

Energy Research in the Oldenburg Region

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奥尔登堡地区的能源研究





Energy Research in the Oldenburg Region

30 years ago Oldenburg University was among the first European universities to recognize the importance of renewable energy research as a major challenge for the future. Over the years this developed into an energy research cluster in Northwestern Germany, which comprises not only the university but also other research institutions and companies developing modern, efficient and climate friendly energy systems. Energy research also plays a major role in teaching at Oldenburg University. Many courses in information technology, physics or economics put an emphasis on energy issues and provide a diverse and attractive study environment for motivated and committed students (and future teachers), post-graduates and scientists.



Photovoltaics Group Energy and Semiconductor Research Laboratory



Our research group focuses on three novel concepts of thin film photovoltaics: Solar cells based on solution-processed organic and hybrid semiconductor blends and the more mature thin film concepts based on CIGS compound semiconductors. Our interdisciplinary research comprises fundamental studies of functional materials relevant for thin film photovoltaics, application oriented analytics on the device level as well as the development of solution-processed thin film solar cells based on organic semiconductor blends and inorganic nanoparticles (CdSe, CdTe, CuInS₂, Cu₂ZnSn(S,Se)₄).

University of Oldenburg
Department of Physics
Energy and Semiconductor
Research Laboratory

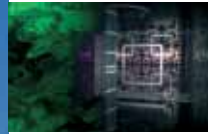


<http://ehf.uni-oldenburg.de/pv>



ForWind

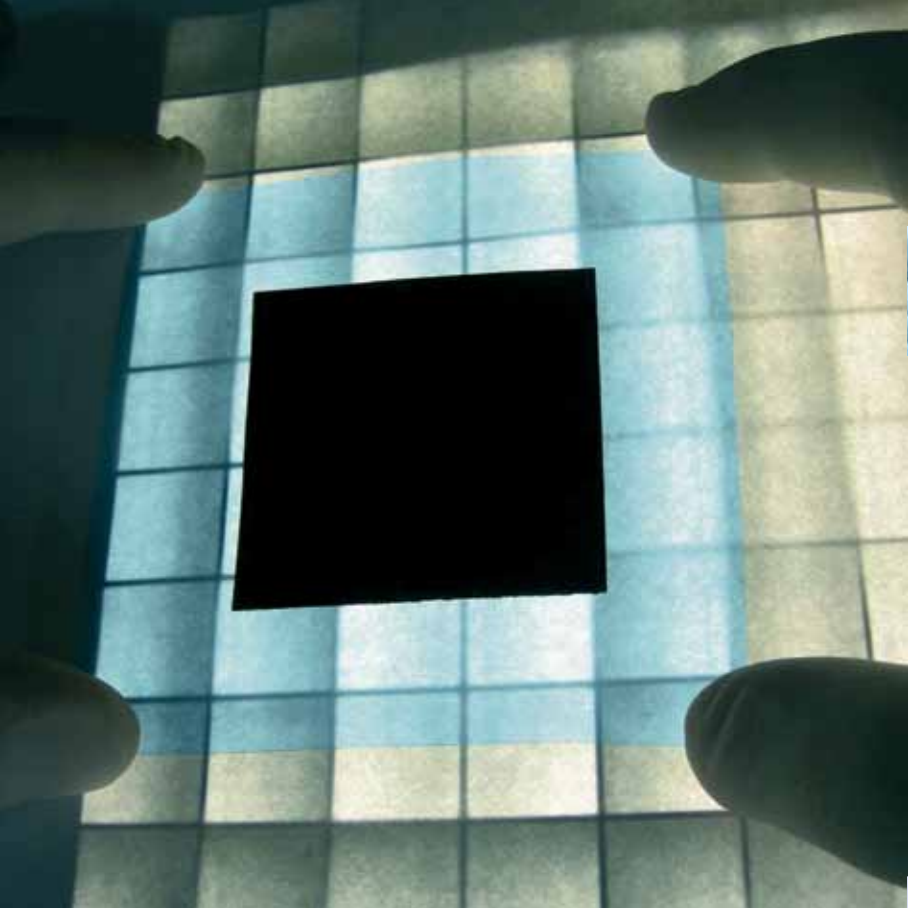
Center for Wind Energy Research



ForWind, the Center for Wind Energy Research of the Universities of Oldenburg, Hannover and Bremen, backs modern developments in the wind energy industry with basic scientific and engineering research. The scientific spectrum of ForWind in Oldenburg ranges from energy meteorology and turbulence research to innovative modeling of wind energy converters and their integration into the power grid. Additionally, ForWind arranges scientific conferences and workshops.

