Coatema research & development projects

05/05/25

MEMBER OF ATH

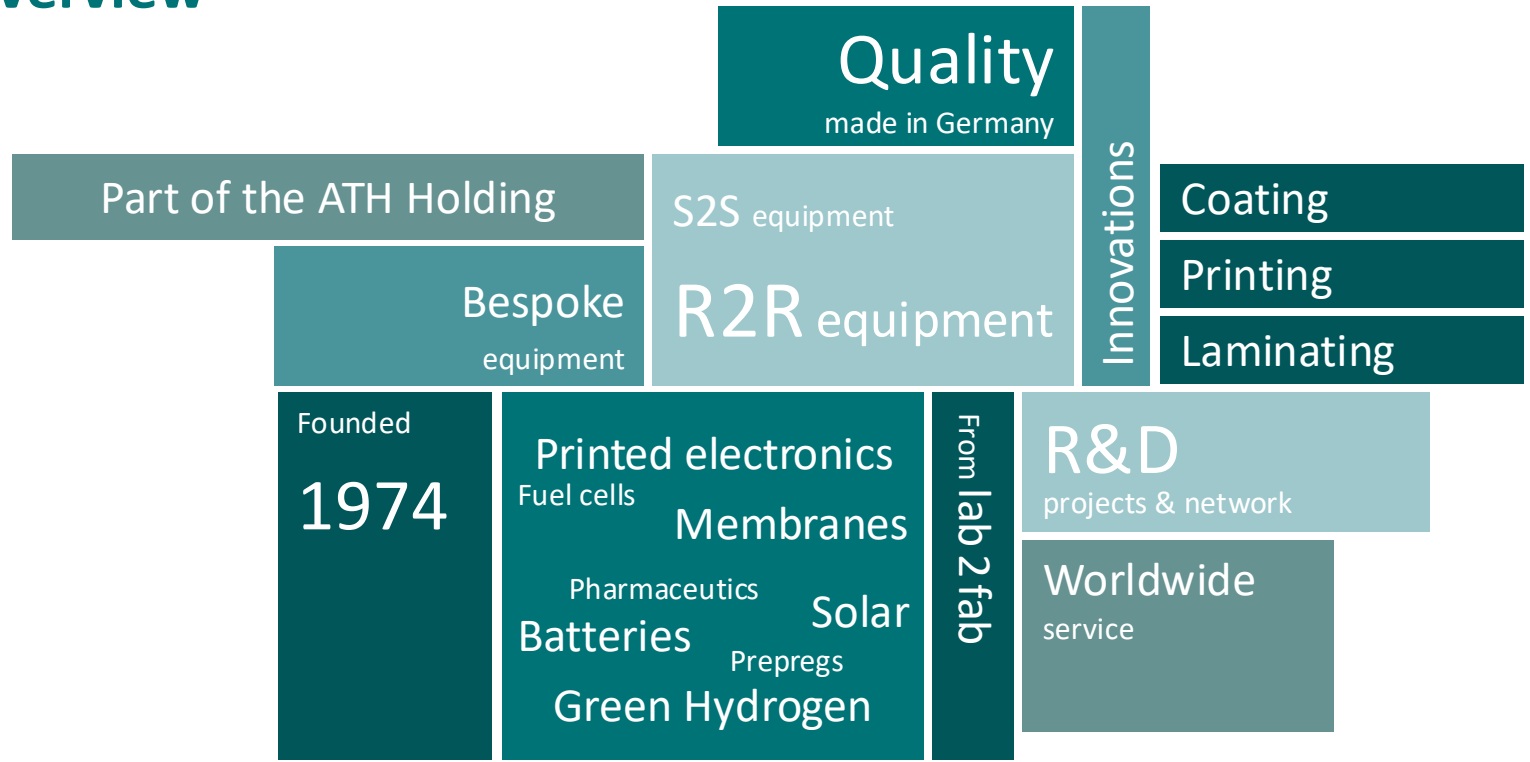
Agenda

1. Introduction
2. The vision
3. The next R&D frontier
4. The R&D centre & know how base
5. Current R&D projects
6. Former R&D projects
7. Summary

1.

Introduction

Overview


Quality
made in Germany
Innovations
Part of the ATH Holding
S2S equipment
R2R equipment
Bespoke
equipment
Coating
Printing
Laminating
Founded
1974
Printed electronics
Fuel cells
Membranes
Pharmaceutics
Solar
Batteries
Prepregs
Green Hydrogen
From lab 2 fab
R&D
projects & network
Worldwide
service

Group of companies

ALTONAER
TECHNOLOGIE
HOLDING

KROENERT

- ✓ Founded 1903
- ✓ Approx. 200 employees
- ✓ Located in Hamburg

DRYTEC

- ✓ Founded 1995
- ✓ Approx. 50 employees
- ✓ Located in Norderstedt

Coatema®
Coating Machinery GmbH

- ✓ Founded 1974
- ✓ Approx. 50 employees
- ✓ Located in Dormagen

Coatema equipment platform strategy for lab2fab

Lab

- ✓ State-of-the-art research and development equipment
- ✓ Sheet-to-sheet to roll-to-roll systems on smale scale & footprint

Pilot Production

- ✓ Proven processes for printing, coating and laminating equipment
- ✓ Highest-quality pilot lines enable stable pilot production and reduce cost of operation
- ✓ Scaling laboratory equipment to enable pilot production

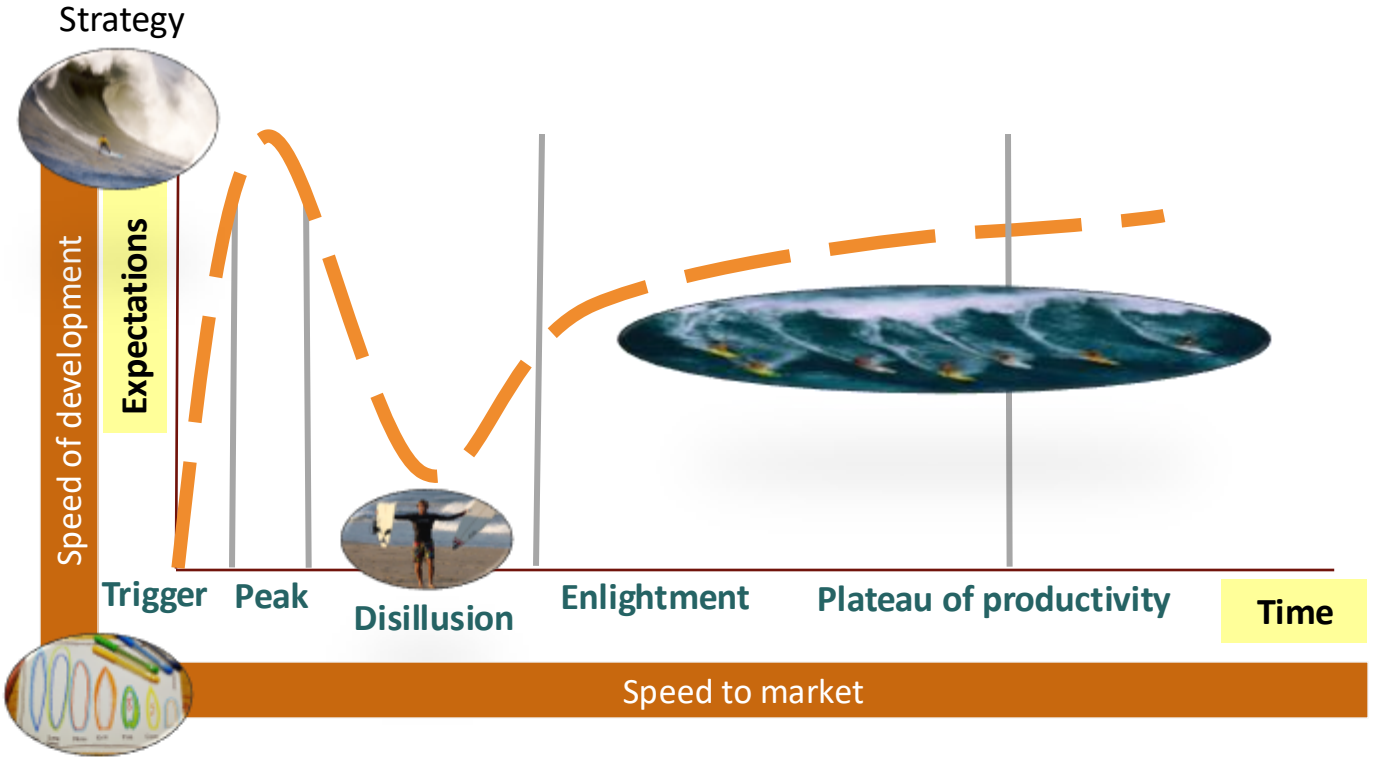
Production

- ✓ Full-scale production lines
- ✓ Optimize the manufacturing process, including streamlining assembly, reducing material waste, and optimizing the carbon footprint

