

The Lightweighting Initiative

ALUMINIUM 2022 in Düsseldorf on 27 September 2022

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Lightweighting is...

- a design philosophy for:
 - Mass reduction
 - resource efficiency
 - increased functionality
- valuable across different sectors:
 - automotive
 - aviation
 - engineering
 - construction
 - energy...
- an important enabler for reducing greenhouse gas emissions and allowing us to achieve our climate goals and strengthening the resilience of our economy

LIGHT-WEIGHTING

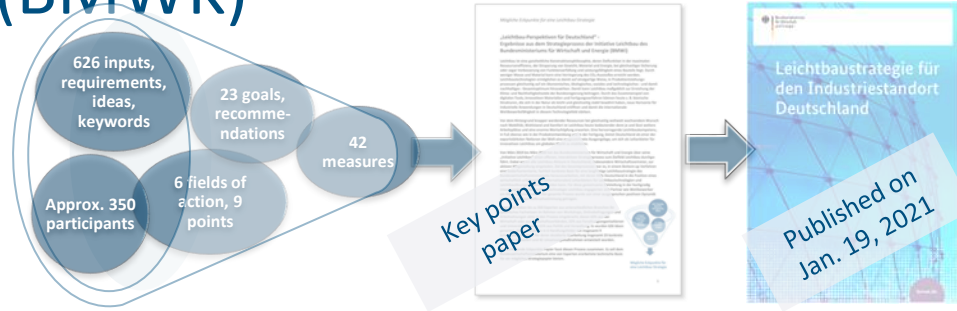
FIELD OF TECHNOLOGY

MANUFACTURING PROCESSES

MATERIAL



News from the Federal Ministry for Economic Affairs and Energy (BMWK)



- Comprehensive strategy process (bottom-up)
- Approx. 350 participants

From the BMWK to the German government strategy

- Activating the potential for carbon reduction in lightweighting across all ministries
- Strengthening independence in raw materials and resilience through lightweighting and new materials
- Closing strategic gaps in leveraging key market potential



The German Government's Lightweighting Strategy will support the sustainable transformation of industry.



Provisional timetable

Interministerial meeting	23 April
Initial public relations work (at interministerial level)	mid-May
Email box for external participation live	open from mid-May to mid-June
Digital survey among expert community live	mid-May until end of May
Request to the divisions/ministries to supply their input on gaps and measures	6-9 May
input by divisions/ministries	until 23 May
Development of a draft text	end of November
Interministerial coordination process	From December
Further coordination within the BMWK	From January
Preparation of the Cabinet decision	From end of January

The cabinet's decision on the Federal Government's strategy will expand the BMWK's current lightweighting activities.

