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Saksa Kevad 2023

Estonia and Saxony – on the way forward to Clean Energy, 2 May 2023, Tallinn/EE

List of networking/matchmaking presentations. More information about the event at:

Võrgustiku networking/matchmaking esitluste loend. Täpsem info ürituse kohta aadressil:

Auflistung der Präsentationen des Networking/Matchmaking. Weitere Informationen zur Veranstaltung unter:

Estonia and Saxony – on the way forward to Clean Energy

SAKSA KEVAD
05.04.-09.05.2023
SACHSEN · SAKSIMAA
SAKSAKEVAD.EE

1. Agenda

1. Implementation of Estonian energy policy, fulfilling the World Energy Council's trilemma balance – **Dr. Arvi Hamburg**, Chairman of the Energy Committee of the Estonian Academy of Sciences (Estonia)
2. Induction heating technology – **Anja Rautenstrauch**, University of Technology, Chemnitz (Saxony)
3. Applied Power Electronics in Estonia – **Prof. Dmitri Vinnikov**, Tallinn University of Technology (Estonia)
4. Engineering and production of high voltage and high current test systems – **Patrick Jansen**, HIGHVOLT Prüftechnik GmbH (Saxony)
5. Smart energy communities/microgrids – future of power system – **Prof. Argo Rosin**, Tallinn University of Technology (Estonia)
6. Development of Green Energy Technology Devices in University of Tartu – **Prof. Enn Lust,** University of Tartu, Estonian Academy of Sciences (Estonia)
7. Building on cutting-edge materials and laser technology, Energy efficiency in Buildings Technology, Energy and storage systems, Design Lab for Applied Research – **Prof. Dr.-Ing. Christoph Leyens,** Fraunhofer Institute for Material and Beam Technology IWS, (Saxony)
8. Producer Semi-Finished Products: Clad strip, Thermostatic Bimetal Metal strip, Metal foil – **Mr. Andreas Handschütz**, Auerhammer Metallwerk GmbH (Saxony)
9. Industrialization of solid oxide core technology in Estonia – **Martin Skov Skjoeth-Rasmussen,** Elcogen AS (Estonia)
10. Chemical and Galvanic Surface Engineering. Thermal Coating Technologies. Material Design and Analysis. Human-Cyber-Physical Systems – **Dr. Thomas Lindner**, University of Technology, Chemnitz (Saxony)
11. Rethinking alkaline electrolysers for lowest cost green hydrogen production – **Dr. Jan Gustav Grolig,** Stargate Hydrogen Solutions OÜ (Estonia)
12. The best of both worlds: combining Estonia and Saxony's expertise to develop and produce clean technologies made in Europe –**Arnaud Castaignet,** Skeleton Technologies (Estonia)
13. Applied R&D on the material and energetic use of biomass, guided by the SDGs. How can biomass best contribute to a bio-economy & to an entirely renewable energy system? – **Karen Deprie**, DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH (Saxony)
14. The Solar Roof Company – **Janari Võrk,** Solarstone OÜ (Estonia)
15. Empowering Consumers to Power the World – **Tarvo Õng,** Fusebox Energy (Estonia)

1. Implementation of Estonian energy policy, fulfilling the World Energy Council's trilemma balance –

Dr. Arvi Hamburg, Chairman of the Energy Committee of the Estonian Academy of Sciences (Estonia)

1. About us

Arvi Hamburg
Implementation of Estonian energy policy, fulfilling the World Energy Council's trilemma balance.

Chairman of the Energy Committee of the Estonian Academy of Scences

Energy policy- World Energy Trilemma
* Power system balance
* Security of electricity supply

2. What we are looking for

1. World Energy Trilemma Indeks:

- *Energy security - Ensuring the energy demand of consumers in normal situations, with minimal disturbances in crisis situations;*
- *Energy equity - Ensuring electricity for consumers at an affordable price;*
- *Environmental sustainability- Carbon footprint of the entire electricity generation process;*

2. Balancing a power system with weather-dependent power generation.

Possible partners:
WEC German National Committee,
Energy commissions of the Academy of Sciences, working groups of research institutions.

3. How to contact us

https://www.akadeemia.ee/

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+373 5162026

2. Induction heating technology –

Anja Rautenstrauch, University of Technology, Chemnitz (Saxony)

1. About us

Dr.-Ing. Dipl.-Wi.-Ing.
Anja Rautenstrauch

Forming department
Professorship for Forming and Joining

Chemnitz University of Technology

Induction heating technology

2. What we are looking for

Innovative method for generating hot gas for CO2-neutral heating of industrial production processes

Objective:

Substitution of current heating processes based on fossil fuel gases by the generation of ultra-hot air through the inductively heated susceptor materials

Development focus:

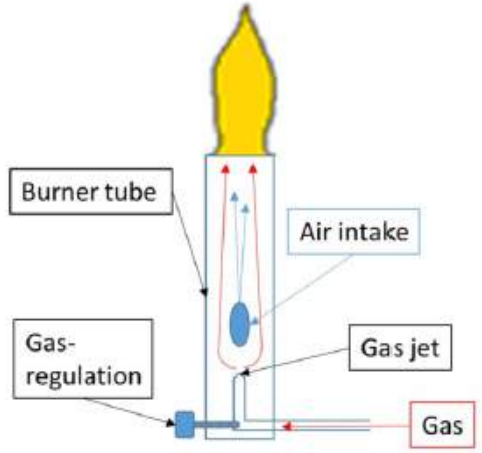
- *Susceptor selection (Novel and innovative combinations of materials)*
- *Porosity of the susceptor material*
- *Selection of the gaseous medium (air, nitrogen...)*

- patend pending -

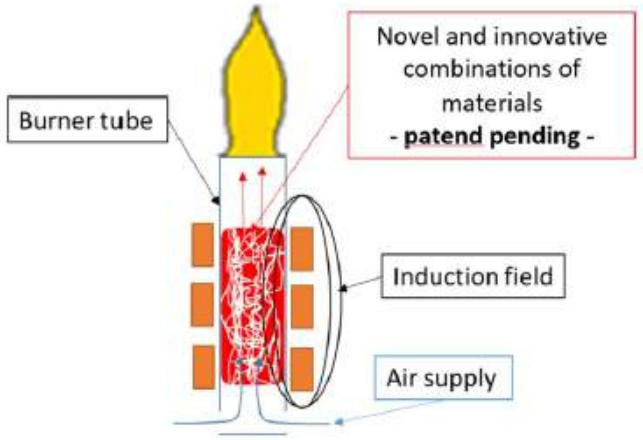
Application:

Industrial heating processes in the field: preheating of different components, soldering, ...

