Industry's Key Enabling Role for Sustainable Economic Growth and Jobs

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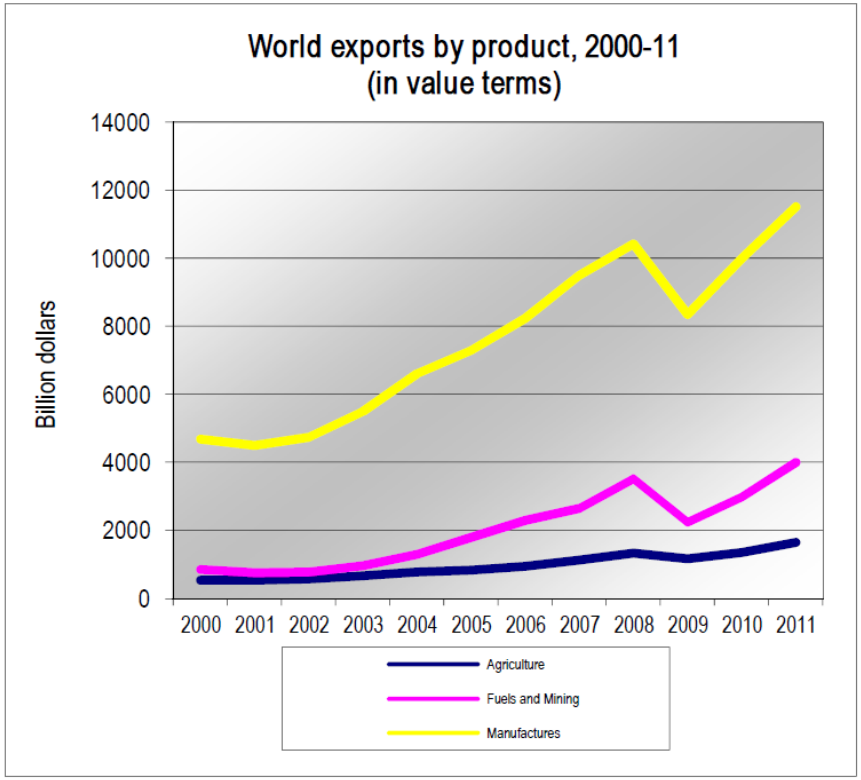
Outline

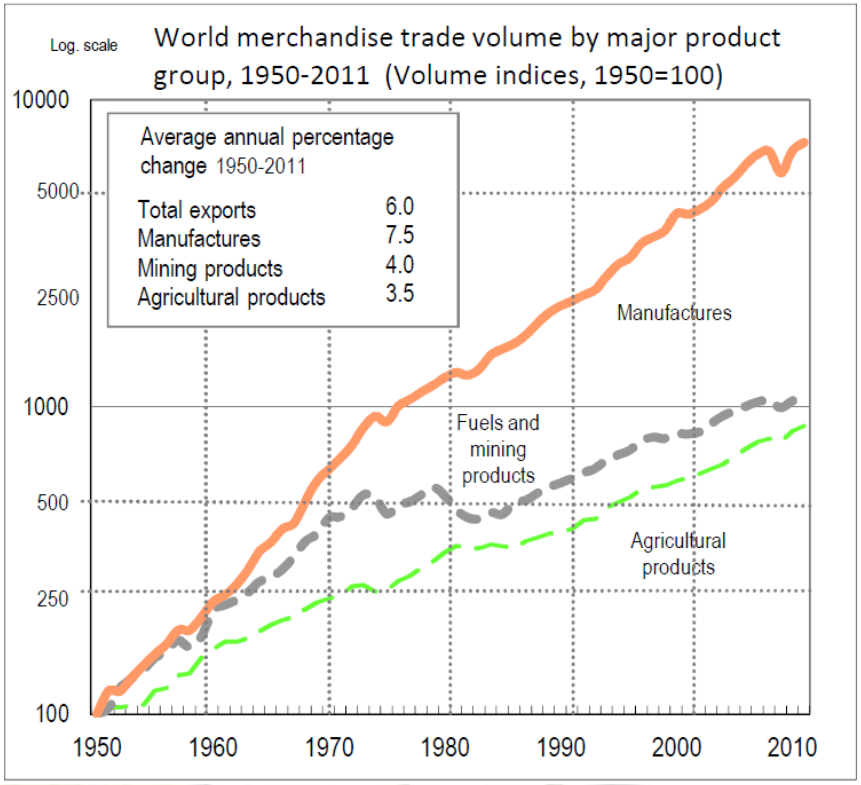
- **Why is manufacturing important for a sustainable economy?**
- **What is future manufacturing?**
- **Why has manufacturing a key enabling role as a systems integrator?**

