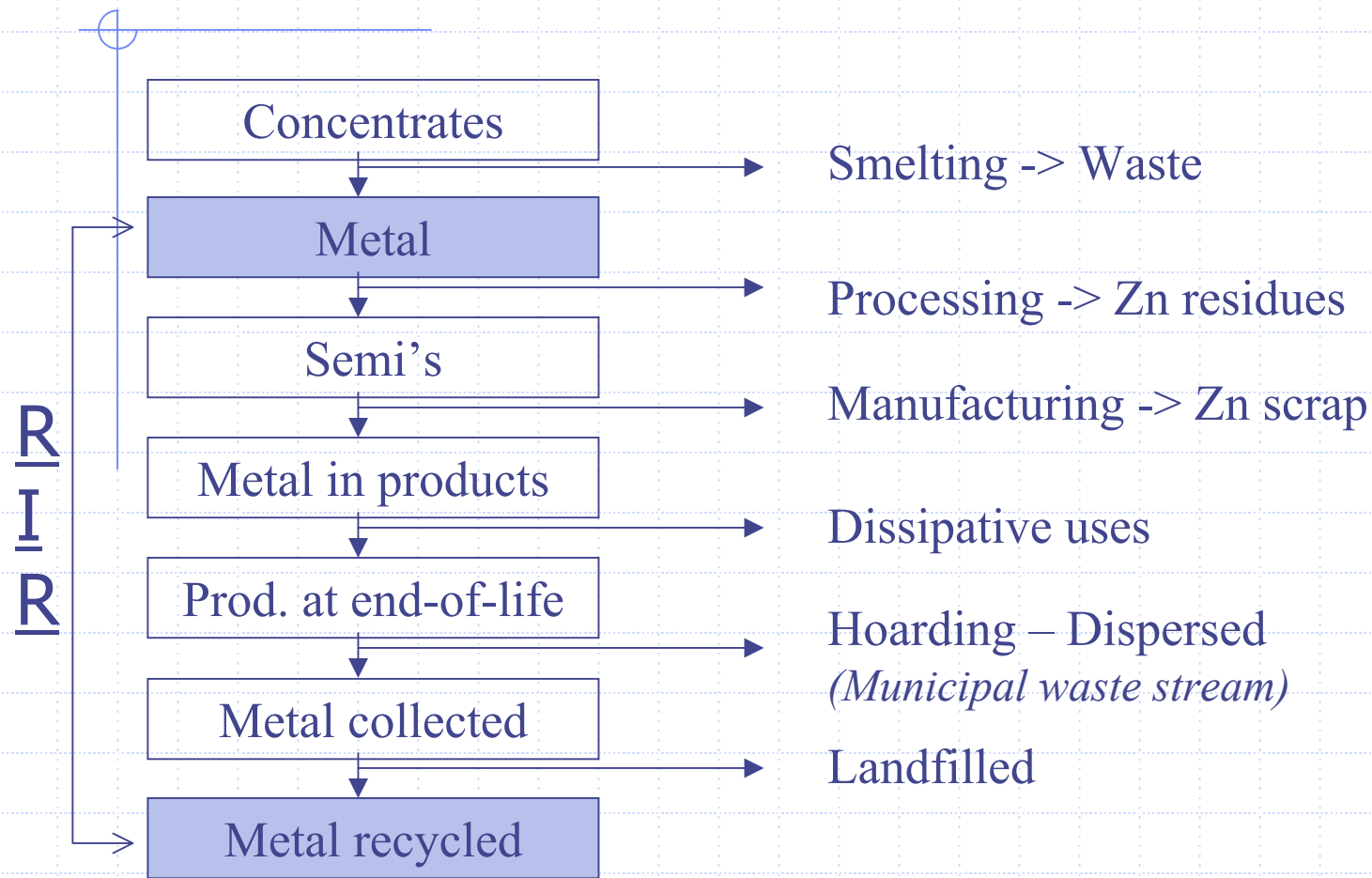
Overall Recycling Efficiency Rate

$$\text{RER} = \frac{\text{Recycled metal}}{\text{Metal available for recycling (old + new scrap)}}$$

