

Alunorf: A true world leader

Thomas Geupel
Commercial Managing Director



Welcome to Alunorf

The world's biggest aluminium rolling and casting plant



Hjertelig velkommen til Alunorf !

**Thomas Geupel,
Commercial Managing Director**



**Dr. Holger Voss
Unit Manager Hot Mills**



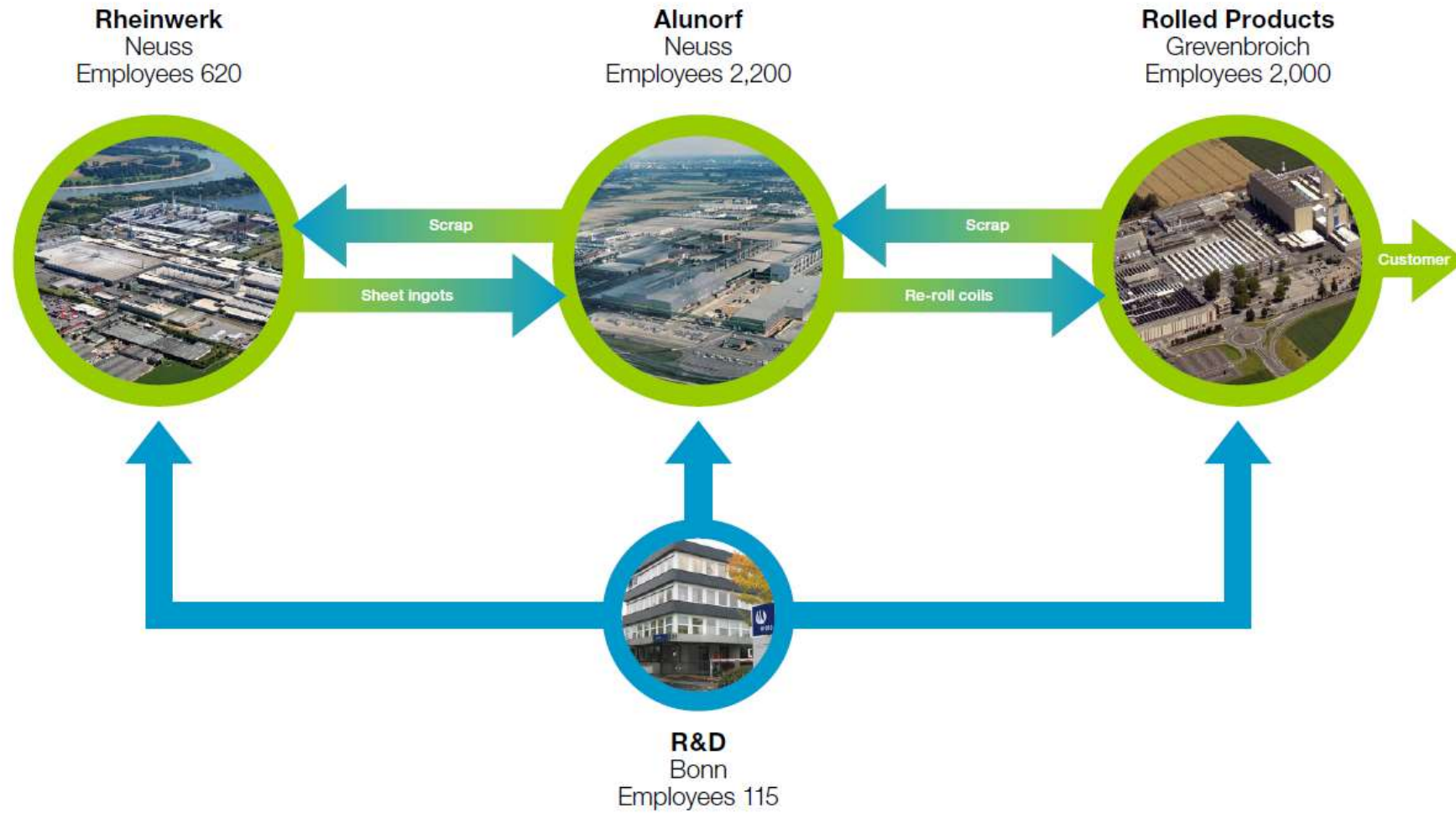
**Dr. Hans Peter Kneijnsberg,
Technical Managing Director**



