Metals, LCA, and ISO 14041 Allocation Procedures for Recycling

Andrea Russell, Five Winds International

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FiveWinds INTERNATIONAL

ISO 14041 (1998), 6.5.4

- *"a closed-loop allocation procedure applies to closed-loop product systems. It also applies to open-loop product systems,* **where no changes occur in the inherent properties of the recycled material. In such cases, the need for allocation is avoided since the use of secondary material displaces the use of virgin (primary) materials***."*
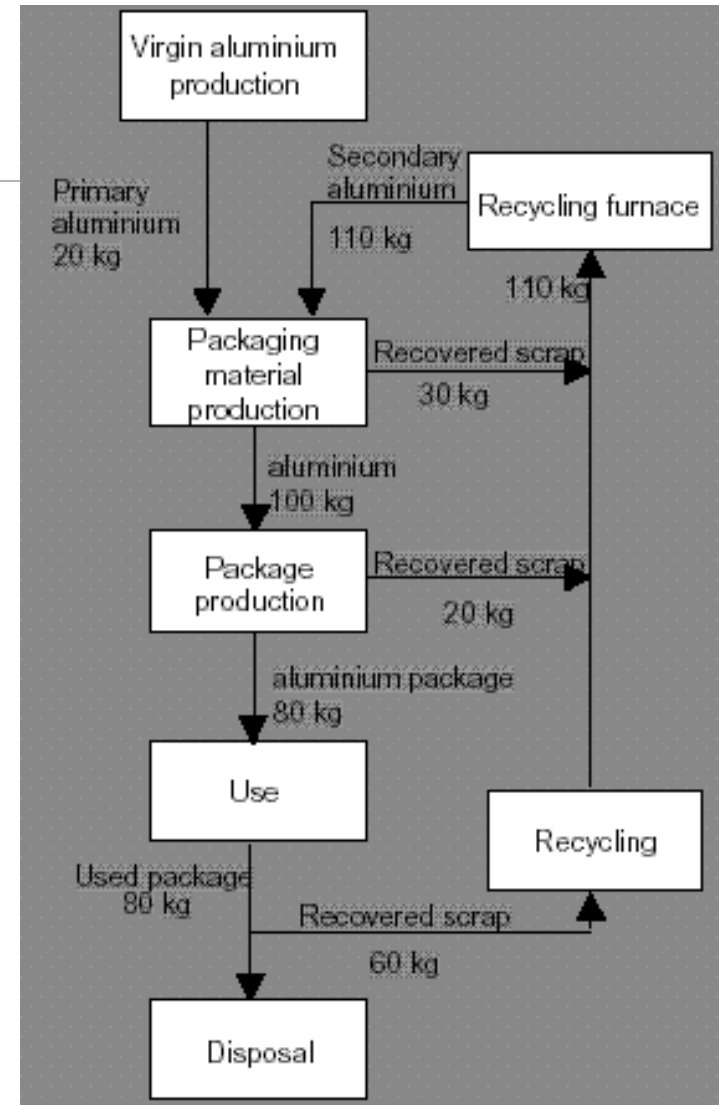
ISO/TR 14049 (2000), 8.2

