



Soluterials

Save and innovate

SOLUTERIAL

Sustainable, innovative & high-performance pure aluminium.

**Reduces EU's dependance from foreign resources
and is the real base for decarbonization.**

BECAUSE MATERIAL MATTERS!

Patent
Pending



Co-funded by
the European Union



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MEET US

Founders



Dr. Alla Kasakewitsch, CEO/CRO
Dr. Ing: Powder Metallurgy & Composites



Christina Walch, CMO/CHRO/CFO
Dipl. Kffr.: Marketing, Production &
Environmental Mgmt.



Uwe Arlic, CTO/CPO
M. Sc.: Materials Engineering
B. Eng.: Mechanical Engineering
Tool mechanic (qualified professional)



Ivan Galant
Financial Modeling



Alexander Frhr. von Strombeck,
Certification & Business Dev.

Future team members (already active for Soluterials)



Dennis Kasakewitsch
Process Automation



Dr. Mathias Walch,
Legal Advisor & BA

**Advisors
&
Business Angels
(BA)**



Dr. Ekaterina Bagreeva,
PR and Communication Advisor

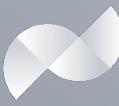


Mazen Touma,
Business Development Advisor & BA

ALUMINIUM IS EVERYWHERE



Aluminum is the 2nd most widely used metal.
It is impossible to imagine our lives without it.
Especially the industry, for which lightness is important,
relies heavily on aluminum (alloys) and is desperately looking for new solutions
to meet the current economic situation and climate targets.



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WHY IS THIS THE RIGHT TIME?

EUROPEAN ALUMINIUM @EU_Aluminium · 18h

Immediate and impactful actions are needed if we want to maintain a complete and competitive European aluminium value chain.

High energy prices are threatening the long-term viability of our industries, undermining path to #climateneutrality & #strategicautonomy.

European Metals @Eurometaux · 23h

40 metals CEOs have warned EU leaders of the energy crisis's existential threat & urged emergency action.

As well as temporarily addressing sky-high gas prices, the EU must deliver a full support package to companies.

FT:on.ft.com/3RobyM5
Letter:bit.ly/3x4n1bz

Industrial metals ✓ Added

European metals sector warns of 'existential threat'

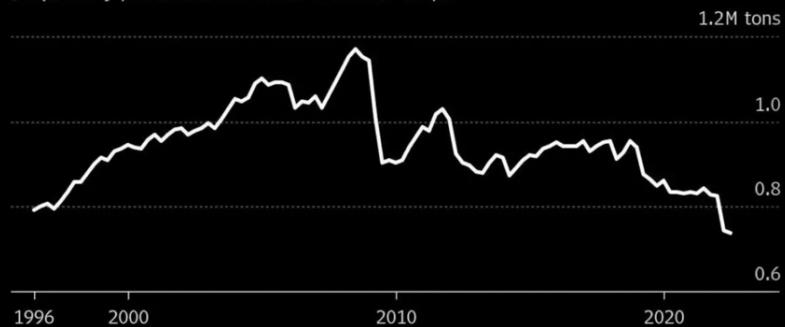
Executives urge emergency EU action to prevent deepening crisis in region's smelting industry



Production Slumps

Europe's aluminum output has fallen to the lowest level since 1973

Quarterly production in Western & Central Europe



tagesschau Sendung verpasst? ▶

Startseite > Wirtschaft > Weltwirtschaft > Gefahr für Autohersteller: Industrie befürchtet Aluminium-Engpass

Gefahr für Autohersteller
Industrie befürchtet Aluminium-Engpass
Stand: 22.10.2021 14:43 Uhr

Der deutschen Industrie geht das Magnesium aus: Vor allem die Autoindustrie ist bedroht, weil der Rohstoff für Aluminium-Legierungen benötigt wird. Experten warnen vor einem Produktions-Stopp.

von Thomas Spinnler, tagesschau.de

Monatlang schien der Chipmangel für die deutsche Industrie das wesentliche Problem bei der Produktion zu sein. Vor allem die Autoindustrie klagte über ernste Lieferengpässe. Dieser Engpass ist noch nicht annähernd behoben, da droht schon der nächste Mangel die Hersteller zu lämmen. Die Wirtschaftsvereinigung Metalle (WM) warnte jüngst in einem Positionspapier vor Lieferengpässen bei Magnesium - einem wichtigen Rohmaterial für die Produktion von Aluminium, das im Automobil- und Flugzeugbau dringend benötigt wird.