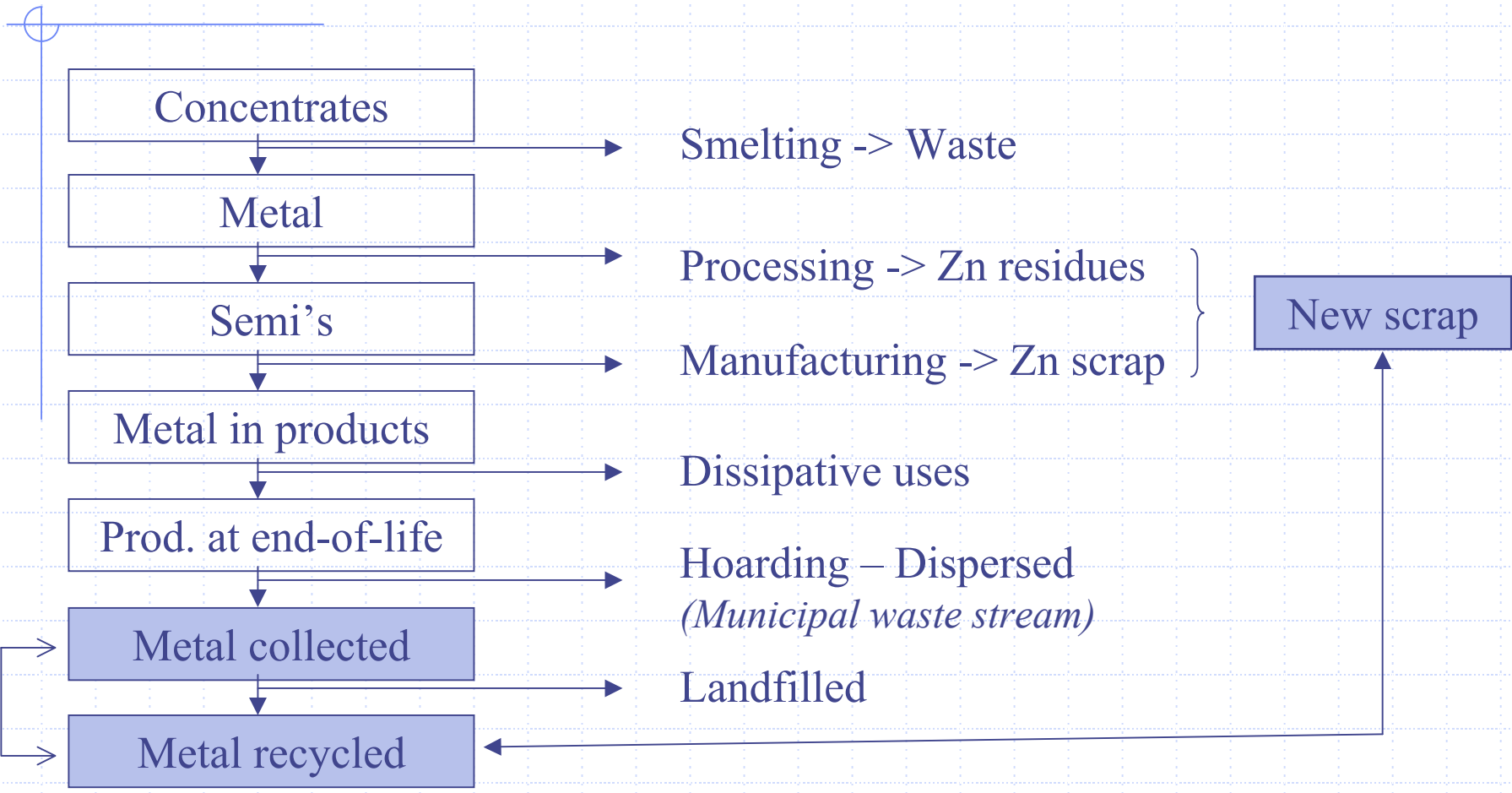
End of Life Recycling Efficiency Rate

$$\text{EOL/RER} = \frac{\text{Metal recycled}}{\text{Metal available for collection (old scrap)}}$$

