AZL Aachen GmbH
Excellence in Lightweight Production





Advanced Plastics & Composite Applications in Defence & Space Systems

A structured market and technology study mapping defence and space applications, materials, manufacturing routes, and functional benefits of plastics and polymer/non-polymer composites

Markets and Applications | Materials | Production Technologies | Business Opportunities

Participants of the Kick-off Meeting

Advanced Polymer & Composite Applications in Defence & Space Systems

Did you know those facts about the space industry ?

SPACE

- **Global Space Industry: Market Size and Forecast**
  The global space economy reached approx. $546 billion in 2023. [1]
  The market could grow to $1.8 trillion by 2035 driven by commercial satellite services, launch innovation and government invest, representing an annual growth rate of around 7% [2]

- **European Space Industry: ESA Budget and Investments (2021-2027)**
  The EU plans to invest approximately €15 billion through 2027 in key programs like Galileo (navigation), Copernicus (Earth observation), and IRIS² (secure satellite communications).[3]

- **By 2035, the number of satellites in orbit is projected to exceed 50,000**
  with hundreds of new small satellites launched every month. [2]

- **Market prediction models indicating a CAGR of 12.11%**
  starting at $1.47 billion in 2023 to $4.61 billion by 2033 [4]

- **Investments in space technologies require large budgets and long-term contracts,**
  e.g. MT Aerospace received $33.5 million from ESA to develop a demonstrator systems made of CFRP for a prototype which will be implemented in the Ariane 6 launch vehicles [5]

Sources: [1]: Statistica; [2]: McKinsey; [3]: Wikipedia: ESA; [4]: https://en.wikipedia.org/wiki/Readiness_2030, [5]: https://www.whitecase.com; [6]: CFA Institute April 2025, [4] BIS Research Feb 2025 , [5] MT Aerospace Nov 2022

Advanced Polymer & Composite Applications in Defence & Space Systems

Did you know those facts about the defence industry ?

DEFENSE

- **Readiness 2030 / ReArm Europe Plan**
  *EU member states plan to mobilize up to **€800 billion** through the Readiness 2030 plan to strengthen European defence infrastructure [6]*
- **SAFE Program (Security Action for Europe)**
  *Emergency loan program worth **€150 billion** to support the European defence industry via joint defence procurement, called Security Action for Europe (SAFE) [7]*
- **GERMANY and FRANCE**
  *The German defence budget has **nearly doubled since 2021**, now totaling around **€70 billion** and France plans to increase its defence spending **by 30% nominally by 2030** [8]*
- **JAPAN has committed to increase defence spending to 2% of GDP by 2027**
  *marking a shift from its longstanding **'1% of GDP'** rule [9]*
- **In 2022 JAPAN avowed in its new National Defence Strategy and Buildup Plan**
  to redouble effort for preserving a domestic defence production base, but still relying on international projects, e.g. Global Combat Air Programme with UK and ITALY [10]

There are large and further growing business potentials for polymer-based materials and polymer/non-polymer composites in space and defence industry sectors which will be identified, structured and analysed within this market & technology study

Sources: [7]: https://www.whitecase.com; [8]: CFA Institute April 2025, [9] Royal United Service Institute for Defence and Security Studies Dec 2024,[10] Hughes, Japan's defence industrial strategy and fighter aircraft production Mar 2025

Advanced Polymer & Composite Applications in Defence & Space Systems
Project Objectives and Results

Objectives:

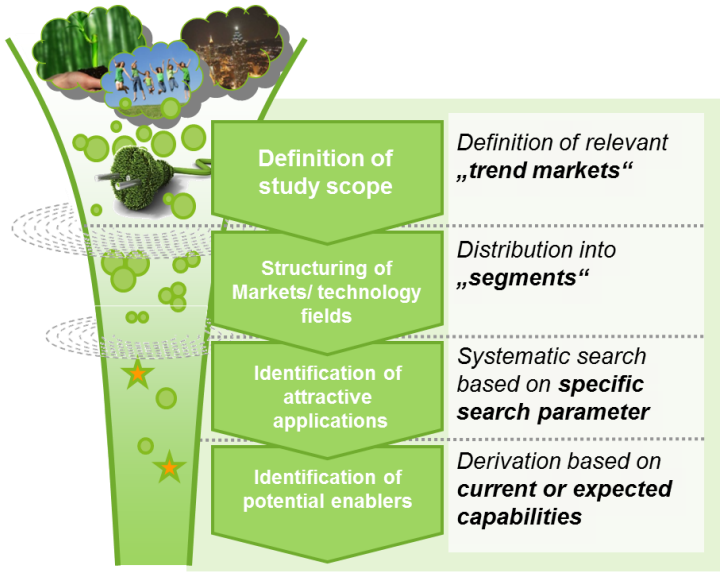
- General understanding of market, trends, and challenges
- Knowledge of latest design, materials & state of the art manufacturing
- Evaluation of current solutions and ongoing development regarding design, materials, and processing
- Network with potential partners & customers at events