World Trade Figures



Manufactured goods by far Number one in world exports. In 2011, the figure amounted to 11,510,949 mn USD





Source: WTO world commodity profiles 11, 10.2012

Manufacturing the Driving Force of the European Economy

- Manufacturing has a huge potential to **generate wealth, jobs and a better quality of life**
- Manufacturing is a **dominant element of the international trade**
- Manufacturing is important in view of its **environmental impact**
- Manufacturing is **important for SMEs**
- Manufacturing **strengthens and supports the service economy**
- Manufacturing is **critical for emerging markets**
- Manufacturing is **critical for research, education and innovation**

The importance of manufacturing can hardly be overestimated

Reach EU Industrial Policy Targets

Growing to a sustainable and job-rich future

- Currently industry accounts for ca. 16% of EU GDP
- Need to reverse the declining trend
- **<u>Main Goal</u>: Industry approach 20% of GDP 2020**
- Also, increase trade in goods in the internal market to 25% of GDP by 2020
- And, 25% of SMEs to engage in markets outside Europe in the medium-term

Source: 201210101-slides_EU Industrial policy technical_briefing_en.pdf

Future Market Opportunities for Industry



Health and nutrition

Affordable healthcare



Safety and security

Disaster prediction and management



Mobility and transportation

Low-emission, reliable mobility in urban areas



Information and communication



Energy and living

Low-loss generation, distribution and use of electricity

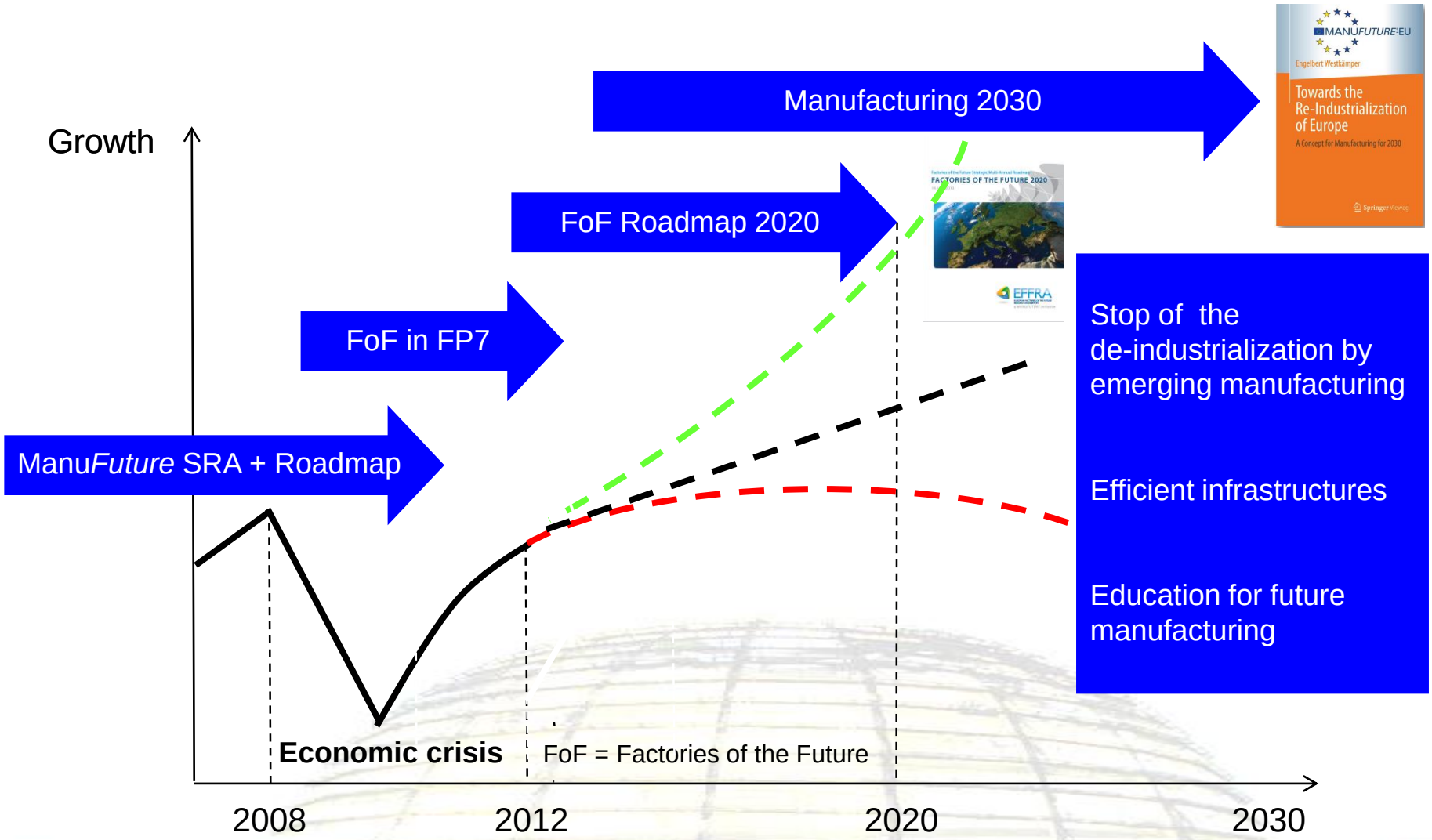


Production and environment

Life-cycle production

Source: H.-J. Bullinger, Fraunhofer 2012

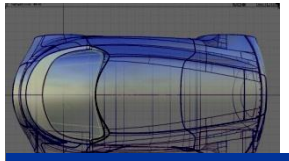
Industrial Growth Supported by RD&I



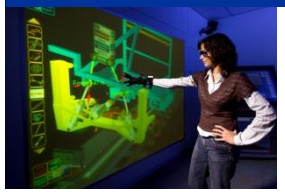
Outline

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Manufacturing is HighTech and Knowledge-intensive



Manufacturing Engineering Platform
Interface to Product Development



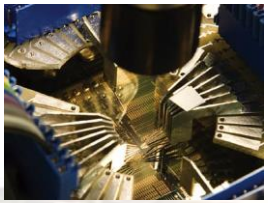
Manufacturing Systems
Organization of work



Different layers of Manufacturing

- Network of Plants
- Plant
- Building
- Line
- Cell
- Operation
- Process

Enabling Technologies



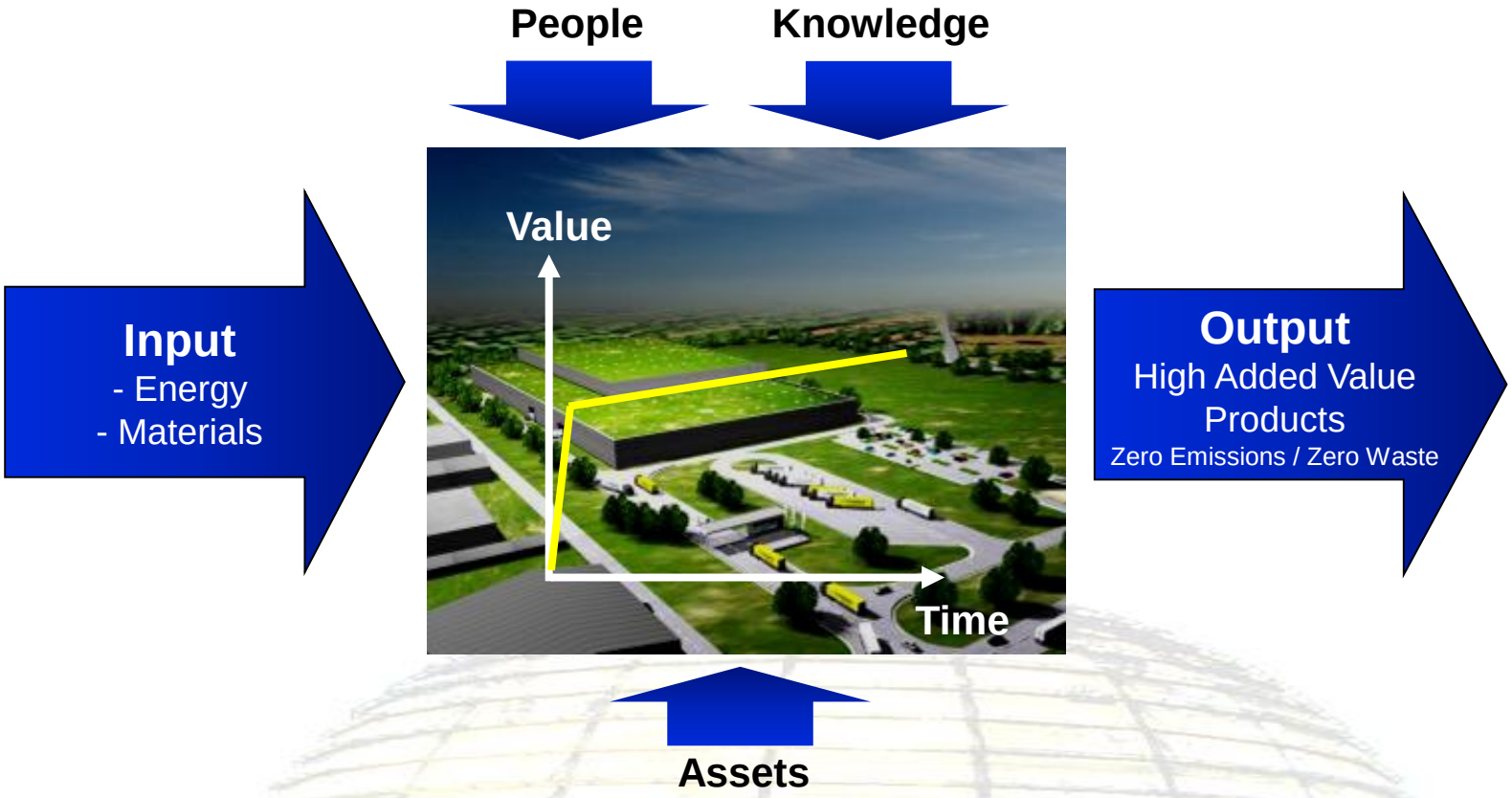
Management of Business
Business Models and ERP