Recycling input rate



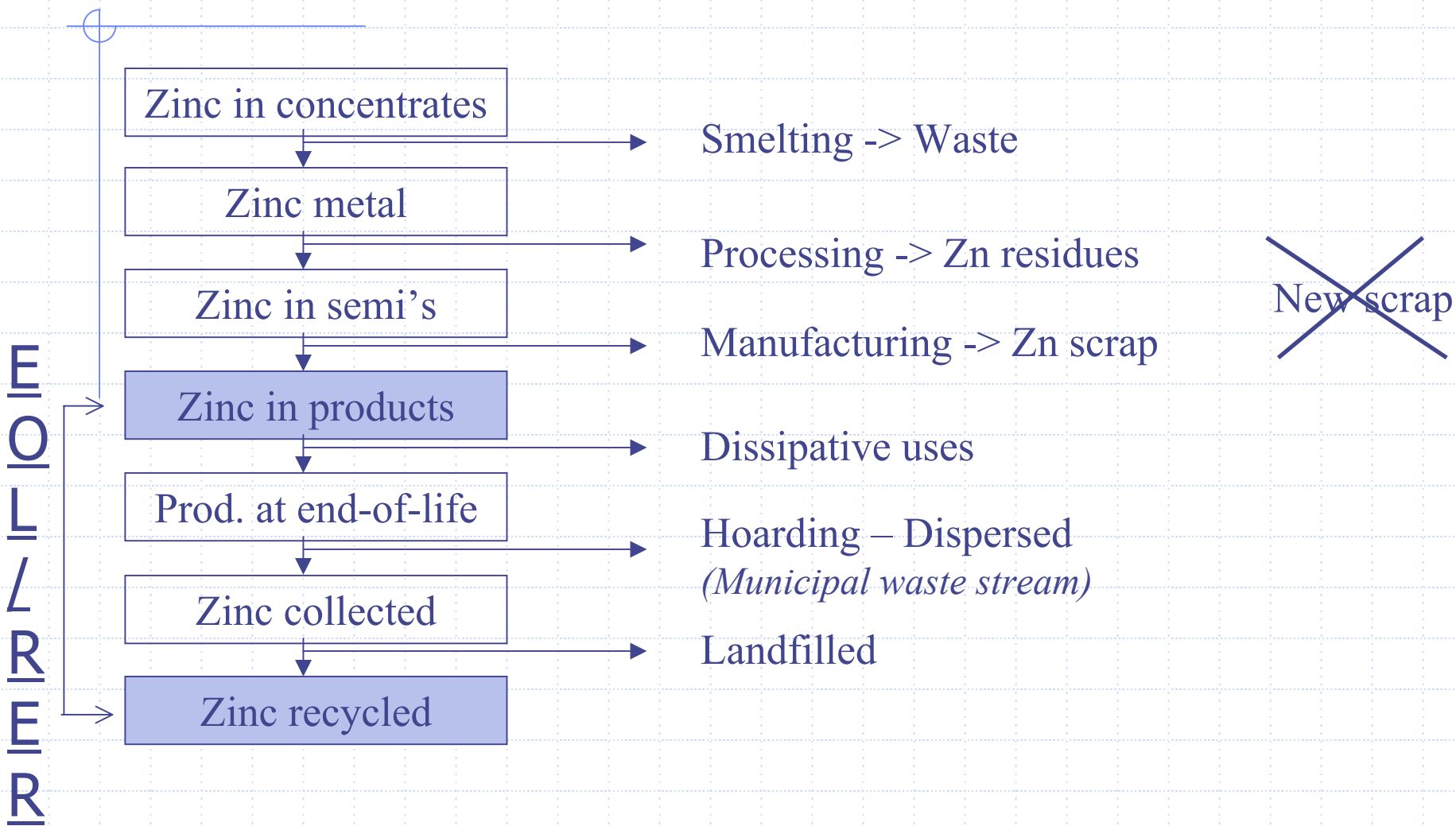
Recycling efficiency rate



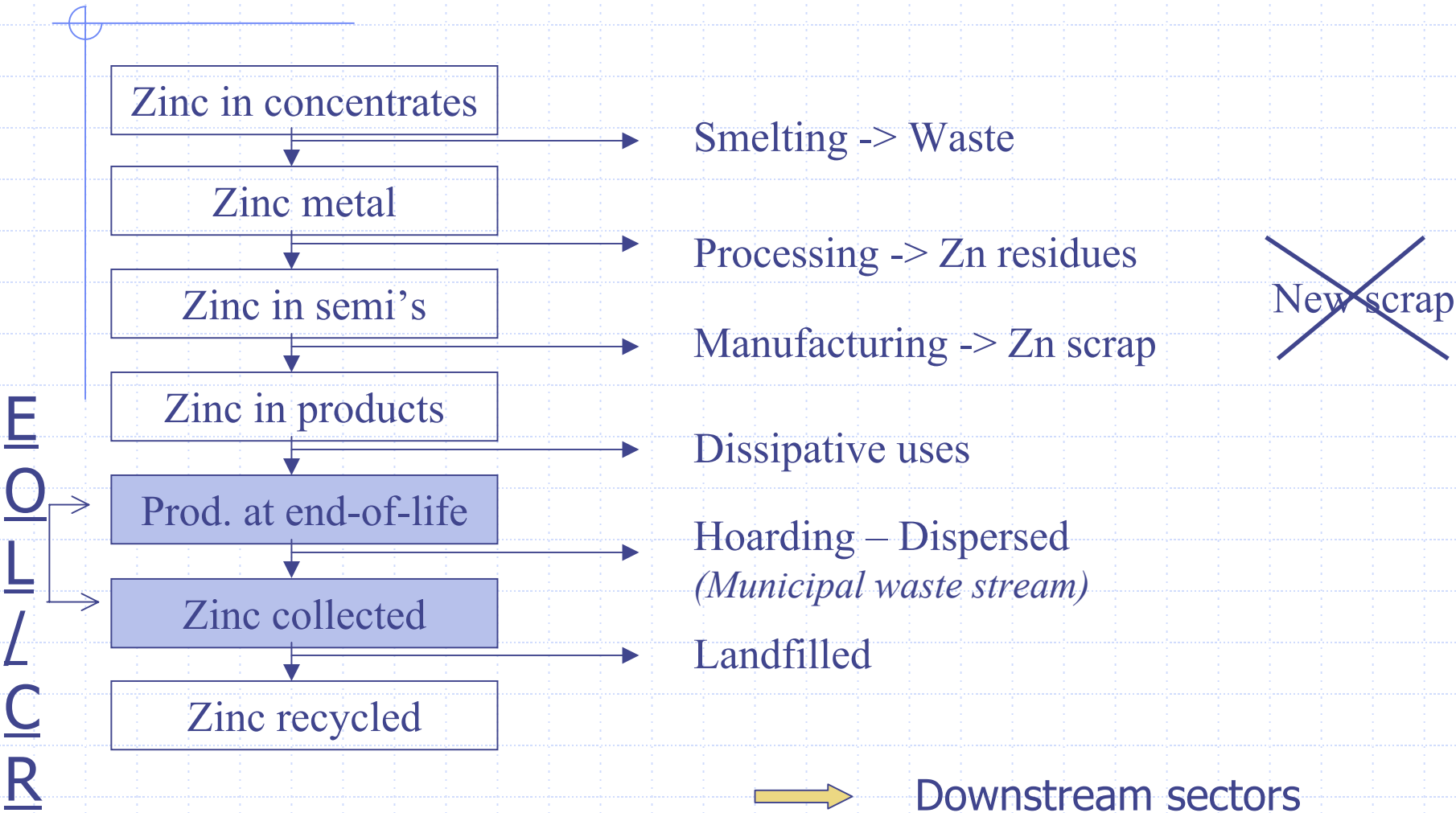
Collected = Old scrap + New scrap