National lightweighting activities

www.initiative-leichtbau.de

Coordination

Strategy

Funding programme

Networking

Internationalisation

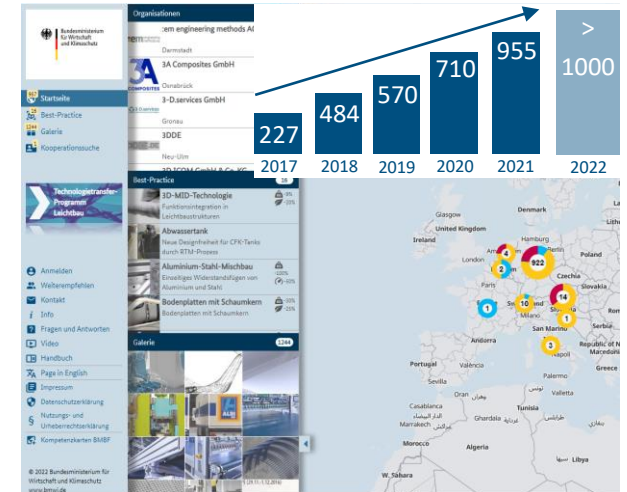
3rd Lightweighting Summit



Photo: 3rd Lightweighting Summit 2022

**"Lightweighting and hydrogen -
Game changer meets game changer"**
31 May 2022, H'Up, HANNOVER MESSE

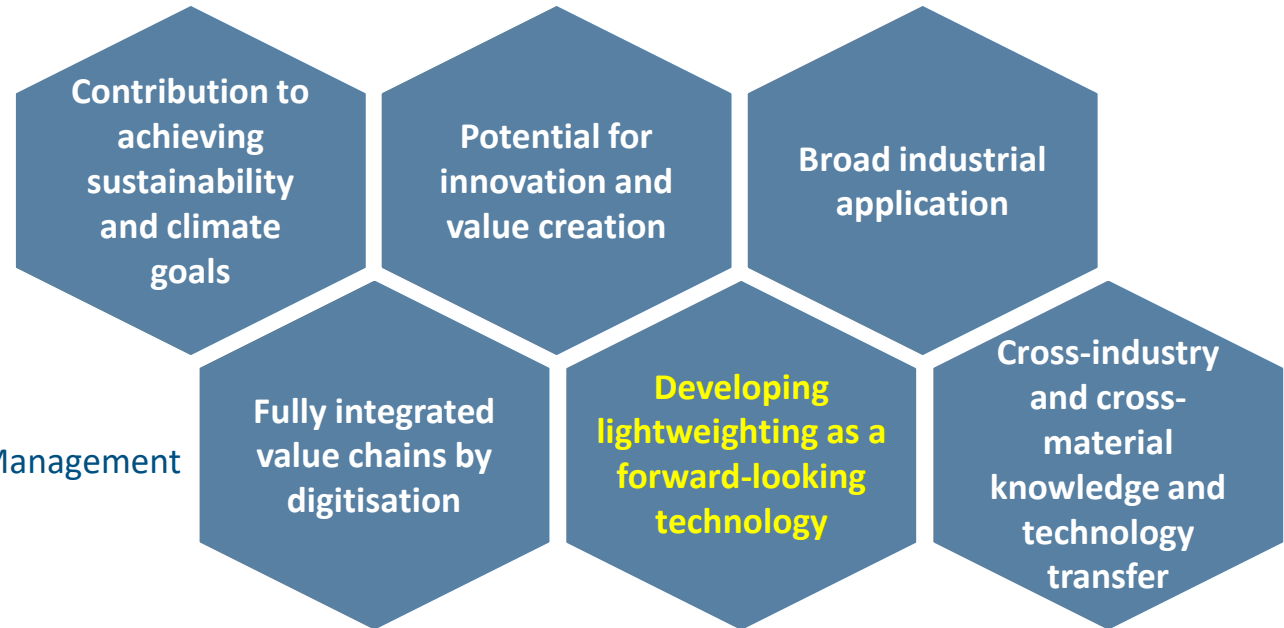
www.leichtbauatlas.de



Source: LIGHTWEIGHTING ATLAS - Current as of: June 23, 2022

The Lightweighting Technology Transfer Programme forms the heart of the BMWK's lightweighting activities.

Technology Transfer Programme (TTP) for Lightweighting



- Launch: April 2020
- Management: Project Management Organisation Jülich

Funding for innovative R&D projects is provided under the TTP for Lightweighting.

Technology Transfer Programme for Lightweighting - Funding conditions

- Funding announcement published on 9 April 2020
- Two deadlines per year: 1 April and 1 October (first one on 1 May 2020)
- Available funds: approx. €70 million per year
- Two-step procedure:
 - Stage 1: submission of project outline (max. 15 pages) via coordinator
 - Stage 2: formal applications from all collaborative partners
- Individual or collaborative projects by companies, scientific institutions and non-profit organisations

Subscription to newsletter: www.bmwk.de/Navigation/DE/Service/Abo-Service/abo-service_anmelden.html

Funding is provided in five funding lines.