Results:

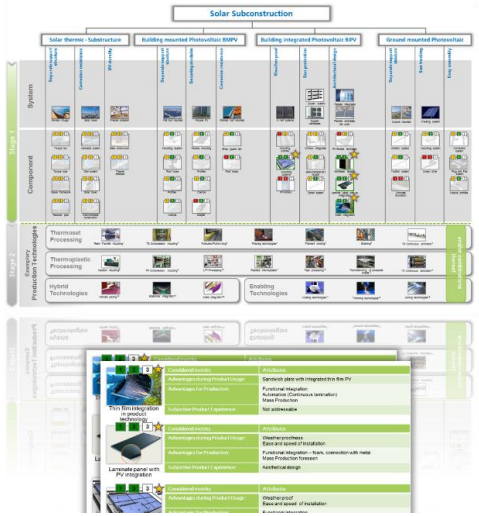
- Discover trends in markets & technologies within the addressed industry sectors
- Understand value chains and provide information on market-active companies
- Overview regulatory, standards & IP landscape info
- Estimate potential for different materials, manufacturing and design methods and evaluate performance influence parameters and cost

Advanced Polymer & Composite Applications in Defence & Space Systems
Systematic Approach of this Market & Technology Study

Exemplary Approach of a Reference Study: see Annex A



Structured analysis and evaluation of technologies & applications in technology trees:



Market Overview & Segmentation

- Space Technology
- Defense

Application & Technology Insights

- Comparative screening of relevant applications within identified sub-segments

Technology Insights and Value Chain Mapping

- Technology overviews
- Overview on value chains incl. key players

Results will be prepared as:

- Comparative KPI matrices
- Technology trees
- Value maps and fact sheets
- Technology fact sheets and providers

Segment Profiles (incl.)

- Segment description
- Market intelligence
- Drivers and hurdles and constraints (e.g. regulatory, functional, operational)
- Potentials for composite related technologies
- Sub-segments

Advanced Polymer & Composite Applications in Defence & Space Systems

Systematic Approach of this Market & Technology Study

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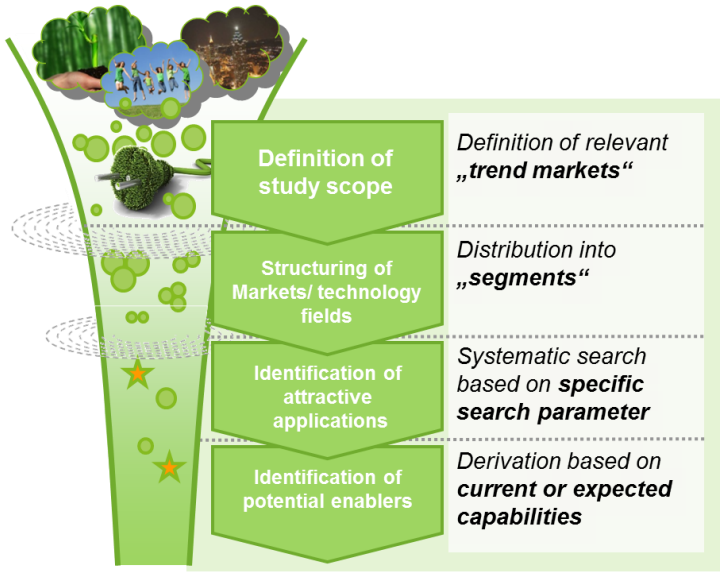

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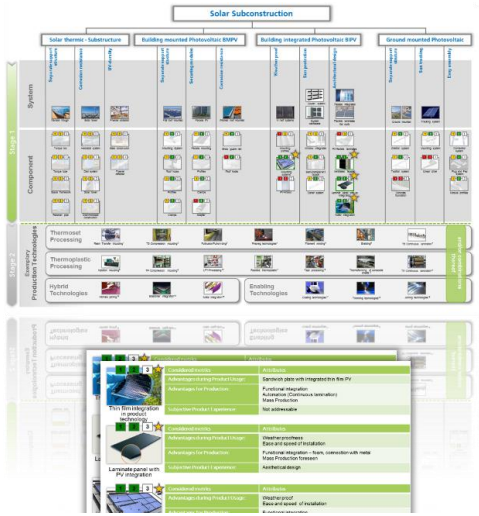

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- Technology trees
- Comprehensive list of specific challenges
- High-level information for the systems and applications to apply a rating and evaluation scheme
- Selection of applications for more detailed analysis according to the interests of the participating companies
- Detailed studies for selected applications

