

Newsletter

June 2021

Master Erneuerbare Energien – Master Renewable Energy Management – Bachelor
Erneuerbare Energien – Bachelor Elektrotechnik / Studienrichtung Elektrische Energietechnik

PhD-Student Sergej Baum successfully defended his doctor's thesis in Kassel



Photo: Ingo Stadler

Sergej Baum successfully defended his dissertation entitled "Influence of different regulatory frameworks on the energy supply of residential buildings" at the University of Kassel on Tuesday, 15 June and completed it with an overall grade of "very good".

In his thesis, Sergej Baum investigated the extent to which energy concepts for buildings will develop under a wide variety of regulatory and tax frameworks. One focus was the question of what the framework conditions must look like for thermal and electrical energy storage systems to become established through market forces.

Congratulations Dr. Sergej Baum

CIRE welcomes a new Professor



Professor Arjuna Nebel - Energy systems and Simulation

An Interview will be published in the next magazine "Inside out".

Photo: Arjuna Nebel

Newsletter

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New project for digitalisation of exams in CIRE study programmes

In the competition "Strengthening university teaching through digitalisation" launched by the foundation "Innovation in university teaching", the TH Köln was successful with two projects. In one of them CIRE is involved.



In the joint project "Innovation Cluster E-Assessment - Diversity, Didactics, Technologies" (NOVA:ea), RWTH Aachen (project management), TH Köln, University Hagen and the German Institute for Adult Education - Leibniz Centre for Lifelong Learning in Bonn want to jointly optimise e-assessments at universities. The aim of the new innovation cluster is to promote study-oriented examination scenarios. "To this end, we will further develop existing e-assessment formats and develop concepts for hybrid and on-demand online examinations, i.e. flexible examinations," says Prof. Dr. Ingo Stadler from the Cologne Institute for Renewable Energy (CIRE) at TH Köln, who heads the sub-project at the university. The concepts developed in the network will then be applied and tested at CIRE. TH Köln's share of the total funding of 2.3 million euros is around 600,000 euros.

CIRE has a new project - PV-i-teach

The 2 year Erasmus + project (strategic partnerships) is in cooperation with the University Freiburg, FH Münster, Danisch Technical University und Dalarna University. During the

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project a platform with a total of 10 courses on photovoltaics will be developed. Professor Blieske can be contacted for further information. (1.6.21-31.5.23)

CIRE has a new project - GaN-HighPower

GaN-HighPower (1.5.2021-30.4.2024) is a joint project of Professor Dick with SMA Solar Technology, Infineon Technologies AG, Vacuumschmelze GmbH & Co. KG, Fraunhofer IEE, Hochschule Bonn Rhein Sieg in the "7. Energieforschungsprogramm der Bundesregierung" GaN-HighPower - Cost- and weight-efficient PV- and battery inverters of high power for international markets of the future by gallium nitride (GaN) semiconductors; Subproject of TH Köln: Coupled magnetics based on low-permeability tape wound cores: possibilities, limits, benchmark

CIRE has a new project - Charge Swing

Charge Swing (1.5.2021-30.4.2023) is a joint project of Professor Dick with AixControl GmbH in "Zentrales Innovationsprogramm Mittelstand - ZIM"

Charge Swing: Effizienz durch Leichtigkeit - ein flexibles, bidirektionales 22kW Batterieladegerät, insbesondere für Elektrofahrzeuge; Subproject of TH Köln: Steuerung, Auslegung, Aufbau und Demonstration eines galvanisch trennenden bidirektionalen DC-DC Wandlers

CIRE contributed to a political declaration at the PV-Symposium 2021

Link: <https://www.pv-symposium.de/pv-symposium/erklaerung-zum-pv-symposium>

Innovationspark Erneuerbare Energien Jüchen – End of project

After 15 months of work, the project Innovationspark Erneuerbare Energien Jüchen is on the finish line. The concept study will be completed by the end of June 2021 by the project consortium consisting of the Zweckverband LandFolge Garzweiler, the TH Köln and the Wuppertal Institute. The aim of the project was to develop a landscape concept on the areas of the open pit mine Garzweiler I that combines modern agriculture with regenerative energy production on one site. In order to ensure a holistic concept, 3 workshops were successfully held for the exchange of visions and perspectives with stakeholders.