**Herman Koss,
Unit Manager Remelt**

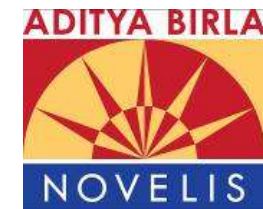


Unique «Aluminium triangle» utilizing logistical, cost and process synergies



Aluminium Norf GmbH

- Founded 1965
- Owners
 - 50% Hydro Aluminium Rolled Products GmbH
 - 50% Novelis Deutschland GmbH
- Capital intensive operation with replacement value much higher than historic asset price
- 2 200 employees
- Energy consumption
 - 1 400 GWh natural gas
 - 600 GWh electricity
- Capacities
 - 1 000 kmt remelt
 - 1 800 kmt hot mills
 - 1 500 kmt cold mills/finishing
- 1 500 kmt sales in 2014



Production equipment

- Remelt

- 13 melting / casting units (DCs)
- 2 recycling furnaces
- 10 sow dryers
- 10 induction furnaces
- 3 scalpers
- 2 edge scalpers
- 3 saws

- Cold mills & finishing

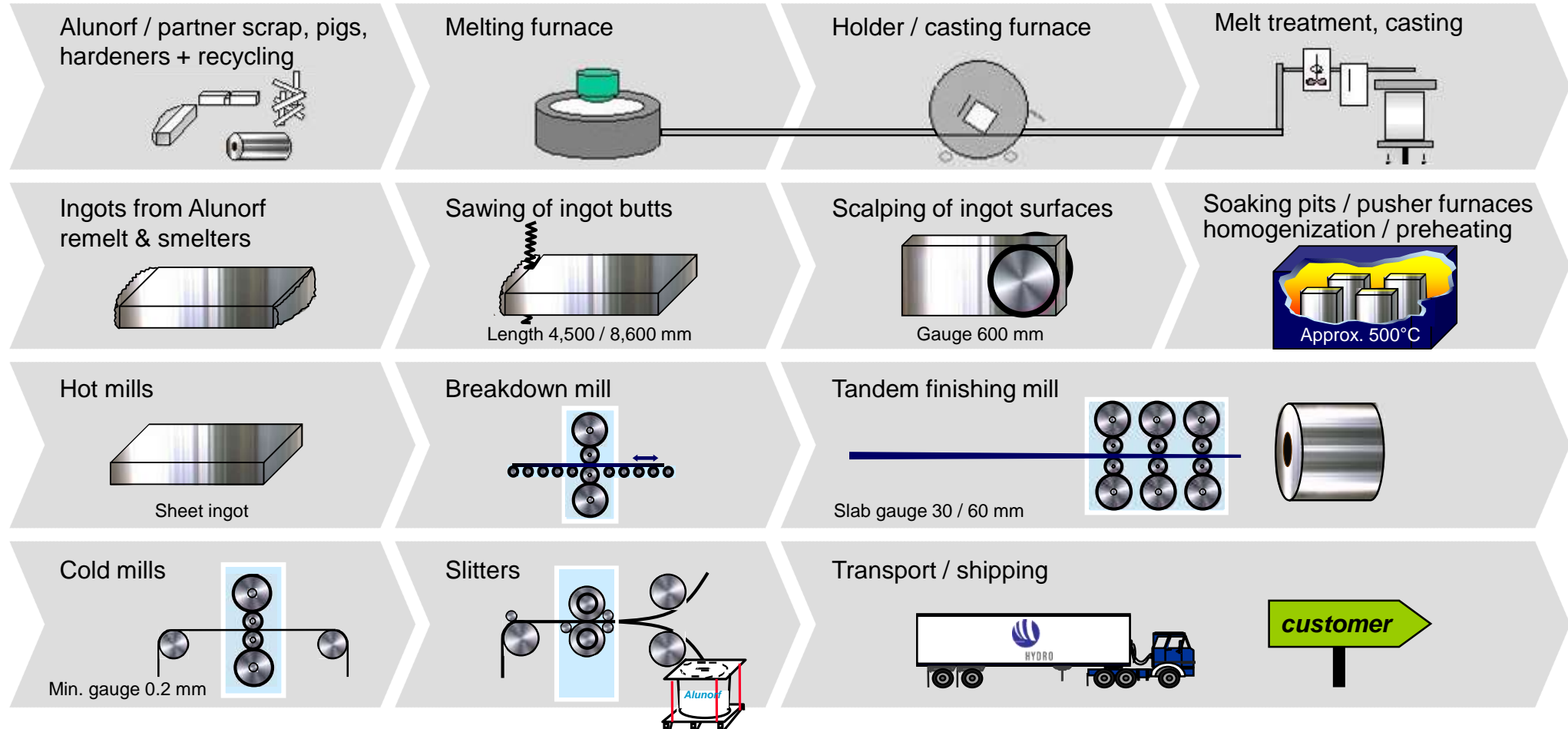
- 4 single stand, non-reversing 4-high cold mills
- 1 two-stand tandem 4-high cold mill
- 29 annealing furnaces
- 8 slitters
- 2 packing lines