Technology Transfer Programme for Lightweighting - Funding Lines



**1. Technology development
to strengthen the German
lightweighting industry**



**2. Carbon reduction and capture
through the use of new
construction methods**



**3. Reduction of carbon emissions through
resource efficiency and
substitution in lightweight construction**

4. Demonstration projects

5 Standardisation



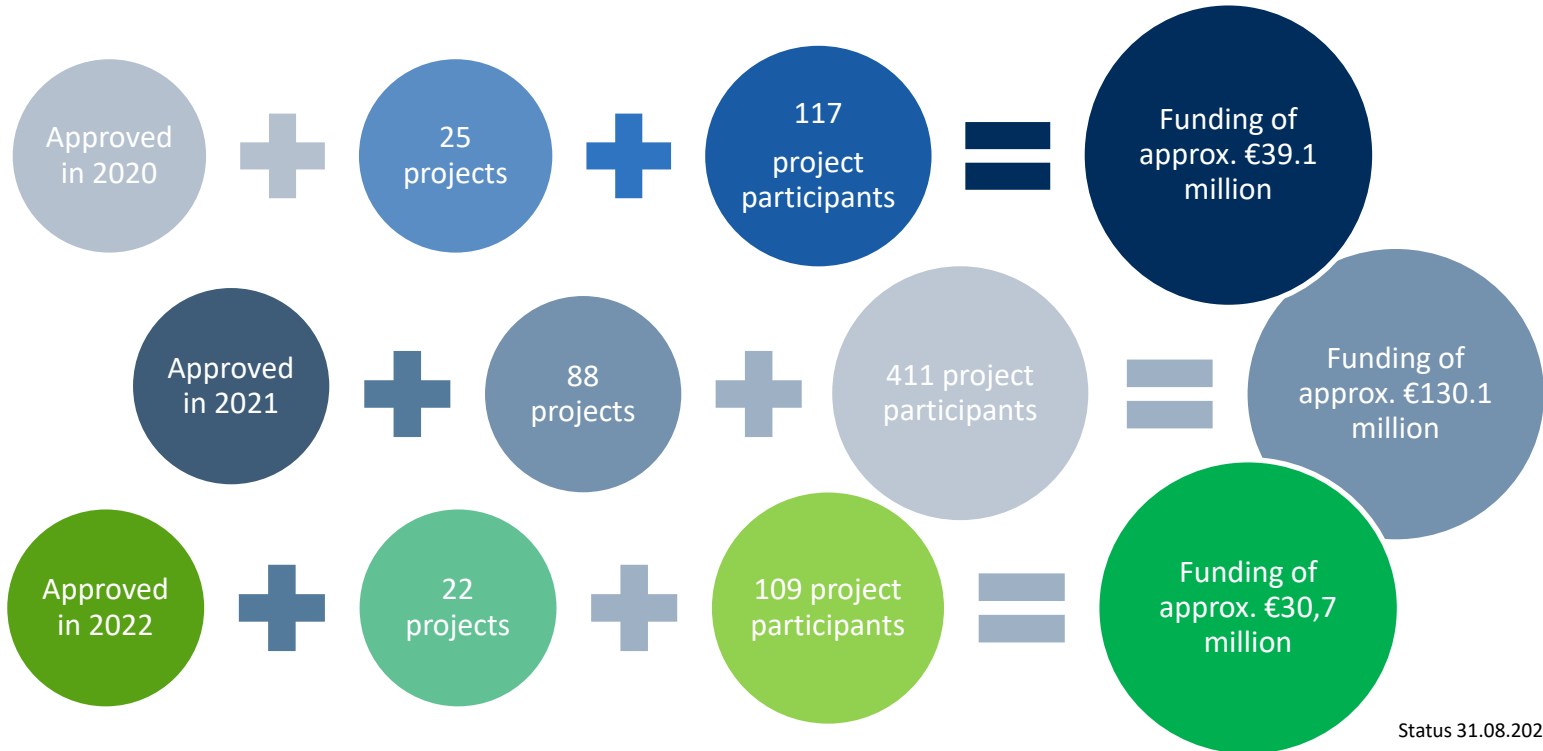
Funding lines 4 and 5 must be attributable to funding line 1, 2 or 3 !



The projects must be assigned to programme line 1, 2 or 3 !

Funding lines 1, 2 and 3 have different financial envelopes.