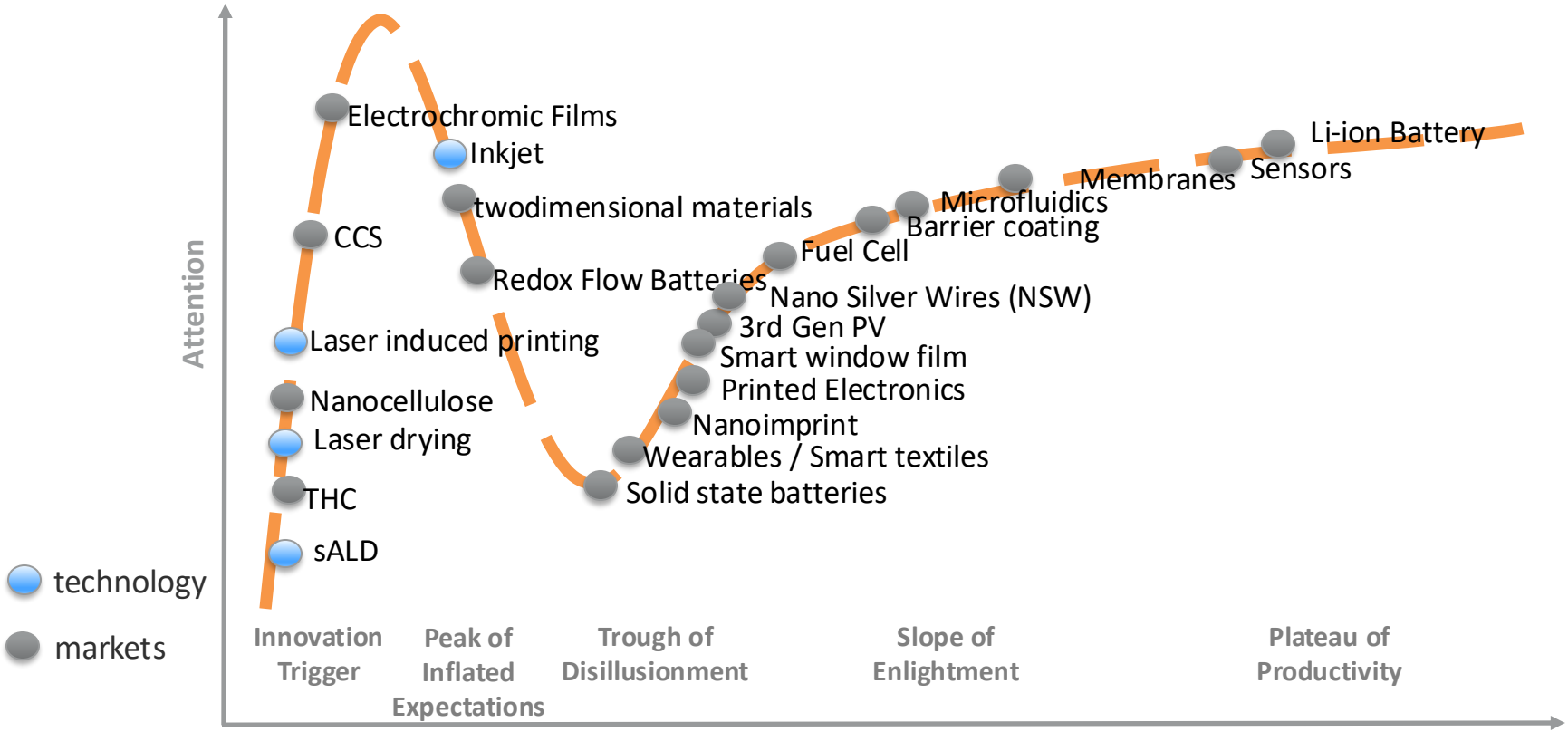
2.

The vision

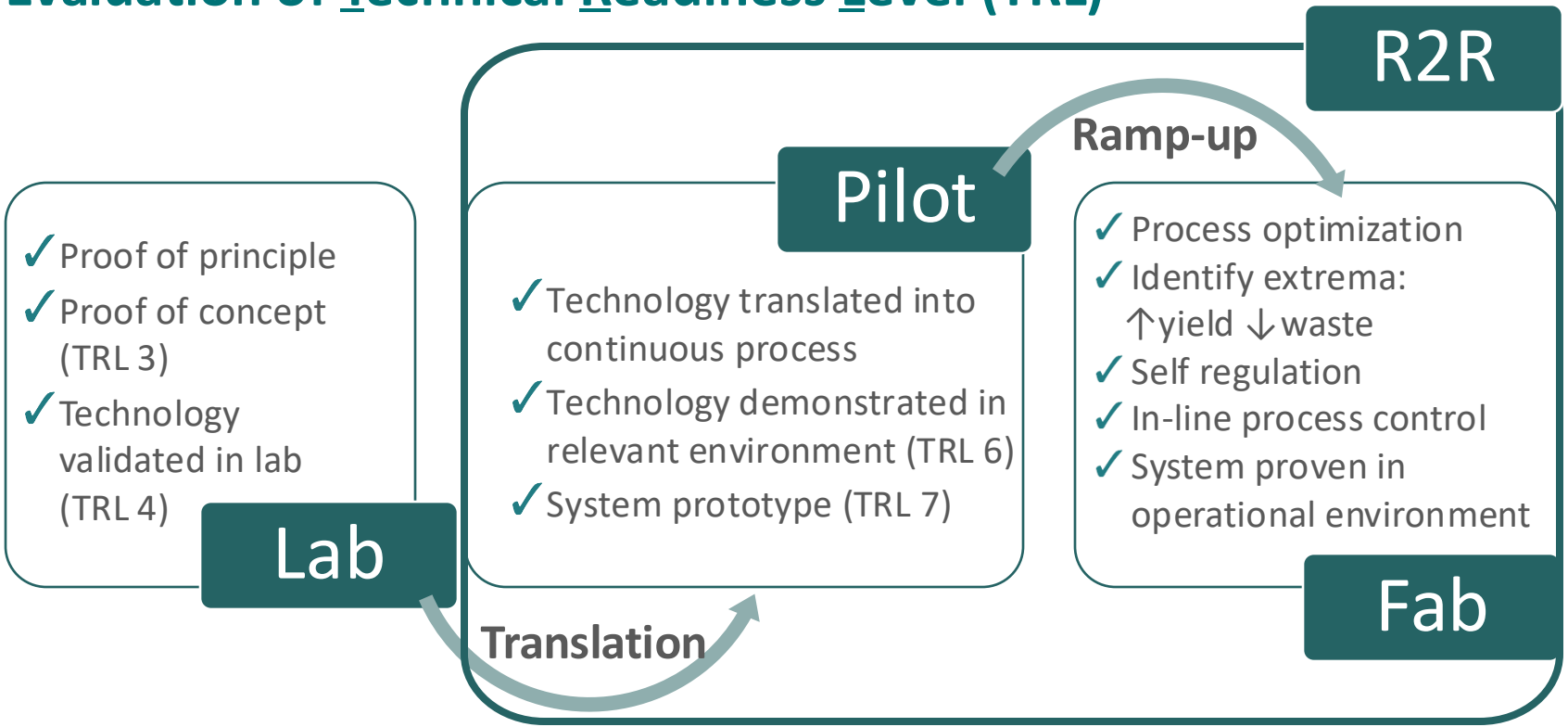
Surf Hype cycle



The vision


Attention
Electrochromic Films
Inkjet
twodimensional materials
CCS
Redox Flow Batteries
Laser induced printing
Nanocellulose
Laser drying
THC
sALD
Fuel Cell
Nano Silver Wires (NSW)
3rd Gen PV
Smart window film
Printed Electronics
Nanoimprint
Wearables / Smart textiles
Solid state batteries
Barrier coating
Microfluidics
Membranes
Sensors
Li-ion Battery
technology
markets
Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightment
Plateau of Productivity