Advanced Polymer & Composite Applications in Defence & Space Systems

Systematic Approach of this Market & Technology Study

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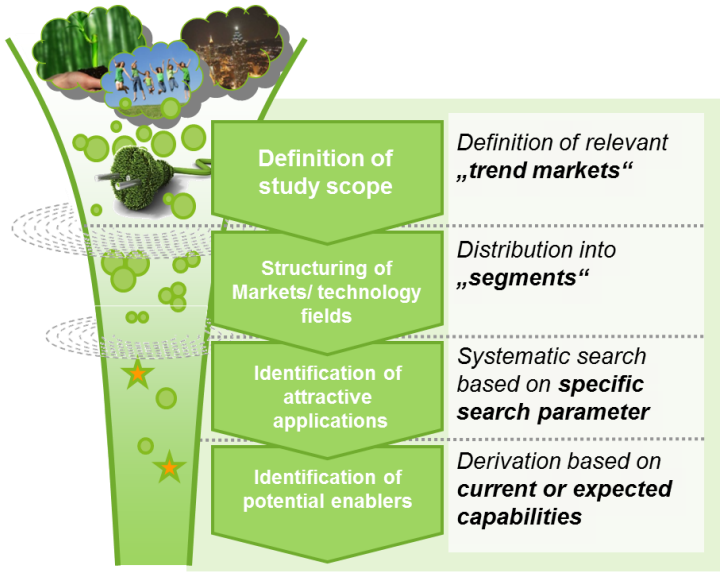

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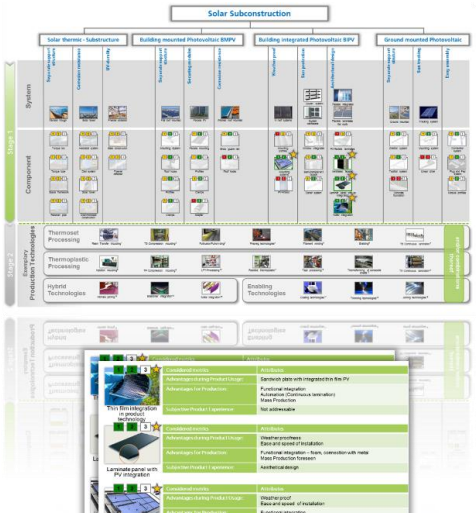

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- Technology fact-sheets related to materials and production technologies for parts including processing technologies, technologies for functionalizing, joining, post-processing, coating
- Identification of key players across the value chain
- Strategic positioning and business opportunities are visualized.

High Value Composite Applications – Space & Defense
Systematic Approach of this Market & Technology Study

Open to join!

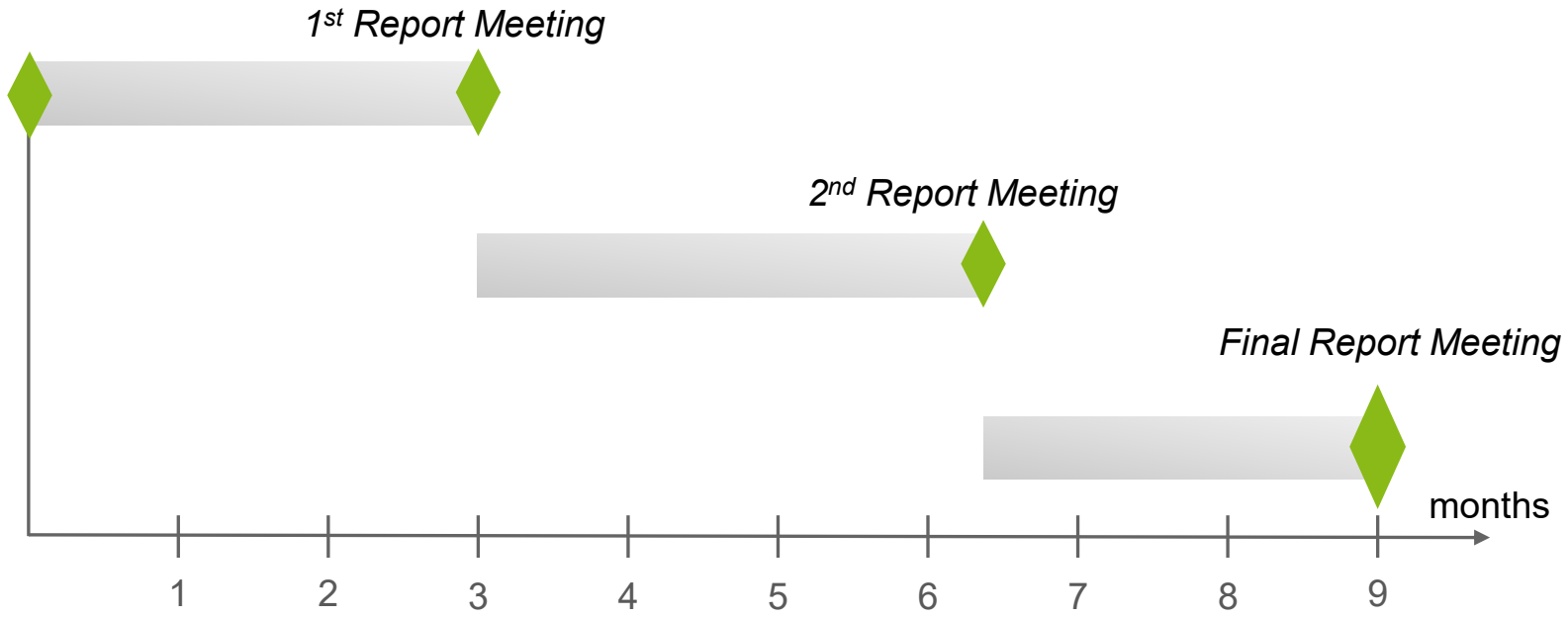



Onboarding Meeting
September 04th 2025

Stage 1:
Market Overview & Segmentation

Stage 2:
Application & Technology Insights
Comparative screening of relevant applications within identified sub-segments