- Hot mills

- HM 1:
 - 23 Soaking pits
 - Breakdown mill
 - 3-stand tandem mill
- HM 2:
 - 6 pusher furnaces
 - Breakdown mill
 - 4-stand tandem mill

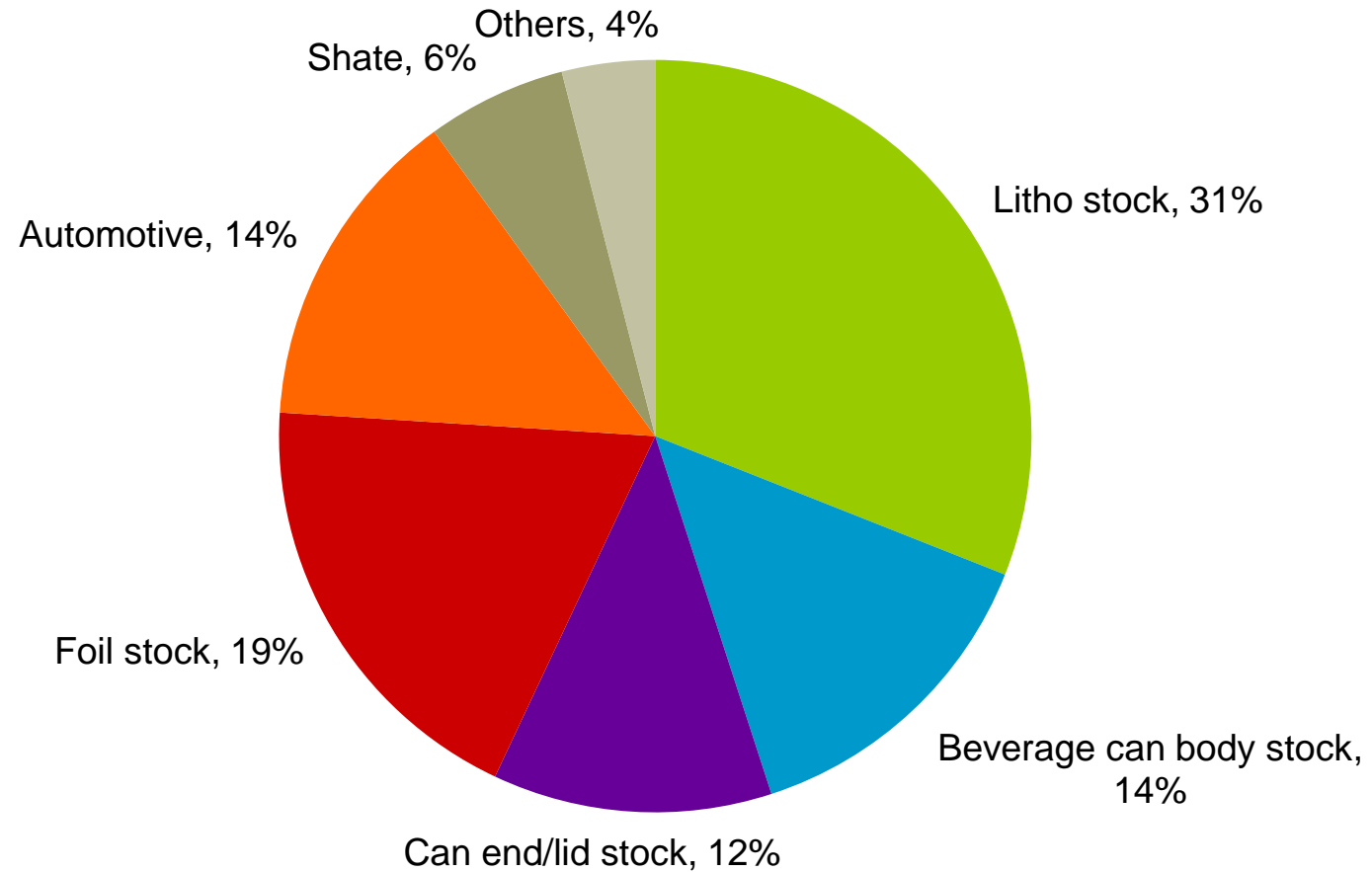


Alunorf Process Steps



Product mix for Hydro in %

(Volume shares 2014; total 708 kt)