Evaluation of Technical Readiness Level (TRL)



Our R&D mission

The exploration part of R&D services

✓ Exploration of new technologies which can or could have an impact on Coatema

Demonstration of R&D results

✓ Product driven engineering solutions

Development & engineering of novel equipment

✓ Optimizing process regimes to eliminate bottle-necks in new or existing technologies

Interdisciplinary Symposia for industry & training

✓ Mid-term branding of Coatema

Consultancy & Equipment optimization

✓ Cost reduction & added value for endusers

Our USP – strength & expertise

- ✓ Multifunctional team of 10 including researchers, engineers and application experts
- ✓ Successful AiF, BMWiF, BMWi and European projects since 2002
- ✓ Global and strong European Network in different technology areas
- ✓ Interdisciplinary networking for innovative coating, printing and laminating solutions
- ✓ Europes biggest and most versatile R&D centre
- ✓ Engaged in currently more than 10 R&D projects
- ✓ Early market entry & know-how build up for start up companies

Our R&D process – R&D strategy

Step 1

✓ Open minded networking with partners (listening & analysis)
✓ Identify high value products (product growth rates & margins)
✓ Innovative concept for R2R process application (first results)
✓ Looking for enduser with intention to start production

Step 2

✓ Building of consortium and finalizing ideas
✓ Specify funding opportunities
✓ Proposal preparation and submission
✓ Evaluation & negotiation
✓ → Kick-Off-Meeting

R&D centre USP

Process development

- ✓ Feasibility study
- ✓ Ink – process study
- ✓ Process analysis
- ✓ Slot die coating simulations
- ✓ Proof of concept
- ✓ Small scale prototype

Test production

- ✓ Prototyping
- ✓ Near to market testing
- ✓ TRL evaluation
- ✓ Training of staff

Education

- ✓ Coating conference
- ✓ Partner trainings
- ✓ Education of students
- ✓ Workforce training

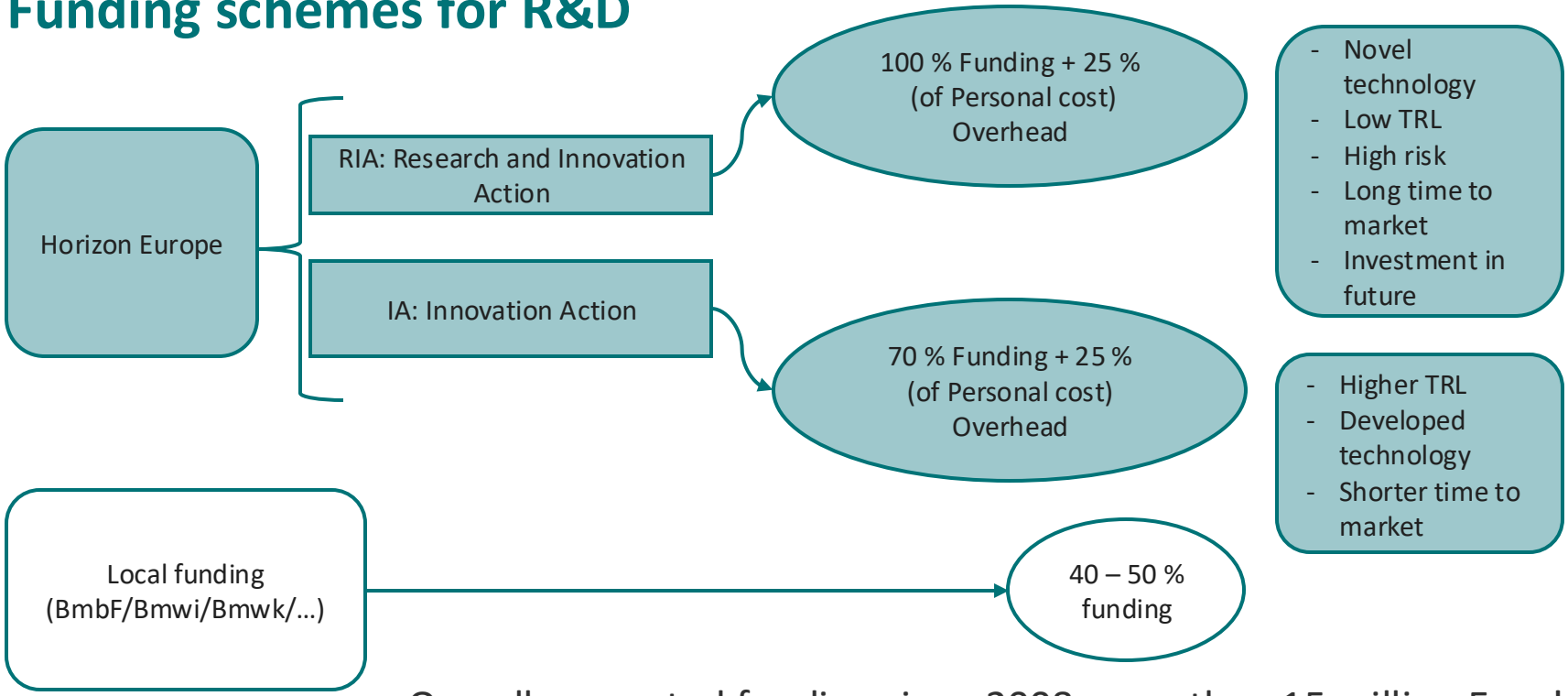
Development of custom-made design for equipment

- ✓ Prototyping
- ✓ Proof of concept

Public funded research projects know-how

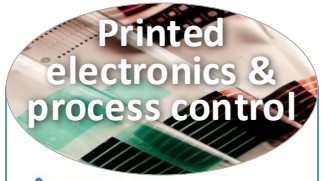
- ✓ German funded
- ✓ Horizon 2020
- ✓ Global 2+2 projects
- ✓ B2B projects

Funding schemes for R&D



Overall generated funding since 2008 more than 15 million Euro!