Stage 3:
Technology Insights and Value Chain Mapping
Detailed studies on technologies and value chains



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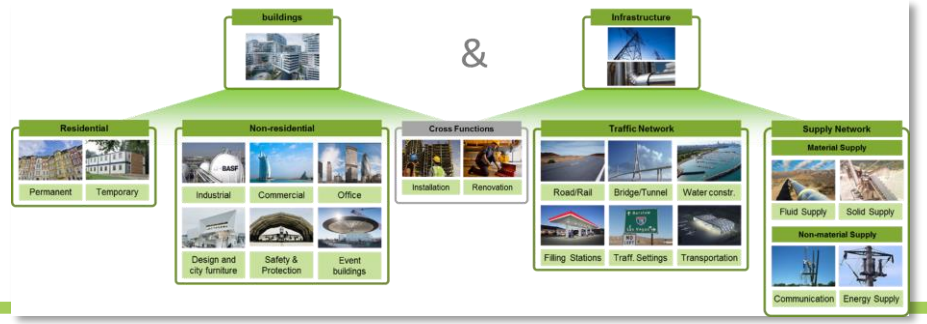
Exemplary Reference Study:
“Composite Technologies in Buildings & Infrastructure”

Market and Business Opportunity Identification

AZL Market and Technology Studies

Structuring and analysis of **trend markets and market segments**



Systematic analysis of **attractive applications**

Identification and benchmarking of **technologies and enablers**

Analysis of **business cases**

- **Systematic and established approach**
- **Market analysis through the eyes of technology experts**

Market and Business Opportunity Identification

Examples of Joint Market and Technology Studies

Example joint studies:

- Mass Production for Lightweight Composite Structures
- Composites in Buildings and Infrastructure
- Energy Storage Systems
- Composites in the Furniture Industry
- Next Generation Mobility Solutions
- High-Performance SMC
- Potentials and Challenges of Thermoplastic Tapes for SME Injection Molders
- Bio-based Composites

"The AZL study on Buildings and Infrastructure provided us a **great networking with key players** and gave us a **proper market understanding** including market size/volume in numbers to prove the value of this technology to building industry."

Justin Jin, CEO of AXIA Materials

Joint Technology Development through Cost-Sharing

Previous Activities

Joint Partner Project
Trends & Design Factors for Hydrogen Pressure Vessles

Joint Partner Project
Thermal Propagation

Joint Partner Project
Rotor Sleeves for Electric Motors

Joint Partner Project
Emerging Battery Storage Technologies

Joint Partner Project
Propellers and Rotors

Joint Partner Project
Cost and CO2 Saving Lightweight Tailgate Concept Study

Joint Partner Project
Concept Study & Development of Cell-to-Pack Battery Casings

Joint Partner Project
Battery Casing Follow-Up: Bottom Impact Protection

Joint Partner Project
Battery Casing Follow-Up: Fire Protection

Joint Partner Project
Multi-Material Battery Casing

Joint Partner Project
Inductive Double Belt Press

Joint Partner Project
Ultra-Fast Manufacturing

Joint Market & Technology Study
New Potentials for Composite Technologies in Buildings & Infrastructure

Joint Market & Technology Study
Composites in the Furniture Industry

Joint Market & Technology Study
Potentials and Challenges of Thermoplastic Tapes for SME Injection Molders