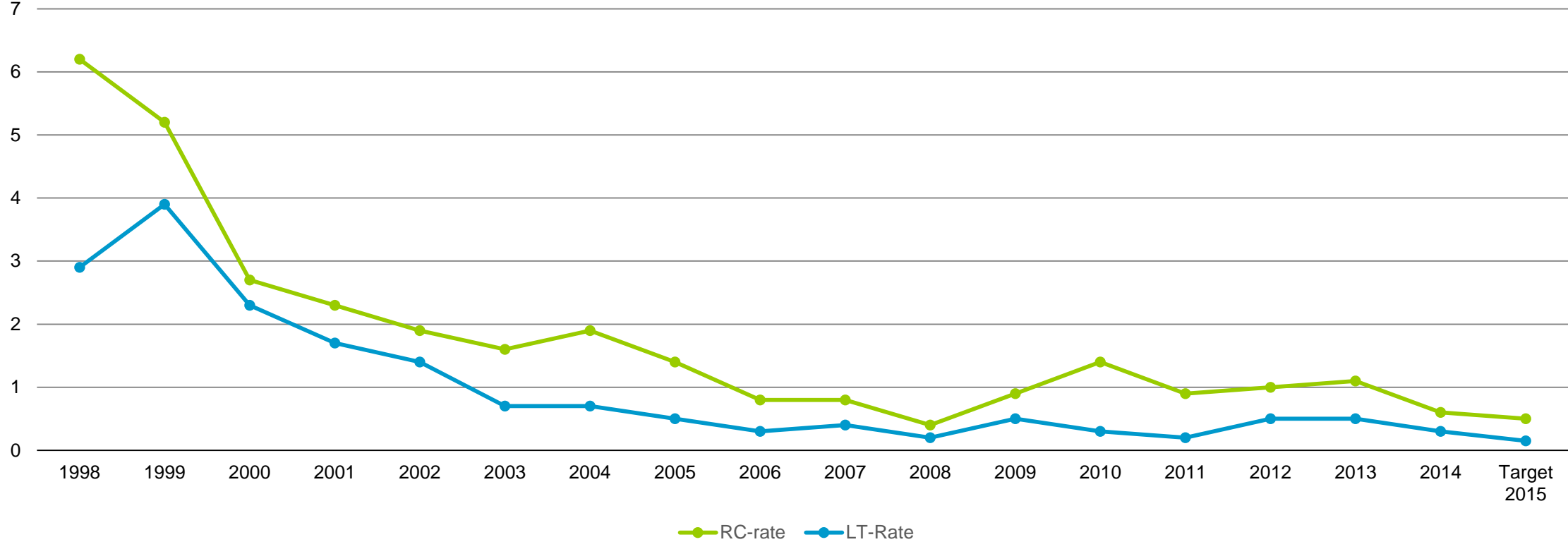
Alunorf's contribution to Hydro's aspiration



