GREEN INNOVATION AND INVESTMENT FORUM

SMART GREEN INDUSTRY

ideas meet capital

10th and 11th February 2015

an initiative by:

UMWELT TECHNIK BW

bwcon

in co–operation with:

eit Knowledge & Innovation Community KIC InnoEnergy

FIDIAS

Alpine SPACE

Introduction

Technology for the 21st Century

The economic system is currently transforming into a green economy—innovative technologies, process engineering as well as forward-looking green solutions are going to meet a growing demand in the next years. The Green Innovation and Investment Forum is the pan-European event in Baden-Württemberg to support researchers, start-ups and entrepreneurs with smart business ideas for green technology and eco-innovation from across the continent.

Keynote

Prof. Eicke R. Weber

Prof. Eicke R. Weber is the Director of the Fraunhofer Institute for Solar Energy Systems ISE and Professor for Physics/Solar Energy at the Faculty of Mathematics and Physics and at the Faculty of Engineering at the Albert-Ludwigs-University of Freiburg, Germany. Fraunhofer ISE is the largest solar energy research institute in Europe and is renowned worldwide for its research in the field of renewable energy and energy efficiency. As researcher in the field of material science, Prof. Weber analysed lattice defects in silicon and III-V semiconductors. In recent years, he is especially interested in producing high-quality solar cells from upgraded metallurgical silicon, or umg-Si, without the use of chlorine-based chemicals.

Prof. Weber studied Physics at the University of Cologne, Germany where he made his doctorate in 1976 and his habilitation in 1983. From 1983 to 2006 he lectured at the faculty of the Department of Materials Science and Engineering of the University of California, Berkeley—since 1991 as Professor of Materials Science. He was president of the Alexander von Humboldt Association of America (AvHAA) from 2001 to 2003 and in 2003 he was elected founding president of the German Scholars Organization (GSO). In 2006 he received the Award of Merit (Bundesverdienstkreuz am Bande) of the German President.

In July 2008 Prof. Weber was appointed Director to the SEMI International Board of Directors. In October 2009 he was elected Honorary Member of the Ioffe Physical-Technical Institute of the Russian Academy of Sciences, St. Petersburg. Since 2010 Prof. Weber is Member of acatech—the German Academy of Science and Engineering, Berlin.

He is founding president of the German Energy Storage Association (BVES), Berlin since January 2013. He was appointed Managing Director to the Centre for Renewable Energy of the University of Freiburg in May 2013. In June 2013 Prof. Weber was honoured with the SolarWorld Einstein Award. In January 2014, he received the Zayed Future Energy Prize from the Crown Prince of the United Arab Emirates on behalf of Fraunhofer ISE.

Greeting

Dr.-Ing. Hannes Spieth

Environmental technology and efficiency of resources are among the central issues confronting the world economy. Environmentally-compatible products and energy sources are essential, as are techniques for conservation of raw materials and reduction of emissions. No aspect of industry is unaffected by these issues and no part of the world economy can remain isolated in this respect.

In future, the ability to participate successfully in the global economy will depend increasingly on the efficient implementation of environmental technologies and techniques for resource conservation. Consequently—and on a global scale—the market for green technologies will further establish itself as a vital part of the world economy. It is of the essence to bring innovative ideas quickly to fruition. Therefore, we support entrepreneurs in getting connected to partners, organizations and funding.

Dr.-Ing. Hannes Spieth is Managing Director of Umwelttechnik BW, the State Agency for Environmental Technology and Efficiency of Resources in Baden-Württemberg.

Greeting

Dr. Jürgen Jähnert

bwcon GmbH, a spin-off of Baden-Württemberg: Connected e.V., the leading high-tech cluster in Baden-Württemberg, intends to establish a platform and market place where innovative ideas in the field of energy, green technology, and eco innovation can be discussed with relevant stakeholders from economy and finance. In order to positively contribute to the turnaround in energy policy, which Germany has decided for, and finally stimulate further innovation and entrepreneurship, bwcon GmbH with its service portfolio is well prepared to attend the further process of the best business ideas towards further commercial exploitation.

I wish the GIIF and all participants a rewarding meeting, new inspiration and an overall sustainable success.

Dr. Jürgen Jähnert is Chief Executive Officer of bwcon GmbH.

closed session

10th FEB 2015

Programme

GREEN TRAINING DAY (entrepeneurs only)

08:45 – 09.00	*Registration and Coffee*
09.00 – 09.05	**WELCOME AND INTRODUCTION** *Valentina Grillea* (bwcon GmbH), *Philipp Oswald* (Umwelttechnik BW)
09:05 – 09:35	**KEYNOTE SPEECH** *Joaquin Soucherain* (KicInno Energy)
09:35 – 09:45	**PITCHING DOS AND DON'TS** *Valentina Grillea* (bwcon GmbH)
09:45 – 11:15	**DESIGN THINKING WORKSHOP** *Alexandra Rudl, Corinna Voß, Valentina Grillea* (all bwcon GmbH)
11:15 – 11:30	*Coffee Break*
11:15 – 13:00	**Coaching Sessions**

A	B	C	D
Test your financing	Check your business model	Protect your idea	Test pitching battle

13:00 – 14:00	*Lunch Break*
14:00 – 14:30	**"Make sure you are building the right 'It' before you build 'It' right"** *Ralf Allrutz* (Allrutz Consulting)
14:30 – 16:00	**Coaching Sessions**

A	B	C	D
Test your financing	Check your business model	Protect your idea	Test pitching battle

16:00 – 16:15	*Coffee Break*
16:15 – 17:45	**Coaching Sessions**

A	B	C	D
Test your financing	Check your business model	Protect your idea	Test pitching battle

17:45 – 18:00	**WRAP-UP** and **OPEN WORKING SESSION UNTIL 20:00**

open session

11th FEB 2015

Programme

PITCHING EVENT

11:00 – 11:45 — *Registration and welcome coffee*

11:45 – 12:00 — **OPENING OF THE PITCHING EVENT**
Dr.-Ing. Hannes Spieth, Managing Director Umwelttechnik BW
Dr. Christian Müller, CEO Kic InnoEnergy Germany GmbH

