

## Europe: Tomorrow just around the corner?

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Europe: Tomorrow just around the corner?

### Agenda

#### What is moving us?

##### Our Environment

- Climate Warming
- Green Steelmaking
- Green Mobility

##### Our Health

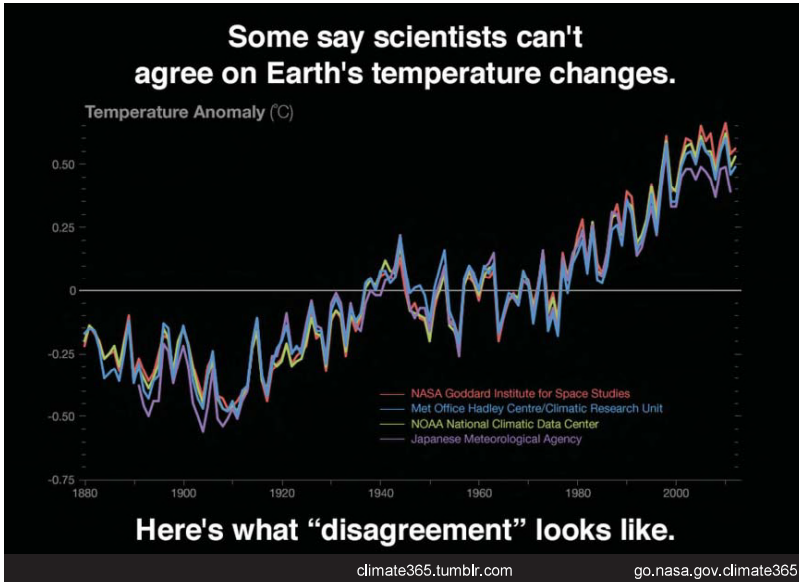
- Covid-19: A worldwide Pandemic
- Perspective

##### Our ideas and developments

- Galvatech 2001 versus 2021, a comparison
- ZincMagnesium, come to stay?

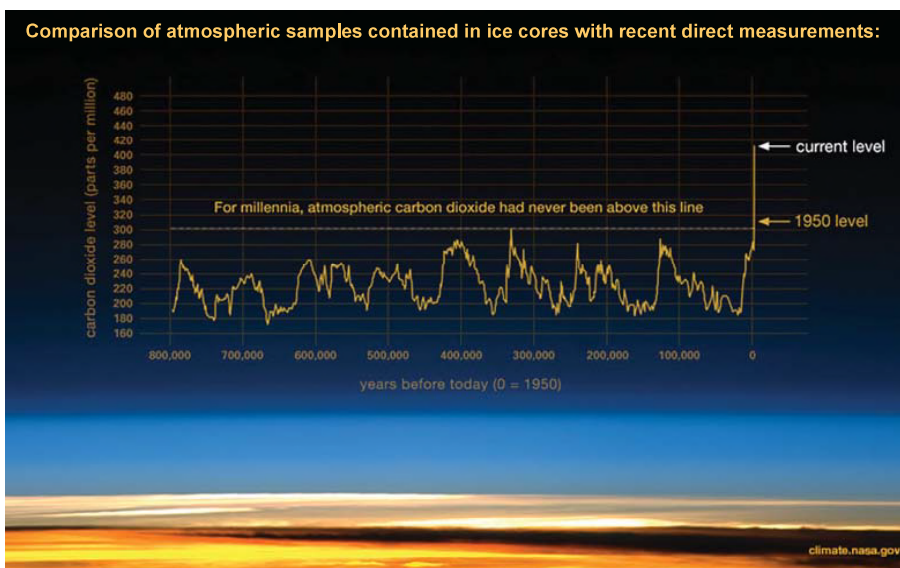
## Our Environment

Earth temperature is rising. Do we take enough care?