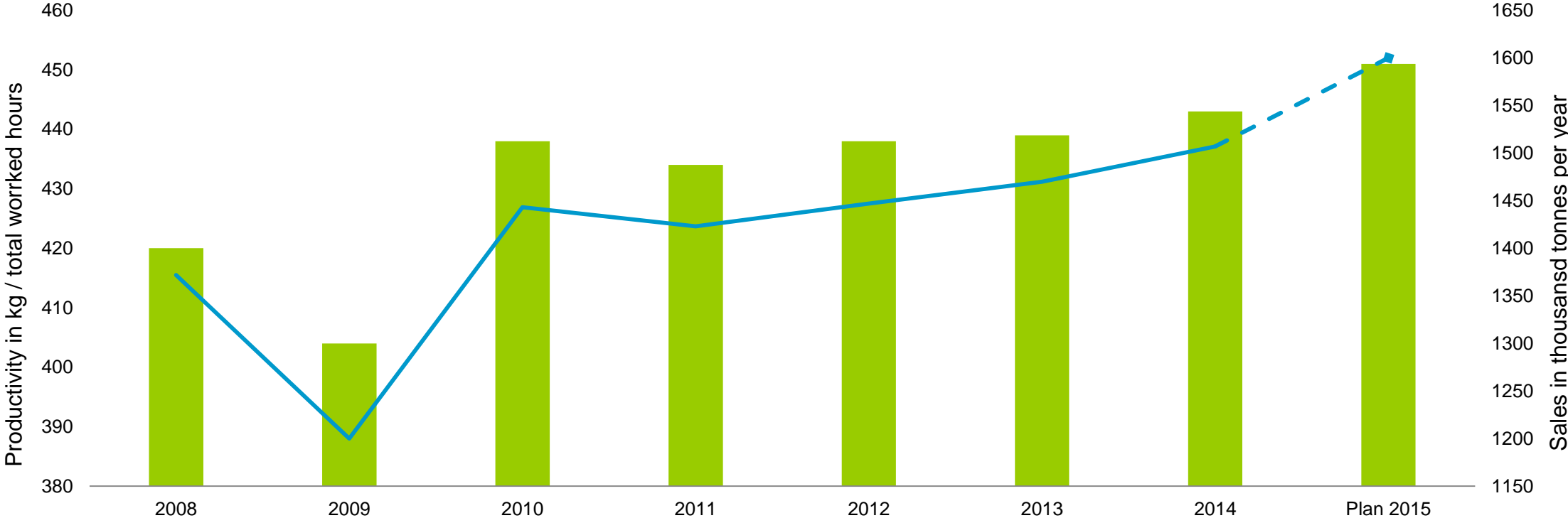
Better Bigger Greener

Better: Safety is our No 1 priority

Accident rates (per 200 khrs)