Future Manufacturing Generates High Added Value and Wealth

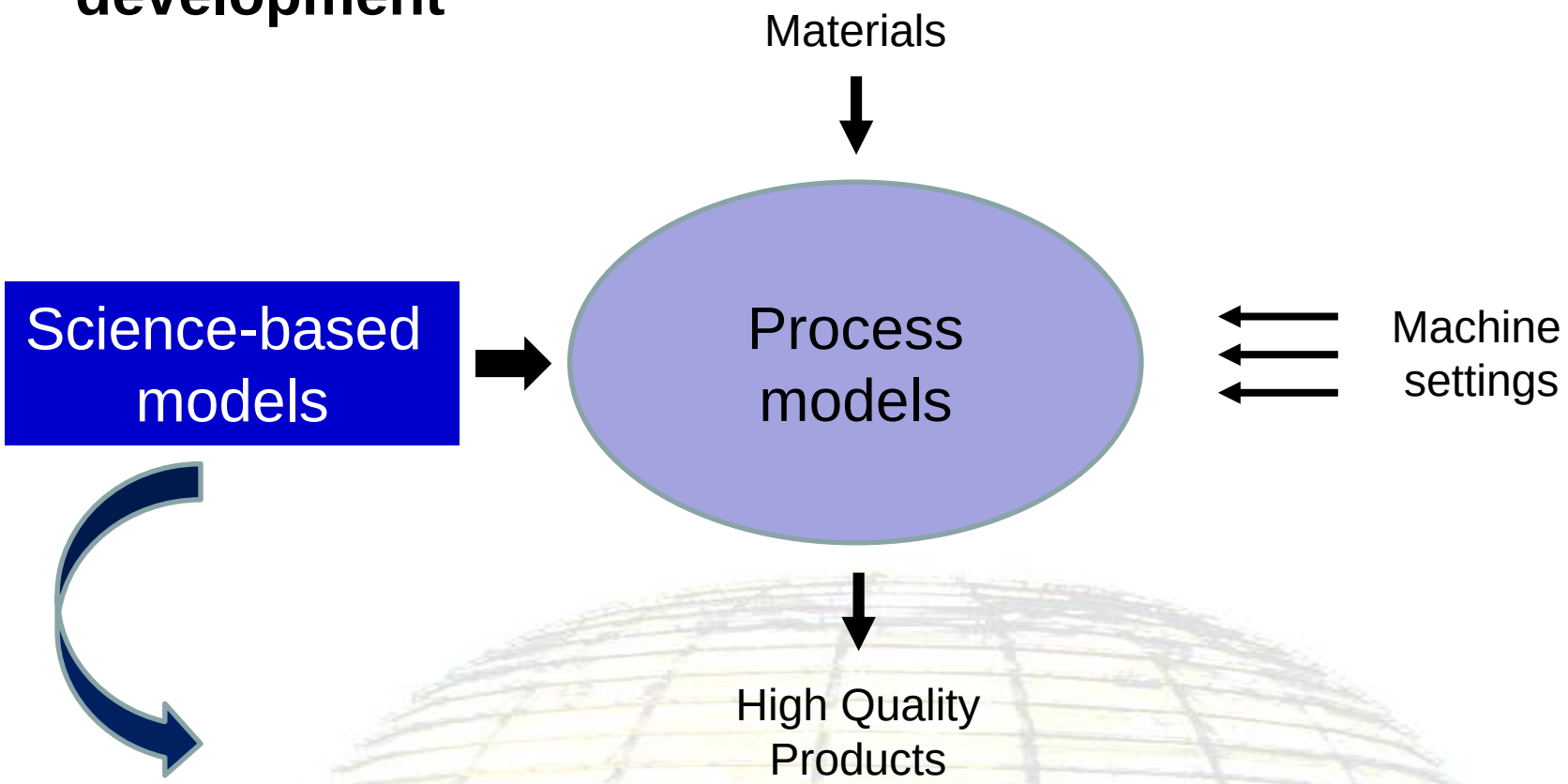
Industry will be the engine of the new low-carbon, resource-efficient and knowledge-based economy