Applicable for
most metal uses

Allocation for recycling

8.3.1 Closed loop	**8.3.2** Open loop (closed loop procedure)	**8.3.3** Open loop
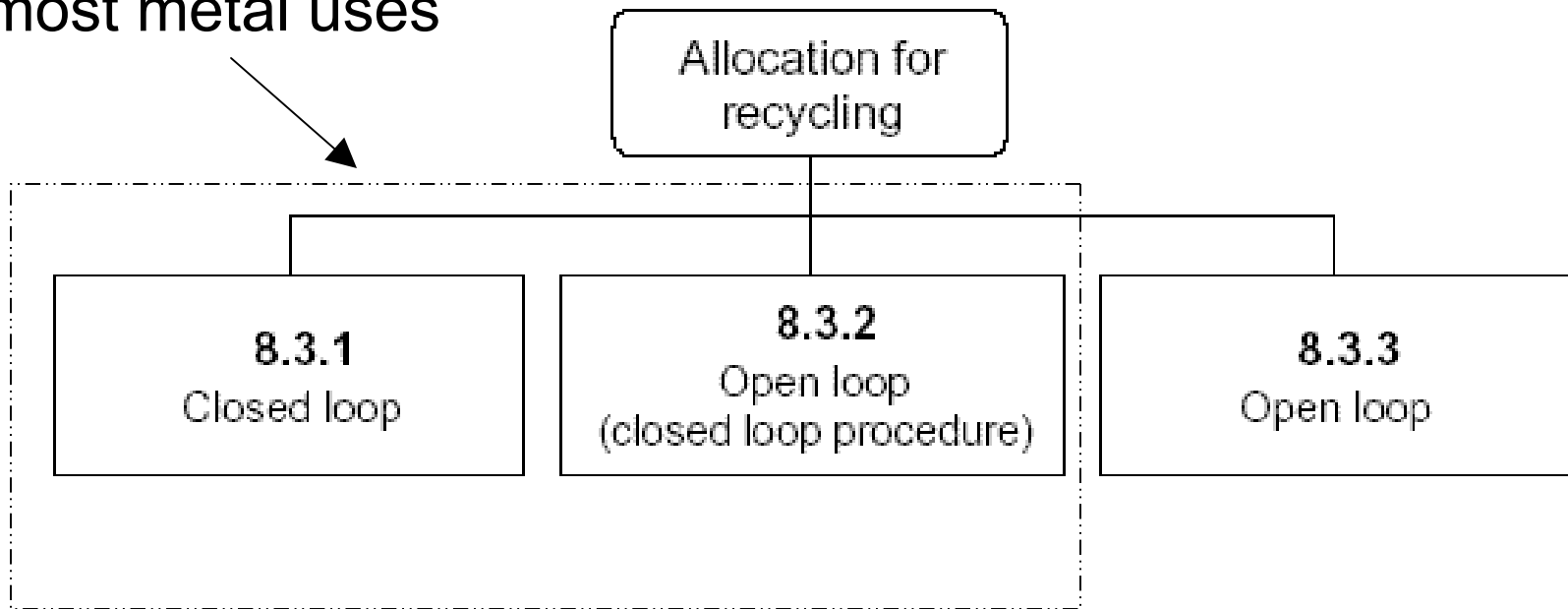
Closed Loop Recycling

- Material to be recycled back into same product system/application without loss in *inherent properties*