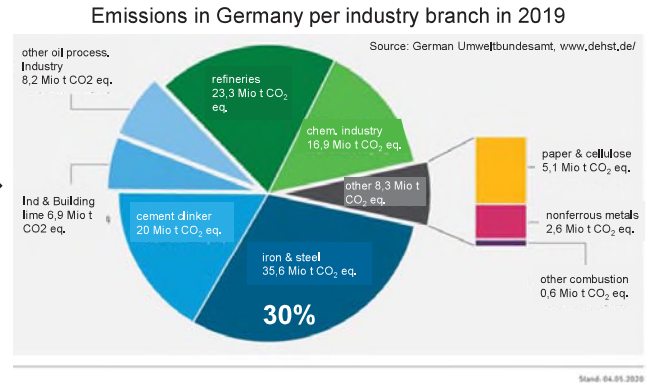
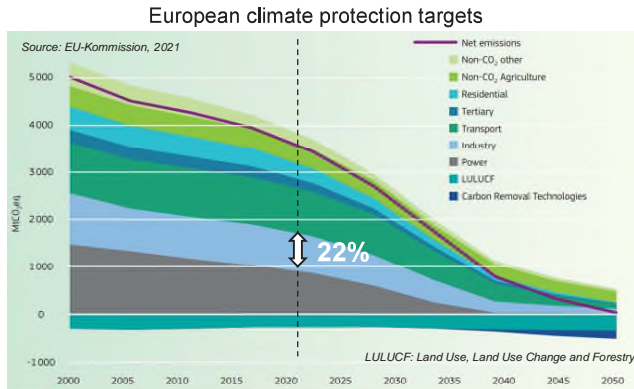
## Our Environment

Atmospheric carbon dioxide increased by 1/3 since 1950



## Climate warming connected to CO<sub>2</sub> emissions

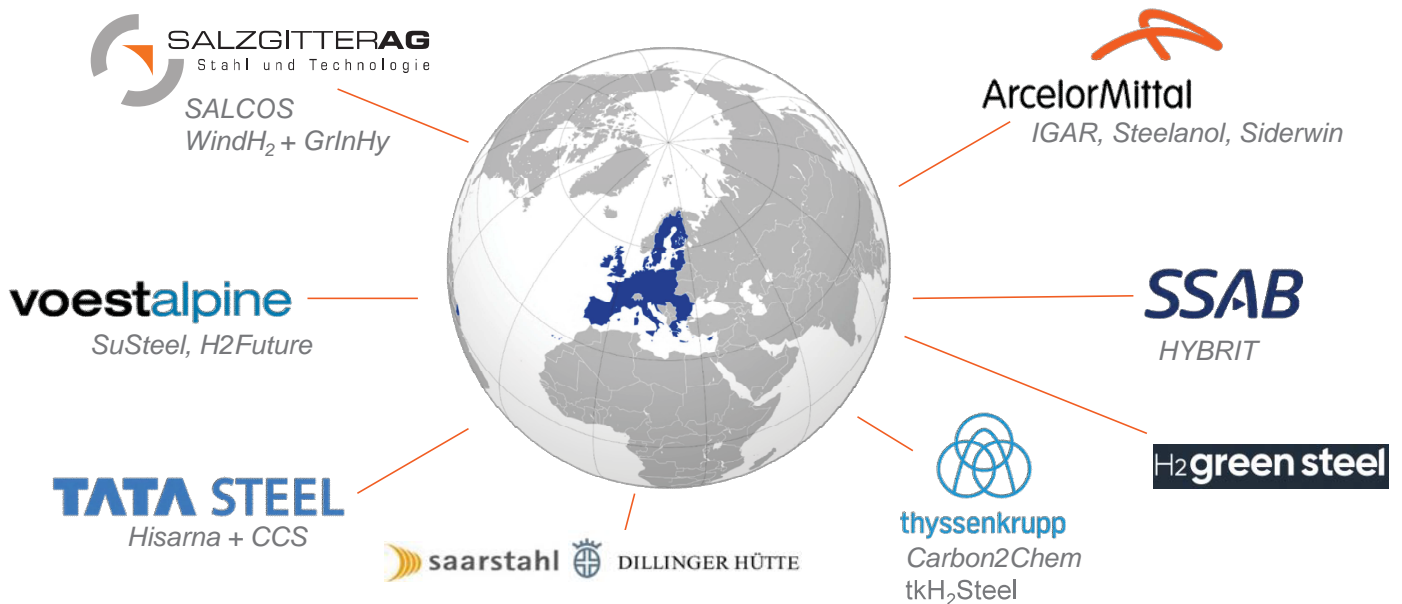
### Where do CO<sub>2</sub> emissions come from?