China habe im Zuge von Bemühungen, den eigenen Energiedrosseln, die Produktion von Magnesium zuletzt drastisch reduziert. Ein Anteil von 87 Prozent an der Produktion hat China ein vollständiges Monopol auf die weltweite Magnesiumproduktion. WM-Papier: China deckt 95 Prozent des Magnesiumbedarfs, bestehende eine fast vollständige Abhängigkeit.

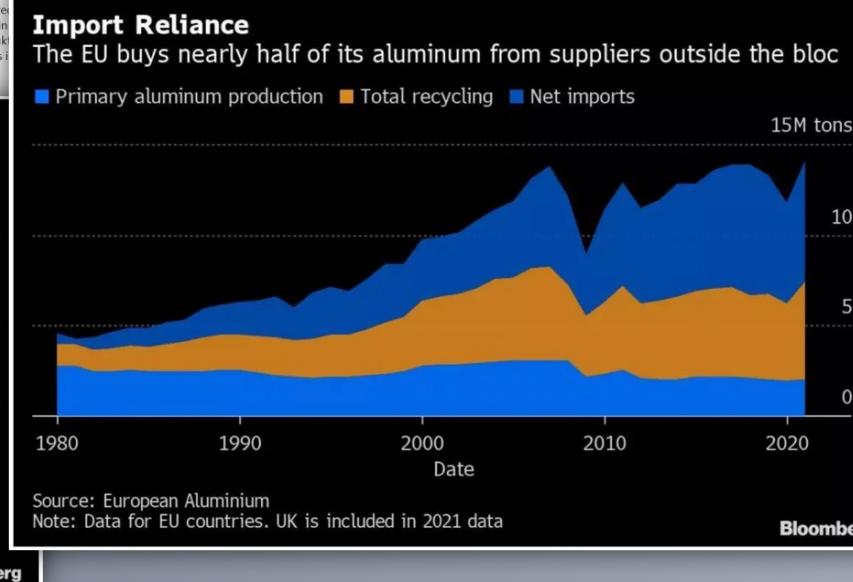
Unter Druck

Energiekrise bedroht deutsche Aluminiumindustrie

23.08.2022 | Quelle: Pressemitteilung des Aluminium Deutschland e. V.

Der Strompreis hat jüngst ein neues Rekordniveau erreicht und stellt die stromintensiven Aluminiumhütten in Deutschland vor existentielle Herausforderungen. Die Produktion von Aluminium in Deutschland ist im zweiten Quartal 2022 auch schon sektorenweise gefallen, heißt es weiter. Mit einem Rückgang von 23 Prozent schrumpfte die Herstellung von Rohaluminium dabei besonders stark. Nach dem ersten Halbjahr 2022 belastet in diesem Bereich nun ein Minus von 21 Prozent die Branche, was rund 448.000 Tonnen

Hilferuf! In Zeiten von rekordmäßigen Energiepreisen kocht in vielen Branchen allmählich die Wut hoch. Dafür kocht es in den Schmelztiegeln – wie hier, bei der Aluminiumverarbeitung – immer wieder. Das hat Folgen



EU VISION FOR EUROPE



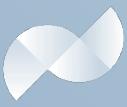
Quelle: FROTCOM

2030:
**Reduce EU greenhouse gas emissions by
at least 55%**



Quelle: FROTCOM

2050:
**Getting closer to target of reducing pollution
by 60%**



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OUR VISION

Physical products need to be more sustainable.