Conventional burner technology based on fossil fuels



Innovative burner technology based on renewable energy



3. How to contact us

http://www.tu-chemnitz.de/mb/UFF

anja.rautenstrauch@mb.tu-chemnitz.de

+49 (0)371 531-37327

3. Applied Power Electronics in Estonia – **Prof. Dmitri Vinnikov**, Tallinn University of Technology (Estonia)

1. About us

Dmitri Vinnikov
Dr. Sc. techn., IEEE Fellow
Full member of the Estonian Academy of Sciences

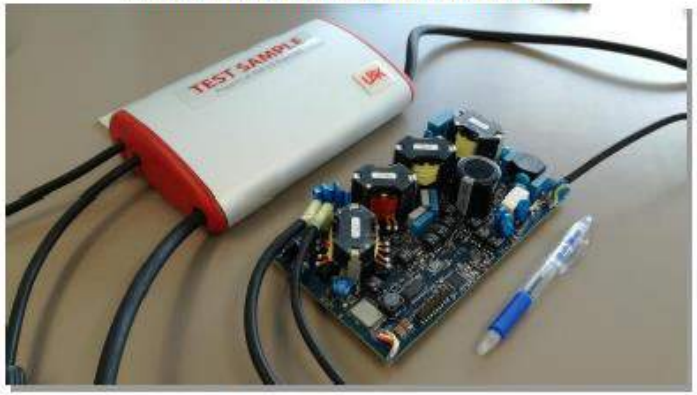
Power Electronics Group
Dept. of Electrical Power Engineering and Mechatronics,
School of Engineering,
Tallinn University of Technology (TalTech)

Applied power electronics
incl. design, development and validation of advanced power electronic systems for renewable energy, sustainable mobility and energy-efficient homes

2. Renewable Energy Systems

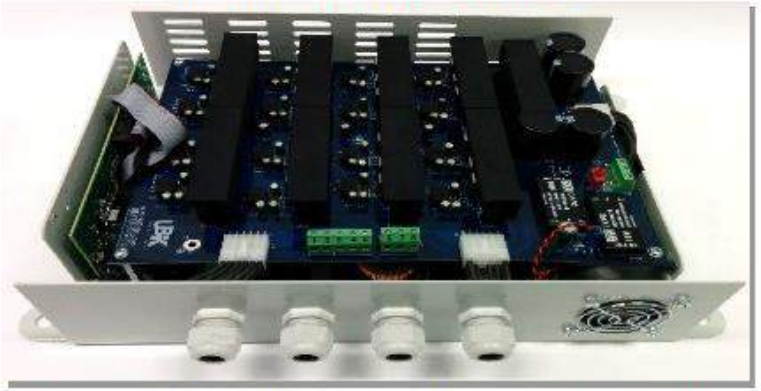
- TalTech PEG works on the cutting edge of the latest advances in the topic of high-performance photovoltaic (PV) converters, incl. string inverters and PV module-level power electronics. Interface converters for fuel-cells, batteries, supercaps, electrolyzers, etc.
- Over 10 Patents and Utility Models; US patent on advanced DC-DC converter and control is currently commercialized as OptiVerter® - first in the world hybrid of PV power optimizer and microinverter
- Joint product development with Estonian cleantech start-up companies Ubik Solutions, Sunly and MicroMasch Eesti OÜ

OPTIVERTER® - Smart Grid Ready Shade-Tolerant PV Microinverter



- *Input 8...60 VDC, output: 230 VAC, 50 Hz, 350 W*
- *Compatibility with different types of PV modules*
- *Global MPPT, ultimate shade-tolerant performance*
- *Wi-Fi based integrated communication gateway (IEEE 802.11 b/g/n)*

Smart Grid Ready "Full-SiC" PV String Inverter with Ancillary Services Support



- *Input: 300...800 VDC, output: 400 VAC, 50 Hz, 3.5 kW*
- *"Full-SiC" design, switching frequency 100 kHz*
- *On-Grid and Off-Grid operating modes*
- *Enhanced power quality control algorithms*
- *Converterless integration possibility of battery storages*

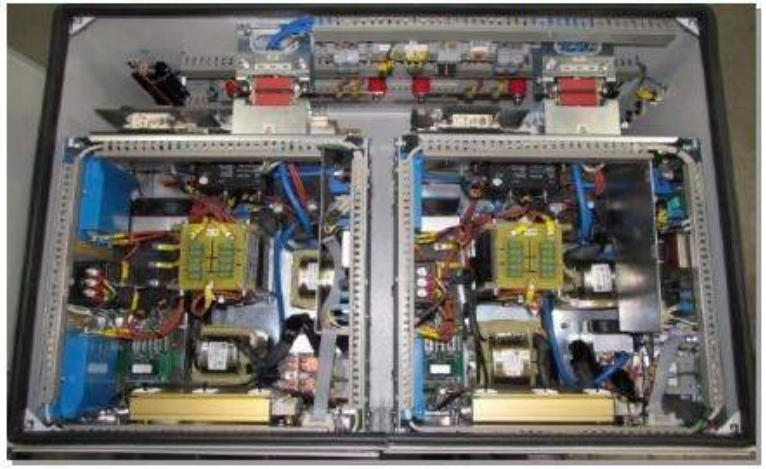
Power Conditioning Unit for Fuel Cell Back-Up Power Systems