ForWind 
Center for Wind Energy Research

www.forwind.de



NextEnergy

Research for Tomorrow's Energy



NEXT ENERGY -EWE Research Center for Energy Technology focuses its research activities on the technology fields of photovoltaic, fuel cells and energy storage. Our application-oriented and interdisciplinary research fields range from new materials to the development of systems. As an associated institute of the Carl von Ossietzky University of Oldenburg, NEXT ENERGY is located on the natural sciences campus of the university. The primary supporter of the institute is the company EWE AG, along with the University of Oldenburg and the state of Lower Saxony, Germany.

NEXT ENERGY

EWE-Forschungszentrum für
Energietechnologie e.V.

www.next-energy.de



Institute for Information Technology ICT for Energy Efficiency and Energy Management



The Oldenburg computer science towards an “energy management of the future” attends to essentially three theme fields. Vertical and horizontal IT-integration from market level to facilities level, minimizing integration and transaction costs by standardization, platforms of participation for new actors – in particular smaller users and suppliers – on the energy market, as well as a coordination of distributed generators and consumers to balance supply and demand. Another field is to make ICT more energy efficient. The major part of the energy consumption of ICT falls upon the backend infrastructure, especially at the data centers. Under the title “Intelligent Data Center” innovative highly dynamic system management solutions are developed at OFFIS, adjusting the power consumption of a data center according to the current workload.





Fraunhofer Institute for Manufacturing Technology and Applied Materials Research



A new project group has been established focusing on energy storage systems to extend the practical driving distance of electric vehicles. The RD-topics are addressing non-LIB energy storage systems, e.g., metal-air batteries, which are promising candidates due to their huge energy densities that can theoretically be achieved. The research focuses on new materials and cell design concepts for an increased energy density and improved cycle life. Advanced integrated processes for nanoscale materials based on Li-, Zn-, and Si-electrochemistry are further developed including the implementation of these materials for electrical energy storage systems.