- Secondary material displaces primary

- Boundaries expanded to include recycling phase

- Losses to landfill replaced by increase in primary input

- Allocation avoided

Source: ISO/TR 14049:2000

Open-Loop w/ Closed Loop Recycling

- When material recycled leaves system boundary w/out loss in *inherent properties*
- Typical in cases where independent raw material pool exists (most metals)
- If product-specific system delivers & is supplied with same amount from pool, closed loop procedure for recycling can be used -
- Allocation avoided
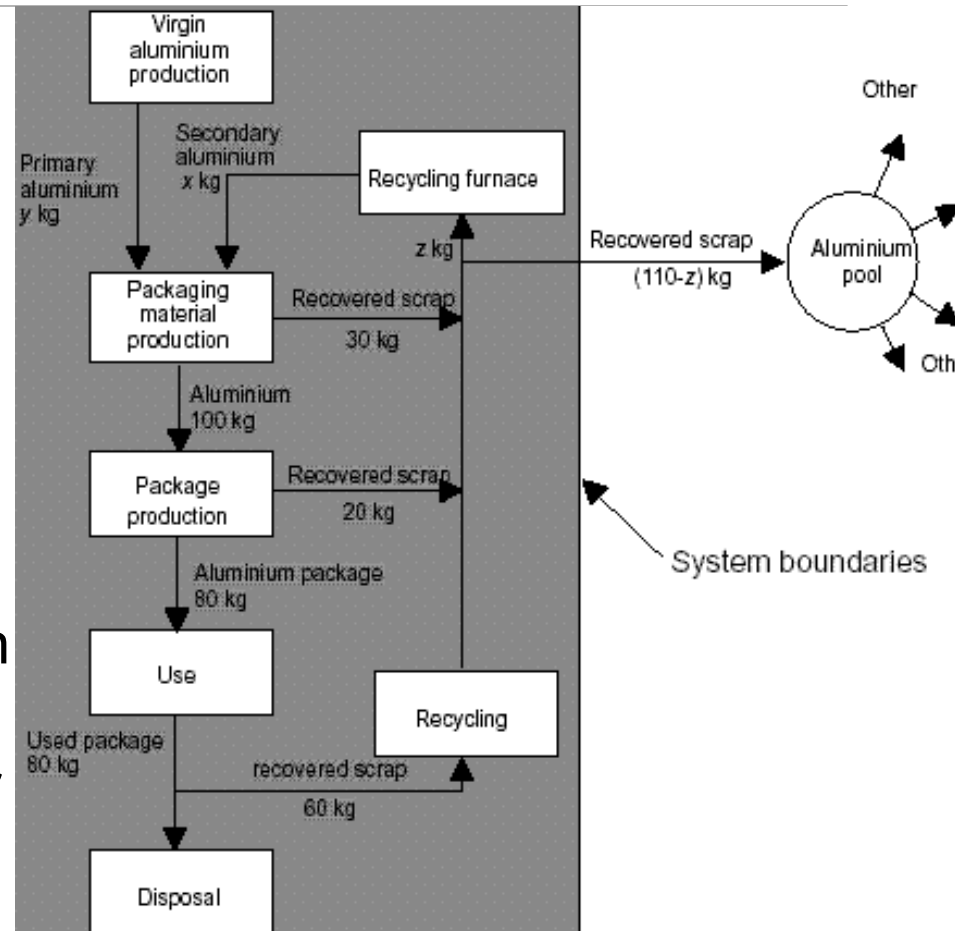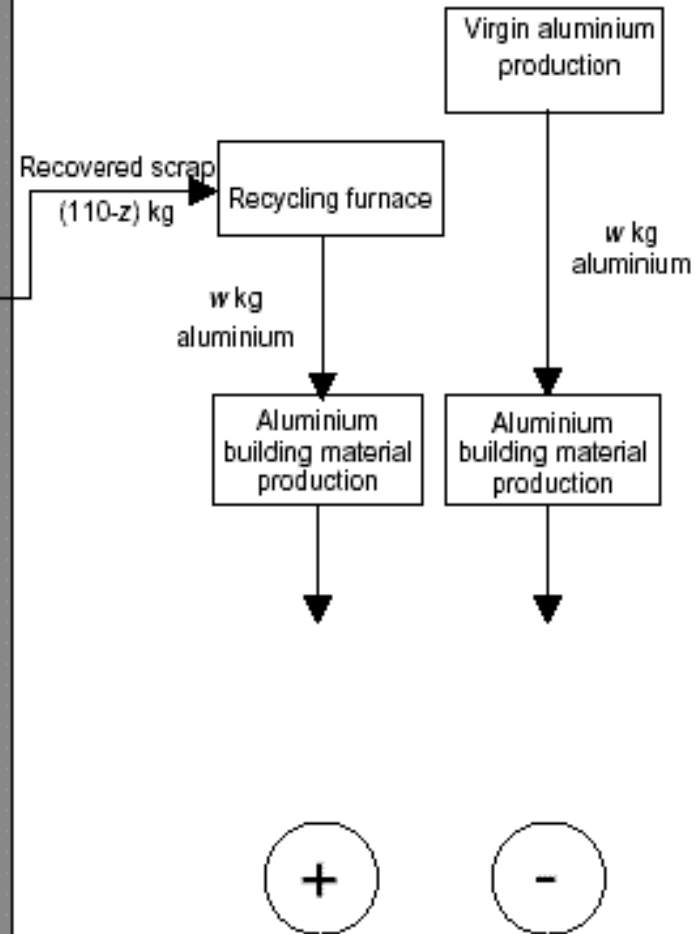

Source: ISO/TR 14049:2000

Open-Loop w/ Closed Loop Recycling (2)