- *Input: 35...64 VDC, output: 400 VAC, 50 Hz, 10 kW*
- *Modular design, interleaving control of cells*
- *On-Grid and Off-Grid operating modes*
- *Enhanced power quality control algorithms*
- *Converterless integration possibility of battery storages*

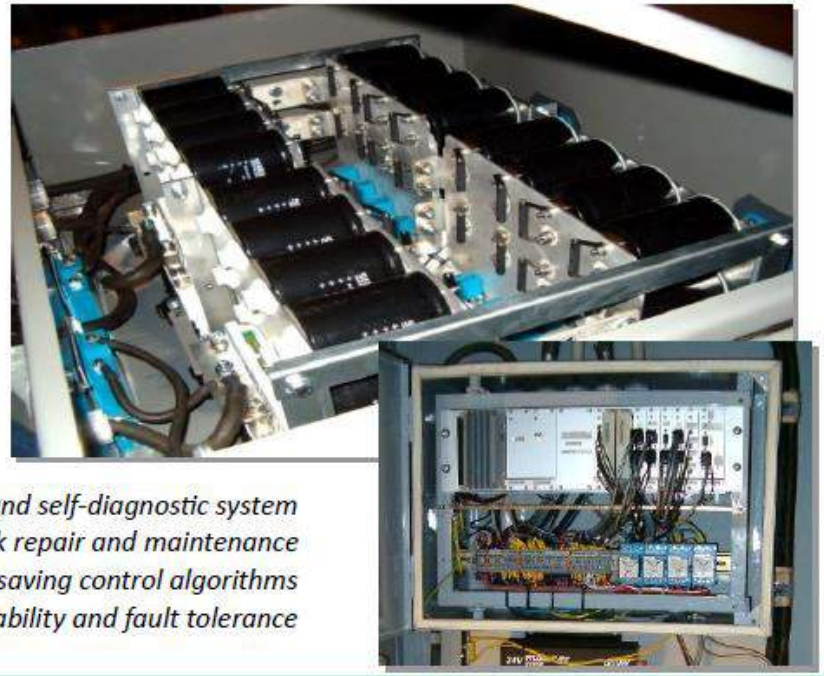
3. Electromobility

- Traction and auxiliary converters for light rail vehicles (trams), electric and diesel-electric locomotives and/or trains
- Fast and opportunity charging systems for electric vehicles (EV)
- Stationary battery energy storage systems
- Wide patent portfolio, joint product development with Estonian companies TET-ESTEL AS and MicroMasch Eesti OÜ

10 kW Rolling Stock Auxiliary Power Converter APC-10-1.5k

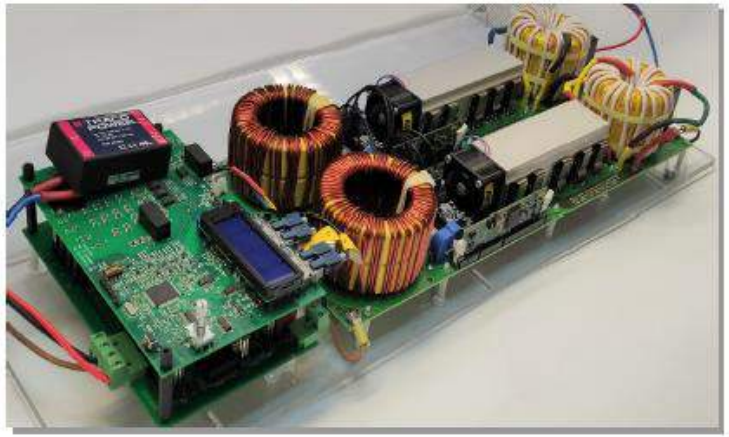


160 kW Traction Converter TVM1 for Light Rail Vehicles



- *Microprocessor control and self-diagnostic system*
- *Modular design for quick repair and maintenance*
- *Energy saving control algorithms*
- *Enhanced reliability and fault tolerance*

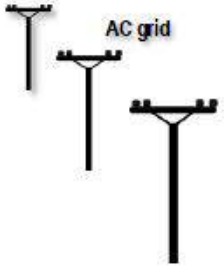
5 kW Electrolytic Capacitorless EV Battery Charger