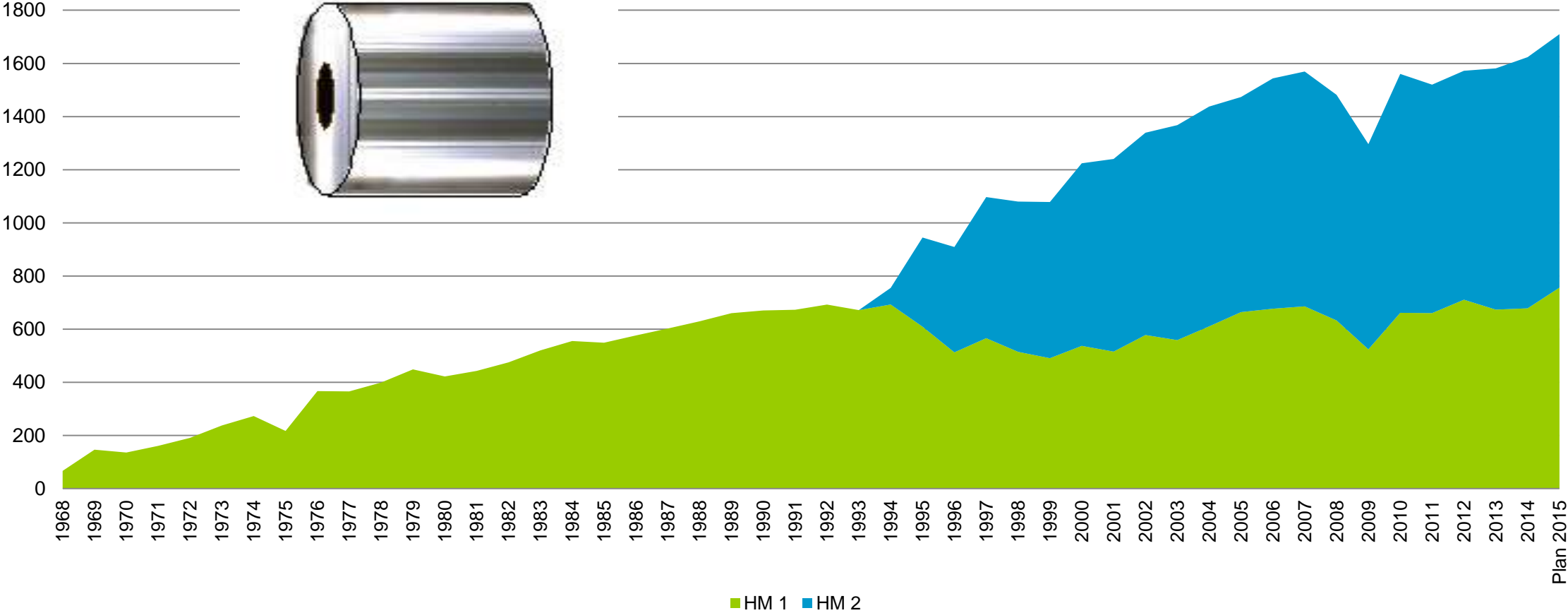
Better: Continuous improvements



Bigger: Past and present



Bigger: Hot mill production development



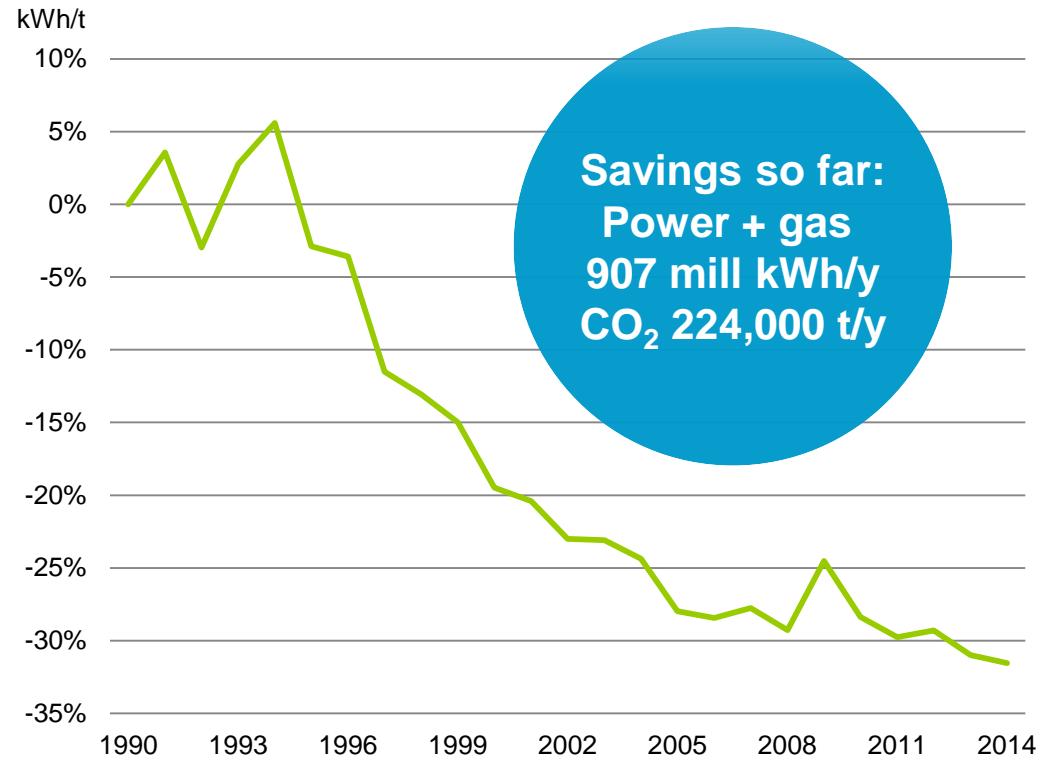
Bigger: Hot mill developments



Greener: Efficient and continuously improving processes

PPP district heating	Heat from waste air saves Neuss and Alunorf 20,000 t CO ₂ per year
Freq.-controlled motors	Process-adapted lower speed saves motor energy
Regenerative burners	New furnaces and burners reduce gas input and increase capacity
Compressed air supply	New generators and leak-proof grids reduce energy input
Online monitoring	Recording and posting the energy input impacts employees' behaviour
Recycling	100,000 t recycled aluminium save 1,400 million kWh power / 980,000 t CO ₂

Greener: specific energy input reduced



- New pusher furnaces, new melting furnaces
- Refurbishment soaking pits
- District heating, use of waste gas
- Enhanced energy saving programme
- Optimization of compressed air
- Behavioral changes by online monitoring
- Regenerative burners
- New annealing furnaces

- **And there is more to come!**

Greener: Double award winner



2014 German Energy Award

2014 Energy Efficiency Award