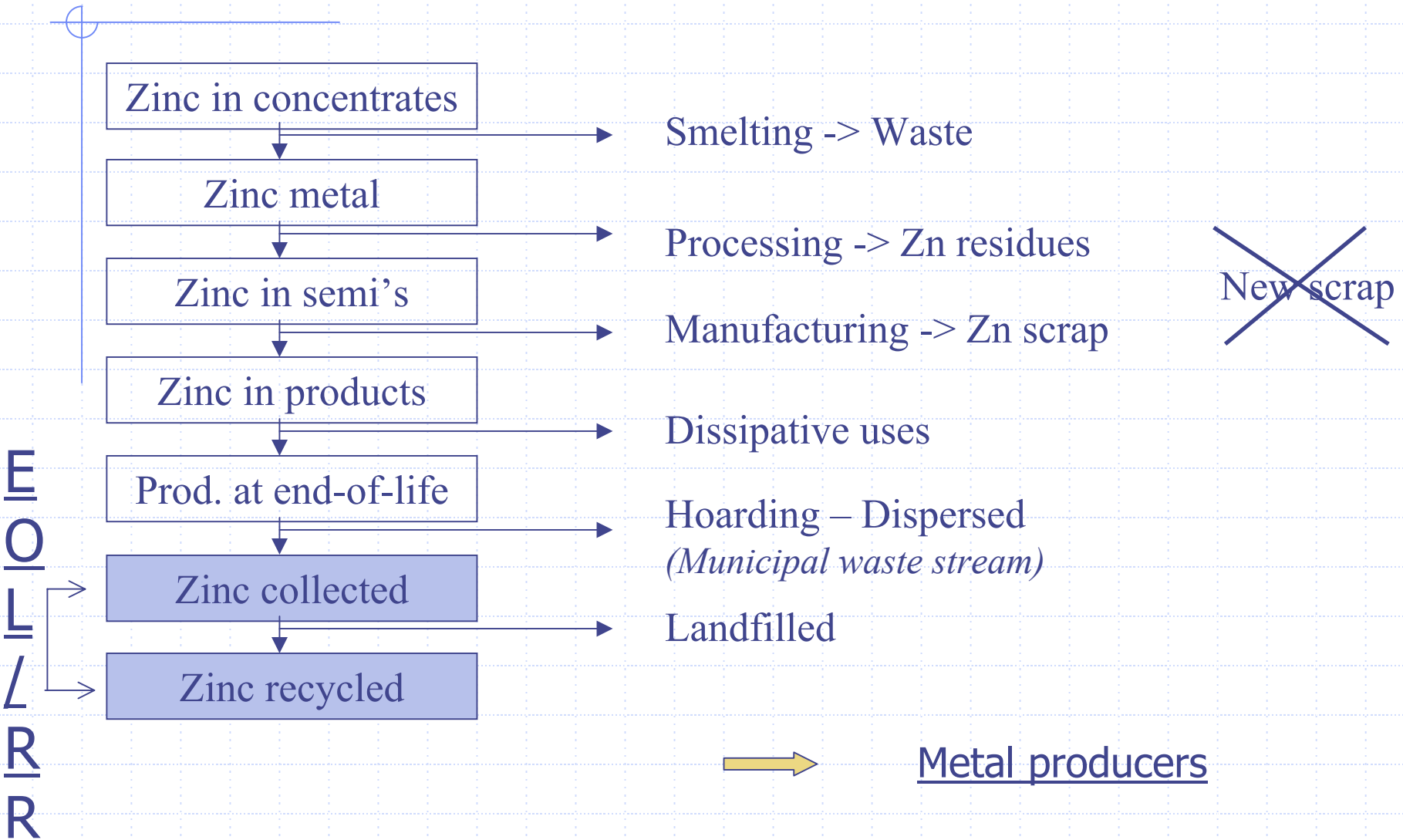
End-of-life recycling efficiency rate



End-of-life collection rate



Life cycle



Additional Collection & Recycling rates (EOL)

EOL Collection rate

$$\text{EOL/CR} = \frac{\text{Metal Collected}}{\text{Metal available for collection from EOL scrap}}$$