### Steel industry has significant responsibility

- Reduce carbon footprint during steel production
- Save resources → enhance recycling

## Reaction of the European Steel Industry



## Green(er) steel production (and downstream processes)

### Recycling involves enhanced scrap use in Electric furnaces:

- Availability?
- Cleanliness?
- At which costs?

### Conversion / Cutback of blast furnace route:

- Reduction of upstream byproducts, already used for downstream heating
- Optimised process chains need re-engineering
- Bridge technologies: run existing equipment with synthetic gases

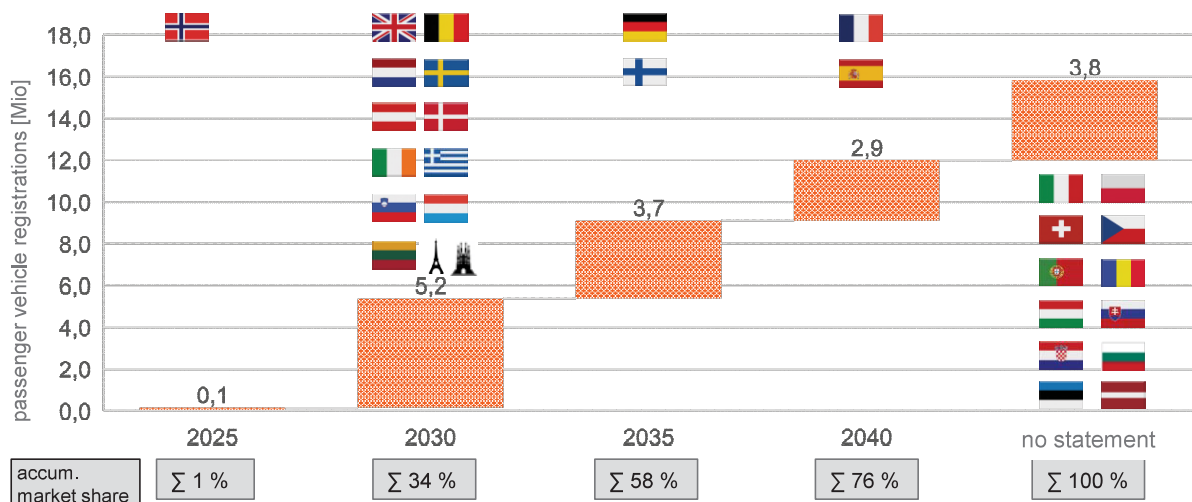
### Replace natural gas by sustainable energy

- Direct: Use of green electricity
- Indirect: Use of H<sub>2</sub> produced with green electricity
- A new aspect for competition between Hot-Dip, Electro-Galv and JVD?