Energy Research Think Tank for the Northwest: The Hanse-Wissenschaftskolleg

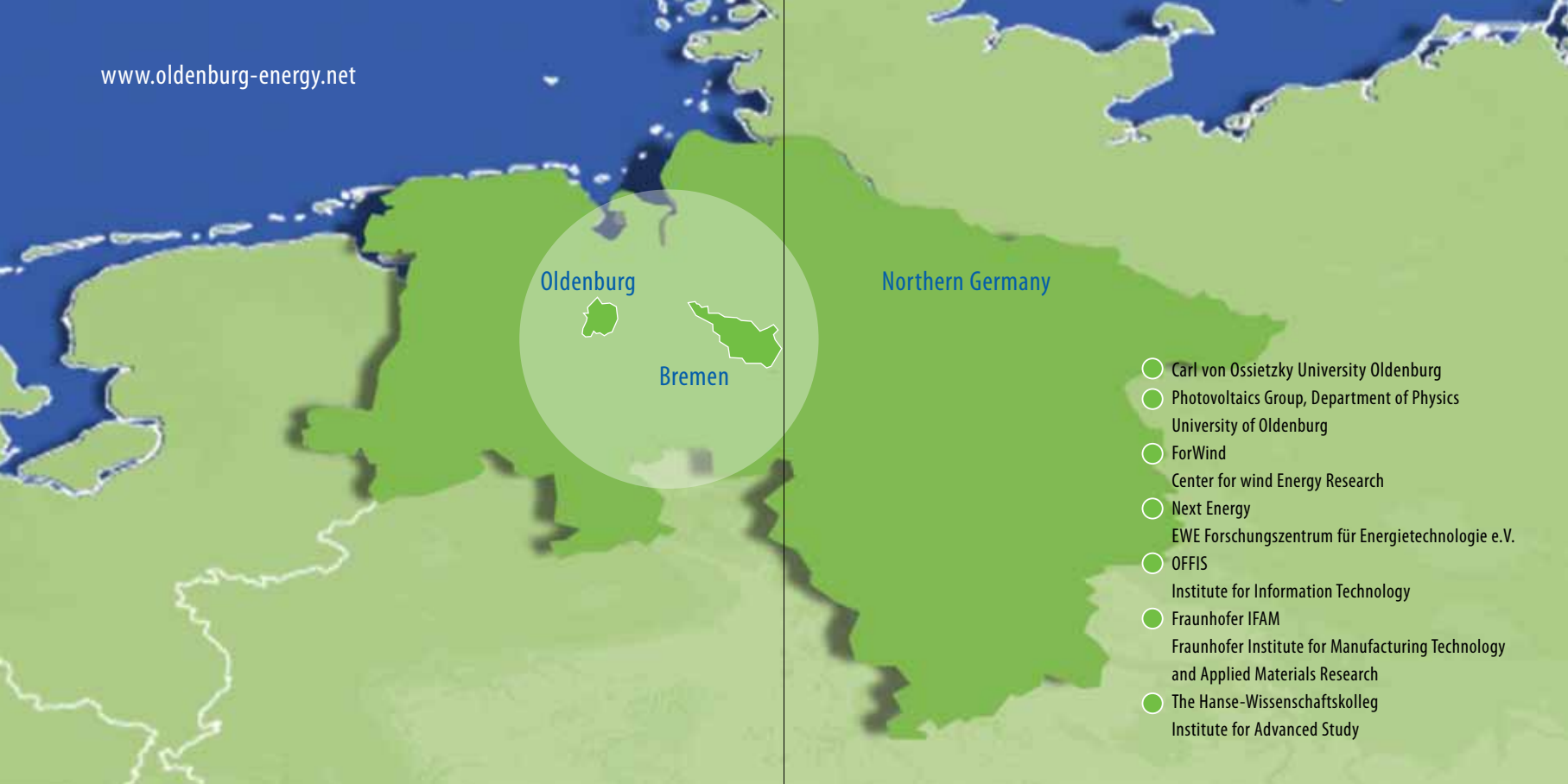


Energy Research is first and foremost the exploration of regenerative energy production, both at present and in the future. Given that planning for the future is one of the most distinguished functions of an Institute for Advanced Study, Energy Research is a central topic for the Hanse-Wissenschaftskolleg. In addition to collaborations and academic networking with the respective universities and non-university institutions and research groups in the field of Energy Research, the primary role of the Hanse-Wissenschaftskolleg is to put together thematically focused, interdisciplinary fellow groups that spur energy research with new motivation, ideas and results.



Hanse-Wissenschaftskolleg
Institute for Advanced Study

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Oldenburg

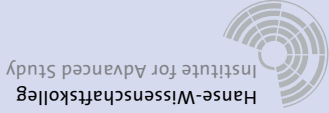
Bremen

Northern Germany

- Carl von Ossietzky University Oldenburg
- Photovoltaics Group, Department of Physics
University of Oldenburg
- ForWind
Center for wind Energy Research
- Next Energy
EWE Forschungszentrum für Energietechnologie e.V.
- OFFIS
Institute for Information Technology
- Fraunhofer IFAM
Fraunhofer Institute for Manufacturing Technology
and Applied Materials Research
- The Hanse-Wissenschaftskolleg
Institute for Advanced Study

西北能源研究智囊机构： The Hanse-Wissenschaftskolleg (HWK)

能源研究的首要任务是对当前和未来的可再生能源生产进行探索。鉴于规划未来是高等研究机构最突出的职能之一，能源研究是HWK 高等研究院的中心议题。除了与各大学及非大学附属研究机构以及科研团队在能源研究领域进行合作并构建学术联系网络，HWK 的主要职责是将主题集中的跨学科成员团队组织在一起，激励具有新动机，新思路和新成果的能源研究。



www.h-w-k.de



为延长电动车量的实际行程，新成立了一个以能源储存系统为研究重点的项目组。项目的研发对象是非锂离子电池能源储存系统，如金属空气电池。由于其理论上可以达到巨大的能量密度，这类电池是能源储存系统很有前途的候选对象。为提高能量密度并延长电池循环寿命，研究的重点是材料及电池设计概念。同时，进一步发展基于锂、锌、硅电化学纳米材料的先进集成工艺，其中还包括这些材料在电能储存系统的应用实施。