- When net export/import from system occurs
- When scrap greater than amount required by system excess can displace need for primary material in another system
  - "Credit" applied to first system using system expansion
  - "Credit" calculated by subtracting displacement in second system resulting from first system
  - Requires *specific* data about second system and both primary *and* secondary material production processes
- Allocation avoided
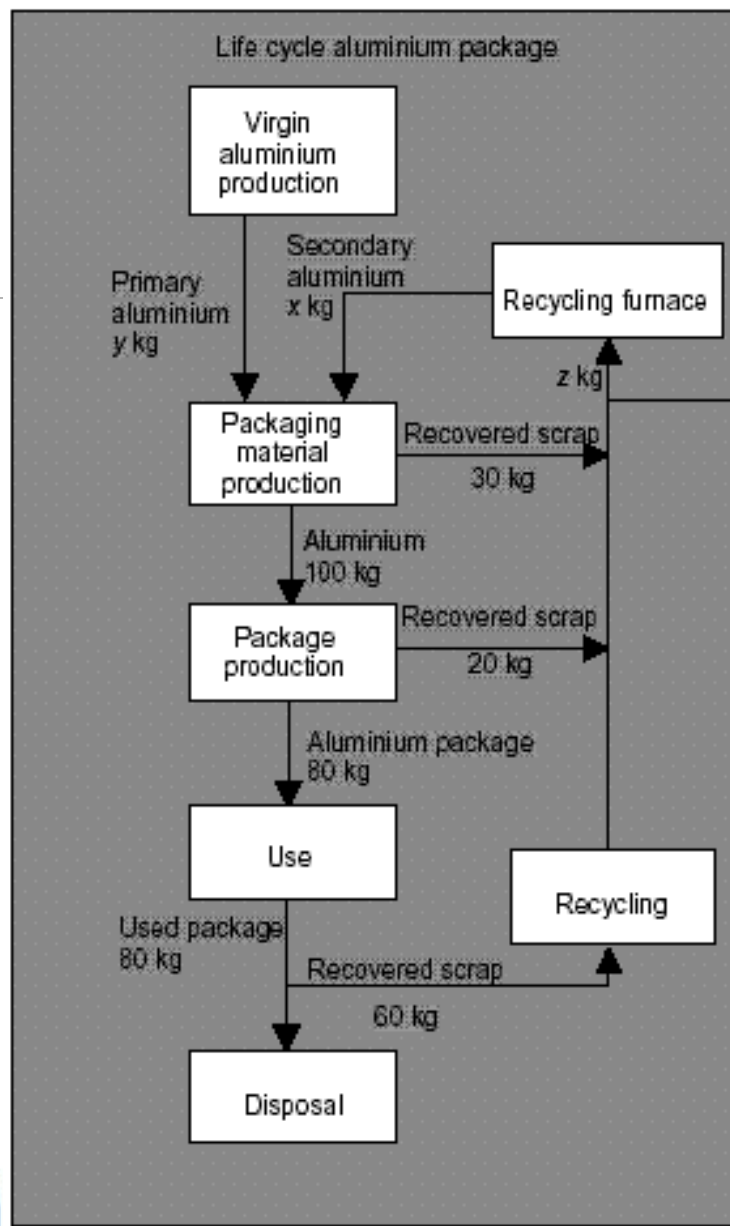
Source: ISO/TR 14049:2000

Potential Issues

- What does "inherent properties" really mean?

- Is closed loop readily achievable?

  - Is it necessary to have high product turnover to maintain steady-state for closed loops?

  - Can low product turnover systems (or long-life applications) be represented as closed loops?

  - Or is primary material required to meet growth in demand?

- Should credit to open-loop systems with closed-loop recycling be applied only where specific system conditions in the secondary system are known?

Potential Issues (2)

- Application of the rules may be varied (especially for quick or screening LCA's) :
    - Will conservative practitioners not apply the credit?
        - Because it is complex and difficult to substantiate?
        - Thus they will not represent the recycling value of metals.
    - Will aggressive practitioners apply unreasonable credits?
        - Where the recycling rate is not demonstrable?
        - Where "inherent properties" are questionable?

Conclusion

- Recycling rules are defined in ISO 14041
- They appear to provide appropriate consideration for metals
- Questions remain