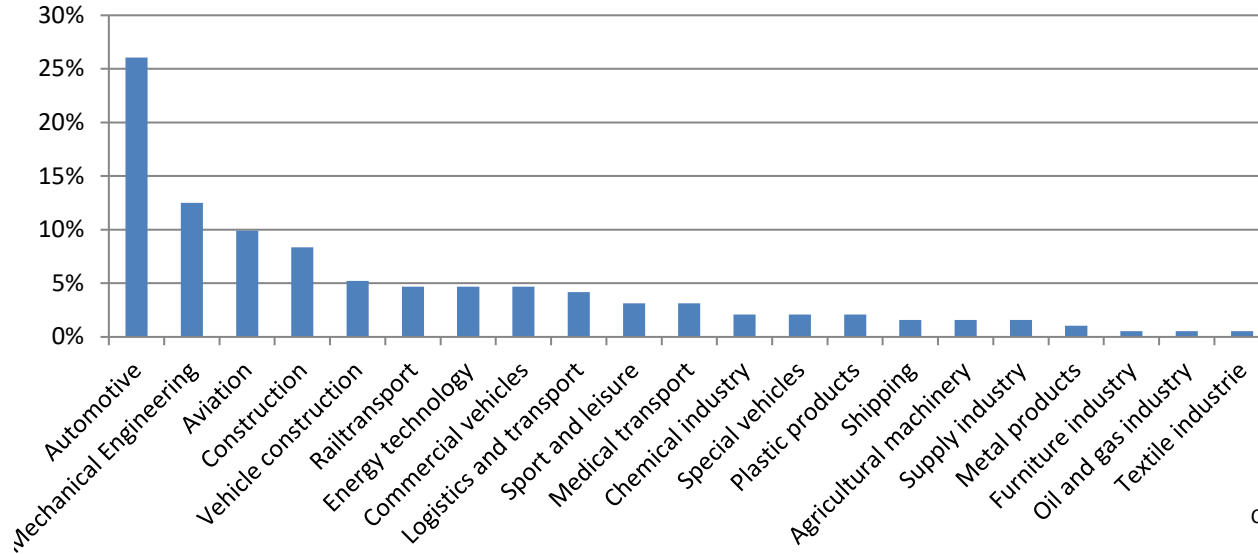
Development of the Technology Transfer Programme for Lightweighting



Private sector funding: approx. €88 million

Sectors using the Technology Transfer Programme for Lightweighting

Share of approved projects by user sector

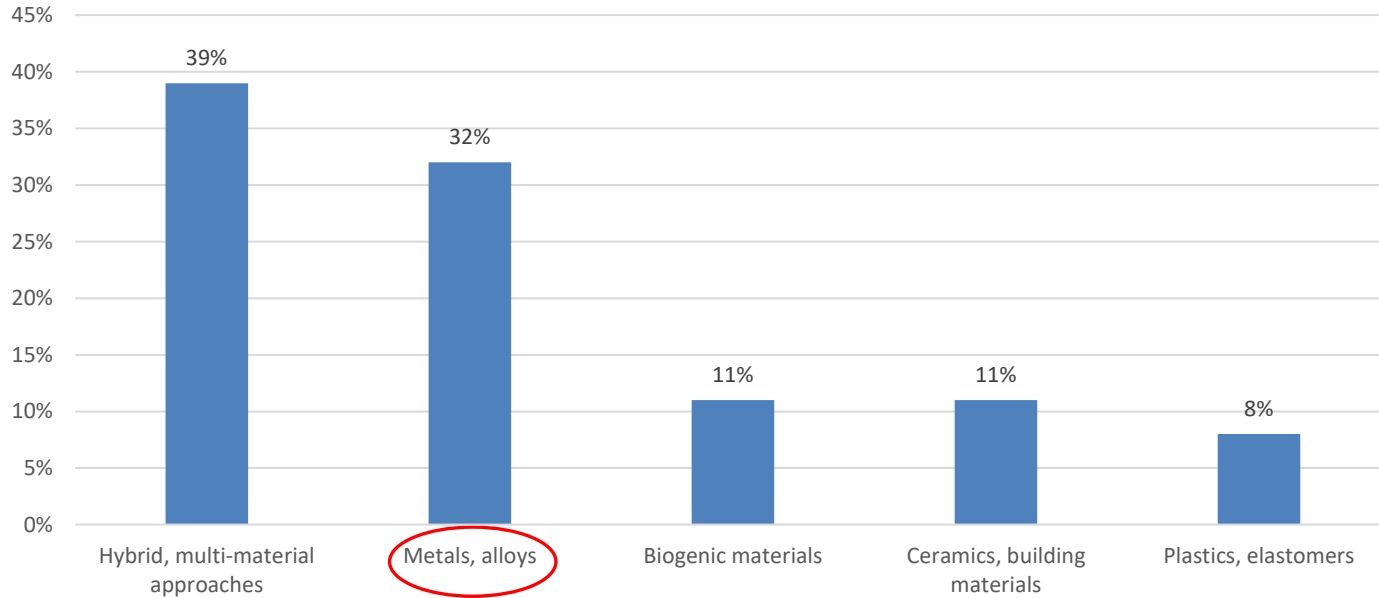


Current as of 31 Dec 2021

The automotive sector is strongly represented across all materials.