R&D projects overview 2022 – 2025



REAL NANO

In-line and real-time digital nano-characterization for flexible organic electronics

NOUVEAU

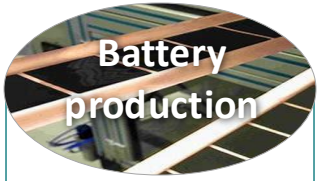
The NOUVEAU project will develop solid oxide cells (SOCs) with innovative La- and PMG-free electrode materials

FLEX2ENERGY
AUTOMATED MANUFACTURING PRODUCTION LINE FOR IPVS

R2R production line for OPV solar with integrated backend

FLEX-G 4.0

Upscaling and development of EC based switchable films to decrease energy use in buildings



IDEEL

Implementation of laser drying processes for lithium-ion battery production

SOLiD

R2R process optimization for solid state batteries

pepLAT

Plasmonically enhanced photocatalysis for wastewater treatment

ROLL 2 SOL

R2R nanostructuring of functional films

WATER PROOF

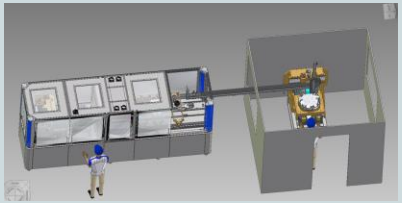
The WaterProof project aims at developing an electrochemical process that converts CO_2 emission

FLEX FUNCTION 2 SUSTAIN

Creating an open-innovation testbed for sustainable packaging

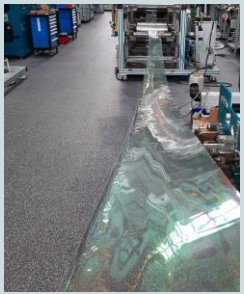
Highlights of R&D Projects 2021 – 2024

PEP LAT

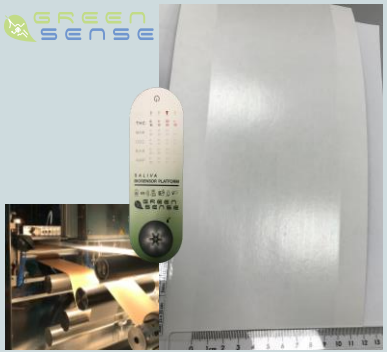


FLEX FUNCTION 2 SUSTAIN

RetroWin

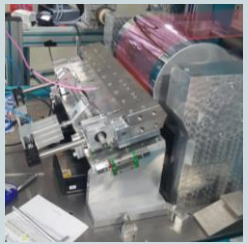


GREEN SENSE



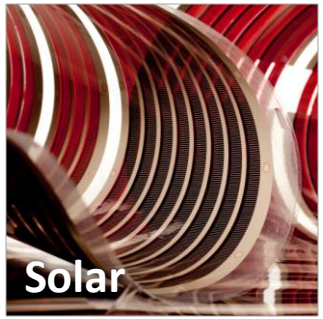
Oled Solar

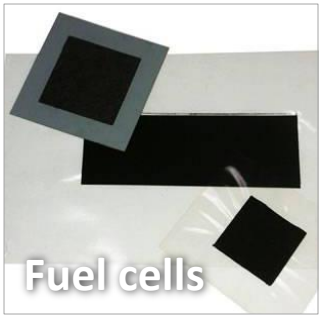
IDEEL

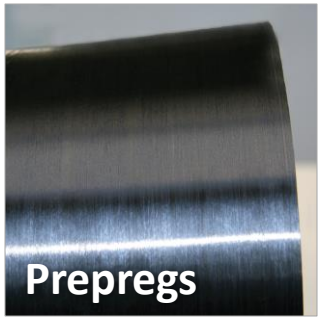


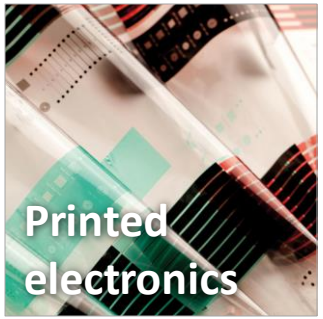
R&D customers

Our markets

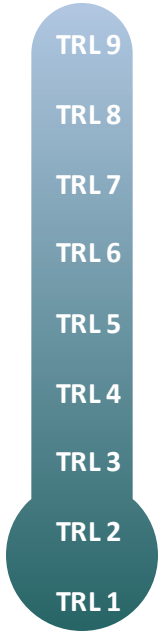








Actual system proven in operational environment



Basic principles observed

Developing 3rd Gen PV at Coatema

✓ 3 BMWF Projects with Ruhr Uni Bochum and ILT: FlexLAS – Photonflex – Effilayers

✓ 1 REGAC project – LS09 Registration improvement on the MAXI Line at VTT

<u>OPV equipment outside of funded projects</u>

G24i, Solarpower, CSEM, VTT-LS09 MAXILINE, UNSW, CSRIO

CSEM, Eight Nineteen, Heliatek

Developed and integrated technologies in 3rd Gen PV

- ✓ Inert pilotcoater design
- ✓ Slot die coating
- ✓ Screen printing, gravure and flexo printing
- ✓ Laser integration
- ✓ Inkjet integration
- ✓ Registration control
- ✓ Inline quality control
- ✓ Inline layer performance control
- ✓ Nanoimprint surface modification

3.

The next R&D frontier

What is Deep Tech?

- ✓ …companies founded on a scientific discovery or meaningful engineering innovation. (Swati Chaturvedi, 2015)
  - ✓ This is where you're asking, „Aren't all technology companies founded on these principles?" Partly yes, but mostly no. Most technology companies these days are built on business model innovation or offline to online business model transition using existing technology. Take Uber for example – Uber is built on the concept of a „sharing economy" – a business model innovation enabling individuals to share existing resources. https://www.linkedin.com/pulse/so-what-exactly-deep-technology-swati-chaturvedi/
- ✓ Deep Tech has been around a very long time- just not called deep tech.
- ✓ Deep Tech can be relative: **important to take societal perspective**
- ✓ Current list of Deep Tech areas often includes:
  - ✓ Advanced manufacturing
  - ✓ Advanced materials
  - ✓ Artificial intelligence
  - ✓ Biotechnology
  - ✓ Blockchain
  - ✓ Energy
  - ✓ Food and agriculture
  - ✓ Photonics and electronics
  - ✓ Quantum computing
  - ✓ Transportation/ mobility

New lab2fab process approach – Characterized by attributes

Time scale: Long

- ✓ Over-the-Horizon time scale, measured in years and decades
- ✓ Scope from basic science to actualized implementation
- ✓ Development cycle often begins in universities or research institutes, prior to formation of start-up or inclusion in larger corporate R&D programs
- ✓ Market adoption can be lengthy

Impact: Large

- ✓ Disruptive to targeted industry – represents a significant change or deviation from traditional approach
- ✓ Broad, across multiple industries and application types
- ✓ Societal: Environmental, societal and governance, plus linking to sustainable development goals is typical

Connectedness: Ecosystem

- ✓ Challenges too complex for „two people in a garage”

Targeted technology?

- ✓ BCG says Yes
- ✓ Plus: design-build-test-learn cycle (DBTL) de-risks plus speeds product development and time to commercialization

New lab2fab process approach – Caveat: Convergence

Technology

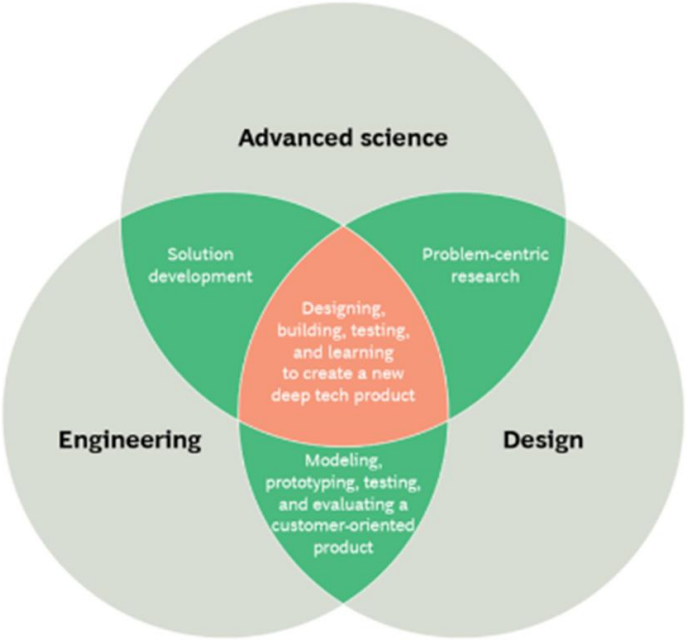
Combining otherwise disparate innovations to uniquely work with each other to enable new advancements

- ✓ Materials & manufacturing
- ✓ Manufacturing & control
- ✓ Control & digital / cloud transformation
- ✓ Cloud transformation & fintech