信息技术研究所：能源效率和能源管理的 信息和通信技术

面向“未来能源管理”的奥尔登堡大学计算机科学主要致力于三个主题领域：从市场层面到设备层面的纵向及横向信息技术整合。



小的用户和供应商）的参与平台以及生产者和消费者分布的协调以平衡供求关系，最大程度地降低整合及交易成本。另外一个领域是要使得信息和通信技术更为节能。信息和通信技术能源消耗的主要部分在于后端设施，特别是数据中心。以“智能数据中心”为题，在OFFIS开发了创新性的高动态系统管理解决方案，可根据当前工作负载调整数据中心的电能消耗。



www.offis.de



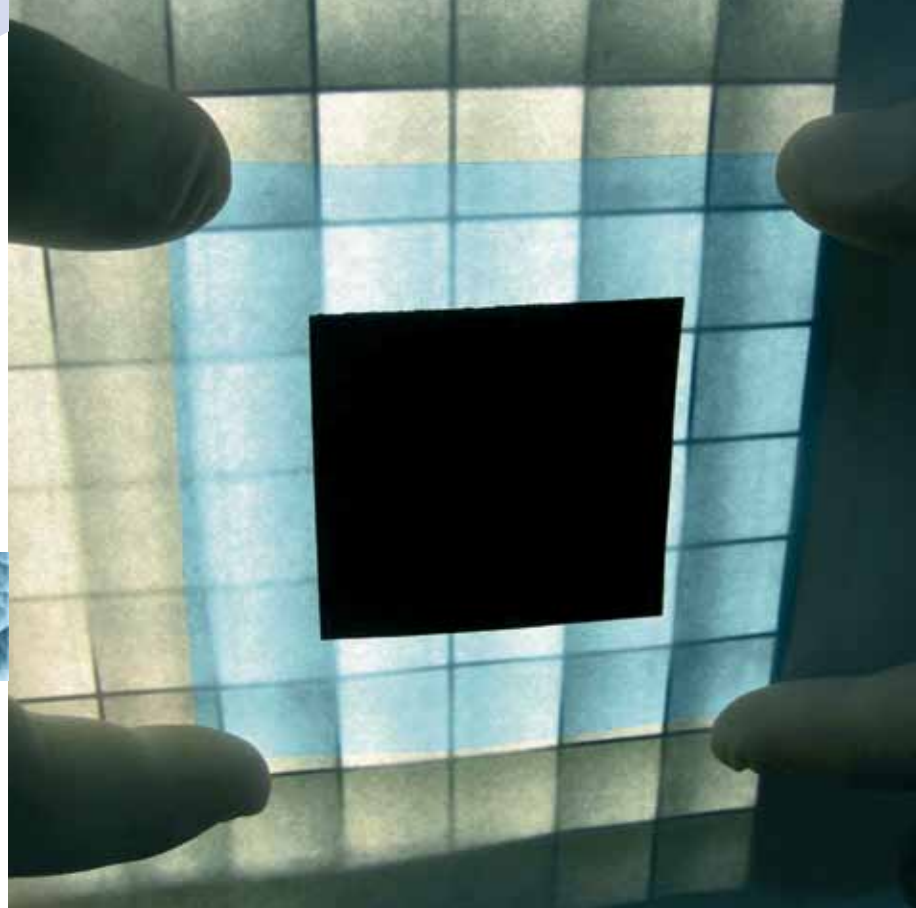
NextEnergy: 研究明日之能源

NextEnergy (EWE 能源技术研究中心) 的研究集中在光伏电池、燃料电池及能量储存等技术领域。我们以应用为导向的跨学科研究涵盖了从新材料到系统开发的范畴。作为奥尔登堡大学的联合研究所, NextEnergy 位于奥尔登堡大学的自然科学校区。研究所的主要支持者是埃维公司 (EWE AG), 同时还包括奥尔登堡大学和德国下萨克森州。



NEXT ENERGY
EWE-Forschungszentrum für
Energietechnologie e.V.

www.next-energy.de



ForWind: 风能研究中心

ForWind 是奥尔登堡大学，汉诺威大学及不来梅大学风能联合研究中心。它通过基础科学及工程的研究，促进风能产业的现代化发展。地处奥尔登堡的 ForWind 的科学研究领域包括能源气象学及湍流研究，风能转换器的创新模型及其与电网的整合。此外，ForWind 也组织安排学术会议和专题研讨会。