They have a big relevance and impact on environmental footprint.

What if...



electric car batteries -
up to 40% smaller



smart thermal management:
miniaturization & more powerful



transmission lines -
up to 40% lighter &
up to 30% smaller



more powerful & discreet



passenger aircraft -
up to 10% lighter



more powerful & less
consumptions

Less CO₂ emissions in the product life cycle and stronger local supply chain.

**Sustainable design with a big impact is now reality, meet
*SOLUTERIAL → NO ALLOY, ALWAYS PURE ALUMINIUM***

SOLUTERIAL - innovative high-performance aluminium material

OUR INNOVATION

NEW MATERIAL

- ✓ We do not solve the problems of the industry with a new alloy, we solve them mechanically and a new pure material!
- ✓ TRL 7

SUSTAINABLE TECHNOLOGY

- ✓ No melting to produce **SOLUTERIAL**
- ✓ Pioneering production technology (foreign to the industry) → TRL 7

COMPLETELY CLOSED RECYCLING LOOP

- ✓ Use of (secondary) pure aluminum to produce **SOLUTERIAL**
- ✓ **SOLUTERIAL** products can be fully recycled, no sorting necessary
- ✓ Strengthening of product green labels (customers)

INNOVATION BOOST

- ✓ **SOLUTERIAL** enables innovative and previously impossible design: e.g., functional lightweight components



SOLATERIAL: THE NEW STATE-OF-THE-ART MATERIAL

SOLATERIAL VS. COMMON MATERIALS

		SOLATERIAL	EN AW-1050 A	EN AW 6060	EN AW 7075	Cu-ETP	AISI304
		Pure Material	✓	✓	✗	✗	✓
Technical Advantage	Improved properties	• High strength	✓	✗	✗	✓	✗
		• High conductivity	✓	✓	✓	✗	✓
		• High lightness	✓	✓	✓	✓	✗
		• High corrosion resistance	✓	✓	✓	✗	✓
	New properties	• Outstanding durability	✓	✗	✗	✓	✓
		• Outstanding usage temperature	✓	✗	✗	✓	✓
Environment Advantage	World Impact	• Low environmental footprint	✓	✗	✗	✗	✗
		• Minimal energy consumption	✓	✗	✗	✗	✗
		• Recycling & recovery of parts	✓	✓	✗	✗	✓
	Business Impact	• Supply chain resistance	✓	✗	✗	✗	✗
		• Low production costs	✓	✗	✗	✗	✗
		• Low material price	✓	✓	✓	✗	✓

SOLATERIAL matters. Let's bring sustainable innovations to life!

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SOLUTERIAL USP: HITS INDUSTRIES GOALS

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DECOUPLED MATERIAL DESIGN

- ✓ All properties combined in 1 material
- ✓ No more compromise in product properties
- ✓ Reduces expenses, such as thermal post-treatment and thus money (TCO) and CO₂

1-STEP PROCESS GENERATES TARGET PROPERTIES

- ✓ Low energy & CO₂ production process
- ✓ Achievement of target properties straightforward in production
- ✓ No thermal and/or mechanical post-treatment necessary
- ✓ Non challenging production due to a MELTING FREE 1-step-process
- ✓ Use of pioneering production technology

ENTIRE PRODUCT RANGE FULLY RECYCLABLE

- ✓ Free from separation → pure aluminum stays pure aluminum
- ✓ No downcycling

HARMLESS

- ✓ Free of magnesium, rare earths, nanoparticles or nanotubes
- ✓ Non harmful to health and environment
- ✓ »REACH« and »RoHS« compliant



SAVE + INNOVATE

COMPARISON TCO BASED ON USE IN WIRE PRODUCTION

EN AW-6060 (aluminium alloy)

+ 50%

Production time

100%

Production mgmt.

