Cologne Institute for Renewable Energy

Technology
Arts Sciences
TH Köln

Newsletter

January 2020

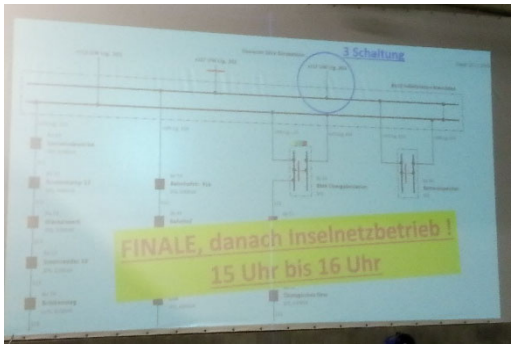
Master Erneuerbare Energien – Master Renewable Energy Management – Bachelor Erneuerbare Energien – Bachelor Elektrotechnik / Studienrichtung Elektrische Energietechnik

Review – What has CIRE been up to over the last months?

CIRE helped Bordesholm become an "island"

Renewable energy systems have to stabilize the power grid in the future. To achieve this, renewable powered subsystems, which are able to balance demand and supply within their local grid and, as an emergency backup option, can run in an island operation is suggested.

The Versorgungsbetriebe Bordesholm (VBB) created a real-world laboratory of the energy transition. Their power grid is locally supplied by 100% renewable energies including photovoltaic (PV) systems (approx. 1.4 MWp) and biomass power plants (2.4 MW). Additionally, the VBB commissioned RES Deutschland GmbH to build a Battery Energy Storage System (BESS) of 15 MWh and 12.5 MW within their utility grid to participate on the frequency containment reserve (FCR) market. However, in emergencies, the BESS should locally control frequency and voltage as a grid former of the power grid in island operation.



On 30 November 2019 the VBB switched its whole medium-voltage power grid for 1 hour on trial to the island operation. Professor Waffenschmidt and PhD student Silvan Rummeny gave scientific support to the VBB project and evaluated the experiments.

After switching off the VBB power grid, the power has been uninterruptedly supplied by the BESS without any disturbances.

The picture shows Professor Waffenschmidt (left) and Frank Günther (right), Managing Director of the VBB, in front of the BESS. These experiments demonstrated a very stable grid-forming operation of the SMA Sunny Central Storage inverters of the BESS and the ability of the utility of VBB to supply their grid and customers in case of an emergency without interruption in an island operation in a manual way.

In a follow up project Professor Waffenschmidt wants to investigate the possibilities of automatic switching due to emergencies.

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https://www.cleanthinking.de/bordesholm-testet-inselbetrieb-erfolgreich-fuer-eine-stunde/

http://www.100pro-erneuerbare.com/blog/2019-12-01-Bordesholm/Batteriespeicher_Bordesholm.htm

CIRE joined a new work group

The "Networks & Storage NRW" network of the Energy Agency of North Rhine-Westphalia has set up a new working group on thermal energy storage under the direction of Professor Dr. habil. Ingo Stadler (TH Cologne) and Dr. Armin Kraft (ENERKO GmbH). The aim of the working group is to bundle actors in the field of thermal energy storage in NRW. The group started its work in September 2019 and will present the results at IRES in March 2020.

Digital Fellows NRW for efficient and digital testing in electrical engineering with Professor May and Professor Waffenschmidt

TH Cologne is awarded three fellowships for innovations in digital teaching. The program is funded by the ministry of culture and science North-Rhine Westphalia (NRW) and the Stifterverband für die Deutsche Wirtschaft. Funding enables spaces and resources for higher education teachers for innovating teaching.

Professor May and Professor Waffenschmidt aim at improving digital testing: They want to develop a tool that allows teachers to create questions and answers in a simplified surface independent of the learning management system. This tool will also improve learning circuit simulation using SPICE. Through improved training students should increase their chances to prepare exams well and at the same time deepen their electrical engineering skills. The tool will be available online as Open Educational Resource (OER) for use in other subjects and disciplines.

https://www.th-koeln.de/hochschule/digitale-hochschullehre-stifterverband-vergibt-drei-fellowships-an-die-th-koeln_70961.php

Energy Supply for Healthcare Facilities in Ghana - EnerShelf

The healthcare sector in Ghana is particularly burdened by the high energy costs and recurring power outages

resulting from the lack of electricity supply. EnerSHelF aims to show that photovoltaic (PV) power can not only contribute to strengthening the Ghanaian national energy system, but do so in a sustainable, cost effective way. The project is funded by the German Federal Ministry for Education and Research under the CLIENT II - International Partnerships for Sustainable Innovation" scheme.