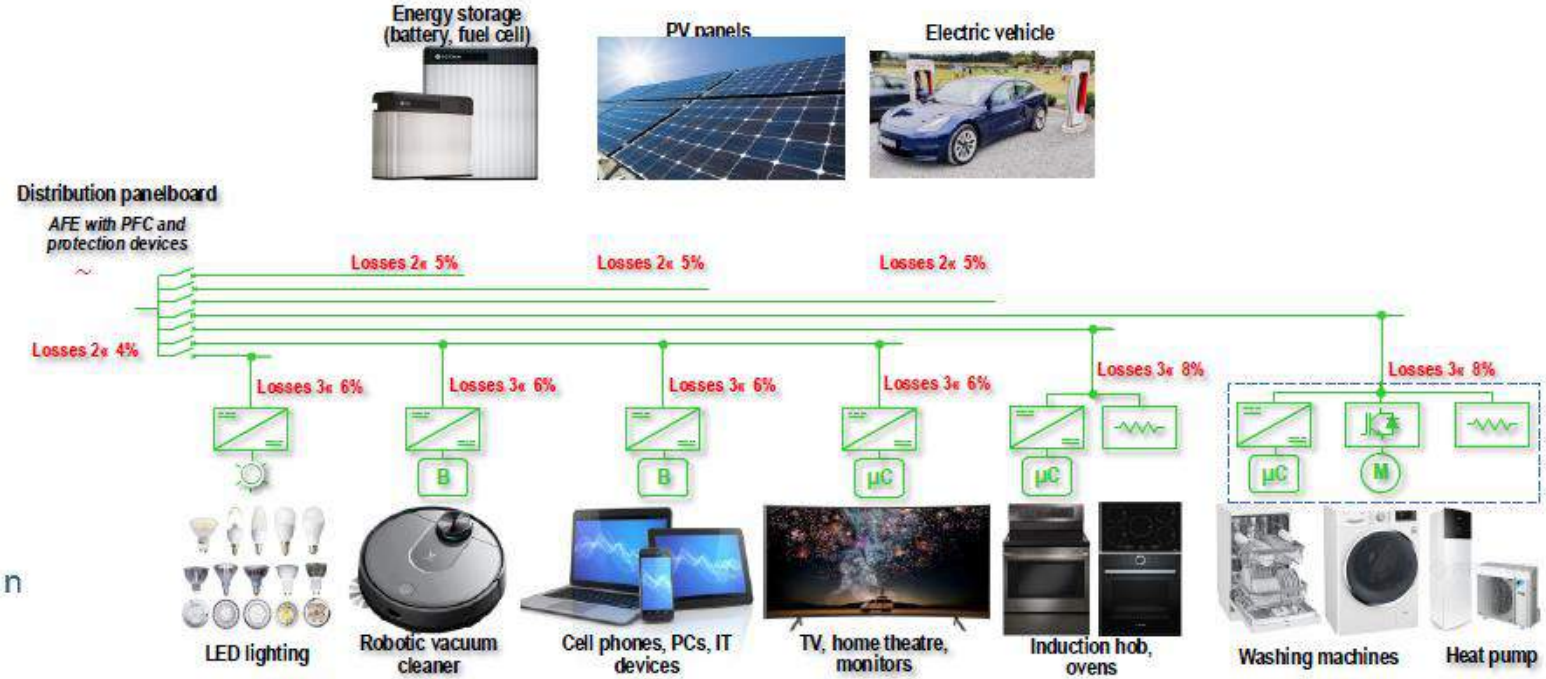


- *Input: 3x400 VAC, 50 Hz; output: 330…470 VDC*
- *Modular design with high-frequency isolation*
- *No grid filter and bulky DC-link capacitors*
- *Enhanced power quality control algorithms*
- *Simplified control with reduced number of sensors*

4. Energy Efficient Homes

- Application of direct current (DC) power distribution concept for energy efficiency enhancement of buildings
- Highly reliable cost-optimal power electronic systems for DC integration of residential PV, battery energy storages and EVs
- Safe and secure control of residential DC microgrids, power trading between the building and utility grid
- Widening the awareness and acceleration of the industrial uptake of the residential DC microgrid technology (*i³DC* initiative)





i³ DC
Accelerates Energy Transition

5. What we are looking for

- *Joint submission of EU/national/regional funding applications*
- *Co-supervision of PhD students and postdocs*
- *Joint organization of matchmaking events for industrial companies and start-ups for dissemination of research findings and initiation of applied research and join product development*
- *Joint organization of IEEE conferences and workshops*
- *Joint participation in the international working groups and other professional activities (i.e., preparation of international guidelines and transfer of good practices into other countries)*

6. How to contact us

https://taltech.ee/en/power-electronics-research-group

https://www.linkedin.com/company/peg-taltech

dmitri.vinnikov@taltech.ee

(+372) 51907446

4. Engineering and production of high voltage and high current test systems –

Patrick Jansen, HIGHVOLT Prüftechnik GmbH (Saxony)

1. About us

Patrick Jansen
Area Sales Manager

HIGHVOLT Prüftechnik
Dresden GmbH

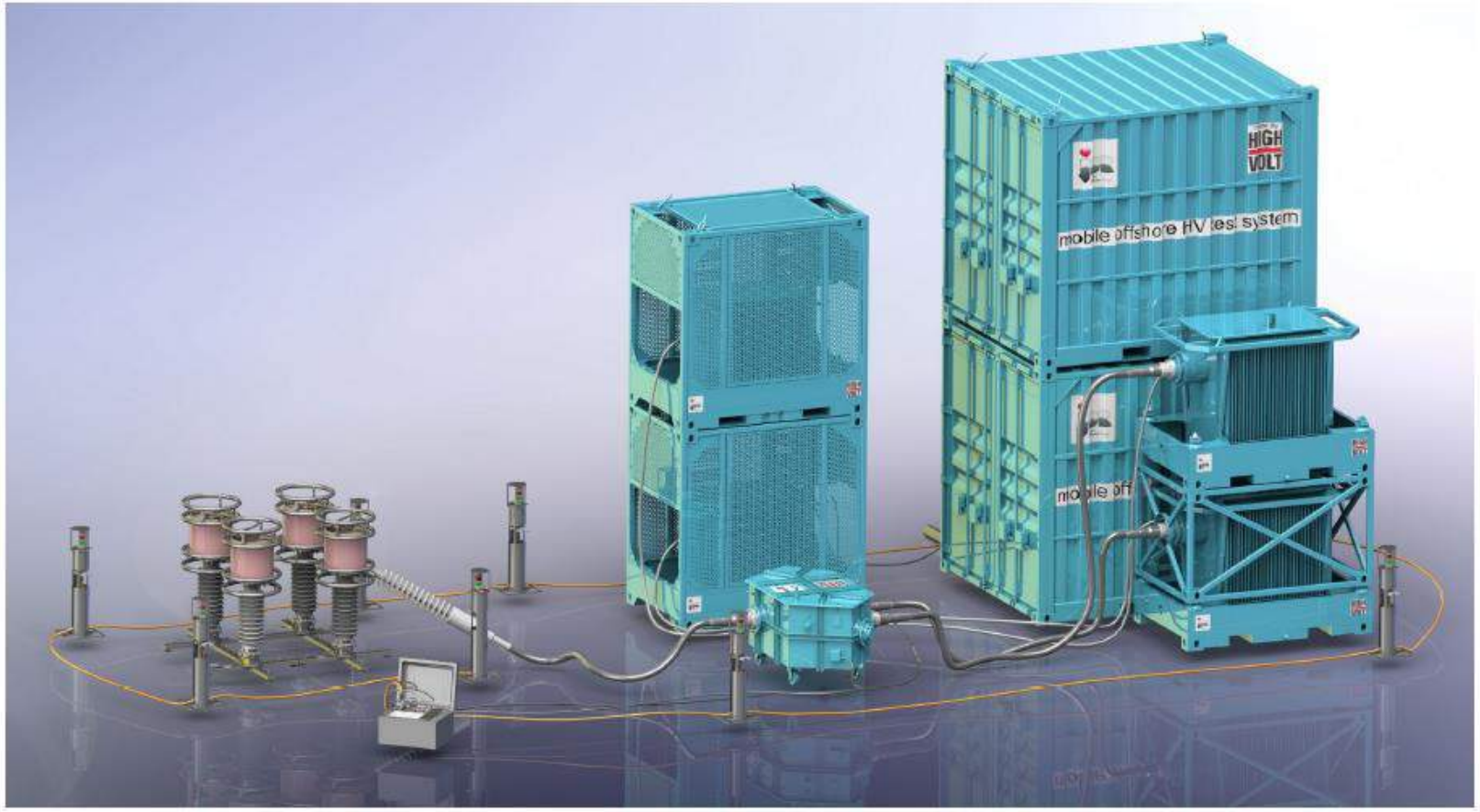
Engineering and
production of high voltage
and high current test
systems