0%

100%

Treatment need for
property setting

0%

€70

Maintenance,
heating elements

€0

€60

Energy demand,
heat treatment

€0

100%

Import dependencies

20%

CO₂

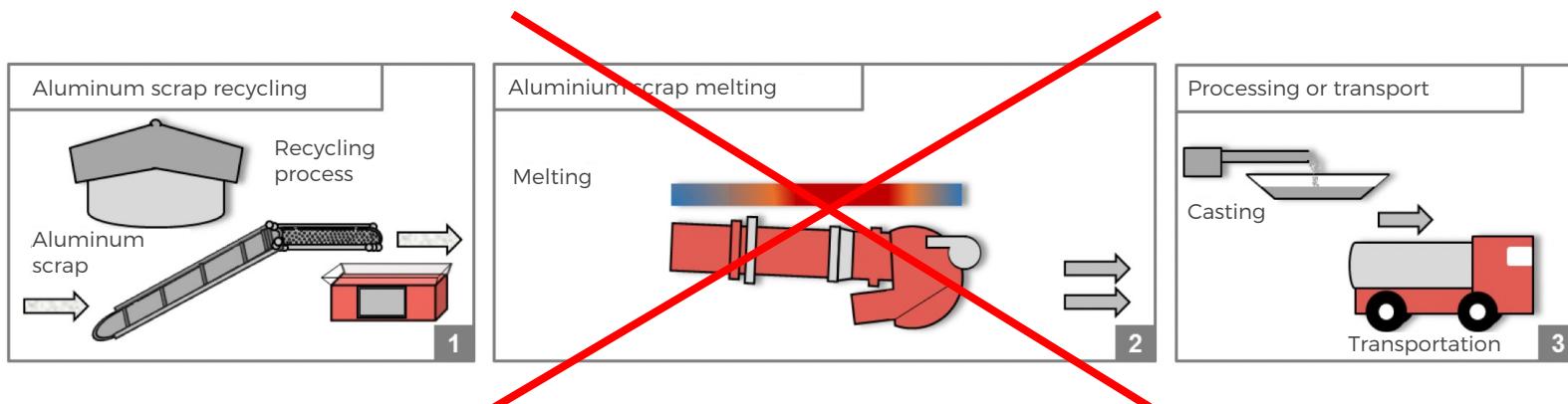
Less

Assumptions

- Wire production (by wire drawing) of 100 t
- 20 times heat treatment cycle p. production.
- Each heat treatment in-line with 500W per heating element.
- Subsequent heat treatment over 3h, 25kW heat treatment furnace

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ENERGY CONSUMPTION



**Consumption of critical elements
(current 2020 EU CRM list) and
resources.***

Name CRM	SOLUTERIAL	Al6060	Al7075
Mg, t	0	12	58
Si, t	0	12	8

**Energy consumption for the
production***

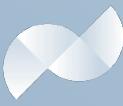
Name	Energy consumption, MWh
SOLUTERIAL	1,000
Recycling Aluminium	1,600
Bauxite melting electrolysis	32,000

**Energy consumption for
heat treatment***

Name	Energy consumption, MWh
SOLUTERIAL	0
Aluminium alloy	3.69.6

SOLUTERIAL matters. Let's revolutionize the materials market together! For good.

*Based on 2,000 tonnes



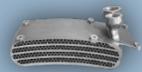
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CUSTOMER MEETS SOLUTERIAL

EXAMPLES OF SHORT-TERM APPLICATIONS FOR CUSTOMERS



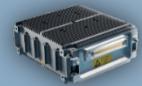
HEAT
EXCHANGERS

- Up to 60% better conductivity and 40% higher corrosion resistance compared to aluminum alloys
- Usable up to 550°C and creep stable due to unique pure metal concept
- Significantly increased mass related cooling efficiency (lightweight high strength thin wall design, up to 7% lower density, exceptional durability)



MECHANICAL
TURBOFAN

- Highly durable, high strength aluminum
- High corrosion and temperature resistance
- Less total weight / more reliable and less prone to harsh environments