12:00 – 12:45 — **KEYNOTE "Innovation and Market Introduction–the Drivers towards a Sustainable Future"**
Prof. Eicke R. Weber, Director Fraunhofer Institute for Solar Energy Systems ISE

12:45 – 14:00 — *Lunch Break—Meet the Panelists*

14:00 – 15:30 EARLY STAGE I

P 01 Bionic Agitator
Wolfram Bernhardt (wusoa GmbH)

P 02 Round-the-clock Industrial Solar Energy
Lars Amsbeck, Tobias Prosinečki (24/7 Solar)

P 03 Producing Raw Material of a Bioplastic Soluble in Water, 100% Biodegradable and Edible
Bosak Yilin Colak (LACTIPS)

P 04 Electrical Methanolsynthesis
Michael Prestel (AEN autarke Energie GmbH)

P 05 Innovative Rreactor Applications
Philipp Engelkamp, Tim Böltken (ineraTec)

14:00 – 15:30 ADVANCED STAGE I

P 11 Fiber Injection Molding for Replacement of PUR
Egon Förster (Fiber Engineering GmbH)

P 12 Drywall Green Evolution
Andrea Fontana Donatelli (Livingood)

P 13 Global Saving and Resourcing of Unused Running Drinking Water in Sinks
Matthias Hartmann (BlueWater GmbH)

P 14 EggPlant—Not Wasting Life
Domenico Centrone (EggPlant Srl)

P 15 One World Solar Collcector
Robert Buchinger, Markus Barek (Sunlumo Technology GmbH)

15:30 – 16:30 — *Coffee Break—Meet the Panelists*

16:30 – 18:00 EARLY STAGE II

P 06 Indoor Vertical Farming
Mark Korzilius (Agrilution)

P 07 L.I.M.I.T.
Paul-Heinrich Neuhorst, Georg Dieckhoff (te-trade AG)

P 08 Smart Energy Floor
Alessio Calcagni, Simone Mastrogiacomo (Veranu)

P 09 Functional Surfaces
Marian Neusser, Dr. Jaime Lupaca-Schomber (NTS NanoTechnologySolar GmbH)

P 10 Global Environmental Solutions
Bettina Löwentraut-Duran (my.tec Consulting UG)

16:30 – 18:00 ADVANCED STAGE II

P 16 Mobile Energy System for Recharging and Energy Storage
Dr. Manfred Baumgaertner (Nomadic Power GmbH)

P 17 SeNa Flora
Nadine Antic (GlobalFlow GmbH)

P 18 Ecovat Thermal Storage and Net Balancing System
Ing. A.W. de Groot (Ecovat Werk BV)

P 19 High Temperature Thermal Energy Storage—HTTES
Dr.-Ing. Günter Schneider (STORASOL GmbH)

P 20 Smart Fertilizer—Economical & Ecological Land Reclamation
Dave Tjiok, Dr. Burkhard v. Stackelberg (SmartCarbon AG)

18:00 – 18:30 — **ENTREPRENEUR'S EXPERIENCE "New Ways in Biochemistry—From the Idea to Reality"**
Peter Achermann, CRO, Founding Partner, Chairman of the Board, AVA-CO2 Schweiz AG

18:30 — *Networking and Apéro | Selection by the Jury of the Best Business Idea*

20:00 — **BEST BUSINESS IDEA AWARD CEREMONY**
Reception Dinner at "Restaurant Garbe" (on invitation only)

EARLY
STAGE I

Wolfram Bernhardt
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P 01

wusoa GmbH
Bionic Agitator

Matchmaking in early innovation phases

We have developed a new type of agitator, that mixes fluids much more energy efficient than agitators that operate with a 200 year old propeller technology. The bionic agitator has been developed by transferring the way ducks are moving through the water on the agitation technology => bionic. Ducks are very energy-efficient in the way they swim as they do not produce shear forces, like propellers do. We have transferred these principles directly into a new agitator, which mixes fluids much more energy efficient than propellers.

- **What is the problem?/Who has this problem?**
  Any industry where fluids need to be mixed or stirred: biogas, chemical, pharmaceutical etc. industry.
- **Solution**: A new type of agitator that mixes fluids up 55% more energy efficient than current agitators do.
- **Advantages and benefits:** Through lower primary energy consumption, a direct increase in the profitability can be observed.
- **Unique selling point:** Lower energy consumption for same result.
- **Competitors:** Manufacturer of agitators like KSB.

Potential applications in industry (market niches, increased productivity)

A simple back-on-the-envelope calculation shows, that a replacement of all agitators in existing biogas plants in Europe would result in a turnover of approx. 2 billion EURO. However, as the bionic agitator can also be used in other industries where fluids have to be mixed or stirred, the overall potential go way beyond the biogas industry and global markets offer great potential for turnover.

Potential buyers/ licensees/investors (industries, companies)

Operators of biogas plants, the pharmaceutical industry, the dairy industry, the chemical industry etc.

More information

→ *www.wusoa.de*

EARLY
STAGE I

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Tobias Prosinečki
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P 02

24/7 Solar
Round-the-clock Industrial Solar Energy

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?**
  Industrial process heat represents around 20% of the total worldwide final energy demand, about the same as electricity demand. About half of the thermal process heat is needed at temperatures >400°C, which is currently mainly supplied by unsustainable energy sources. Renewable energy sources are commonly intermittent and unreliable.
- **Solution**: A concentrated solar power tower system which uses particles as the energy storage medium, operating up to 1,000°C.
- **Advantages and benefits:**
  - Lower energy costs in target markets with large potential for further cost reduction
  - Reliable 24/7 energy production with thermal energy storage
  - Full availability guaranteed with a conventional backup system
  - Largely reduced environmental impacts
  - Not restricted by land constraints adjacent to the customer for the solar field
- **Unique selling point:**
  - Even the pilot plant is expected to be cost-competitive in niche applications
  - Capability for high temperature operation enables diverse market opportunities
  - Final development potential to be cost-competitive against the lowest cost solution available today
- **Competitors:** Fossil fuels