## Green Mobility: Legal frame conditions in Europe

### Bans for initial registrations of vehicles with combustion engine increase significantly in Europe



Sources: ACEA, wiss. Dienst des Bundestages, Press

## Green Mobility: An Outlook

### Green mobility by more public and less individual transport

- Car-sharing ⇒ Fewer passenger cars
- Public transport ⇒ Trains, buses, trams
- Drive Sharing ⇒ Taxis, mini buses, self driving cars

### Green mobility by green vehicles

- Green materials ⇒ CO<sub>2</sub> footprint during production, resource efficient materials
- Green use ⇒ CO<sub>2</sub> footprint during transport

- New drive concepts, e.g. electric power
- Energy conversion from green H<sub>2</sub> into electricity by fuel cells, including high pressure tanks
- Direct storage of electric energy by batteries, including adapted frame conditions

Autonomous mini bus in Sion, Switzerland



## Battery Electric Vehicles: A Contemplation

### BEVs will increase in vehicle weight, need for light-weight design?

- Battery weight in same range as BiW ⇒ weight spiral: battery protection, reinforced chassis, brakes, etc.
- Recuperation avoids energy loss during braking
- Prof. Dudenhöffer: „Increased vehicle weight only minor effect on range of BEV, Welt.de 03.12.2017

#### But:

#### Psychological constraints:

- Public acceptance, driving licenses

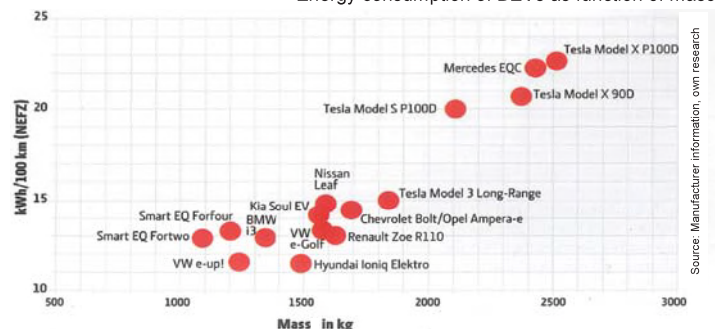
#### Technical constraints:

- Production lines including robots
- Load on road surfaces, tire abrasion

#### Perspective:

- Weight reduction: Biggest lever to-day: energy density of battery, currently 200..270 Wh/kg
- Weight reduction in body-in-white will become relevant again mid- to long term