U C A P
*Ultra-compact
Multifunction avionics platform*

- Thin-walled high strength housings
- Lightweight housings with excellent environmental and EMF protection as well as high passive cooling capability



STATIONARY
PLASMA
THRUSTER

- Functional structure element approach (highly durable and self-supporting electrical coils)
- Reduced dead-weight, smaller size



CABLING
*Ladder &
reinforcing elements*

- Cables made of aluminum and a material are reality
- Copper free conductors (due to high current/heat conductivity, no creep!)
- 50% weight reduction compared to copper due to 2 times better density-related conductivity
- Lightweight, self-supporting power lines consisting only of highly electrically conductive **SOLUTERIAL**, coupling free challenges
- Fiber free or steel free reinforcement due to high strength, corrosion resistance and creep stability
- Light self-supporting power lines (65% of total mass reduction compared to steel reinforced copper cable)



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OUR MARKETS

INITIAL MARKET:



Electronics



Mechanical Engineering



Telecommunications

NEXT STEP:



E-Mobility



Infrastructure



Maritime



Medical Technology

VISION:



Aerospace



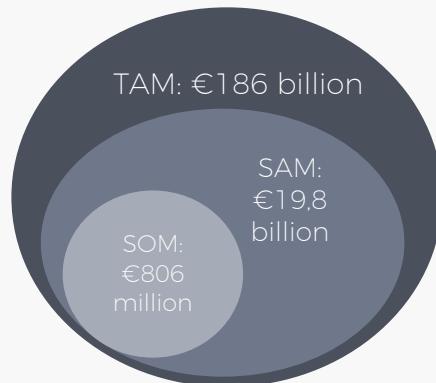
Aviation

The (sub)market for aluminum extrusion alone is expected to grow at a CAGR of 7.8% from 21-28. It is estimated to reach US\$104.15 billion by 2028.

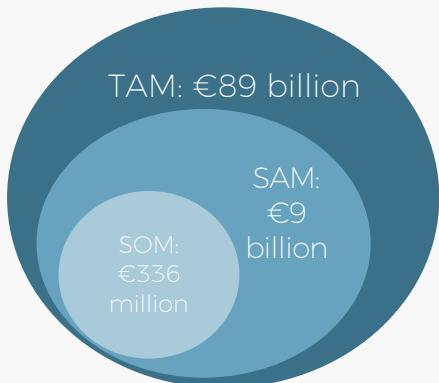
Aluminium (alloys) for 3D printing:



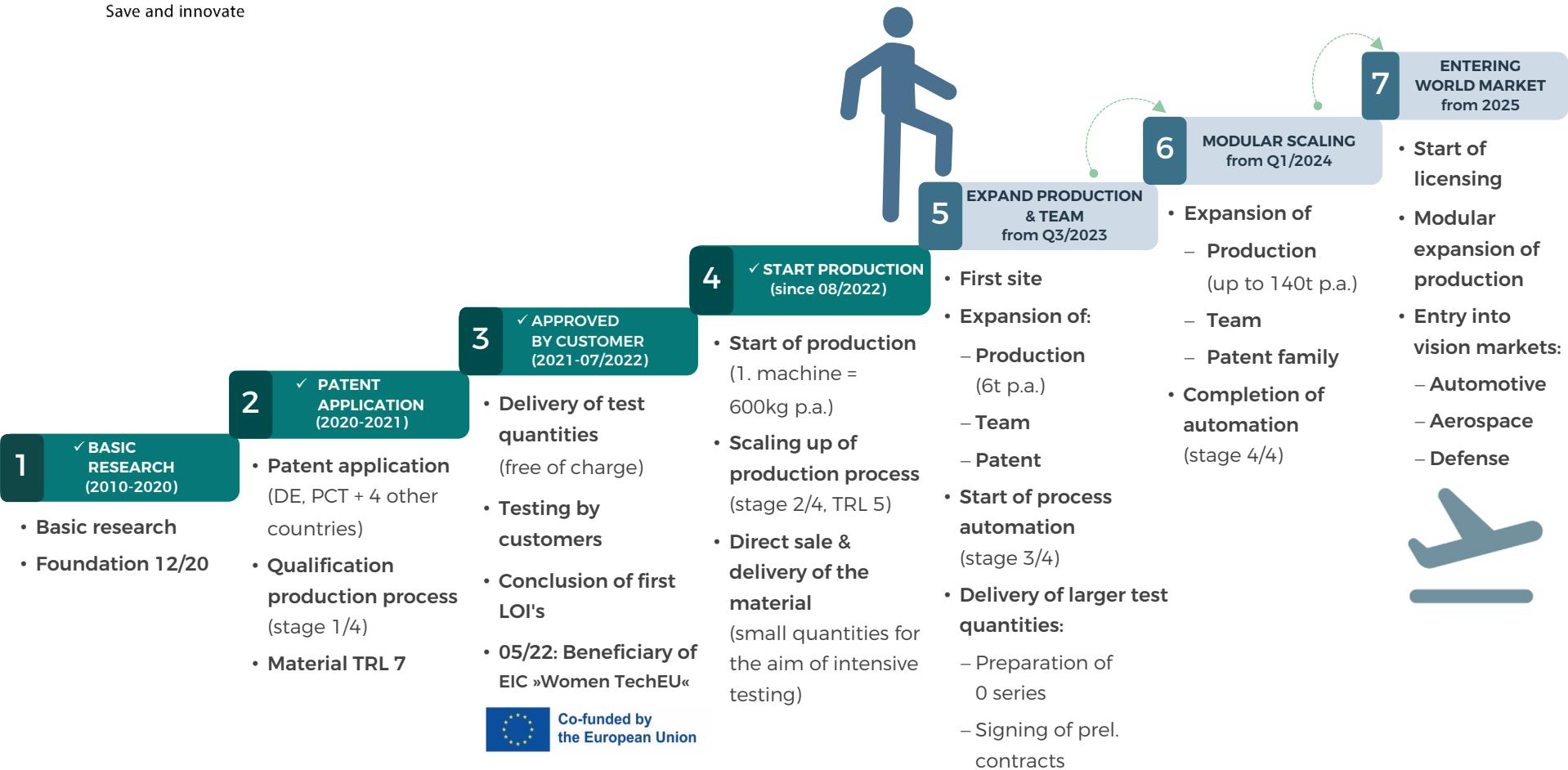
Electric wires:



Aluminium (alloy) extrusions:



BUSINESS DEVELOPMENT



FINANCIAL PROJECTIONS

FINANCIAL NEEDS:

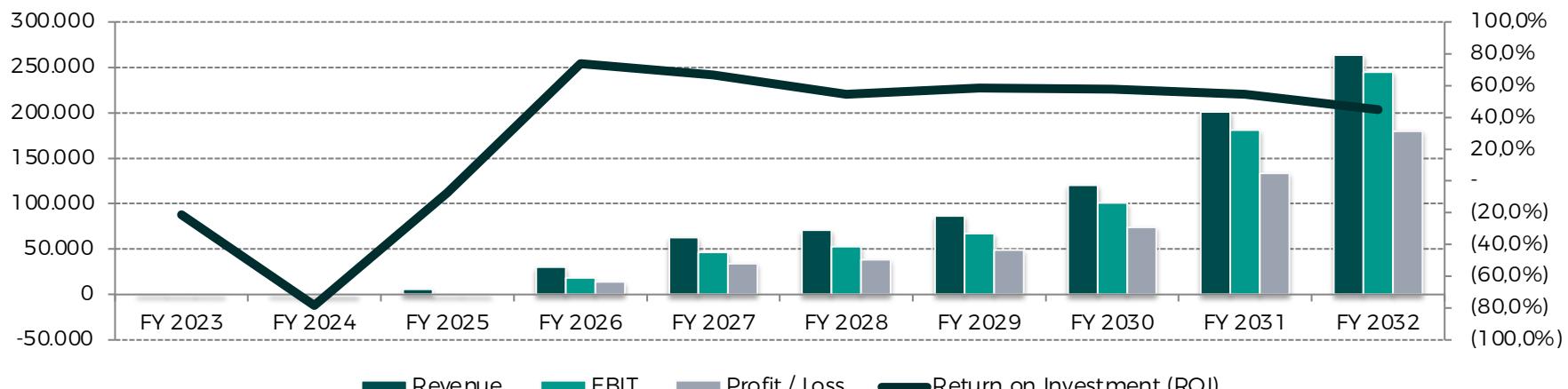
Total:
approx.
€6.6 Mio.