Potential applications in industry (market niches, increased productivity)

- Lowers energy costs
- Reduces the risks in investment decision making for customer projects, by minimizing energy price uncertainty
- Decreased emissions can significantly ease environmental permitting for industrial projects and reduce sensitivity to potential carbon pricing regulations

Potential buyers/ licensees/investors (industries, companies)

Energy intensive industries such as:
- Petrochemical
- Enhanced oil recovery
- Ferrous & non-ferrous metals
- Non-metallic minerals
- Food, drink & tobacco

Power plants:
- Off-grid
- Grid tied
- Hybridizing existing large scale power plants

More information

→ *www.dlr.de/sf/Portaldata/73/Resources/dokumente/soko/soko2014/praesentationen/Amsbeck_-_Keramische_Partikel_als_W_rmetr_ger.pdf*
→ *www.dlr.de/sf/en/desktopdefault.aspx*

EARLY
STAGE I

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P 03

LACTIPS **Producing Raw Material of a Bioplastic Soluble in Water, 100% Biodegradable and Edible**

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** In the field of phytosanitary soluble film (for instance the film around washing machine tablets), the existing film is not biodegradable, has poor properties of solubilisation in cold water and this film can be accidentally eaten by young children.
  In the field of food, there is a very poor offer and the existing product doesn't meet the requirements of he food industry.
- **Solution**: We produce pellet of thermoplastic bioplastic RAW MATERIAL issued of milk. Our material is patented. Our material can be process through any technology of plastic transformation. Our material has specific properties:
  - Edible
  - Soluble in water (we can adjust the time of solubility)
  - Biodegradable, home compostable
  - Our material is a matrix to convey taste, smell, colour but also other fragile bio-elements
- **Advantages and benefits:** In the field of sanitary our film is biodegradable in 18 days hence, the dissolution of our product and it spreading in the environment is 100% harmless. Our properties of solubility protect the washing machines mechanical durability, produce a better wash at cold temperature and allow to low the washing temperature (energy savings). The possibility to add a bitter taste helps in fighting against domestic accidents.
  In the field of food industry we can provide edible film to improve the process of production or for the final consumer: there is a big demand for single doses. Today this demand is not filled.
- **Unique selling point:** There are a lot of companies trying to process an edible packaging but for the moment we are the sole company that can process an edible packaging with good mechanical properties.
- **Competitors:** In the field of sanitary film, the competitors provide a soluble film made of a synthetic material. This industry is an old chemical industries worth 5.5 billions US-Dollar. In the field of food, we have indirect competition from other ways of packing with edible film of rice; of jellies.

Potential applications in industry (market niches, increased productivity)

We have numerous markets where we can propose a disruptive application:
- Sanitary film
- Food an edible film
- Food contact (packaging): an active film that can secure food security; a health safe film that can secure plastics migration in baby food

Potential buyers/ licensees/investors (industries, companies)

The buyers are the detergent manufacturers, the big food industry, and the pharmaceutics industry.

EARLY
STAGE I

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P 04

AEN autarke Energie GmbH
Electrical Methanolsynthesis

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?**
  In view of the increasing energy demand coupled with falling availability of fossil fuels increases the need to switch to renewable energy resources. However, renewable electricity from wind or solar systems occurs intermittently and can not be effectively stored. Renewable biofuels are produced mainly from potential food.
- **Solution**: The innovative concept is to develop a technical system in which biomass and wind or solar energy are converted to methanol. The system can easily save large amounts of green power in the form of methanol. The special feature of the process is the integration of electric current.
- **Advantages and benefits:**
  - Biomass is completely converted into methanol
  - Electric power is stored
  - FFV: methanol and gasoline in any mixture
- **Unique selling point:**
  Methanol is nowadays fossil and thus finite. With this system, the methanol is completely renewable and CO_2 neutral. Green electricity can be stored in large quantities.
- **Competitors:**
  - Hydrogen
  - Power-to-Gas

Potential applications in industry (market niches, increased productivity)

- Biogas plants in Germany: about 7,500
- Sewage treatment plants in Germany: about 10,000

Potential buyers/ licensees/investors (industries, companies)

- Ecological communities/city works/farmers/cooperatives
- Wind farm and solar plant operators
- Chemical industry

EARLY
STAGE I

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P 05

ineraTec
Innovative Reactor Applications

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** An increasing demand for sustainable energy is enforced by political regulations. Economically viable energy generation, flexibility and storage need to be combined without social conflicts (food vs. fuel).
- **Solution**: ineraTec´s technology converts gas into (renewable) fuels of high quality in ultra-compact, load-flexible units, in the range of 0.5 to 50 bpd.
- **Advantages and benefits:**
  - High energy density, performance and storability of liquid fuels
  - CO_2 neutral synthetic fuels are produced, e.g. with biogas from waste fermentation
  - Marketable prices via blending
- **Unique selling point:**
  - Turn-key containerized solution
  - Remote control for maximum output and online monitoring
  - Modularity of basic technology
  - Scalability of technology and business model
- **Competitors:**
  - Conventional technology economically not viable below 1,000 bpd
  - A limited number of competitors in the field of innovative reactor technology
  - Biogas is currently exclusively converted into subsidized electricity via CHP units

Potential applications in industry (market niches, increased productivity)

- Economically viable exploration of small and medium-sized (renewable) remote energy sources
- Energy storage with a high efficiency
- Applications for the reduction of CO_2 emissions converting exhaust gases from the industry
- Decentralization and modularization of production for the chemical industry

Potential buyers/ licensees/investors (industries, companies)

- Energy from the waste sector:
  - Farmer (unions) in the animal production sector
  - Urban/private bio-waste disposal organizations
  - Biogas plant manufacturers
- Energy storage:
  - Energy-autonomous regions
  - Power-to-Gas(-to-Fuels) projects
  - Companies with surplus of CO_2 and access to cheap hydrogen gas

More information

→ *www.ineratec.de*

EARLY
STAGE II

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P 06

Agrilution
Indoor Vertical Farming

Matchmaking in early innovation phases

Agrilution is a development stage company that seeks to become a manufacturer of modular aeroponic fixtures as well as operations software. These fixtures are to be installed in urban indoor vertical farms (IVF) as well as in a household appliance (HHA) called Plant Cube (PC). IVF is ideally operated by a fully owned subsidiary of Agrilution by the name of HappyNest. PC will be developed and manufactured under a JV Agreement with a large HHA manufacturer.

