

Magnesium – Environmental Performance

Overview of IMA - DLR Study on Life Cycle Assessment

- Benefits of magnesium applications in the transport sector
- Examples of two components one used in a gasoline passenger vehicle and the other in a mid-haul aircraft compared with a similar aluminium component.
- Study follows cradle-to-grave approach
- Full accordance to ISO 14044 (including external critical review)

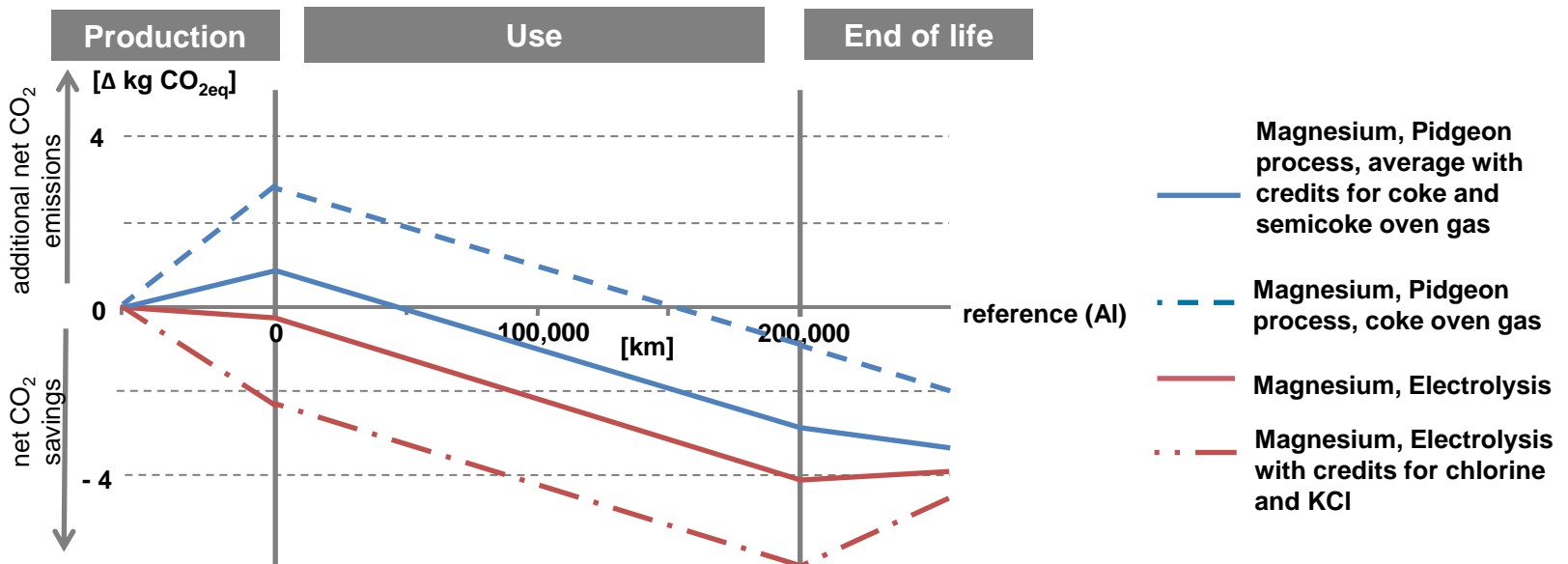
Module 1	Primary magnesium production
Module 2	Advantages of magnesium-specific design and parts manufacturing
Module 3	Life cycle performance of magnesium in transport applications
Module 4	End-of-life and recycling



Magnesium – Environmental Performance

Positive Net Balance for Use in Passenger Car

- Comparison of magnesium and aluminium in terms of **Greenhouse Gas Emissions** for a steering wheel in a passenger car
- Positive net balance for **all** magnesium scenarios (magnesium production routes) can be reached



Primary Al world average used as reference (12.7 kg CO₂eq / kg Al*)

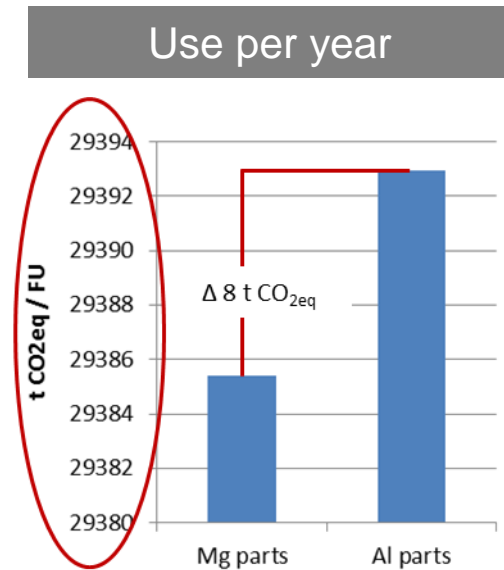
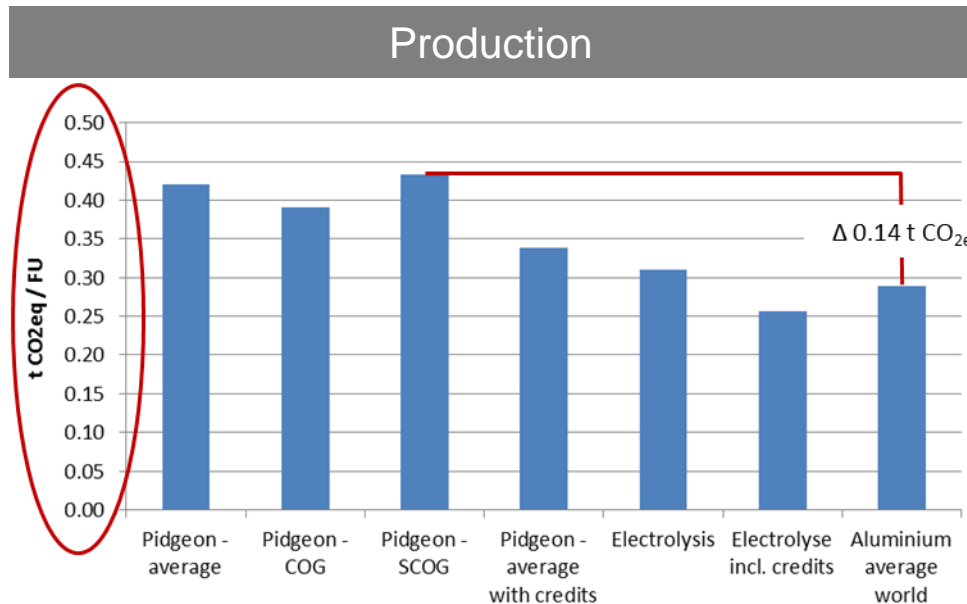
*) Gao 2009



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Positive Net Balance for Use in Aircraft

- Comparison of magnesium and aluminium in terms of **Greenhouse Gas Emissions** for aircraft parts (gearbox and seal closer)
- Break-even points reached in an early stage of aircraft life: **< 10 flights**
- Annual savings during aircraft operation*): 8 t CO_{2eq}



*) annual mileage: 1.9 Mio km



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Summary

Use for passenger cars

- Results show beneficial aspects of magnesium use for green mobility
- Adequate vehicle design and process optimization (incl. end-of-life management) are needed to ensure benefits

Use for aircraft

- Magnesium parts in aircrafts show significant benefits in terms of greenhouse gas emissions

→ Reliable and up-to-date data source for magnesium LCA is now available