Joint Market & Technology Study
Next Generation Mobility Solutions

Joint Market & Technology Study
Energy Storage Systems

Joint Market & Technology Study
High-Performance SMC

Joint Market & Technology Study
Bio-based Composites

Exemplary Refence Study „Buildings & Infrastructure“

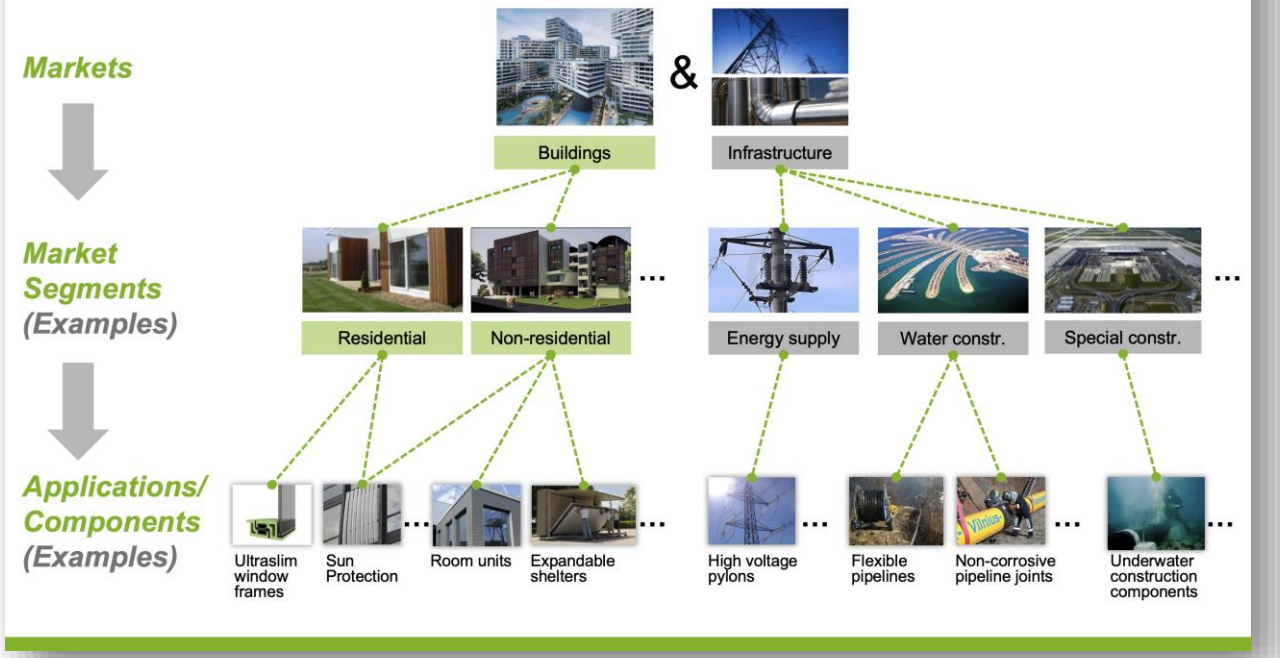
Get more details on completed activities!

Exemplary Approach of a Reference Study
„Composite Technologies in Buildings & Infrastructure“

Structuring of Applications based on Market and Product Segments:

AZL – Market and Technology Study
„Lightweight Composite Structures for Buildings & Infrastructure“: Application Examples

in cooperation with: AZL Aachen GmbH, AZL Aachener Zentrum für integrativen Leichtbau, RWTH AACHEN UNIVERSITY



Exemplary Proceeding
Stage 1 – Pilot Study

1 2 3

in cooperation with: AZL Aachen GmbH, AZL Aachener Zentrum für integrativen Leichtbau, RWTH AACHEN UNIVERSITY

Market Segmentation

- Structured overview on market segments within „Buidlings & Infrastructure“, market structure and overall market volume

Segment Analysis

- Overview on high level chances, risks
- Technology and market trends

Segment Evaluation

- High level aggregation of market and technology intelligence
- Selection of most promising segments based on expert knowledge (interviews) and appraisal of the steering committee

Exemplary Approach of a Reference Study
„Composite Technologies in Buildings & Infrastructure“

Technology Trees
(including sub-segments with value chain overview, technology overview and market analyses):

Exemplary Proceeding
1 2 3

Stage 1 – Pilot Study

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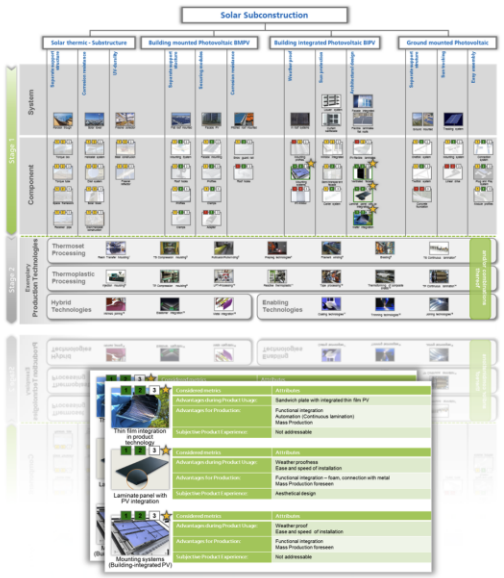


Segment Sub-structure

- Overview on technology fields within the market segment at hand

Detailed Segment Analysis

- Derivation of major challenges within these sub-segments in order to enable a focussed selection of growing or developing marketsegments

»Technology Tree«

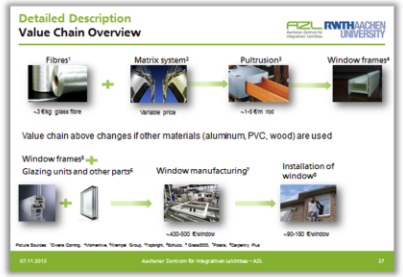
- Market requirement-based breakdown of relevant sub-segments into systems and components