Markets

Trends and interests aligning to create needs and opportunities

- ✓ Consumer interests & corporate objectives



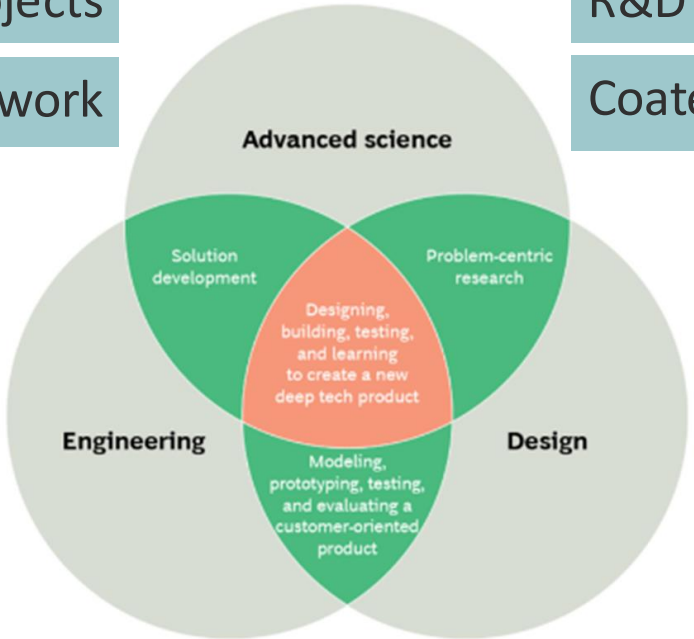
The vision of Coatema is lab2fab and we are the solution provider for Deep tech companies

Research projects

Coatema R&D Network

R&D projects team

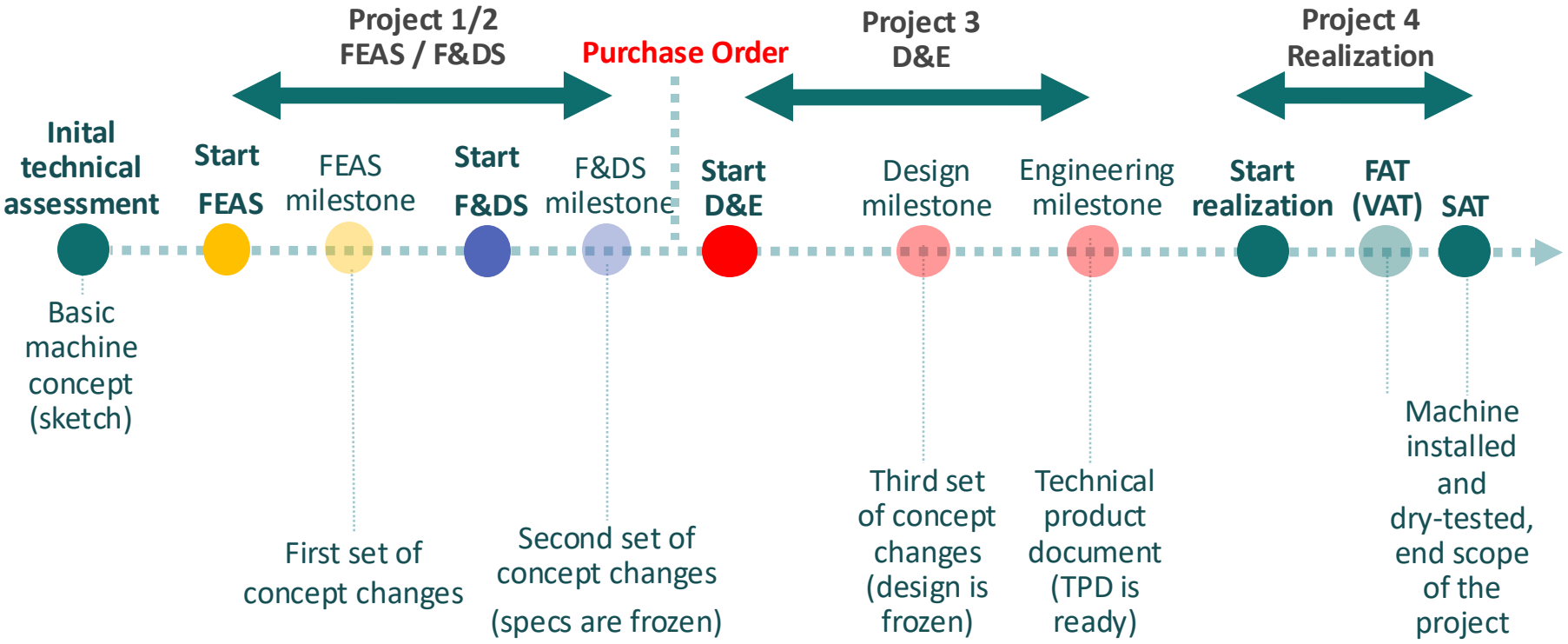
Coatema R&D centre



Teams out of the design department & project engineering

Coatema plattform strategies like Click&Coat™

Overview of integral planning and machine concepts



Proces feasibility study – function & design study

50 mm; 1-5 m/min

Lab scale

A4

Process specification
→Machinery
→Fluid
→Coating
→ Drying
→ Curing

Defining optim. layer thickness
3 µm ± 0,2 µm

Defining optim. dilution
50 % → 70 %

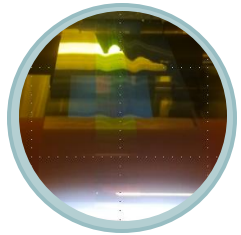
Ajustment, testing initiators
→ UV LED 365 nm

Trials
→ Quality
→ Speed
→ Curing
→ Thickness

Defining Pilot-line set up for coating, lamination
CC08

Transfer to
CC08

Pilot scale



200 mm; 1 m/min

Process & Equipment specifications

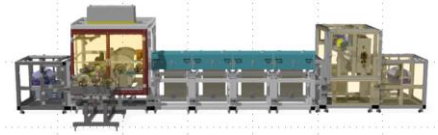
✓ Suitable R2R coating and lamination solutions at COA will be defined / evaluated

Process & Ink development

✓ Testing defined coating/ process parameter at R&D centre COA
✓ Ink & Process optimization
✓ Defining most suitable R2R process

Upscale to production in the Coateam R&D centre

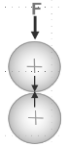
Pilot scale



Process transfer
→ 200 mm coating width
→ 1 m/min

Trials

Integration lamination
→Adhesive foil
→Protective layer



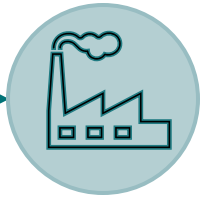
Production demonstrator
→

Further optimization
→ Ink formulation
→ UV LED 365 & 395 nm

Pumping method

Pre treatment

Production scale



500 mm; 3 m/min

Process integration

- ✓ Integration into a single R2R process suitable for the production of the OPV modules → Further optimization ink formulation
- ✓ The boundaries of the R2R process regarding quality, speed and costs

Demonstration and evaluation

- ✓ Production final R2R window film & comparison to the initial S2S film
- ✓ Was the transfer from lab- to pilot scale successful?
- ✓ Process equipment
- ✓ Design of a suitable R2R pilot line (500 mm)

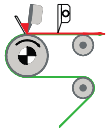
4.