2. What we are looking for

- Exchange with manufacturers to evaluate the current R&D needs in order to offer the most suitable test solutions
- Potential customers in need of test systems to ensure flawlessly working power grid equipment, for example for:
  - 66 kV Wind Farm Array Cables Off-shore or On-shore (WRV Off-shore)
  - MV transformers in wind turbines (on-site AC test system with static frequency converter, e.g. type WV 18-18/1.4)
  - MV and HV cables after installation (AC voltage test system with variable frequency, e.g. type WRV 83/260 T)

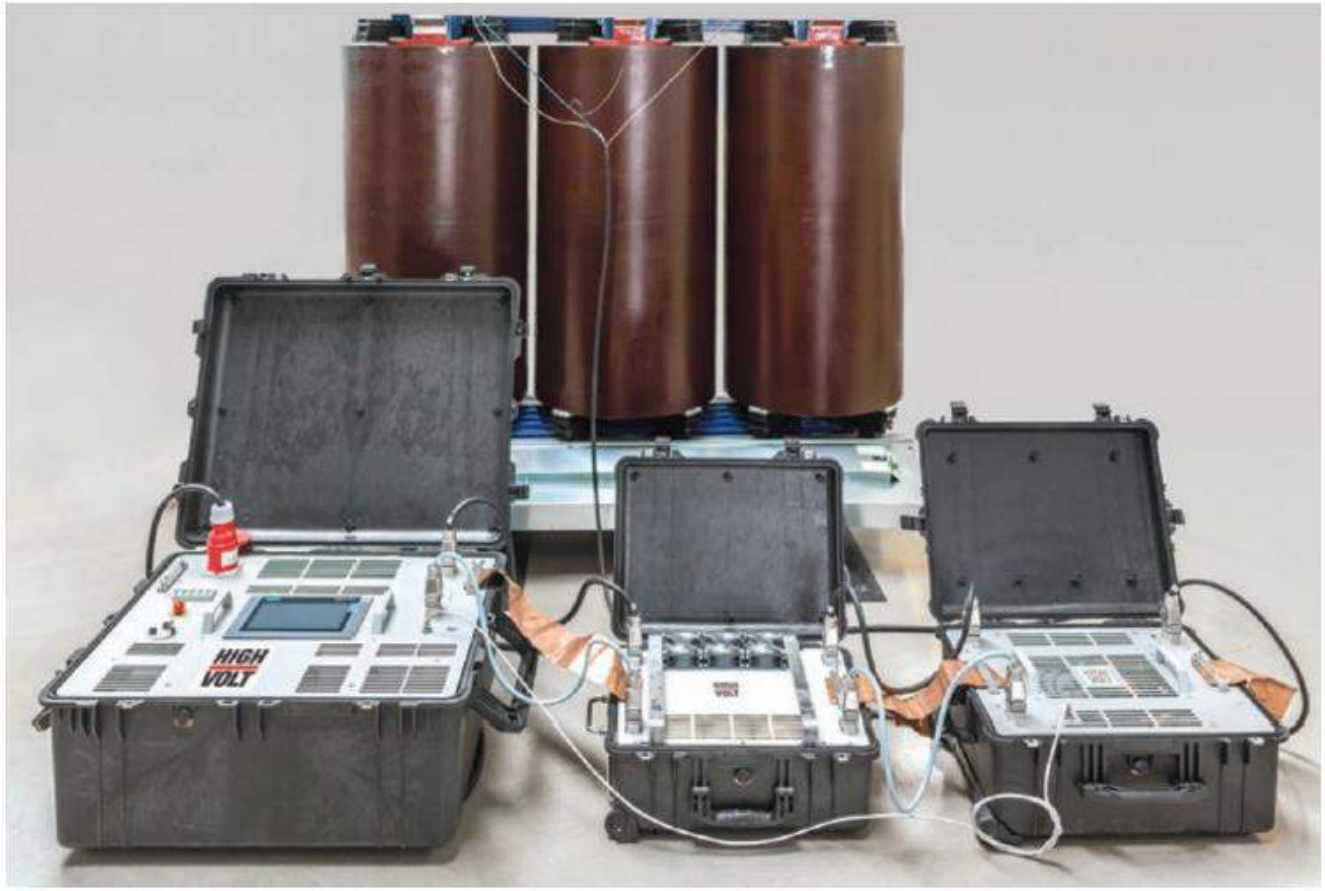
2.1 Example WRV off-shore

- Test voltage:
  up to 80 kV
- Test current:
  up to 50 A (1 reactor)
- Test power:
  7000 kVA (at 50 Hz)
- Test frequency:
  20…300 Hz