Indoor vertical farming is the process of optimizing agricultural technology within a controlled environment building. Controlled variables are temperature, lighting, humidity, CO_2, pH and nutrient analysis. This allows HappyNest to grow a large variety of leafy greens, micro-greens, fruiting plants, herbs, and pharmaceutical plants by using 90% less water, 60% less fertilizer, yielding high contents of vitamins and minerals.

Our fixtures and patent pending system design are based upon a modular concept providing a level of customization we believe based upon our knowledge of the industry is not currently offered by other aeroponic system manufactures.

- **What is the problem?/Who has this problem?** Sustainability, food safety, food waste issues resulting from traditional agriculture. The world as a whole, arid and developing countries in particular.
- **Solution**: Indoor Vertical Aeroponic based Farming
- **Advantages and benefits:** 90% less water, 60% less fertilizer, no pesticides, 20 to 40 times higher nutrient content year round availability, farm to fork at its best, beyond organic.
- **Unique selling point:** Plant recipes in conjunction with advanced production fixtures and software.
- **Competitors:** Aero Farm, USA, Indoor Harvest, Mirai, JP, Grove labs, USA, Green house operators in NL, ESP, I.

Potential applications in industry (market niches, increased productivity)

Agrilution technology can be licensed on a global scale to farm operators as well as HHA manufacturers leading to a sustainable supply of healthy produce, especially in drought stricken, polluted and highly populated areas.

Potential buyers/ licensees/investors (industries, companies)

Consumers that care about safe, nutritious, locally grown greens. Potentially existing farmers, retailers, like Whole Foods could create JV and franchise models for operating urban farms.

More information

→ *www.agrilution.com*

EARLY
STAGE II

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P 07

te-trade AG
L.I.M.I.T.

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** The te-trade AG has a floor luminaire called L.I.M.I.T. fully developed and measured. A prototype is available. Because we use new technologies the costs by a low number of pieces are too high for a market launch with fair market price. Only through the production of a total of 500 to 1,000 Pieces it is possible to achieve a reasonable market price.
- **Solution**: We are looking for an investor to finance the first series production and market introduction.
- **Advantages and benefits:** High-tech product with an intelligent product-design and good sales profit, also a number of new ideas and products.
- **Unique selling point:** The luminaire L.I.M.I.T. is a product with excellent efficiency and excellent lighting technology. Very eco-friendly at the production, operation and recycling. The product is very resource efficient.
- **Competitors:** Lighting companies like OSRAM, Zumtobel etc.

Potential applications in industry (market niches, increased productivity)

Luminaire for office and desk lighting, individual colour temperature adjustable (comfort factor), low energy consumption, low investment costs, one product solves the office lighting.

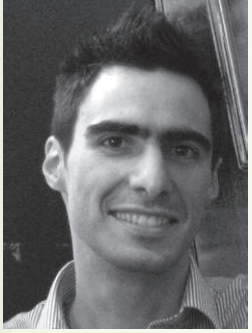
Potential buyers/ licensees/investors (industries, companies)

- Office furnisher
- Electronics manufacturers
- Lighting manufacturers

More information

→ *www.te-trade.de*

EARLY
STAGE II



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P 08

Veranu
Smart Energy Floor

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** Energy saving is worldwide important for economy, environment and security. Municipalities and companies suffer the large energy cost while bus, trains and ships need to be energy efficient.
- **Solution**: Smart energy floor (SEF) converts steps into electricity, saving money and making clients more energy independent.
- **Advantages and benefits:** SEF will provide widespread energy distribution. Freely accessible sockets will be available in public spaces where everyone can recharge their portable electronic devices. Sidewalk covered by SEF can provide energy to recharge electrical cars and supply public lightings. Similarly passenger's steps can recharge bus, train and cruise ships, when their internal floor is SEF-tiled giving them more energy autonomy.
- **Unique selling point:** SEF is flexible, completely recyclable and can be integrated in any surface. SEF is thin, easy to be installed and replaced, and characterized by low cost of transportation and installation.
- **Competitors:** Energy Floor, Pavegen, traditional floor companies

Potential applications in industry (market niches, increased productivity)

This product can be installed in industries with production machines that generate vibrations. From these vibrations and human steps the floor can generate energy.

Potential buyers/ licensees/investors (industries, companies)

The goal is to have a patent to license to flooring companies, electrical providers, automotive and ship companies. The end customers will be municipalities and public and private companies.

More information

→ *www.veranu.eu*

EARLY
STAGE II

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P 09

NTS NanoTechnologySolar GmbH
Functional Surfaces

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** The current standard method tries to reduce on microstructures and the law of refraction, reflection losses at solar cells (silicon solar cells). Disadvantage: The light that is not absorbed, the solar cell can leave unhindered. The result is that today's and future solar cells (cells improved architecture) cannot develop their full potential (efficiency).
- **Solution**: Optical (nano-)antenna: optical antennas coupled the entire solar spectrum into the solar cell! The optical antennas keep the light longer in the cell than in the previously used microstructures (micro-pyramids)! These properties do not have the microstructures because they do not have antenna characteristics! The improvement works on the whole spectrum of sunlight, thus: no shadowing.
- **Advantages and benefits:** First preliminary experiments and simulation results indicate that the current solar cell is to be expected (efficiency ≤ 20%) by about 10% (relative) efficiency and at the current and future high-performance cells (efficiency ≥ 20%) may efficiencies of well over 24% can be realized.
- **Unique selling point:** Patent pending
- **Competitors:** Institutes such as ISE

Potential applications in industry (market niches, increased productivity)

Increasing the efficiency of solar cells of each type. Effective in the current and future cell architecture (eg PERC, bifacial, heterojunction). Can be used at turnkeys or existing production systems (for cells) as an upgrade. Payback period between 3 to 10 months.