The R&D centre & know how base

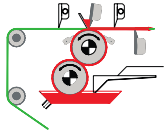
R&D centre equipment

R&D centre

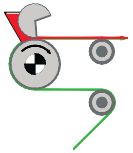
Coating systems



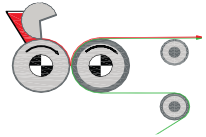
Knife system



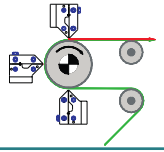
Double side coating system



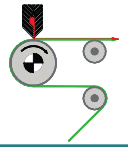
Commabar system



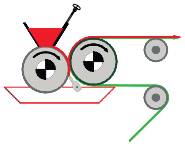
Reverse commabar system



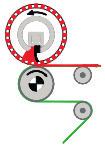
Slot die system



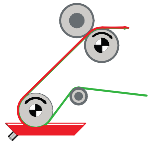
Curtain coating system



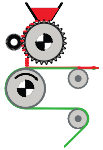
Case knife system



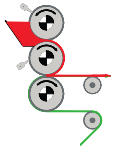
Rotary screen system



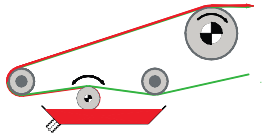
Dipping system (Foulard)



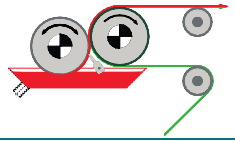
Powder scattering system



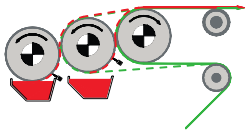
Reverse roll coating system



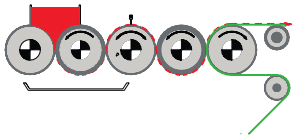
Micro roller coating system



2-roller coating system

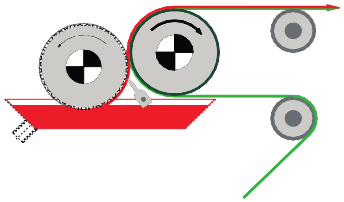


3-roller combi coating system

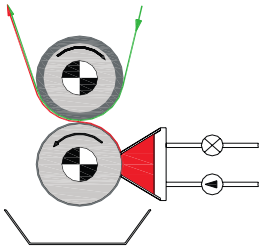


5-roller coating system

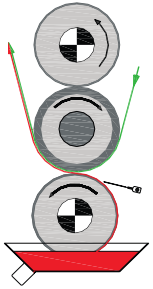
Printing systems



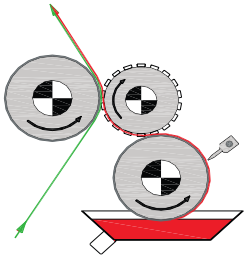
Engraved roller system



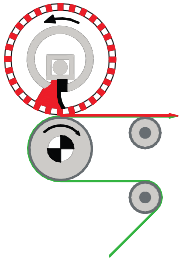
Gravure roller system



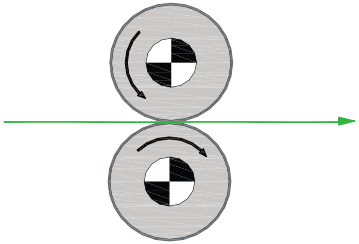
Gravure indirect system



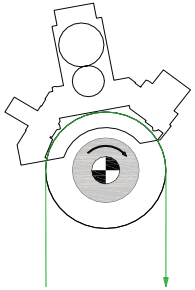
Flexography system



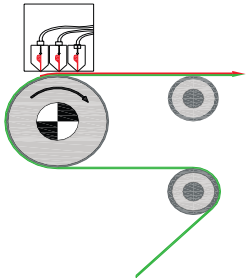
Rotary screen system



Hot embossing system

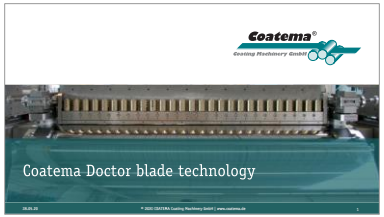


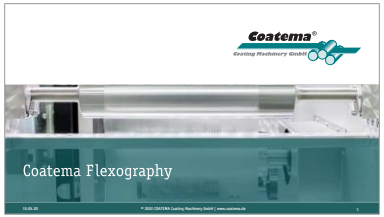
Nanoimprint system

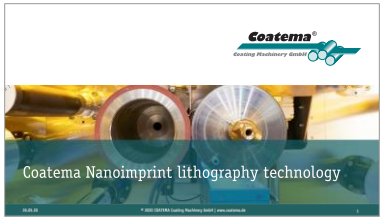


Inkjet system

Overview of technical presentations







Our work in associations – global networking

oe-a

NMWP.NRW
Cluster NanoMikroWerkstoffePhotonik

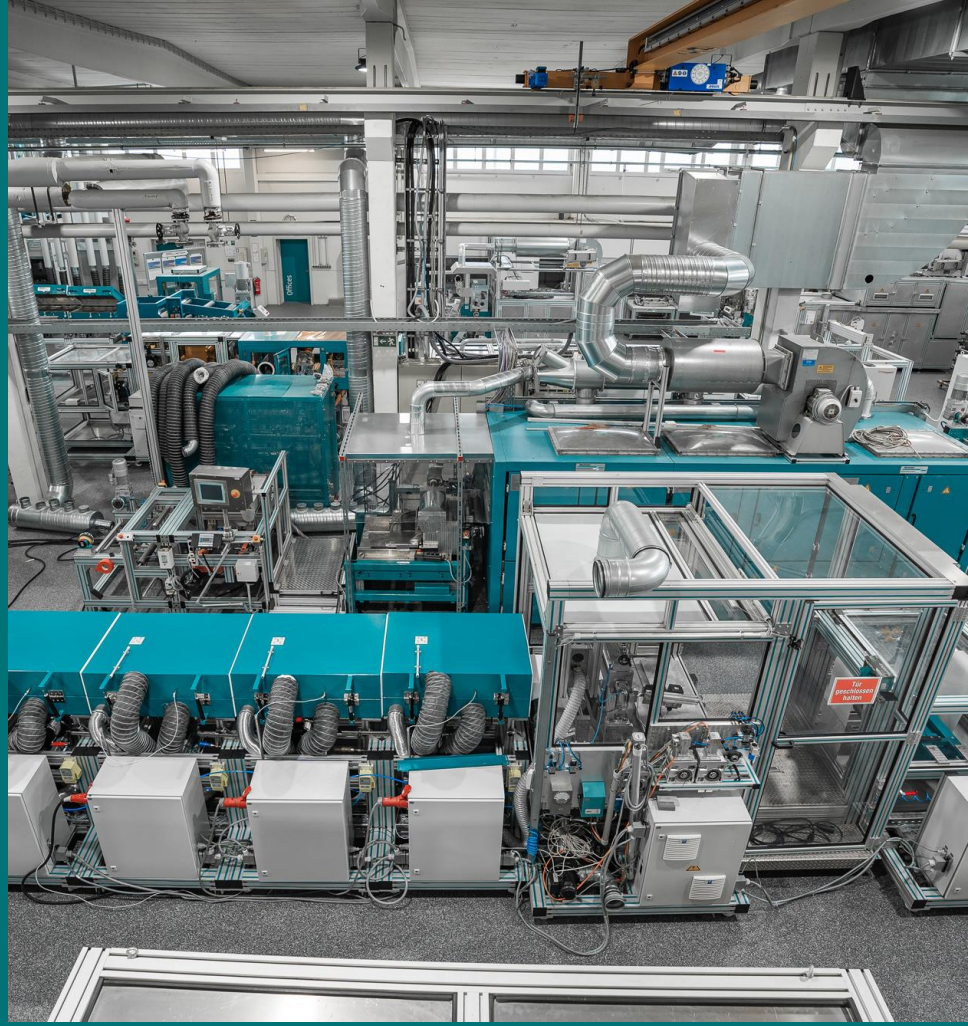
HOPE-A
Hellenic Organic & Printed Electronics Association

Board Member:
OE-A

Advisory Board:
Fraunhofer ITA

5.