CIRE is one of the 11 expert organizations from industry, the technical disciplines and social sciences to improve and disseminate marketable PV based energy solutions for health facilities in Ghana.

https://enershelf.de/

PhD-Student Magnus Böh successfully defended his doctor's thesis in Berlin

Under the supervision of Professor Andreas Lohner, PhD-Student Magnus Böh defended his doctor thesis using the german title: "Effizienzuntersuchung einer weich- und hartschaltenden Konverterstruktur mit Siliziumkarbid-Halbleitern als DC/DC-Wandler für Hybrid- und Elektrofahrzeuge"

Graduierteninstitut NRW

The new Higher Education Act passed by the state parliament on 11.07.19 provides for a change in the regulations governing doctoral studies. The new Higher Education Act envisages the transfer of the existing Graduate Institute for Applied Research into a doctoral college and the granting of the right to award doctorates to this college following positive assessment by the Science Council. This would mean that for the first time in NRW it would be possible to do a doctorate at a doctoral college run by the universities of applied sciences without the universities having to be involved in any mandatory institutional arrangements.

For the Resources section, CIRE member Ingo Stadler was elected as the group's spokesperson alongside Astrid Rehorek (also from Technical University Cologne) and Ralf Holzhauer (Westfälische Hochschule).

CIRE is present at the "Rheinische Revier"

Mrs. Eisheuer, Professor Schneiders, Professor Waffenschmidt and Professor Blieske participated or actively took part at several regional conferences with a large

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number of stakeholders organizing the energy transition in the "lignite region of the Rhineland".

In the picture shown Professor Blieske is discussing future and current energy projects with Professor Dr. Pinkwart, Minister for Economy, Innovation, Digitalization and Energy of North Rhine-Westphalia.

VISE

In context of the research project "Virtual Institute Smart Energy" (VISE for short) by Professor Schneiders, we held a conference together with the project partners (Forschungszentrum Jülich, University of Duisburg-Essen, University of Münster, Bergische University Wuppertal, Wuppertal Institute and the Energy Economics Institute of the University of Cologne - EWI).

Various stakeholders* from the energy industry were guests. Wulf Pabst from the Ministry of Economics, Innovation, Digitalization and Energy gave the welcoming speech. Furthermore, there was a keynote speech by Prof. Marc Oliver Bettzüge (Director of the EWI). In the further course, current results from the VISE projects were presented and discussed in a stimulating poster session.

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SmartCity Cologne Conference

June 6th, 2019 CIRE was at the Smart City Cologne conference: "The smart city of tomorrow: digital, ecological, social?!

The venue was the Piazzetta of the Historical City Hall of Cologne. Mayor Henriette Reker held an opening speech at Smart City Cologne. This was followed by further exciting presentations and an exhibition with various information stands, where CIRE also presented itself.

There CIRE had a booth where we presented a smart home demonstrator from a research project and a poster of a master student who investigated and compared the accuracy of household energy loggers.

https://www.th-koeln.de/hochschule/mit-guenstigen-energiemessgeraeten-zuverlaessig-strom-und-geld-sparen_66060.php

End-of-year review of the student council Renewable Energy

This year was exciting and full of action.

The student council had their first summer party and a lot of fun with barbecue and homemade salads. The freshmen trip went this year again to Schleiden in a self-catering house. At the scavenger hunt and night hike the freshmen were warmly welcomed.

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The student council participated in many Fridays for Future demos and were full of energy to fight for our future. The most impressive thing was that they ran on November 29th in the first row! But also, the other demos were a complete success.

Student organized excursion

As every year, around 40 students of the third term went on the traditional excursion to the north of Germany.

They visited the Energiekompetenz-zentrum (energy competence centre) in Werlte, the Klimahaus (climate house) in Bremerhaven, the Wesertalsperre, a dam in Bremen and the museum electrum and the Energiebunker (energy bunker) in Hamburg.

It was an extraordinary trip where we learned lots of new things. Especially the climate house in Bremerhaven was impressive, because we got to know many different climate zones around the world and their challenges. Also, the dam in Bremen was very fascinating. We got to go inside to have a look at the shaft and the gigantic ring-generator. The energy bunker in Hamburg contains a 2 million liters thermal storage, standing next to it was awesome.

Thank you, to all people who made this trip possible!

Excursion to the teaching and research center :metabolon

On Tuesday, 02.07.2019, 75 bachelor students of the program Renewable Energy of the Cologne Institute for Renewable Energy (CIRE) visited the teaching and research center :metabolon. The excursion took place for the students in the 6th semester as part of the module "biogas production" of the CIRE study course of Professor Rieker.