lean, clean, green, sustainable!

Future Manufacturing needs Science-based Models

From trial & error to science-based process development



Huge reduction of the experimental and testing effort

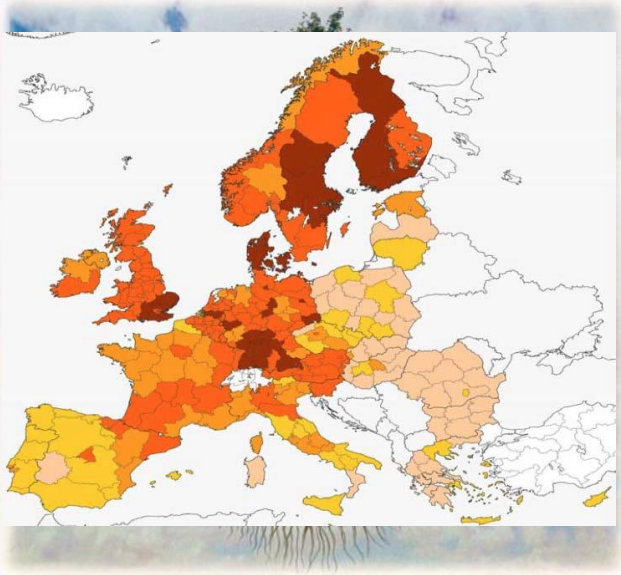
Factories with Regional Roots
Smart Specialization

Regions are drivers of sustainability and growth

Regional Synergies
- regional clusters
- open innovation
- cooperative development
- energy supply
- resource supply

Public Services

Smart Regulation



Factories and their Peripherals
- suppliers
- customers
- government
- public organisations

Social Efficiency
- regional culture
- human-centered
- flexible capacities
- social partnership