Approved projects - materials

Share of approved projects by class of material



Approved projects - materials

Hybrid, multi-material approaches

- Fibre-reinforced plastics (about 60%), especially CFRP, rCFRP and GRP
- Mg (Al)/ hybrid plastics
- Hybrid metal/CFRP (GRP) composites
- Sandwich materials
- Other (e.g. multi-layer composite systems)

Metals, alloys

- Steel (about 50%)
- Aluminium (Al), Al alloy, secondary Al (approx. 30% in total)
- Al/Steel
- Magnesium (Mg) die casting and extrusions
- Other (e.g. Ti alloys, Cu)

Holistic approaches are very effective in terms of climate protection and resource conservation.

Approved projects - materials

Biogenic materials

- Natural fibre-reinforced matrix materials (approx. 60%) based on cellulose, hemp, wood
- Hybrid wood composites
- Fibre-reinforced bioplastics

Ceramics, building materials

- Concrete-based materials (about 50%), e.g. carbon concrete
- Other (e.g. aerogels, geopolymers, SiC)

Plastics (monomaterials)

- Particle foams, thermoplastics, thermosets, elastomers

New materials are the basis of many sustainable innovations.

TTP for Lightweighting - Collaborative Project 'Green-Al-Light'

Collaborative project 'Green-Al-Light'

Funding amount: €2.2 million **Funding period:** 1 July 2021 – 30 June 2024

Partners: Audi AG, Clean-Lasersystem GmbH, Cleansort GmbH, FAU Erlangen, Matplus GmbH, Otto Fuchs KG, Trimet Aluminium SE

Material: wrought aluminium alloys

Goal: Further development or establishment and digital linking of the entire process chain from material sorting, alloy production, composition and processing through to the final component to ensure maximum use of secondary aluminium from end-of-life scrap.

Fields of application: automotive industry, mechanical engineering

Benefit: The sorting technology has been optimised with regard to sorting and cost efficiency in order to achieve the most reliable sort and alloy-specific separation possible, thereby ensuring maximum use of secondary aluminium in structural components.

TTP for Lighweighting- Collaborative Project 'OptiProGResAl'

Collaborative project 'OptiProGResAl'

Funding amount: €1.55 million **Funding period:** 01 January 2022 – 31 December 2024

Partners: BOHAI TRIMET Automotive Holding GmbH, neo hydrogen sensors GmbH, NetCo Professional Services GmbH, Technical University of Braunschweig, Chem-Trend (Deutschland) GmbH, G. A. Röders GmbH & Co. KG

Material: aluminium for die-cast components

Goal: The project aims to process secondary aluminium in such a way that tramp elements and impurities are reduced to a level that allow it to be used for die casting. In addition, hydrogen burners for melting are being tested.

Fields of application: automotive industry and transport in general

Benefit: The GHG reduction results from the recycling of secondary aluminium instead of using primary aluminium and is estimated to be more than 90 % in relation to the raw material. The process being developed has major market penetration potential.

TTP for Lightweighting – Collaborative project 'BrakeThrough'

Collaborative project 'BrakeThrough'

Funding amount: €2.4 million **Funding period:** 1 September 2021 – 31 August 2024

Partners: Münster University of Applied Sciences, DTS GmbH - Diamond Tooling Systems, Bremskerl-Reibbelagwerke Emmerling GmbH & Co. KG, Mercedes-Benz AG

Material: aluminium matrix composites and matching brake pads

Goal: Development of forward-looking "green" brake disc systems made of hard particle-reinforced aluminium matrix composites (AMC) to establish virtually wear-free, low-emission brake systems as lifetime components in the automotive sector.

Fields of application: mechanical engineering, automotive industry

Benefit: The new braking system does not need to be replaced and does not rust; it is lighter and causes 95 % less emissions during the braking process.