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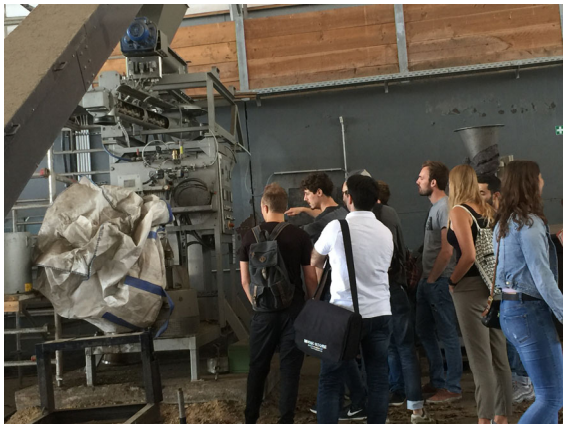
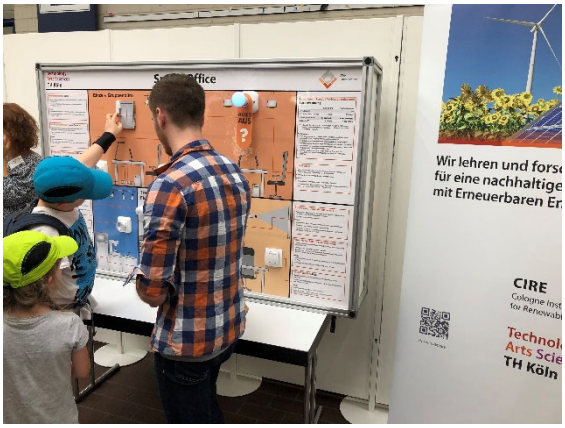


After a lecture by Professor Rieker about the background of the former landfill Leppe and the development towards a teaching and research center, the students were introduced to the experimental and pilot plant facilities in the research halls by the scientific assistants Dr. Jamile Bursche, Dipl. Ing. Thomas Mockenhaupt and M. Sc. Patrick Beuel. In addition, the students gained insights into current research projects. The aim of the excursion was to directly link theory and practice in the field of biogas production - preparation, pre-treatment and fermentation of a wide variety of biomass for the production of biogas. In addition, the students were shown how residual and waste materials can be used and under which conditions different material flows can be combined and material cycles closed. During a walk to the top of the landfill site, the students were also able to understand how science and practice are dovetailed at the site.

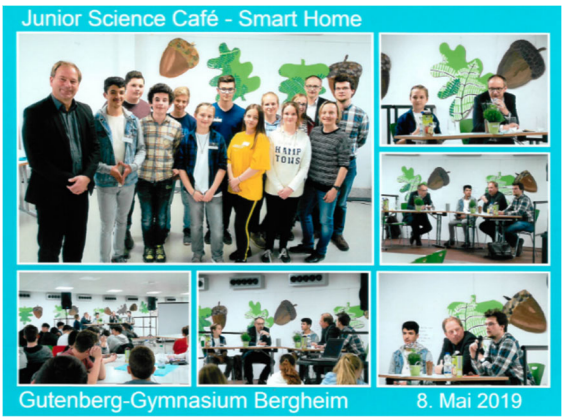
https://www.bavweb.de/Kurzmen%C3%BC/Startseite/Exkursion-des-CIRE-zum-Lehr-und-Forschungsstandort-metabolon.php?object=tx,2886.5&ModID=7&FID=2886.844.1

Night of Technology - Nacht der Technik 2019

CIRE presented a Smart Home Demonstrator for an office and textured photovoltaic solar glass for the young and interested at the night of technology.



Junior Science Café im Gutenberg-Gymnasium in Bergheim



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CIRE colleague and former Student Fabian Geßner was invited to discuss with high school students about Smart Home and the research of TH Köln.

EU PVSEC 2019

Six students of the Cologne Institute of Renewable Energy, PhD Student Lionel Clasing and Professor Ulf Blieske took part at the 36th EU PVSEC in Marseille, the biggest scientific conference in the field of photovoltaics in Europe.

One of the students, Eva Grommes, was interviewed regarding the value of the conference for her studies in Cologne and is now present on the major summary of the conference:

https://www.youtube.com/watch?v=X3wYNzR7EBY

Furthermore, she gave a scientific talk in a session on building integrated PV with more than 200 participants.