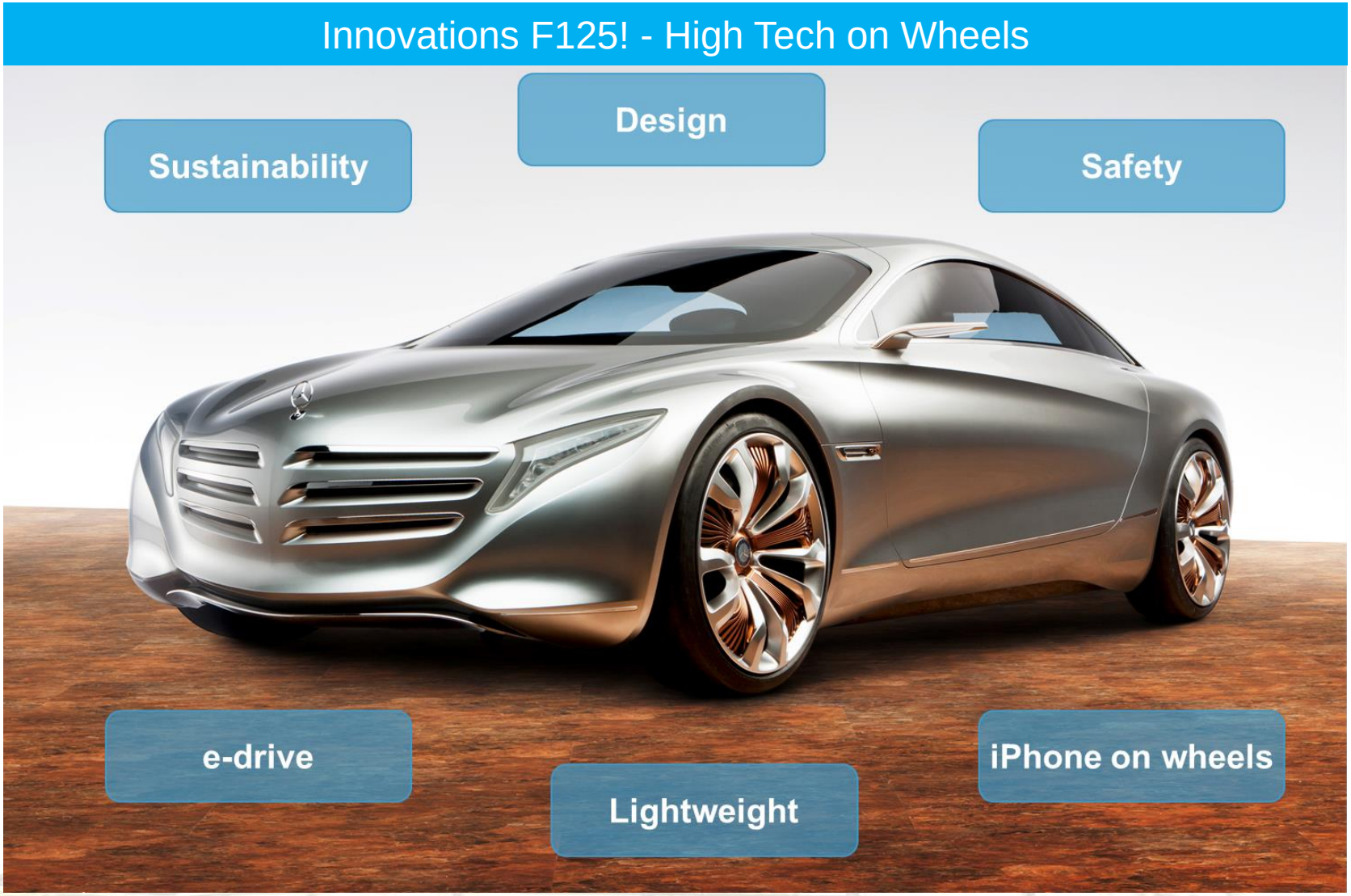
Roots in the Regional Community and Infrastructure

Education Research Communication Health Transport Energy Water … Services

Outline

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Sustainable Mobility needs a broad spectrum of Advanced Industrial Technologies



Lightweight - New Materials on the Rise

Steel/Aluminum lightweight design finding its limitations - FRP/CFRP gaining importance – The cost challenge prevails