= ✓ **1. Step**
(03/23)
€0.2 Mio.
Business Angels →
convertible loan

+ ✓ **2. Step**
(07/23)
€1.2 Mio.
✓ HTGF: TEUR 800
➤ TEUR 400 open

+ ✓ **3. Step**
(09/24)
€5.2 Mio.

REVENUES, EBIT & PROFIT/LOSS (in EUR '000)



Assumptions

OCT 2022: Start of first production (for prototypes) & delivery of further test material to customers in addition to first revenues from sales to innovators (small quantities) → done

2023 – 2026: Production expansions (automation) of own production initially up to max. 24 containers → capacity increase from 7t to approx. 2,715t p.a.)

2025: Start licensing

From 2026: Flexible scaling possible according to customer requirements

05/2023-2031: Team expansion from 3 to 45

From 2030: It is assumed that demand from 2030 onwards will be far greater than shown, as orders from automotive and aviation industries can be expected



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CONCLUSION

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» Unleashing the full power of industry, using our unique material that increases efficiency, reduces effort, integrates easily, enables entirely new innovations, and actively combats climate change while strengthening local supply chains. «



Quelle: FROTCOM



Quelle: FROTCOM



Quelle: virtualdesignmagazine.de



Quelle: galileo.tv



Quelle: spiegel.de



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Let's revolutionize the materials market together.
For good!



Co-funded by
the European Union

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Soluterial is the new and sustainable aluminum for out of the box thinking.

WHAT WE DO

Soluterials is a young start-up that transforms (pure) aluminum (preferable scrap) into an innovative nanostructured **high-performance pure aluminum** material **SOLUTERIAL** (patent protection is pending).

We offer a “solution” for “materials”.

FOUNDERS



Dr. Alla Kasakewitsch, CEO/CRO
Dr. Ing. Powder Metallurgy & Composites



Christina Walch, CMO/CHRO/CFO
Dipl. Kffr.: Marketing, Production & Environmental Mgmt.



Uwe Arlic, CTO/CPO
M. Sc.: Materials Engineering
B. Eng.: Mechanical Engineering
Tool mechanic (qualified professional)

COMPANY SUMMARY

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STATUS

Founded: 12/20
#Employ.: 3
Stage: pre-revenue/
first revenues

TEAM

Highly motivated team with deep understanding of own material and process as well as long term industry knowledge and active relevant network (to customers, research institutes and other relevant stakeholders).

GROWTH EXPECTATIONS

Aluminium market: reached US\$ 160 bn in '22 ('23-'32: CAGR of 5% & value projection in '32: US\$ 282 bn)

ACHIEVEMENTS

Award: EIC Women TechEU (06/22)
Convertible Loan: Business Angels (EUR 333.334)
Material: TRL 7
Production: Commissioning of the 1st machine and start of production (600kg p.a.)
Production Process: Scaling stage 2/4 → TRL 5
Direct distribution/sale: Delivery of the material to customers (small quantities for the aim of intensive testing)

PILOT CUSTOMER



And others from electronics (wire manufacturing), off-shore, OEM and aerospace sectors (naming not possible due to NDA)

CONTACT

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