Sustainable Development of Energy, Water and Environment Systems Conference SDEWES

The 14th SDEWES Conference took place in Dubrovnik from 1-6 October 2019. The CIRE of the TH Köln is co-organizer of the conference and had for the first time more than 600 participants. Professor Dr. habil. Ingo Stadler (Co-Chair of SDEWES ISC for Western Europe) gave a keynote speech with the topic "Scientists using YouTube and other social media to foster sustainable development of Energy, Water and Environment Systems (SDEWES)".

CIRE will host the next SDEWES Conference 2020

https://www.cologne2020.sdewes.org

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8th International Energy & Sustainability Conference 2019 - October 17th and 18th at State University of New York in Farmingdale

The conference was opened on 17.10.19 with a lecture on current and future developments in photovoltaics by Professor Dr. Ulf Blieske. Afterwards Eva Grommes reported on the positive effects of photovoltaics on education and employment in Senegal. On the second day of the conference, Dr. Jamile Bursche and. M. Sc. Patrick Beuel successfully presented current results of the :metabolon subproject "Cascade Utilization of Residual Biomasses". The following discussions showed that there is a great interest in :metabolon and in research on alternative biomass sources, such as lignocellulose, for sustainable energy and fuel production.

Professor Dr. Ulf Blieske - Current and future trends in photovoltaic technology

Eva-Maria Grommes - Influence of Photovoltaic Installations on Employability and Education in Senegal

Dr. Jamile Bursche - Lignocellulosic Biorefineries: Adding compost improves the biogenic catalysis of wheat straw

Patrick Beuel - Comparative Life Cycle Assessment of pretreatment processes for the production of biofuels from lignocellulosic residues

CIRE hosted two lectures for the Public Climate School – 25.11.19 + 27.11.19

On the 25th Professor Waffenschmidt held an interesting lecture on „Renewable Energy – We are being betrayed with the truth“. Not one seat or even step to sit on stayed free.

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http://www.100pro-erneuerbare.com/publikationen/2019-11-Waffenschmidt-Public_Climate_School/Waffenschmidt-Mit_Wahrheit_betrogen.htm

On the 27th Professor Blieske held a lecture about the future of photovoltaics and Professor Stadler held a lecture with the question if we have enough energy storage for the energy transition.

CIRE is looking for new colleagues

Soon CIRE will be looking for new colleagues. In case of interest please check the Webpage of TH Köln.

https://www.th-koeln.de/hochschule/stellenangebote_3843.php

CIRE on tour

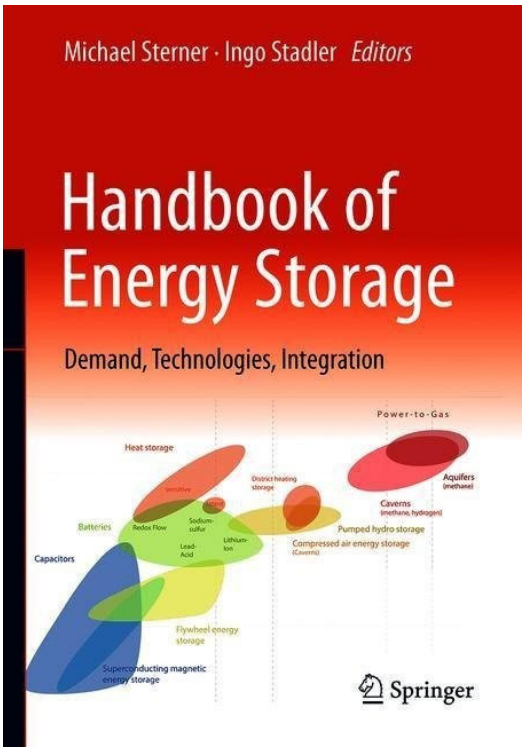
- Professor May @ 3rd PLATE 2019 Conference (Product Lifetimes and the Environment), Berlin 18-20.08 on ecoefficiency of electrical vehicles.

https://www.researchgate.net/publication/335967277_Influence_of_usage_patterns_on_ecoefficiency_of_battery_storage_systems_for_electromobility_and_home_storage

- Professor May @ Tag des guten Lebens in Cologne-Ehrenfeld 15.08.

Recent publications of interest

https://www.springer.com/gp/book/9783662555033



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CIRE lecture series (CIRE-Vortragsreihe)

In the course of the CIRE lecture series we will be able to introduce the following guest speaker:

22.4. – Carolin Märker – Forschungszentrum Jülich (Institut für Energie- und Klimaforschung)

CIRE is on Facebook: @cire.thkoeln