Aluminum Applications



C-Class

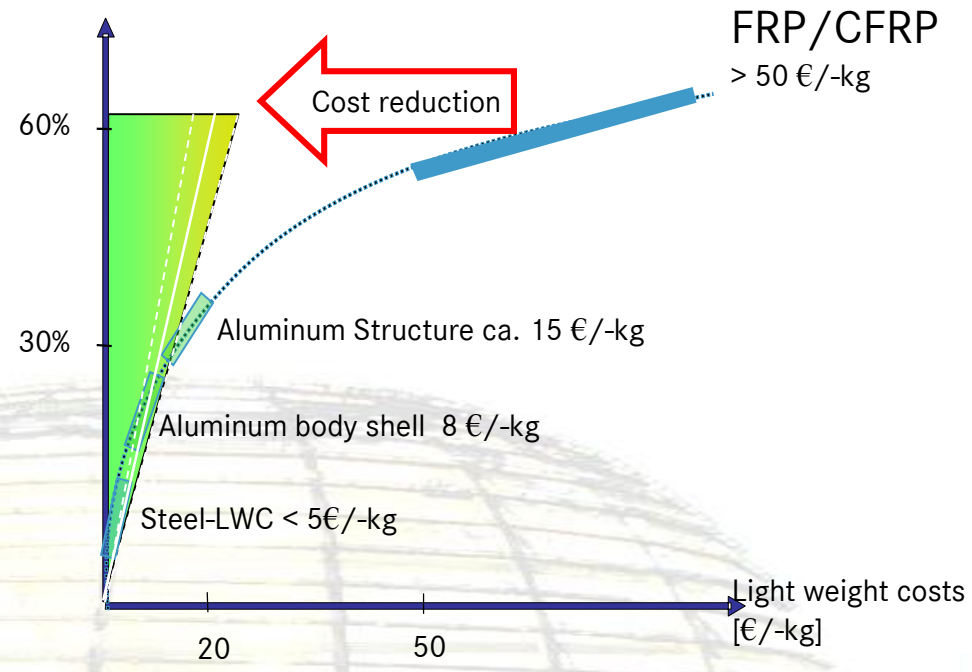
E-Class

S-Class

Aluminum

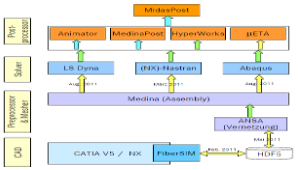
- Aluminum widely used in body shell applications
- Intensively used in structural applications

Light Weight Materials Graph

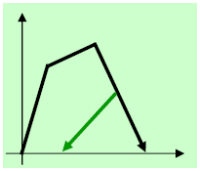


Lightweight - Challenges for FRP concepts

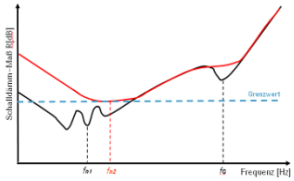
Design Methodology and CAD-Process Chain