Potential buyers/ licensees/investors (industries, companies)

Customer: mechanical engineer (for photovoltaic systems, e.g. Schmid Group)
Revenue model: royalties (mechanical engineer)

More information

→ *nanotechnologysolar.com*
Cooperation: innoWerft, ISFH, Thoma GmbH, FH Münster, Temicon GmbH

EARLY
STAGE II

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P 10

my.tec Consulting UG Global Environmental Solutions (Maximum Yield Technology)

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** Landfilling and waste dumping, contamination of water, soil, air (emissions and smell) and occupation of valuable space close to settlements and cities. Loss of raw material and potential energy carriers. The problem occurs in most municipalities around the world, also still in Europe and US/Canada.
- **Solution**: Establishing of integrated waste valorization & treatment centers for various waste streams including wastewater combined with energy generation at high efficiency. No further need for waste separation at home or waste incineration. One synchronized system makes the center economic and sustainable. Optimized (cost saving) waste logistics and relieve of the local environment.
- **Advantages and benefits:** Instead of dumping, the waste is converted into energy and raw materials, ready for use. This contributes inexpensive energy to the local industry and supplies power to the national electricity grid. Health risks are reduced and jobs are created in the waste sector which can also include the informal sector.
- **Unique selling point:** Licensee of Maximum Yield Technology (MYT) developed and patented by ZAK in Ringsheim, Baden-Württemberg-Germany. MYT as core technology combined with processes for water treatment and energy production. My.tec will serve as one face to the customer executing the planning/engineering of the project and the supply of key components. High local content including construction is important. My.tec is taking care of compliance with specifications, construction progress towards investors and the training of the operator.
- **Competitors:** Energy efficient waste treatment providers

Potential applications in industry (market niches, increased productivity)

Employment of this technology in an adapted manner provides inexpensive energy (electricity, heating and cooling energy as well as process steam) and raw materials such as various types of plastics, metals and minerals (glass, sand, etc.) to the local industry. Additional applications (e.g. greenhouse farming using waste heat and liquid fertilizer/water from plant) are conceivable and considered during project development if desired.

Potential buyers/ licensees/investors (industries, companies)

- Municipalities that still dump their waste and are willing to improve their waste management
- Waste incinerators, which have the need for increasing their incineration capacity
- Energy providers, which benefit from inexpensive energy carriers
- Private industries with shortages in energy supply to satisfy their own energy demands

More information

→ *www.mytec.info* and
→ *www.zak-ringsheim.de*

ADVANCED
STAGE I

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P 11

Fiber Engineering GmbH
Fiber Injection Molding for Replacement of PUR

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** 3D insulation parts are made today with PUR foam or from felt sheets. PUR foam is made from raw oil and has additional components for better performance. The production with Isocyanat, one component of PUR, is toxic. The emissions from PUR parts too. Alternative production with fibers use sheets as semi product. This production is cheap for flat and square parts, but expensive for 3D formed parts and produces a lot of off-cut as waste.
- **Solution**: We develop a new process, called FIM, which allows high efficiency 3D part production direct from fibers. Nearly every kind of fibers or recycling material could be used.
- **Advantages and benefits:**
  - Save one production step because no semi product is necessary
  - Reduce material consumption
  - Possibility to implement inside of 3D parts different densities in different thickness in a tolerance of millimetres
- **Unique selling point:** FIM Technology with adjustment of different densities inside of 3D parts
- **Competitors:** Direct none, indirect "old" felt production lines and PUR technology

Potential applications in industry (market niches, increased productivity)

- Increase process efficiency for example by decrease of material consumption up to 25%
- Lighter parts with same stability
- Replace oil connected material like PUR foam against natural or recycling materials
- No harmful emissions during production or lifetime
- Easy recycling possible

Potential buyers/ licensees/investors (industries, companies)

- Automotive industry: OEM, TIER1 and TIER2
- Aircraft TIER1
- Railroad TIER1
- Furniture industry for replacement of PUR cushion, mattress
- Textile industry
- Industry for juvenile products

More information

→ *www.fiber-engineering.de*

ADVANCED
STAGE I

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P 12

Livingood
Drywall Green Evolution

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** The built environment is the single largest contributor to global greenhouse gases, with more than 50% of CO_2 emissions generated worldwide. Drywall is the number three producer of greenhouse gasses among building materials. Its production is hugely energy intensives and generates immense amounts of carbon dioxide gas.
- **Solution**: The proposal solutions are designed to replace gypsum-based wall-boards. By changing the raw materials and the manufacturing process, is reduced the energy needed for production and the greenhouse gas emissions of up to about 80% compared to standard drywall. Unlike traditional drywall are naturally dried, can harden without any use of heat and are made primarily of recycled materials.
- **Advantages and benefits:** The proposed technical solution ensures significantly higher performance than the systems currently used in its own segment. It is a much healthier building material in the home, while contributes more potential LEED credits than any other drywall. Are engineered to be fully re-utilized and completely recycled at end of life.
- **Unique selling point:** By promoting greater efficiencies for energy and water, the proposal solutions lower building costs while conserving the earth's precious resources. This powerful combination of built-in payback with environmental stewardship creates a new value proposition.
- **Competitors:** In the Drywall market the most popular product is plasterboard, the main European producers are Saint-Gobain S.a, Knauf Group, Lafarge S.a..

Potential applications in industry (market niches, increased productivity)

The Drywall industry exists since a long time and the production is done through different industrial processes. The proposed idea is a large-scale industrial initiative aiming at developing and realizing a production plant of better quality and ecologically safer pre-fabricated panels.