2.2 Example WV 18-18/1.4

- Test voltage:
  up to 1380 V
- Test current:
  up to 17 A
- Test power:
  18 kW / 18 kVA
- Test frequency:
  200 Hz



2.3 Example WRV 83/260 T

- Test voltage:
  up to 260 kV
- Test current:
  up to 83 A
- Parallel and series connections possible to increase test power and test voltage

3. How to contact us

https://www.highvolt.de/en/

sales@highvolt.com

+49 351 8425 700

5. Smart energy communities/microgrids – future of power system –

Prof. Argo Rosin, Tallinn University of Technology (Estonia)

1. About us

Argo Rosin

Doctor of Science in Engineering

Department of Electrical Power Engineering and Mechatronics

Tallinn University of Technology

Microgrids
Energy communities
Energy flexibility
AI in power systems
Lighting technologies

2. What we are looking for

- **Smart energy communities/microgrids – future of power system**
- Joint research in the domains of
  - ✓ Methods to improve **energy flexibility and power quality in energy positive districts/communities**
  - ✓ ***AI based solution to improve planning of microgrids*** with high share of renewables and quantification of energy flexibility on demand side
  - ✓ ***Optimization the operation of microgrids*** with integrated renewables, energy storages (ES), EVs, smart streetlighting solutions, e.g. optimization the use of municipal distribution network.
  - ✓ ***Novel self-sustainable energy systems and business models for Green Energy Communities.*** New business models for all parties (companies, energy communities, municipalities) connected through underlying infrastructure
  - ✓ **Interdiciplinary Micorgrids (Pilot) Projects**: „Renewable Energy, Energy Storages, Demand Side Flexibility, AI, Smart Grids and Microgrids, Street Lighting Networks and …“

3. How to contact us

https://taltech.ee/
en/epem-organisation

argo.rosin@taltech.ee

+372 5290305

6. Development of Green Energy Technology Devices in University of Tartu –

Prof. Enn Lust, University of Tartu, Estonian Academy of Sciences (Estonia)

1. About us

Professor of physical chemistry Enn Lust

Univesrsity of Tartu; Institute of Chemistry, Chair of Physical Chemisrty

Physical Electrochemisrty; Materials Science; Systainable green hydrogen energy technology

2. What we are looking for

- *Micro-mesoporous carbons for ionic liquid based supercapacitors;*
- *Na-ion and Zn-ion batteries;*
- *Thin-film complex metal hydrides for hydrogen storage;*
- *Low Pt-metal content and Pt-metals free polymer electrolyte fuel cells;*
- *Medium-temperature solid oxide fuel cells and electrolysis cells;*
- *Novel operando electrochemical synhrotron radiation and neurton scattering methods for detailed studies of catalysts.*

3. How to contact us

www.chem.ut.ee

Enn-lust@ut.ee

+372 7375165;
+372 5112030

7. Building on cutting-edge materials and laser technology, Energy efficiency in Buildings Technology, Energy and storage systems, Design Lab for Applied Research –

Prof. Dr.-Ing. Christoph Leyens, Fraunhofer Institute for Material and Beam Technology IWS, (Saxony)

1. About us

Prof. Dr. C. Leyens
(Fraunhofer IWS)

Prof. Dr. M. Klingner
(Fraunhofer IVI)

Fraunhofer Institute
for Material and Beam
Technology IWS

Fraunhofer Institute
for Transportation and
Infrastructure Systems IVI

Building on cutting-edge materials and laser technology, Energy efficiency in Buildings Technology, Energy and storage systems , Design Lab for Applied Research