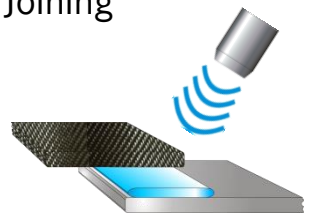
CAE-Crash-Methods



NVH-Methods and -Concepts



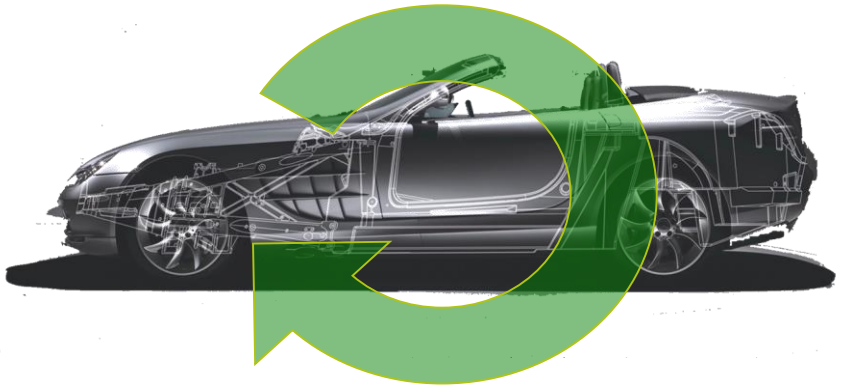
Joining



LCA and Recycling

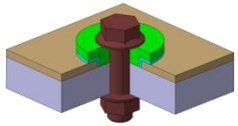


Failure Detection and Repair



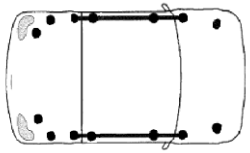
Assembly



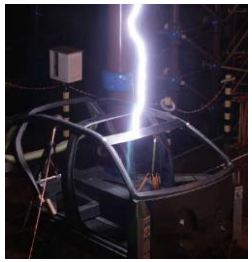




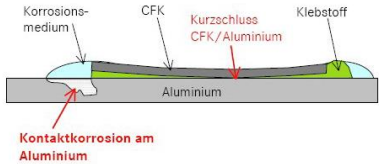
Electrical Ground Connection



EMC and lightning Protection

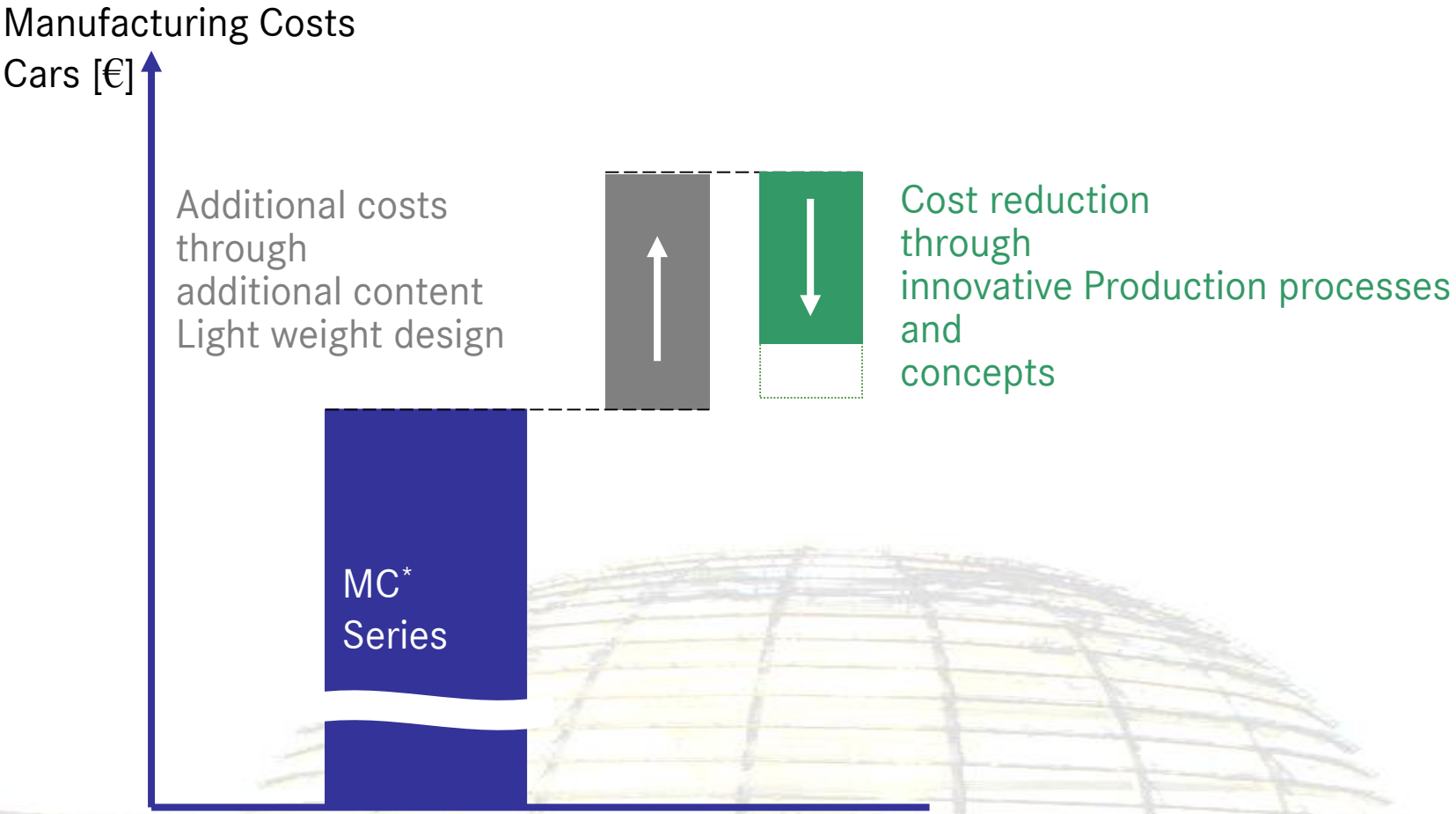


Corrosion Protection



Need for innovative production processes

Reducing additional costs through new production processes and concepts



* MC = Manufacturing Costs

Key Messages

- Manufacturing has a critical enabling role for the production of goods and international trade, and is the key to high added value and wealth.

- On every commercial product, you can put the sticker “manufacturing inside”.



- A strong industry base or re-industrialization is necessary for all nations seeking to permanently free themselves of the debt trap. Since making money without substance is mere illusion and not sustainable.

- Manufacturing is knowledge-intensive and need to be backed through scientific and applied research.

- Horizon 2020 is a unique opportunity to strengthen the European manufacturing base.