Potential buyers/ licensees/investors (industries, companies)

- Industrial companies operating in the Drywall segment market
- Industrial companies operating in the Building sector who want to expand/diversify their offer
- Companies operating in other contexts who want to explore new business opportunities markets with high value and growth

More information

→ *www.livingood.eu*

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P 13

BlueWater GmbH **Global Saving and Resourcing of Unused Running Drinking Water in Sinks**

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** Drinking water is a crucially limited resource. In sinks, large quantities of drinking water are wasted daily due to waste of 75 to 80% unused running tap water, i.e. 25 to 30 litre per person per day. Globally there is no technology in place for any building type that saves unused tap water (coined Bluewater).
- **Solution**: Bluewater GmbH offers a comfortable to use, energy free water saving solution that saves 100% of unused Bluewater and redirects it via a simple system for secondary use to replace drinking water.
- **Advantages and benefits:**
  - Saves 100% of unused water
  - Comfortable use
  - Easy to install
  - No energy requirement
  - Reduces waste water, transport, cost, energy and CO_2
- **Unique selling point:** Bluewater GmbH provides globally the only patented water saving solution of its kind, compatible and adaptable to international standards and appliances. It is also a new design object in sinks which is not only bling but saves water.
- **Competitors:** There is no competing technology available on the market.

Potential applications in industry (market niches, increased productivity)

Installations are possible globally for all building types with the following amortisation times:

- Hotel new build/refurbishment: 3 years (retrofit: 5 years)
- Residential block new build/refurbishment: 3 years (retrofit: 5 years)
- DIY and internet market: 1 year
- Commercial and industrial buildings

Potential buyers/ licensees/investors (industries, companies)

- New build, retrofit, refurbishment projects
- Hotel and developments, architects, specification writers, plumbing professionals, DIY
- Manufacturers for bathroom and kitchen appliances
- Suppliers for bathrooms, kitchens, fixtures and fittings, plumbing industry
- Bathroom and kitchen sales/showrooms

More information

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Apparatus for saving water, Filed Patent Application EP 2683880 A2

ADVANCED
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P 14

EggPlant Srl
EggPlant—Not Wasting Life

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** EggPlant faces two big environmental and social problems, the wastewater disposal and the pollution coming from traditional hydrocarbons-based plastics.
- **Solution**: EggPlant reuses wastewater to manufacture green and high-performance bio-plastics (PHB—Poly-3-hydroxybutyrate) through a zero-waste process.
- **Advantages and benefits:** EggPlant ensures social, economic and environmental sustainability and actively contributes towards a more sustainable development.
- **Unique selling point:**
  - Bioplastics from waste rather then from agriculture products (e.g. crop, corns, sugar canes, etc.)
  - Application variety
  - Cost effectiveness.
  - Technology scalability
  - IP
- **Competitors:** EggPlant offers a holistic enhancement of wastewater through a zero-waste process. Today more and more companies (e.g. Bio-On, Mango Materials, etc.) are working on the reuse of waste to manufacture bioplastic. EggPlant advantages are: technology scalability, cost effectiveness, IP.

Potential applications in industry (market niches, increased productivity)

Wherever traditional plastics are adopted, in particular:
- High-tech electronics (conductive bioplastics, piezoelectricity, etc.)
- Biomed (scaffold, tissue engineering, etc.)
- Packaging (film, edible packaging, etc.)
- Consumer (consumer goods)
- Agriculture (weed control fabric, etc.)
- Aerospace (outgassing material)

Potential buyers/ licensees/investors (industries, companies)

Companies working in the polymer sector, wastewater disposal & treatment market players, investors focusing on clean tech solutions, impact investors, E&C market players. Market players interested in EggPlant solutions and applications (biomed, high-tech electronics, packaging, etc.).

More information

→ *www.eggplant.it*

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P 15

Sunlumo Technology GmbH
One World Solar Collcector

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** Worldwide, there is a giant demand for affordable heating energy for room heating, domestic hot water and industrial processes. Widely used solar thermal could address this effectively but current products are too expensive.
- **Solution**: Sunlumo developed a new technology for the novel solar thermal collector that can be produced fully automatic. Instead of expensive metals it is made by 100% from polymer materials and supports hot water preparation and heating systems.
- **Advantages and benefits:** We revolutionized solar collector production with today's means of choice: Fully automatic mass production coupled with recyclable polymer materials and low energy production.
- **Unique selling point:** The One World Solar Collector is produced 50% cheaper than current metal based solar collectors and features a better ecological footprint. This product makes solar thermal heating affordable for everyone.
- **Competitors:** The One World Solar Collector is the first mass production-ready flat plate solar collector made by 100% plastic and the key technology to cover the demand of today's global mass markets.

Potential applications in industry (market niches, increased productivity)

According to recent estimations, the worldwide demand for solar thermal collectors increases by 10 to 15 per cent every year and the annual demand will have reached approx. 200 million squaremetre by the year 2020. Plastic based solar collectors are the only way to cover the human demand in such dimensions.

Potential buyers/ licensees/investors (industries, companies)

- Companies who want to play a leading role in the European/ worldwide Green Technology Market
- Non Governmental Organisations (NGO)
- Renewable Energy Industry
- Plastic industry
- Green Technology Companies

More information

→ *www.sunlumo.at*

ADVANCED
STAGE II

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P 16

Nomadic Power GmbH **Mobile Energy System for Recharging and Energy Storage**

Matchmaking in early innovation phases

Energy everywhere: Nomadic Power operates virtual power plants of Mobile Energy Systems, i.e. powerful 85kWh Li-ion batteries 'on wheels' called 'Nomads' Mobility everywhere: Nomads are movable/mobile fast chargers. Nomads can be used as range-extenders for electric vehicles enabling 500 kilometre of autonomy. Nomadic Power has developed totally new mobile energy sources in co-operation with Fraunhofer Institutes and a Swiss mobile platform manufacturer. They are able to deliver electric energy to a broad variety of grid, off-grid, and mobile applications. Technically, these Mobile Energy Systems are powerful 85kWh Li-ion batteries 'on wheels'. They can be charged with clean energies from photovoltaic installations as well as from the grid. Nomadic Power has won a 2 million EUR grant from the European Union's Horizon 2020 SME Instrument for develop series production readiness.