EOL Recovery rate

$$\text{EOL/RR} = \frac{\text{Metal recycled}}{\text{Metal collected}}$$

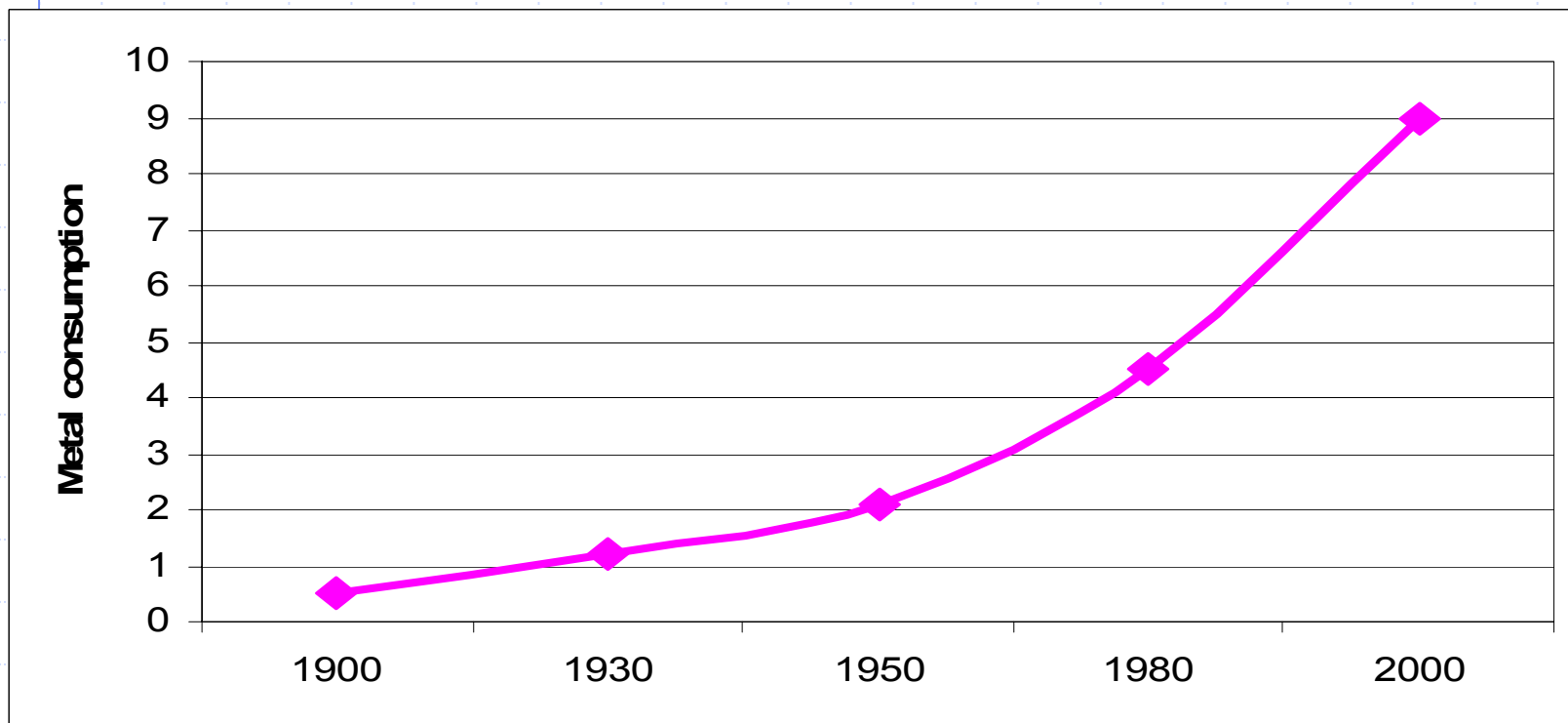
→ Is the responsibility of the downstream sectors

