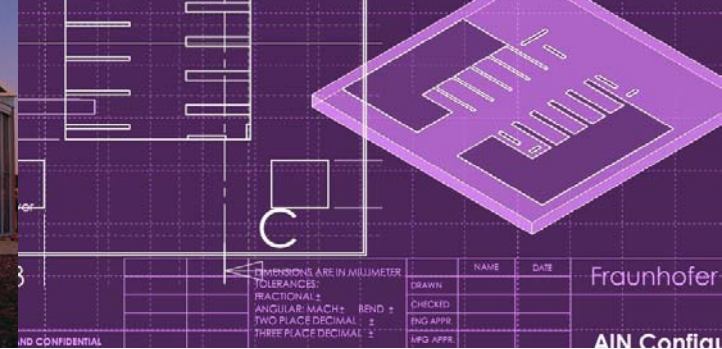


THE CENTER

Located within walking distance of the MIT campus, the **Center for Sustainable Energy Systems (CSE)** is a non-profit contract research center dedicated to serving the needs of the sustainable energy industry.



What Makes the CSE Unique?

Fraunhofer CSE offers a wide range of applied research services to companies interested in exploring innovative cleantech applications. Thanks to connections and partnerships with institutions like MIT and Germany's renowned Fraunhofer Institute for Solar Energy Systems ISE, the Center's in-house expertise is supplemented by a pool of world-class talent on both sides of the Atlantic. Our activities are concentrated in three major areas:

Solar Module Innovation

The Module Innovation Group works with industry towards the next generation of module design. Objectives include:

- **Process development** for integration of novel materials into thin film and crystalline silicon modules.
- **Module durability** extended beyond 25 years.
- **Increased energy yield** through enhanced light capture, lower module temperature and improved electrical performance.
- **Full sized module fabrication** and advanced testing lab from August 2009.

Capabilities

- **Module energy yield** under various lighting conditions using a customized AAA level solar simulator.
- **Failure analysis** using EL and IR imaging and facilities at MIT's Center for Materials Science and Engineering.
- **Environmental testing** including damp heat, thermal cycling, UV and freeze-humidity as per IEC 61215 and 61646.

Building Efficiency

The Building Efficiency Group works with companies to develop practical and sustainable building products, and provides third-party energy and durability performance measurements in laboratory and building environments.

Together with the Fraunhofer Institute for Solar Energy Systems ISE and Institute for Building Physics IBP, we form the Efficient Buildings Alliance, an international collaboration of over 300 building scientists.

Capabilities

- **Building Integrated PV:** Develop and test products that reduce installed cost and provide genuine dual functionality.
- **Solar Thermal Collection & Storage:** Heating, cooling and dehumidification.
- **Daylighting Systems:** Analysis, development of advanced, interactive daylighting and thermal management systems with automated controls.
- **Integrated Analysis & Monitoring of Low Energy Buildings:** Study performance to achieve comfortable designs that last.
- **Building Envelope & Moisture Performance:** Component and system-level hygrothermal testing, mold growth analysis and prevention, advanced insulation concepts.

Energy Device Prototyping

The Prototyping Group provides clients access to facilities and expertise to help them turn their designs into reality. We allow innovators to focus on their core ideas without being slowed down by the need to establish infrastructure or bring on specialized manpower. Our vast network allows efficient and highly leveraged use of time and resources.

Capabilities

We maintain a large variety of test equipment, including a CW solar simulator for cells, a pulsed simulator for modules, semi-auto probe station and associated electronics, wire bonder, microscopes, and FEA/CFD modeling workstations.

Access to more specialized equipment is available through Fraunhofer's 17,000-strong worldwide network of engineers and scientists.

Alliances and Partnerships

As a member of the Fraunhofer Energy Alliance, the Fraunhofer CSE is linked into Germany's most cutting-edge research in areas ranging from intelligent energy nets to building technology.

The Center has also begun the process of establishing an Industry Alliance to build closer ties with members of the US cleantech industry. Aside from inaugural Alliance member National Grid, the Fraunhofer CSE is supported by a number of governmental and academic bodies, including the MIT Energy Alliance, the MIT Department of Mechanical Engineering, and the Massachusetts Technology Collaborative.



About Fraunhofer

For more than 50 years, Germany's **Fraunhofer Society (FhG)** has been at the forefront of research and commercialization of new technologies in Europe.

At current, the Society operates 80 institutes and centers worldwide. Contract research makes up the majority of the Society's €1.4 billion annual research budget, with the remainder being paid for by state and federal funding.

Under the "Fraunhofer Model", each center strives for excellence in one particular area of applied sciences, allowing the Society to offer clients deep, focused research in a variety of fields. Today, centers run the gamut from applied polymer research to toxicology and experimental medicine.

The CSE is both one of the newest members of the Fraunhofer family and the first US-based center devoted to the increasingly pressing issue of renewable energy.

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OVERVIEW