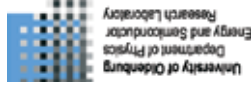
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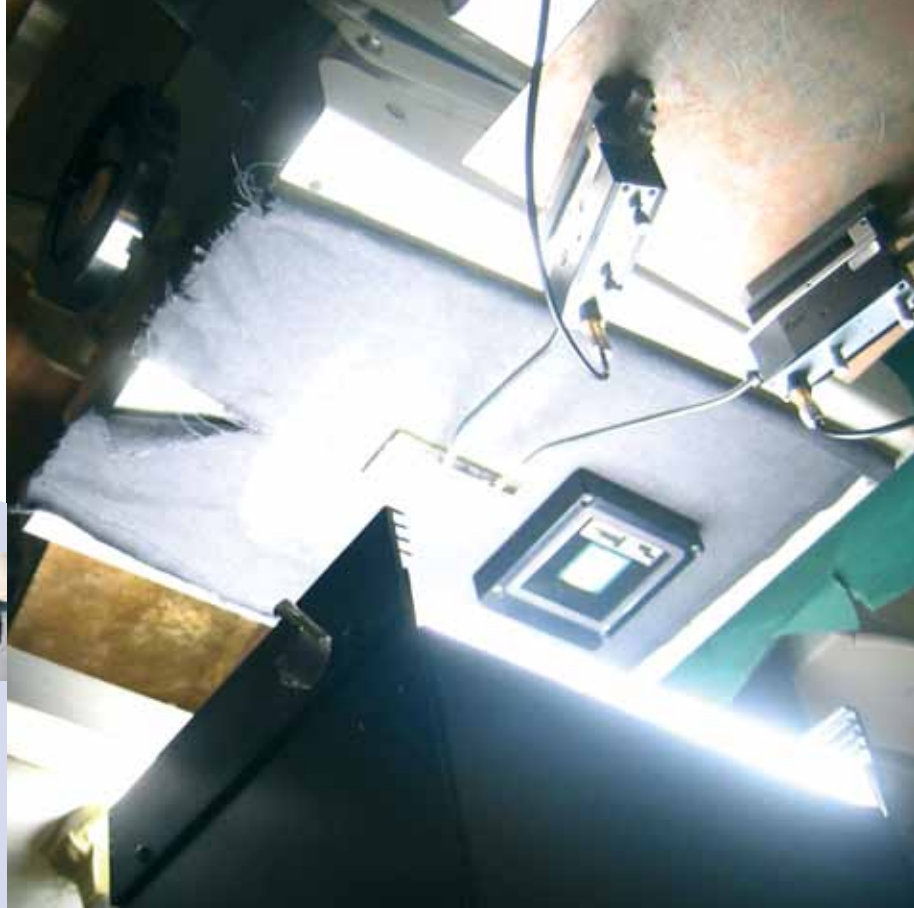
能源与半导体研究室 光伏电池科研团队



我们的科研团队关注薄膜光伏电池的三个新概念：基于溶剂制程有机物的太阳能电池，基于杂化半导体共混体系的太阳能电池，以及更为成熟的基于铜铟镓硒 (CIGS) 化合物半导体的薄膜概念。我们的跨学科研究包括薄膜光伏电池功能材料的基础研究，面向应用的仪器分析技术，以及基于有机半导体共混体系和无机纳米颗粒 (CdSe, CdTe, CuInS_2 , $\text{Cu}_2\text{ZnSn(S,Se)}_4$) 的溶剂制程薄膜太阳能电池。



<http://ehf.uni-oldenburg.de/pv>



奥尔登堡地区的能源研究

30年前，奥尔登堡大学是最早认识到对未来提出重大挑战的再生能源研究重要性的欧洲大学之一。经过数年，在德国西北地区已经发展起来一个能源研究群体。它不仅包含奥尔登堡大学，同时也包含开发现代、高效和气候友好型能源系统的其他研究机构和公司。能源研究在奥尔登堡大学的教学中也起到了重要的作用。信息技术、物理和经济学在许多课程都强调能源问题，并为具有动力和积极性的学生（及未来的教师）、研究生和科学工作者提供一个多样化和有吸引力的学习环境。

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