→ Is the responsibility of the recyclers/metal producers

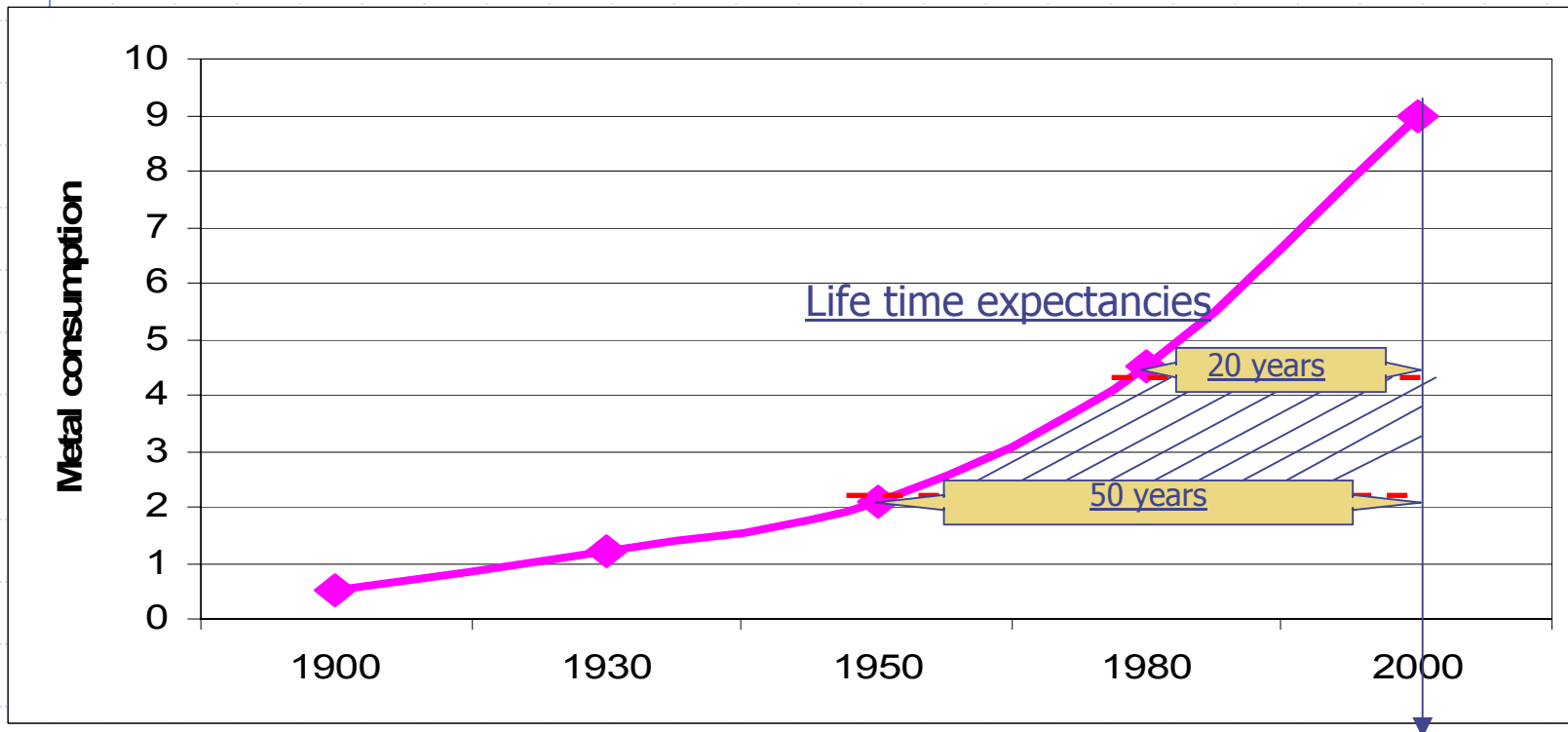


Evaluation of recycling rates

Evolution of metal consumption



Zinc Consumption Evolution



Available for recycling

Calculation of recycling rates

For each application and market segment

- ◆ Gather data on historical production and consumption
- ◆ Evaluate quantities of new scrap (home scrap) generated by the processing of metal and manufacturing of metal products
- ◆ Evaluate the quantities of old scrap available at the end of life of products
 - Life time expectancy
 - Collection rates
- ◆ Consolidate all applications and derive recycling rates

Conclusions

- ◆ There is a wide agreement by metals industry on recycling rates definitions
- ◆ Not one definition can describe properly the recycling of metals
 - RIR has just a statistical value
 - RER and EOL/RER are the most suitable definitions to appreciate recycling efficiencies in metals industry
 - As long as the consumption is increasing, one cannot reach 100 % recycling efficiencies
- ◆ Recycling data are based on best possible evaluation of collection rates and lifetime expectancies by market segment and applications
- ◆ Each sector is committed to evaluate recycling rates for its metal
- ◆ Main difficulty is to collect data by application and market segment