Energy consumption of BEVs as function of mass



## Battery-Electric Vehicles: a change in design

### Requirements for battery-electric vehicles

#### Crash protection

- Avoidance of fire hazard by intrusion

#### Corrosion protection

- Underbody corrosion
- Corrosion by leaking cells

#### Environment protection

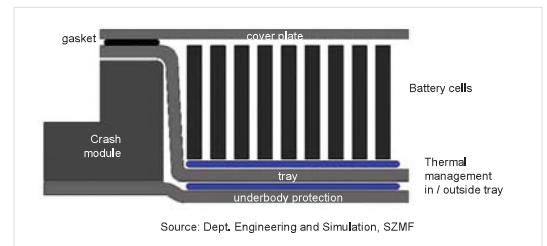
- Leakage prevention

#### Thermal management

- Keeping operating temperatures

#### Manufacturability

- Battery pack mounting in final assembly

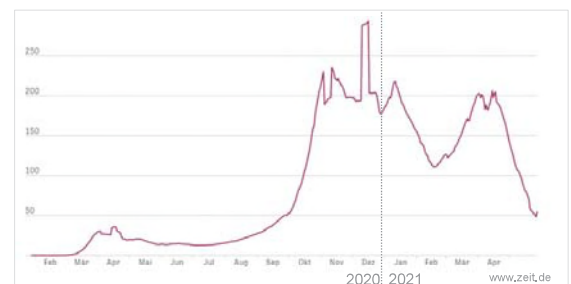


## Our health: Covid, a worldwide pandemic

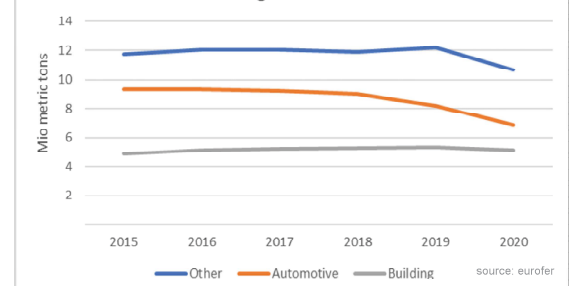
### The situation

- Europe not well prepared for Covid-19 in 2020
- Infections and victim numbers rising ⇒ „learning by doing“
- Lockdowns, production stops, a dipping market
- Economic reaction: reduced demand for steel in 2020
- Consequences for working conditions:  
Home office, no-contact provisions research ⇔ production
- Research at the Home Office? Line trial ⇒ big data analysis
- Consolidation of new colleagues, students?
- Virtual conferences, like our Galvatech 2021

Europe: infections / week \* 100.000 people



EU27 Market Segments Galv Sheet Steel



## Our health: Covid, a worldwide pandemic

### The perspective

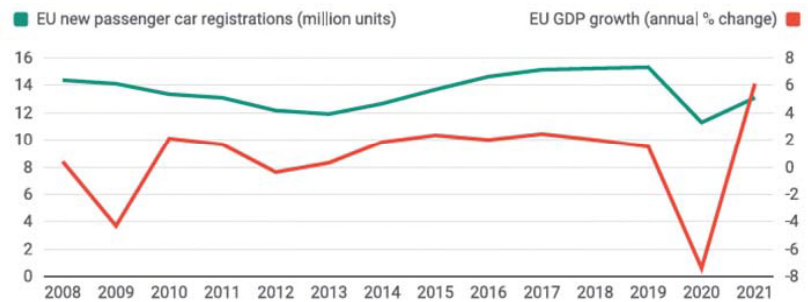
Unparalleled development of vaccines worldwide, first signs of recovery

Consequences for the future:

- Digital processes got boost, industry 4.0 becomes more real
- Virtual meetings will establish, business travelling will decrease
- Demand for individual cars seems to rise again



Source: <https://www.heimeundspitaeler.ch/>



Created with LocalFocus

Source: ACEA, DG ECFIN, IHS MARKIT

## Let's dig into the conference

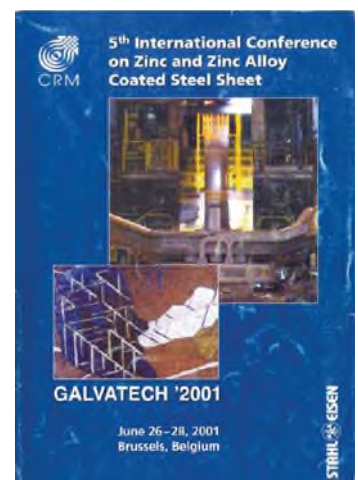
### 20 years ago, Galvatech was in Europe, too, a comparison:

#### Focus 2001:

- Coating metallurgical problems & analysis during coating of high strength steels
- Production technology
- Zinc-Iron alloy coatings (GA)

#### Focus 2021 has shifted:

- From metallurgical processes of coating high strength steels to their processability (LME, delayed fracture)
- From Zinc-Iron to Zinc-Aluminium-Magnesium coatings
- Towards new products: Exposed quality and hot-forming
- Simulation has become a relevant and reliable tool in development



The times they are a-changing ... as the present now will later be past – Bob Dylan

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## Let's dig into the conference II

### ZM coatings, come to stay? Most important: worldwide availability!

Introduced in building industry in **2007**, standardised in **2010**

Introduced in automotive applications in **2013**, exposed quality in **2016**

### Advanced corrosion protection and formability

Used for difficult corrosion situations or complex shaped parts, and outer parts

BMW: Potential for lightweight car production by saving weight and resources

**Papers: Today 10:50** Automotive applications,  
**16:10** Non-automotive applications,  
**Thursday afternoon** in corrosion session

**Enjoy the conference!**



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## No matter what you have planned..



**Thank you for  
your attention!**

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