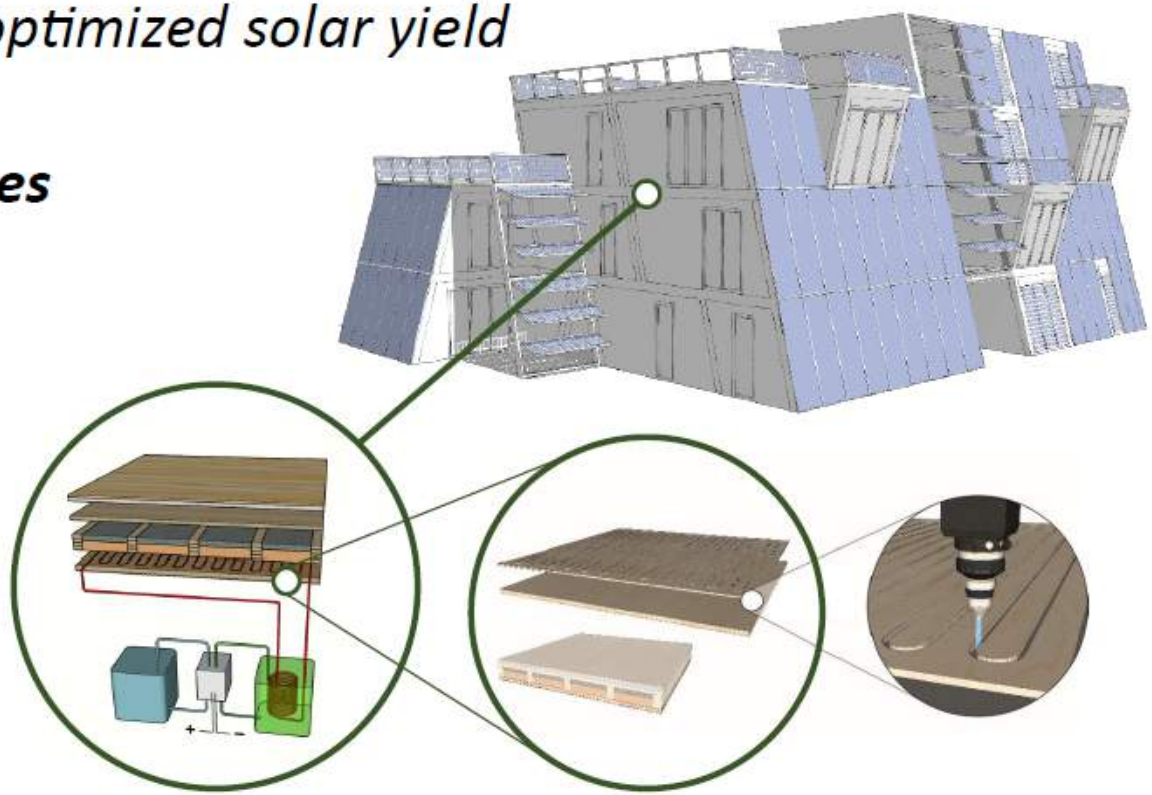
2. What we are looking for

Our aim:

- ***polymorphous construction elements*** *with optimized solar yield*
- *large area* ***wood laminate heat exchangers***
- *power grid stabilizing through* ***energy services***

We are looking for:

- ***Timber based manufacturing***
- ***Energy storage systems***
- *Buildings energy* ***management control***
- ***Heat pump*** *technologies*



3. How to contact us

www.iws.fraunhofer.de

www.ivi.fraunhofer.de

christoph.leyens@
iws.fraunhofer.de

matthias.klingner@
ivi.fraunhofer.de

+49 351 83391 3420

+49 351 4640 640

8. Producer Semi-Finished Products: Clad strip, Thermostatic Bimetal Metal strip, Metal foil – **Mr. Andreas Handschütz**, Auerhammer Metallwerk GmbH (Saxony)

1. About us

Andreas Handschütz

Auerhammer Metallwerk GmbH

Producer Semi-Finished Products:
Clad strip
Thermostatic Bimetal
Metal strip
Metal foil

2. What we are looking for

- *Cooperation in the fields of energy storage, fuel cells/hydrogen technologies and renewable energy*
- *Projects with universities/research institutes*

- *Clad Materials: beneficial new properties*
  - *Invar/Cu, Ni/Steel/Ni,*
- *Metal strips: Ni-, CuNi- and NiCu-Alloys*
- *Metal Foils: miniaturization – Foils with 2,5 µm thickness*
  - *Steel, Ni, Cu, Refractory Metals, Ti, Brazes*

3. How to contact us

www.auerhammer.com

andreas.handschuetz
@auerhammer.com

+49 3771 272 374

9. Industrialization of solid oxide core technology in Estonia

–

Martin Skov Skjoeth-Rasmussen, Elcogen AS (Estonia)

1. About us

Elcogen AS
Martin Skjøth-Rasmussen
CTO

elcogen

Elcogen AS
Valukoja 23, Tallinn
Estonia

Developer and manufacture of core components to Solid Oxide Electrolysis Technology and Solid Oxide Fuel Cell Technology

2. What we are looking for

Elcogen is a developer and manufacturer of Solid Oxide (SOC) cell and stack technology – the most efficient solution to green hydrogen and emission-free clean power generation. We are looking for partners, for further development of SOC technology:

- Raw material suppliers;
- Companies to cooperate in technology industrialization (equipment and software developers);
- Green hydrogen system developers and operators/end-users, to integrate our technology (cells, stacks and modules).

3. How to contact us

www.elcogen.com

martin.skjoeth-rasmussen@elcogen.com

+372 514 2285
+45 2275 4422

10. Chemical and Galvanic Surface Engineering. Thermal Coating Technologies. Material Design and Analysis. Human-Cyber-Physical Systems –

Dr. Thomas Lindner, University of Technology, Chemnitz (Saxony)

1. About us

Thomas Lindner

Head of Department Thermal Coating Technologies

Chemnitz University of Technology

Materials and Surface Engineering

D-09107 Chemnitz

Chemical and Galvanic Surface Engineering

Thermal Coating Technologies

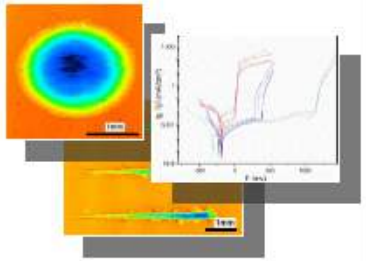
Material Design and Analysis

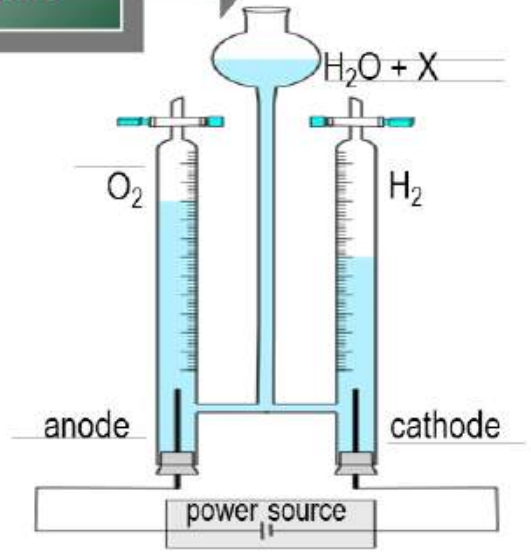
Human-Cyber-Physical Systems

2. What we are looking for

Alloy Development → **Coating Processes** → **Structure & Properties** → **Function & Performance** → **Hydrogen Production**