- **What is the problem?/Who has this problem?**
  - Fast charging costly and stationary
  - Electric power shifting still poor
  - Range of electric vehicles unsatisfactory
- **Solution**:
  - Nomads are movable/mobile fast chargers with no infrastructure needs
  - Nomads can shift electric power from photovoltaic installations for one week
  - Nomads are range-extenders, giving unlimited range for long distance travelling with electric cars
- **Advantages and benefits:** Nomads deliver mobile energy
- **Unique selling point:** Nomad swarms are virtual power plants for grid stabilisation
- **Competitors:**
  - Residential battery systems: Sonnenbatterie
  - Stationary fast charger: ABB
  - Petrol driven range extenders: internal: BMW i3, Chevy Volt, external EP-Tender

Potential applications in industry (market niches, increased productivity)

- Fast charger with no for 25,000 EUR infrastructure update: 16 A outlet sufficient, no civil engineering
- Buffer battery for weekly shift: enables 100% grid independence, avoid PV installations shut-down on sunny days
- Range extender: Autobahn Rental on-demand system enables electric vehicle long distance travelling without range limitation

Potential buyers/ licensees/investors (industries, companies)

- OEMs: BMW has procured 13 Nomads for global roadside assistance field trial
- Fast charger network operators
- Private and business owners of PV-installations and electric vehicles

More information

→ *www.nomadic-power.com*

ADVANCED
STAGE II

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P 17

GlobalFlow GmbH
SeNa Flora

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** The food consumption is increasing; therefore the organic waste accumulation and soil degradation rises while stocks of nutrients for fertilization fall.
- **Solution**: SeNa Flora complements the existing techniques for organic disposal by a refining process, the worm composting. Organic waste like production residues from food industries can be processed and used as an organic fertilizer. The nutrient cycle is being closed and additional chemical fertilizer can be reduced.
- **Advantages and benefits:**
  - Naturally produced clay-humus-complexes enhance the air balance and water holding capacity of the soil.
  - Effective nutrient storage of the input materials leads to a reduction of water and chemical fertilizer.
  - Contained humic substances foster the plant durability and bind pollutants into their matrix.
- **Unique selling point:** Natural process for disposing and refining organic waste in an industrial and quality-assured scale.
- **Competitors:**
  - Composting and fermentation technologies
  - Worm composting farms
  - Companies who produce chemical fertilizer

Potential applications in industry (market niches, increased productivity)

- Economic sector—production of high quality fertilizer from organic waste by using natural process
- Source of raw materials as N, P, K
- Marketing tool—image profit
- Environmental protection—substitution of polluting fertilizers to avoid eutrophication, siltation and salinization of soils

Potential buyers/ licensees/investors (industries, companies)

- Target customers: farms around fruit and vegetables, turf farms, sports field (e.g. golf courses), end users and anyone who wants to fertilize naturally and unencumbered. No user restrictions.
- Investors: food companies, engineering companies, farmers, everyone who is interested in this project.

More information

→ *www.sena-flora.de or*

ADVANCED
STAGE II

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P 18

Ecovat Werk BV
Ecovat Thermal Storage and Net Balancing System

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?**
  - Energy is cheap when I cannot use it and expensive when I need it (everybody)
  - 100% use of sustainable energy is not feasible in practice. Production and demand do not match. (Municipalities, health care organizations, house owners, etc.)
  - Remnant heat is often lost (problem owners: heat grid owner, industry with remnant heat, etc.)
  - Frequent imbalances in high voltage grids (high voltage grid owners and wind turbine owners)
- **Solution**:
  - Thermal Storage, that stores up to 90°C over the seasons (>6 months) with only an average energy loss of max. 10% over 6 months and an average exergy loss of max. 7%.
  - Buy cheap energy and sell expensive energy
- **Advantages and benefits:**
  - Cost reduction
  - 100% use of sustainable energy
  - Profit on energy-trade
- **Unique selling point:**
  - Large storage capacity over the seasons
  - High energy and exergy efficiency
  - No environmental danger
  - No visibility (100% underground)
  - Low costs
  - Vibration free construction method
- **Competitors:** All other storage possibilities (TTES and PTES Stores, batteries, etc.)

Potential applications in industry (market niches, increased productivity)

Net-balancing of high voltage grid, energy-storage in heat grid, making large buildings and dwelling area 100% sustainable and independent from volatile energy prices. Green houses, cold storage for cool-units (warehouses)

Potential buyers/ licensees/investors (industries, companies)

Heat grid owners, housing corporations, health care industry (hospitals etc.), Green house owners, shopping mall (heat and cold!)

More information

→ *www.ecovat.eu*

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STAGE II

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STORASOL GmbH
High Temperature Thermal Energy Storage—HTTES

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?** Renewable energies like CSP, PV, CPV and Wind require cheap energy storage to reduce electricity costs. Many industrial processes have high temperature excess heat which is not used, because no commercially attractive high temperature thermal energy storage (HTTES) are available. Molten salt storage or ceramic storage applied in CSP plants are too expensive.
- **Solution**: Thermal energy with up to 600°C or higher is stored in sand/small stones using air as heat transfer medium. The storage material is arranged in an innovative way in modules, allowing for easy scale up of the novel energy storage (HTTES).
- **Advantages and benefits:**
  - Low investment and operation costs
  - Flexible in capacity because of modularity
  - High storage efficiency
  - Simple process, robust
- **Unique selling point:**
  - Patent worldwide filed
  - Experience and know-how far ahead of other potential players
  - Operation experience with several test facilities within structured technology development
- **Competitors:** No competitors for comparable HTTES, only for molten salt storage and ceramic or concrete systems.