Revision of the TTP for Lightweighting

Potential issues:

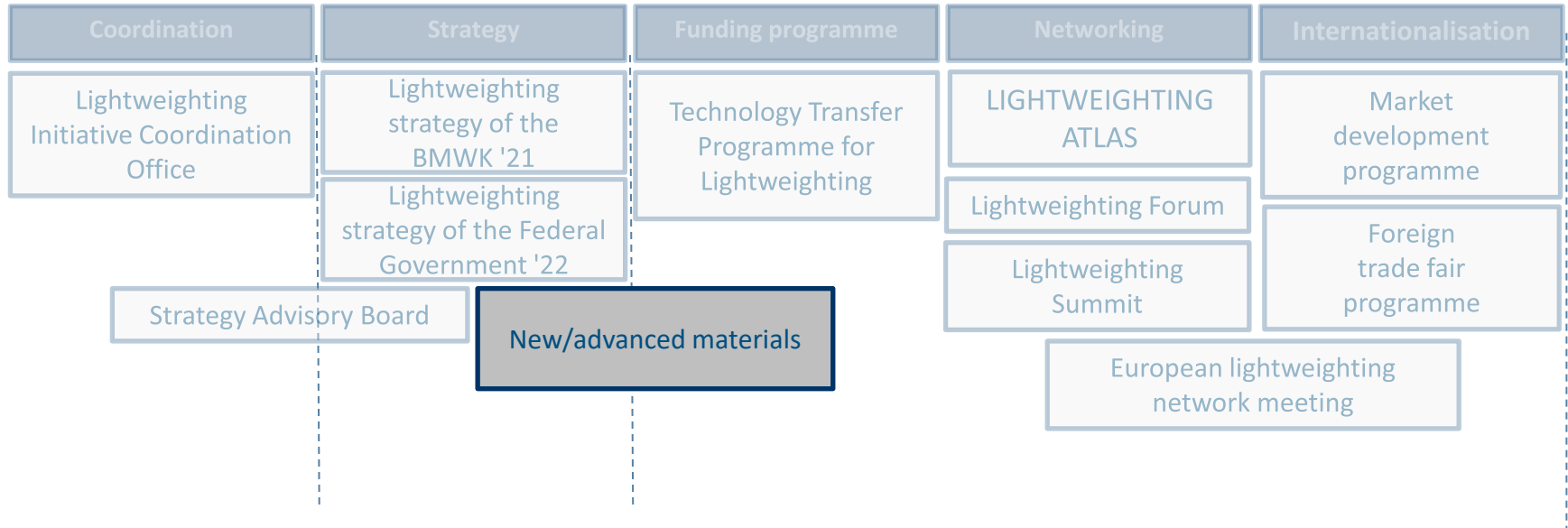
1. Circular economy
2. Advanced materials
3. Additive manufacturing
4. Internationalisation
5. ...



C: massimo - stock.abode.com

The revision of the TTP for Lightweighting by the end of 2022/early 2023 may include advanced materials.

Expansion of BMWK activities



Advanced materials help to sustainably strengthen Germany as a base for industry.

Advanced materials

- Key technology to sustainably **strengthen Germany as a base for industry**
- Advances in materials technologies give rise to numerous **product and system innovations**
- Importance of **materials as a cost factor** - reducing production costs and dependence on critical raw materials



Incorporating advanced materials into BMWK activities requires a solid foundation.

Study on new/advanced materials

- Review of the **potential for expanding existing activities** - especially with regard to climate change mitigation
- **Targeted and market-oriented R&D funding** under the **Lightweighting Initiative** (Jour Fixe: BMWK and Federal Finance Ministry; closing gaps in cascade funding)
- **Goal:** to bring market-oriented product developments to maturity

A broad overview is needed to ensure high validity of the study.

International lightweighting activities

BMWK Market Entry Programme for SMEs (MEP)

- 2022: France, Sweden, Canada
- MEP cooperation project: South Korea - mobility sector (launch: 2022)

European Lightweighting Network (ELN)

- 1st meeting of the German EU Presidency on Oct. 21, 2020
- 2nd meeting organised by Austria from Sept. 23-24, 2021
- 3rd meeting planned for 2023 in Sweden

Foreign Trade Fair Programme (AMP)

- "Sustainable Lightweighting Made in Germany" joint stand (launch: 2022)

Side events on lightweighting

- 4/2021 German Trade and Investment Days
- 4/2021 UNECE
- 6/2021 UN Global Compact Leaders Summit
- 3/2022 G7 Workshop on Resource Efficiency

Solving global problems requires strong international networks.

Thank you for your attention.

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