➔ Criteria-based (market and technology) priorization of applications/ components

Exemplary Proceeding
1 2 3

Stage 2 – Detailed Analysis

in cooperation with: AZL Aachen GmbH, AZL Aachener Zentrum für integrativen Leichtbau, RWTH AACHEN UNIVERSITY



Value-Chain Overview

- Connected and/or synergetic technologies within the value-chain of the component at hand
- Visualization and quantification of added value steps and derivation of future requirements regarding material, process chains and production systems

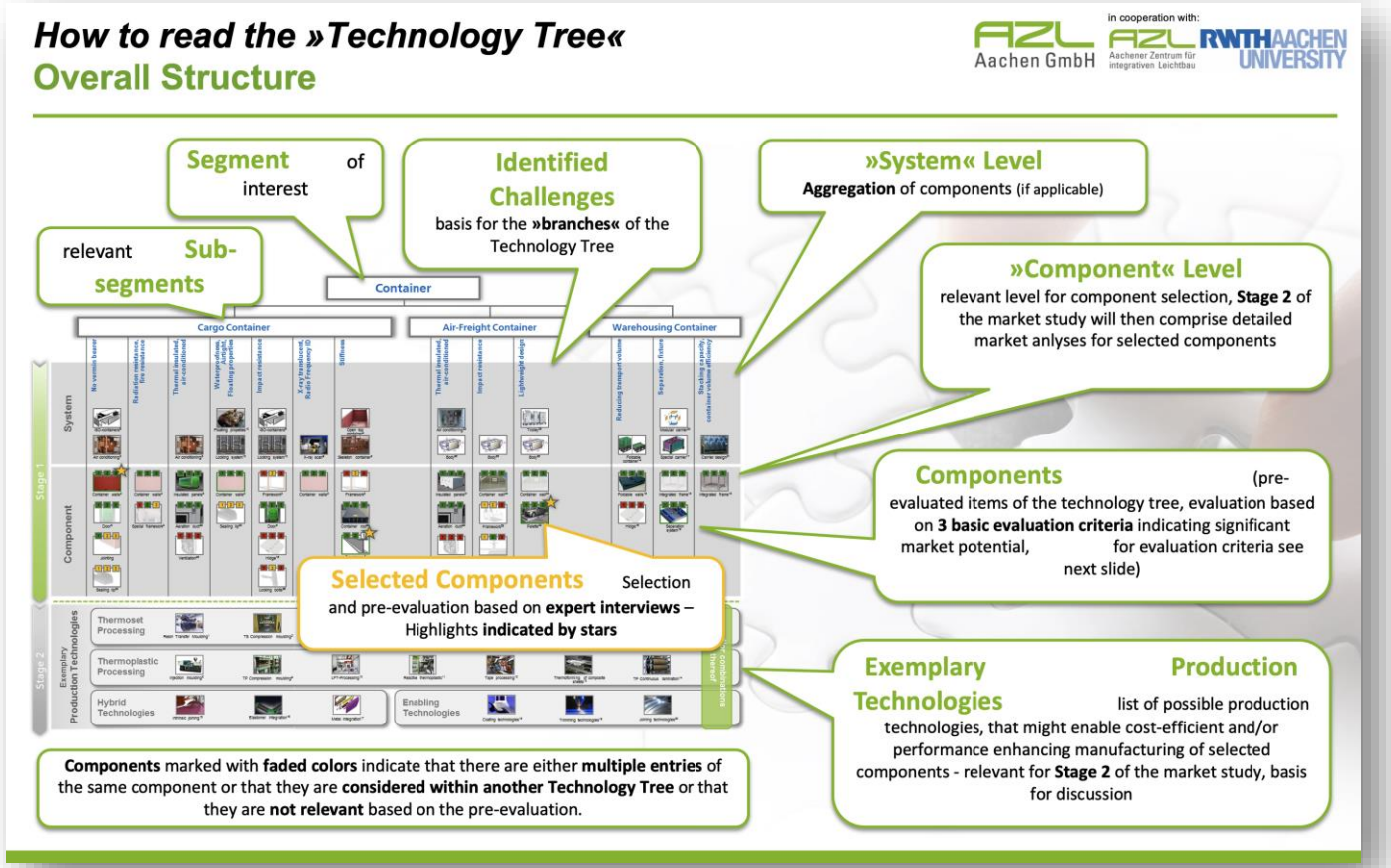
Detailed Technology and Market Analyses

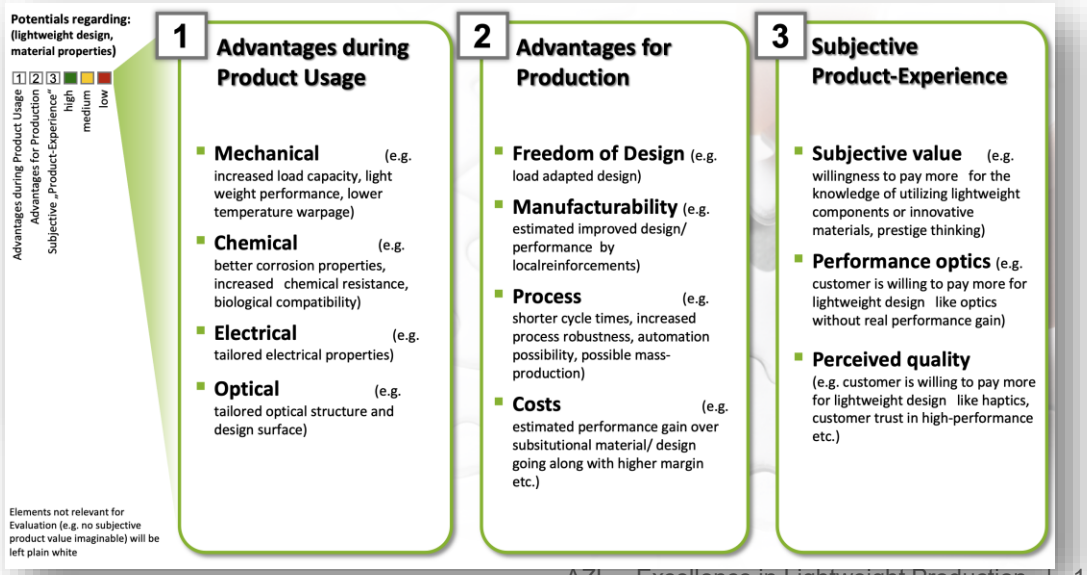
- Detailed Aggregation of relevant technology- and market-related information
- Executive Summary for quick evaluation

➔ Information basis for selection of highlight components/ applications

Exemplary Approach of a Reference Study
„Composite Technologies in Buildings & Infrastructure“

Technology Tree:

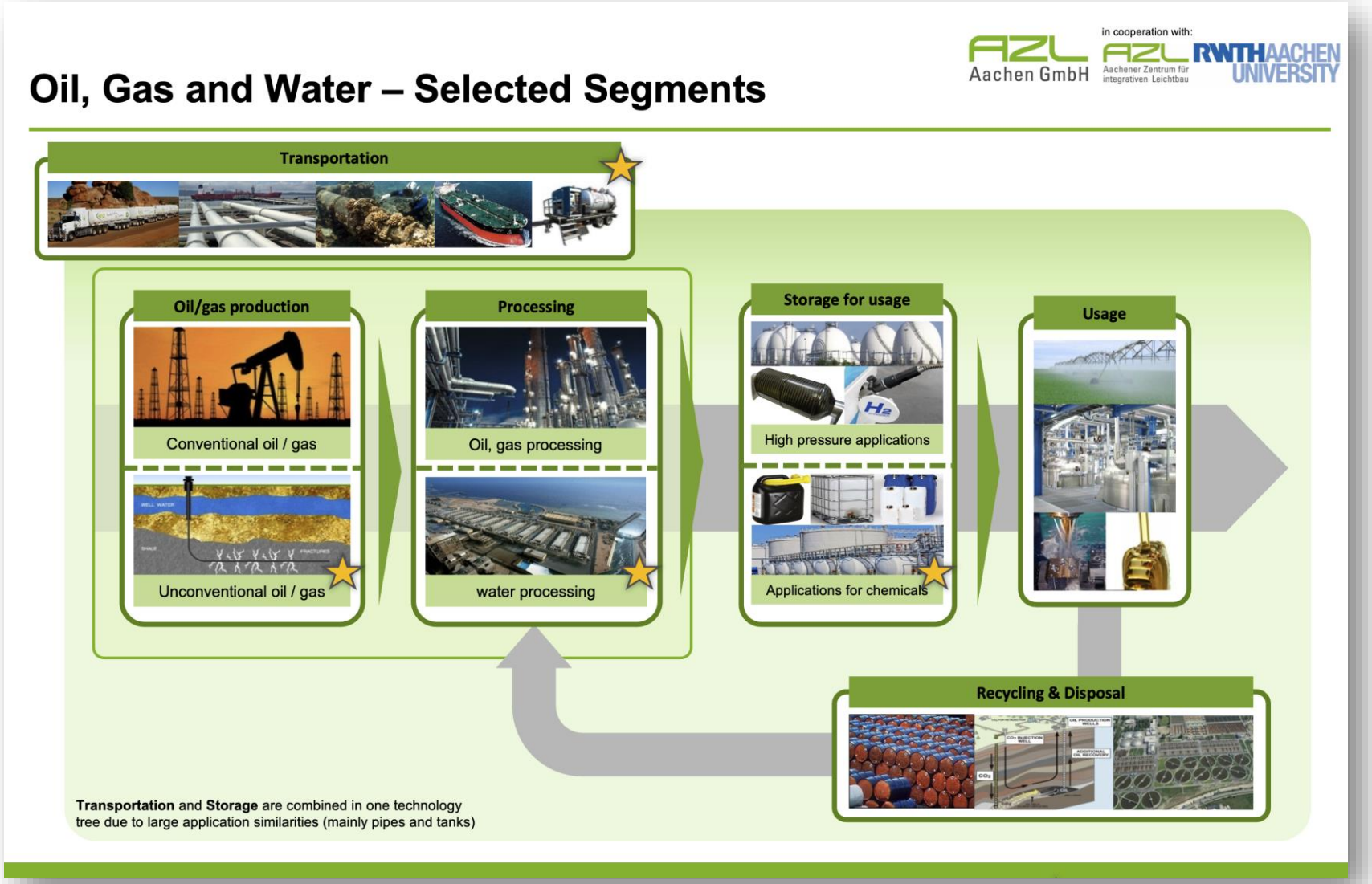




Exemplary Approach of a Reference Study

„Composite Technologies in Buildings & Infrastructure“

Technology Tree Example „Oil, Gas and Water“:



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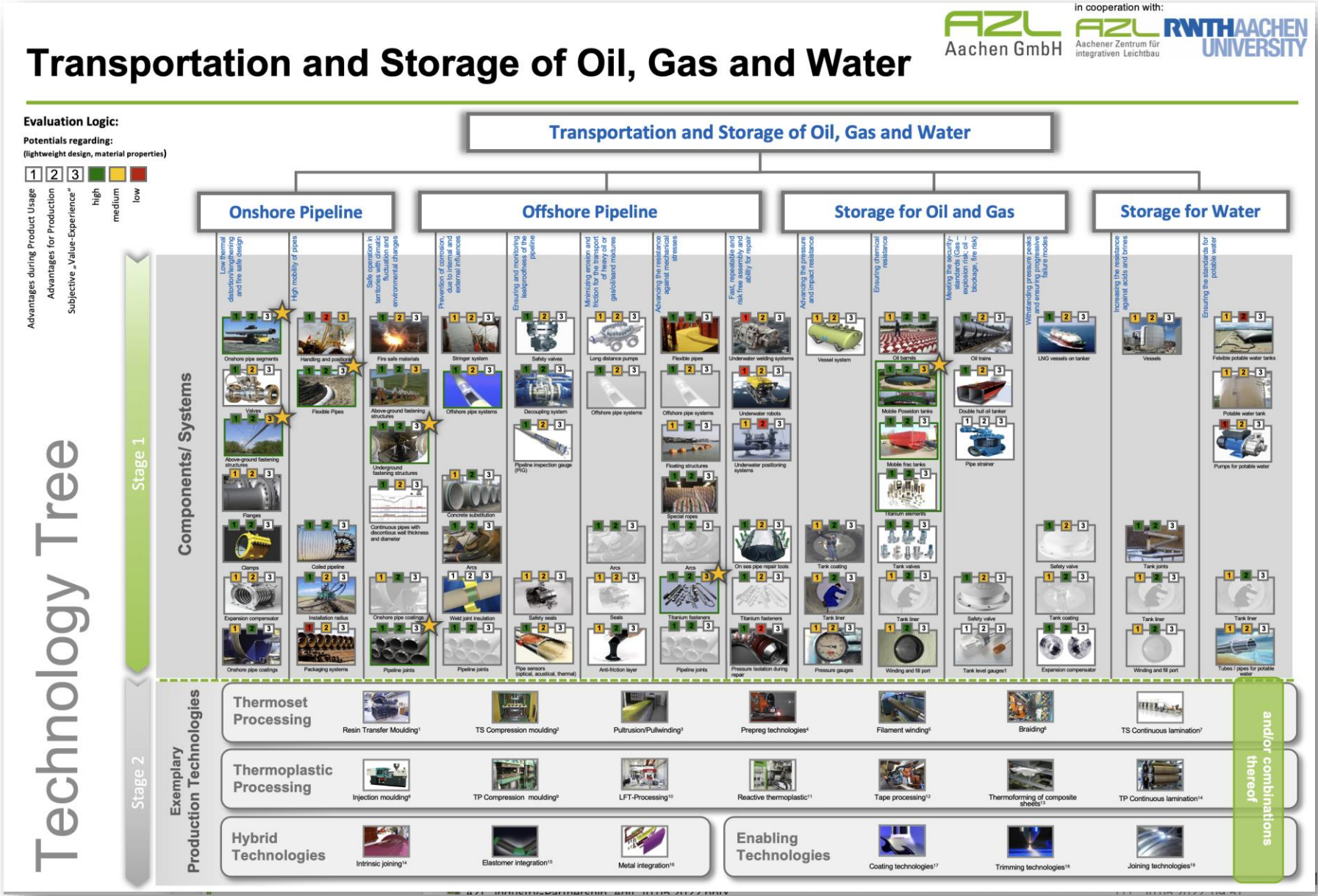

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