Current R&D projects



Battery & Fuel cell

IDEEL	
✓ 08/2021 – 07/2024	✓ 3.62 M€
✓ 8 national partners	
✓ Implementation of laser drying processes for lithium ion battery production	
✓ Continuous and intermittent slot-die coating	
✓ Benchmarking and upscaling of the drying process	

NOUVEAU: Safe- and sustainable-by-design metallic coatings and engineered surfaces	
✓ 09/2022 – 08/2025	✓ 3,88 M€ total budget
✓ 9 European partners	
✓ Development of sustainable solid oxide cells (SOCs)	
✓ Lanthanum and platinum metal group free electrode materials	
✓ Solid electrolyte and interconnects with a reduced amount of rear earth materials and chromium	

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FKZ: 03XP0414B

Funded by the European Union

Battery & Fuel cell

SOLiD-EU: Manufacturing technology development for solid-state batteries (SSB, Gen. 4a-4b)	
✓ 09/2022 – 08/26	✓ 7 M€ total budget
✓ 15 European partners	
✓ Cost efficient manufacturing	
✓ Pilot scale dry extrusion coating process for the NMC cathode + BSPE polymer	
✓ Scalable thin film deposition methods for the Li anode and the interlayers	
✓ Pilot scale slot die coating process for the solid	

Funded by
the European Union

Process and equipment for printed electronics

EffiLayers: R2R process optimization of organic photovoltaic cells	
✓ 09/2019 – 02/2023	✓ 1.5 M€ total budget
✓ 4 German partners	
✓ Follow on project of Flexlas & PhotonFlex	
✓ Flexible organic solarcells (OPVs)	
✓ Process development	
✓ Laser drying and patterning	
✓ Equipment engineering	

TiKaBe HyFAB: INK DEVELOPMENT FOR FUEL CELL CATALYST COATING - A HYFAB PROJECT (TIKABE)	
✓ 06/2022 – 07/2024	• 76 K€ total budget
✓ 5 European partners	
✓ Development of catalyst inks with optimized rheological properties for different printing coating processes (inkjet, slot-die, gravure, flexo, screen,…)	

EffiLayers

Leitmarkt Agentur.NRW

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Die Landesregierung Nordrhein-Westfalen

ERDF.NRW
Investment for Growth and Employment

EFRE-080155

Bundesministerium für Bildung und Forschung

(Opto-)electronic devices

Flex-G 4.0: Research into technologies for the manufacture of translucent and transparent roof and facade elements with integrated optoelectronic components.

- ✓ 08/2022 – 07/2026
- ✓ 3.7 M€ total budget
- ✓ 14 national partners
- ✓ Process transfer & upscaling
- ✓ Pilot-scale manufacturing process for EC films with a process yield of 85%
- ✓ Demonstration of EC films in public building (schools)

Bundesministerium für Wirtschaft und Energie

Nano-imprint

PEPcat: Plasmonically enhanced photocatalysis for wastewater treatment	
06/2019 – 03/2023	3.0 Mio € total budget

- ✓ 5 German partners
- ✓ Novel advanced oxidation process with reduced energy consumption for wastewater treatment
- ✓ Scale-up photocatalytic nanostructures for industrial production
- ✓ Enhancing machinery accuracy to single digit micrometer range
- ✓ www.pepcat.de

Bundesministerium für Wirtschaft und Technologie
FKZ: 02WCL1019C

Sustainable production technology

RealNano: In-line and real-ime digital nano-characterization for flexible organic electronics

- ✓ 03/2020 – 02/2023
- ✓ 4.9 M€ total budget
- ✓ 9 European partners
- ✓ Development of rapid characterization methodologies and integration in pilot-to-production lines
- ✓ Digital Intelligence to manufacturing
- ✓ http://www.realnano-project.eu/

REAL NANO

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 862442

FF2S: Creation of an open innovation test bed for future-oriented and sustainable production technology

- ✓ 04/2020 – 04/2024
- ✓ 16 M€ total budget
- ✓ 21 European partners
- ✓ Validate and demonstrate the outstanding performance of novel nano-functionalized plastic, paper and membrane surfaces
- ✓ Upgrade existing „lab-to-fab" facilities and connect them to a unique OITB (TRL4 → TRL7)
- ✓ https://flexfunction2sustain.eu/

FLEX FUNCTION 2 SUSTAIN

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 862156

Sustainable production technology

Waterproof: Deploying industrial-urban symbiosis solutions for the utilization of energy, water, industrial waste and by-products at regional scale	
✓ 06/22 – 05/26	✓ 9.2 M€ total budget
✓ 12 European partners	
✓ Convert CO_2 emissions from waste(water) processing into green consumer products	
✓ Electrochemical conversion of CO_2 into formic acid used for end products	

Flex2Energy: Advanced manufacturing of Integrated PV	
✓ 01/2023	✓ folgt € total budget
✓ 17 European partners	
✓ Boost Integrated Photovoltaics manufacturing and the reliability	
✓ Integration of external hardware of partners (BST, SEMILAB, LAYTEC, …) in Click&Coat™ based system	
✓ Automation, machine learning & AI	
✓ Implement Industry 4.0 concepts	

Funded by the European Union

Funded by the European Union

6.

Former R&D projects

Printed electronics & process control

Scale-**U**p of **P**rinted **E**lectronics **R**aw materials on of flexible organic solar cells	
✓ 01/2018 – 12/2020	✓ 5.0 M€ total budget
✓ 7 EU partners	
✓ Products and services for circular economy	
✓ Scale-up key materials for organic and printed electronics	
✓ Enhance EU competitiveness in organic and flexible electronics	
✓ https://supersmart-project.eu/	

SUPERSMART

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement no 696076.

Advanced production for opto-electronics Towards industry 4.0	
✓ 09/2018 – 08/2021	✓ 7.8 M€ total budget
✓ 18 European partners	
✓ Inline measurement and registration for OLED and Solar processes on R2R	
✓ In the stage of project planning and clarification of needs	
✓ https://oledsolarproject.eu/	

Oled Solar

This project has received funading from the European Union´s Horizon 2020 research and innovation programme under grant agreement no 820789.

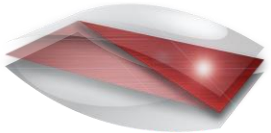
Printed electronics & fabric functionalization

Sustainable paper-based printed electronics and biosensing platform	
✓ 01/2018 – 12/2021	✓ 8.0 M€ total budget
✓ 11 EU partners + 2 non EU	
✓ Printed electronics on paper	
✓ Nano cellulose instead of „normal“ paper	
✓ Sensors for „drug-of-abuse“ analysis	
✓ Recyclable, ultra-low power consumption, low cost, environmental friendly biosensing platform	
✓ https://www.greensense-project.eu	

GREEN SENSE

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement no 761000.

R2R technology for producing ECD with tunable g-values	
✓ 06/2017 – 05/2020	✓ 2.4 M€ total budget
✓ 11 German partners	
✓ Follow up on EELICON	
✓ R2R production of ECD on EFTE	
✓ R2R production of OPV	
✓ Improved lamination	
✓ ECD for membrane roofs	



FLEX-G

Bundesministerium für Wirtschaft und Energie

FKZ: 03ET1470D

Electrochemical related projects

Innovative solid state batteries with Sol-Gel, Li anodes and 3D structuring	
10/2017 – 09/2020	2.1 Mio.€ total budget
✓ 6 German partners	
✓ Innovative cell concepts	
✓ All solid state batteries	
✓ Lithium metal anode	
✓ Sol-Gel cathode and current collectors	
✓ Upscaling of lab processes	

Electroluminescent textiles for interior and exterior decorative and advertising applications	
✓ 10/2018 – 09/2020	✓ 1.6 M€ total budget
✓ 2 Belgian, 4 German partners	
✓ Illuminating wallpaper	
✓ Process upscaling for production of EL textiles	

SOLID

Bundesministerium für Bildung und Forschung

FKZ: 03XP0129C

EI-FIB

ELECTROLUMINESCENCE for FLAGS, INTERIOR and BANNERS

ZIM Zentrales Innovationsprogramm Mittelstand

Supported by:

Federal Ministry for Economic Affairs and Energy

(Opto-)electronic devices

Bringing flexible organic electronics to Pilot innovation scale	
✓ 01/2016 – 12/2018	✓ 14.0 M€ total budget
✓ 14 EU partners	
✓ Flexible organic light-emitting diodes (OLEDs)	
✓ Open access Pilot line	
✓ Intermittent coating with low viscous inks	
✓ www.pi-scale.eu	