Newsletter

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The developed concept foresees 5 subprojects, which shall merge to a large-scale energy system in the long run. Innovative technologies and technology combinations are to be used to integrate renewable energy and sector coupling into the post-mining landscape in a demand-oriented and regionally compatible manner. Among other things, noise barriers with integrated photovoltaics, agri-photovoltaics and agrothermics are being taken into account. The feasibility study on the "Innovationspark Erneuerbare Energien Jüchen " is being funded by the Ministry for Economic Affairs, Innovation, Digitalization and Energy of the state of North Rhine-Westphalia through the Immediate Structural Change Program for the Rhenish Mining Area.

Professor Bhandari won the TH Köln science prize 2021



Photo: Thilo Schmülgen/TH Köln

Link: https://www.th-koeln.de/hochschule/th-koeln-ehrt-forschende-fuer-herausragende-leistungen_81977.php

Publication of Interest

"Modellierung und Evaluierung eines PV-Diesel-Hybrid-Systems für ein Krankenhaus in Ghana", 36. PV-Symposium 18.-26.Mai 2021, online, Tagungsband ISBN 978-3-948176-14-3, S.348

Newsletter

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In Ghana ist im letzten Jahrzehnt der Strombedarf gegenüber der Stromerzeugung deutlich gestiegen, mit dem Resultat, dass die Stromversorgung aktuell sehr instabil ist und es häufig zu Stromausfällen kommt. Aus diesem Grund verwenden Gesundheitseinrichtungen vor Ort häufig Dieselgeneratoren, um im Falle eines Stromausfalls die Versorgung sicherzustellen. Das Projekt Energy-Self-Sufficiency for Health Facilities in Ghana (EnerSHelf) sucht nach Strategien, die Dieselgeneratoren aus Umwelt- und auch aus wirtschaftlichen Gründen durch einen Batteriespeicher und eine Photovoltaikanlage (PV-Anlage) zu ersetzen oder zu ergänzen. In unserem Beitrag stellen wir das Modell eines netzintegrierten PV-Diesel-Hybrid-Systems vor. Das Modell baut auf einem bereits bestehenden Simulationstool der TH Köln auf und wurde im Rahmen dieses Beitrages weiterentwickelt. Auf Basis realer Messdaten zum PV-Ertrag und Stromverbrauch eines Krankenhauses in Ghana, in einem Zeitraum von Februar 2016 bis 2017, wird das Verhalten des Hybrid-Systems für unterschiedliche Szenarien untersucht. Dabei wird der Einfluss von Stromausfällen und saisonalen Unterschieden in der Solarstrahlung auf den Einsatz des Generators und den Autarkiegrad des Systems für verschiedene Batteriegrößen betrachtet. Hierbei liegt ein besonderes Augenmerk auf die meteorologischen und atmosphärischen Besonderheiten in Ghana, wie die Regen- und Trockenzeit, sowie der Harmattan, einem saisonal auftretenden Wind in Westafrika, der viel Staub mit sich führt.

Professor Waffenschmidt held a lecture about Swarm-Grids at IRENEC 2021

Eberhard Waffenschmidt, "Swarm Grids - Distributed power grid control for distributed renewable power generation" Keynote presentation at 11th International 100% Renewable Energy Conference (IRENEC 2021), 20.-22. May 2021

Abstract: A distributed power generation with renewable energies benefits from a distributed control of the power distribution. Here, a proposal for the control of such a cellular power grid structure is made, which is named "Swarm Grid" by the author. The name refers to the



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swarm-like control structure, which implies no master control for the coordination of the grid components. The presentation shows details of the Swarm Grid concept. As exemplary grid components, charging stations of electric vehicles and the background of this use case are presented. First results from a related research project are also be presented, which include methods to estimate the grid's topology from the measurements and then the calculation of voltage and current states in the determined power grid.

Link: http://www.100pro-erneuerbare.com/publikationen/2021-05-Waffenschmidt-IRENEC/Waffenschmidt-Swarm_Grids.htm