Wear / Corrosion / Catalytic Activity





3. How to contact us

th.lindner@mb.tu-chemnitz.de

+49 371 53138287

11. Rethinking alkaline electrolysers for lowest cost green hydrogen production –

Dr. Jan Gustav Grolig, Stargate Hydrogen Solutions OÜ (Estonia)

1. About us

Dr. Jan Gustav Grolig
Chief Operations Officer

Stargate Hydrogen

Electrolyser development and manufacturing

2. What we are doing

3. What we are looking for

- Partners for
  - Installation/Demonstration projects
  - Scaling up
  - R&D
- Suppliers for components
- Locations for expansion

4. How to contact us

stargatehydrogen.com

jan.grolig@stargate
hydrogen.com

+372 5308 0340

12. The best of both worlds: combining Estonia and Saxony's expertise to develop and produce clean technologies made in Europe – **Arnaud Castaignet,** Skeleton Technologies (Estonia)

Skeleton Technologies – The High Power Energy Storage Company

Combining German engineering & Estonian IT

STAATSMINISTERIUM FÜR WISSENSCHAFT KULTUR UND TOURISMUS | Freistaat SACHSEN

- Global technology leader in high power energy storage
- **Unique technology** & product roadmap with **Curved Graphene**, protected by more than **30 granted/pending patent families**
- **German engineering** with **Estonian innovation** and intellectual property
- World-class team of **330+ professionals** with vast experience in energy storage development & production

Our locations

Großröhrsdorf, Germany

- The largest supercapacitor factory in Europe, IATF-certified

Markranstädt, Germany

- The largest and most modern supercapacitor factory in the world, start of production in 2024

Bitterfeld-Wolfen, Germany

- Curved Graphene synthesis and production

Tallinn, Estonia

- Electronics, software, Sales, C-level

Raw Material

Curved Graphene

Supercapacitors and SuperBattery

Industrial Modules

From low to high voltage needs

Systems

MWs of immediate power

- **A qualified supplier and system provider to industry leaders in grid and renewable energy, transportation and heavy machinery, industry, and automotive**

Power & Automation · ŠKODA · MEDCOM · Danfoss · esa · Hitachi Energy · Marubeni · HONDA · SIEMENS

Blueprint Factory Concept

Backbone of Skeleton's modular scale-up

Superfactory in Markranstädt – Factory as a Product

- **220mEUR** to be invested
- Building will be finished by end of 2023, a factory space of **20.000 m²**
- Manufacturing of **12 mio. supercapacitors per year**
- SOP planned for **2024**
- Design of the plant as **blueprint for further growth**
- Ready for implementation of **machine learning and artificial intelligence**
- **Full traceability** throughout the plant
- **Bidirectional communication** of the machines possible

Leipzig Superfactory

Dresden Superfactory

3. How to contact us

www.skeletontech.com

Arnaud.Castaignet@skeletontech.com

+372 5669 9602

13. Applied R&D on the material and energetic use of biomass, guided by the SDGs. How can biomass best contribute to a bio-economy & to an entirely renewable energy system? –

Karen Deprie, DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH (Saxony)

1. About us

Karen Deprie

DBFZ – Deutsches Biomasseforschungs-zentrum gGmbH (German Biomass Research Centre)

Applied R&D on the material and energetic use of biomass, guided by the SDGs → How can biomass best contribute to a bio-economy & to an entirely renewable energy system?

2. What we are looking for

- ✓ Industry partners interested in implementing new technological concepts, e.g. plant engineers, energy-intensive industries
- ✓ Communities or farmers interested in diversifying/investing into RE concepts
- ✓ Research organisations and other stakeholders interested in scientific exchange
- ✓ Generally, partners interested in our competences, such as:
  - Biogas: potential of un(der)used substrates; flexibility in biogas production; bio-CH_4 production
  - Power-to-X: synergies of biomass & electricity-based processes (e.g. electrolysis-based H_2 in HEFA & synthesis/refinery processes // biomass + H_2 to CH_4 as fuel)
  - Bioenergy in a 100% RE system: analysis of regional resource potentials; identifying maximal systemic use in combination with other renewable energies (sector coupling)

3. How to contact us

https://www.dbfz.de/
en/

karen.deprie@dbfz.de

+49-341-2434-118

14. The Solar Roof Company – **Janari Võrk,** Solarstone OÜ (Estonia)

1. About us

Janari Võrk
Communications Manager

Solarstone
The Solar Roof Company

Building-Integrated Photovoltaics (BIPV) and Sustainable Solar Energy Solutions

2. What we are looking for

At Solarstone, we create innovative building-integrated photovoltaic (BIPV) solutions, merging solar energy generation with sustainable construction materials. We design high-performance solar roof tiles, develop digital tools for efficient BIPV project management, and collaborate with industry professionals to promote BIPV adoption.

We seek partners in:

- *Building material manufacturing and supply.*
- *Construction and engineering firms.*
- *Energy utilities and providers.*
- *Research institutions and universities.*
- *Local/regional governments or organisations.*

Together, we can accelerate the global transition to sustainable energy and create a lasting environmental impact.

3. How to contact us

solarstone.com

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@solarstone.com

+372 5668 9087

15. Empowering Consumers to Power the World – **Tarvo Õng,** Fusebox Energy (Estonia)

1. About us

Tarvo Õng

Fusebox OÜ

Energy flexibility software

2. What we are looking for

Fusebox is a specialized company, whose core competence is our unique software platform that unlocks electricity consumers' flexibility and enables the green transition. With Fusebox's SaaS platform for energy management, you can easily integrate and access new energy markets, while also reducing CO2 emissions and maximizing profitability.
Our aim is to find local partners from the energy sector (energy retailers, asset aggregators, original equipment manufacturers, PV park investors, etc) that can benefit from our demand response software.

3. How to contact us

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