PI-SCALE
SHAPING THE FUTURE IN OLED LIGHTING

PHOTONICS 21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

GA No. 688093

Development of slotdie equipment for perovskite solar cells	
✓ 07/2017 – 06/2019	✓ 0.8 M€ total budget
✓ 3 EU partners	
✓ Ultra fast intermittent coating	
✓ Piezo based technology	
✓ Perovskite photovoltaics devices	
✓ Improved material usage & yield	
✓ http://rocket-innovations.eu/laufende-innovationsprojekte/i07-icoat/	

iCoat

INTERREG Deutschland Nederland

Europäische Union
Europese Unie

Rocket-I-007

From 2D materials and 3D coating on fibre materials

Synthesis, properties & application of 2D-materials	
✓ 04/2016 – 03/2019	✓ 2.1 M€ total budget
✓ 6 German partners	
✓ Synthesis of 2-D Materials such as Graphene and MoS2	
✓ Trials & design study for deposition & transfer	
✓ R2R and R2P processes	

Process chain of powder-coated glass-fiber reinforced compounds	
✓ 12/2016 – 11/2019	✓ 0.8 M€ total budget
✓ 2 German partners	
✓ Homogeneous organic composites	
✓ Fully coated fibers	
✓ Less production steps	
✓ Electrostatic rollers	

Herstellung Eigenschaften
HEA2D
Anwendungen von 2D-Materialien

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ERDF.NRW
Investment for Growth and Employment

EFRE-0800148

PowderSizing

Bundesministerium für Wirtschaft und Energie

FKZ: ZF4099702BL6
FKZ: TF4018750BL6c

Solar cells

Production of flexible organic solar cells	
✓ 06/2016 – 06/2019	✓ 1.3 M€ total budget
✓ 5 German partners	
✓ Follow on project of Flexlas	
✓ Flexible organic solarcells (OPVs)	
✓ Process development	
✓ Laser drying and patterning	
✓ Equipment engineering	

PhotonFlex

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European Regional Development Fund

2014 2020 ERDF.NRW
Investment for Growth and Employment

EFRE-0800069

Multipurpose Sol-Gel films for Photovoltaic	
✓ 04/2017 – 3/2020	✓ 2.0 M€ total budget
✓ 6 German partners	
✓ Sol-Gel materials as adhesive	
✓ Sol-Gel as passivation layer	
✓ Sol-Gel materials as Mie resonator	
✓ Upscaling of nanoimprint	

SolGel
PV

Bundesministerium für Wirtschaft und Energie

FKZ: 0324151C

(Opto-)electronic devices

Enhanced Energy Efficiency and Comfort by Smart Light Transmittance Control	
✓ 01/2014 – 06/2017	
✓ 13 EU partners	
✓ Follow-up project of Innoshade	
✓ Lightweight electrochromic devices	
✓ Click&Coat technology	
✓ Scaling & automation	
✓ Demonstration of pilot line production	
✓ Market entry	
✓ https://www.eelicon.eu/	

EELICON
SMART LIGHT TRANSMITTANCE CONTROL

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 604204.

Development of machines, tools and processes for OE nanomaterials	
✓ 01/2013 – 12/2016	✓ 7.9 M€ total budget
✓ 17 EU partners	
✓ Smart nanomaterials & technologies	
✓ Pilot line	
✓ Upscaling of R2R process	
✓ Production of OE devices	
✓ www.smartonics.eu	

smartonics

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 310229.

Electronic devices

Innovative Switchable Shading Appliances based on Nanomaterials and Hybrid Electrochromic Device Configurations	
✓ 09/2008 – 08/2012	✓ 10 M€ total budget
✓ 19 EU partners	
✓ Large scale, cost effective and light weight, high trough put	
✓ In-situ-polymerization	
✓ Prototype & demonstrator	
✓ Concept & start of Pilot line	

High-speed laser process for the production of fully integrated flexible solar cells	
✓ 08/2011 – 10/2014	
✓ 5 partners (Ziel2.NRW)	
✓ Optics	
✓ OPV development	
✓ Laser patterning, structuring welding	
✓ Demonstration	

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 200431.

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European Regional Development Fund

Organic electronics & thin film batteries

Contamination and Defect Control for Increased Yield for Large Scale R2R Production of OPV and OLE	
✓ 05/2012 – 04/2015	✓ 10 M€ total budget
✓ 17 EU partners	
✓ Detection & inspection	
✓ Cleaning	
✓ Repair	
✓ Integration	
✓ Best practice procedures	

ProLiBat – Design of a continuous fabrication structure for the production of Li-Ion-Batteries	
✓ 08/2011 – 02/2014	
✓ 7 partners	
✓ Pilot line for Li-Batteries	
✓ Concept for standardization	
✓ Production specifications	
✓ Study for production	
✓ Process for batteries	

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 281027.

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Novel applications

ML2 – MultiLayer MicroLab	
✓ 09/2012 – 08/2016	
✓ 12 EU partners	
✓ Click&Coat™ Technology	
✓ Imprint Technology	
✓ Transfer Processes e.g. vacuum to wet R2R	
✓ R2R-manufactoring platform	
✓ Micro-Nano-Bio-Systems	
✓ www.ml2.eu	

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 318088.

Innovation for Digital Fabrication	
✓ 03/2012 – 02/2014	
✓ 21 EU partners	
✓ Networking Project	
✓ Roadmap for Digital Fabrication	
✓ Status & evaluation of digital 3D-Manufacturing, e.g. organic Electronic	

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 290557.

Novel combinations

Large scale manufacturing technology for high-performance lightweight 3D-multifunctional composites
✓ 04/2011 – 03/2015
✓ 18 EU partners
✓ Automotive application
✓ 3D-textile & novel efficient production
✓ Complete manufacturing chain
✓ Demonstration of Prototype
✓ Reduced process time & cost
✓ Qualification of principle
✓ www.3d-lighttrans.com

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 263223.

Fabric Structures for Solar power generation
✓ 11/2011 – 04/2014
✓ 8 EU partners
✓ Tensile Membrane material that incorporates PV modules
✓ Qualification of principle
✓ Demonstration of Prototype, e.g. off-Grid local power

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 286605.

Inline monitoring & thin film characterisation

Thin Film Measurements on organic photovoltaics layers	
✓ 11/2012 – 10/2014	✓ 1.5 M€ total budget
✓ 8 EU partners	
✓ Integration of in situ-metrology in manufacturing line at Coatema	
✓ Hyperspectral Imaging	
✓ Spectroscopic ellipsometry	
✓ Demonstration of prototype	
✓ Qualification of principle	

Registration Accuracy, High accuracy Registration control for roll2roll manufactured printed electronic	
✓ 11/2013 – 10/2014	
✓ AIF-Project	
✓ 3 EU partner + 1 partner from Japan	
✓ Integration of novel Printing Unitsin Production Line	
✓ High registration accuracy	
✓ Control software	
✓ CCD-camera	
✓ Demonstration of prototype	

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 315665.

FKZ: KU3190401RR3

Inline analysis

Inline evaluation of transparent foil coating	
✓ 03/2015 – 08/2017	✓ 125.000 € total budget
✓ 2 German partners	
✓ Detection of organic dyes	
✓ Small amounts of dye	
✓ Quartz light guiding	
✓ Stimulation via UV-LED	
✓ Detection with photodiode	

Fluorescence detection

FKZ: KA3190402ZG4

And many more…

7.

Summary

Coatema is…

- ✓ A valuable partner for novel R2R-processes
- ✓ An expert in transferring processes to pilot and production lines
- ✓ Innovation leader in novel equipment
- ✓ Coordinator or partner in funded projects since 2002
- ✓ Member of the ATH Holding, a group of technology leading companies in coating, printing and laminating

Do not hesitate to contact us!

Anything missing?

Let us know and we will make it happen!

Our R&D centre is worldwide the most versatile centre for coating, printing and laminating.

Sales department:
sales@coatema.de

Download
broschures & presentations

Coatema

Thank you

Roseller Straße 4 ▪ 41539 Dormagen ▪ Germany
T +49 21 33 97 84 - 0 ▪ info@coatema.de

www.coatema.com

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