Potential applications in industry (market niches, increased productivity)

- Cheap energy storage for renewable energies like CSP
- Energy storage for excess heat in industrial processes like cement, steel, glass, chemicals, etc.
- Optimization of conventional power plants like coal, gas
- Different applications for electricity grid operation support

Potential buyers/ licensees/investors (industries, companies)

- EPC-contractors for power plants and industrial facilities (Siemens, Alstom, Linde, Abengoa, ACS Cobra, GE, Mitsubishi, Doosan, Hitachi, etc.),
- Utility companies (E.ON, RWE, EnBW, Vattenfall, ENEL, GDF Suez, ACWA, etc.)
- Financial institutions, private equity and venture capital funds as investors in emerging markets and technologies

More information

→ *www.storasol.com*

ADVANCED
STAGE II

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P 20

SmartCarbon AG **Smart Fertilizer— Economical & Ecological Land Reclamation**

Matchmaking in early innovation phases

- **What is the problem?/Who has this problem?**
  - Biomass waste materials (e.g. municipal organic or production waste) need to be disposed with financial and logistic efforts.
  - There is a growing demand for high-quality fertilizers and agricultural usable area.
- **Solution:** For plantations worldwide and horticulture we provide high-quality soil conditioner & fertilizer products and manufacturing process. Products can be adjusted to specific needs. Reverse of desertification & erosion effects and amelioration of the soil (productivity).
- **Advantages and benefits:** Tests at the University of Hohenheim demonstrate yield increases & reduced fertilizer requirement, thus: cost saving potential. Local biomass waste can be used by hydrothermal treatment & biological post-processing.
  - Adds to the nutritient capacity of the soil
  - Adds to soil structure (aeration)
  - Contains nutrients for plants (mineral) and microbes (organic)
- **Unique selling point:**
  - Similar to natural humic substances
  - Longer lifetime compared to compost
  - Allows to fertilize even deserted areas, reverting desertification
  - Uses biomass that cannot be used by pyrolysis
  - Cheaper production costs
- **Competitors:** Compost/pyrolytic biochar/fertilizer producers & HTC-plant manufacturers

Potential applications in industry (market niches, increased productivity)

Customizable fertilizer-on-demand products. Humic substance and humic acid products. Fertilizer plus soil amelioration product made by combination of hydrothermal process and biotechnological adaption for any soil type using any kind of biomass waste available.

Potential buyers/ licensees/investors (industries, companies)

Agricultural plantation owners, soil/humic acid/fertilizer production manufacturers and distributors, institutions/companies with interest in soil reclamation and land amelioration.

More information

→ *www.smartcarbon.eu*

INITIATORS & CO-OPERATORS

Initiated by

- **bwcon GmbH**—Technology and Innovation for Baden-Württemberg was founded in 2014 as a spin-off of the Baden-Württemberg: Connected e.V. network, one of the most successful European technology networks. bwcon GmbH offers start-ups, entrepreneurs and SMEs continuously support in their innovation process and is involved in many regional and European activities and projects. bwcon GmbH supports first-time entrepreneurs in business recognition and accompanies young and growing companies via tailor made coachings, through a virtual business incubator as well as through pitching events and business plan awards. bwcon GmbH provides a platform for the cross-sectorial usage of technologies and interdisciplinary cooperation and is managing the Baden-Württemberg: Connected e.V. network with its more than 600 companies, organizations and research institutes. bwcon GmbH has a strategic alliance with Steinbeis foundation.

- **Umwelttechnik BW**
  Keeping you ahead. In order to promote the local growth of environmental technology, the State of Baden-Württemberg has established Umwelttechnik BW (UTBW) an agency devoted to environmental technology and efficiency of resources. UTBW is tasked with establishing a platform for enhanced networking of industry, science and government, initiating forward-looking projects, supporting businesses and institutions engaged in environmental technology, and providing a clearinghouse for industry-relevant information.

In co-operation with

- **KIC InnoEnegy** is the European company dedicated to promoting innovation, entrepreneurship and education in the sustainable energy field by bringing together academics, businesses and research institutes. Our goal is to make a positive impact on sustainable energy in Europe. We do this by creating future game changers with a different mind-set, and bringing innovative products, services and successful companies to life.

- Considering the high eco innovation potential of the Alpine Space, the Project **FIDIAS** aims at providing local authorities, green tech small and medium-sized businesses and financial operators of the alpine regions with sufficient know-how to exploit the opportunities coming from EU financial instruments and support services. Through better access to finance, FIDIAS reinforces sustainable local development and intends to promote innovative mechanisms, financial instruments and services able to attract public and private capital.

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Venue

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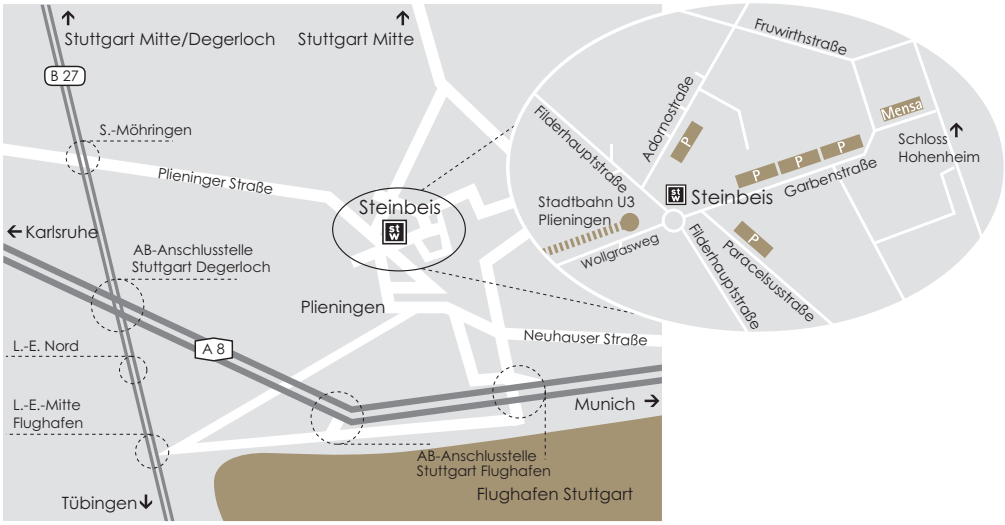

An initiative by:

UMWELT TECHNIK BW

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In co–operation with:

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FIDIAS

Alpine Space

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Startup business

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More information:

www.green-inno-forum.eu