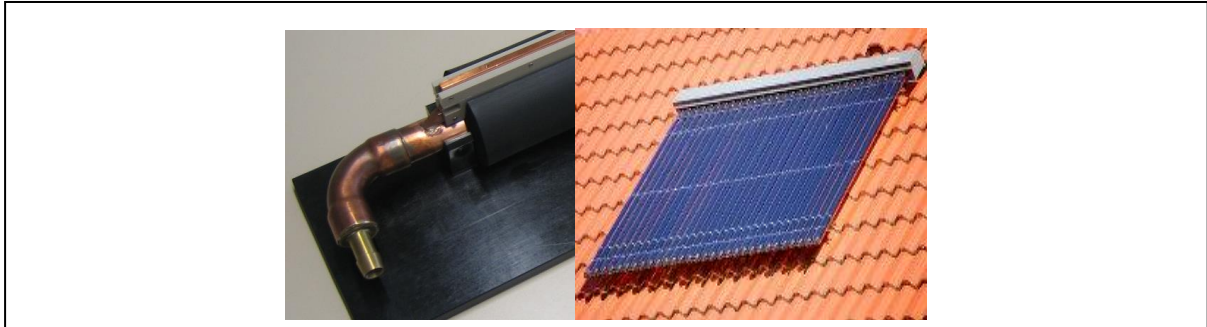


## Access provider – Fraunhofer IMS

### Energy Harvesting and System Integration - Access description

#### Thermoelectric Generator Testbed

Access to the environment for design, simulation, test-environment of TEG-harvesters. Within the physical lab and inHaus-Centre facilities the verification and validation can be performed.



#### Technical offering

- Support of thermal simulation in modelled environments incl. training
- Design of thermal / mechanical constructions
- Design and prototype realization of mechanical construction
- Functional and performance testing in physical lab of Fraunhofer IMS
- Consultancy of applying norms and regulations for microelectronic circuits and radio equipment

#### Main equipment

- Simulation environment with libraries
- Design tools
- Heating and cooling test equipment
- Mechanical workshop
- Rapid prototype circuit realization by milling plotter
- Test equipment for measurement in time and frequency domain
- Climatic chamber
- Electronic design automation software
- Electromagnetic field simulation software

#### Typical applications

The physical principle of Seebeck effect, used in thermoelectric generators becomes more and more popular with new MST processes with allow a cost-efficient production of TEGs. Typical applications can be found in sensor devices for industrial automation, where a heat-flow between a hot and a cold terminal can be used as power source.


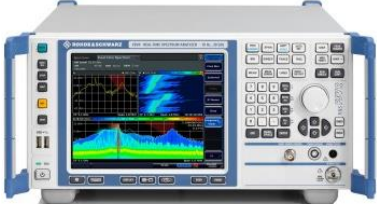
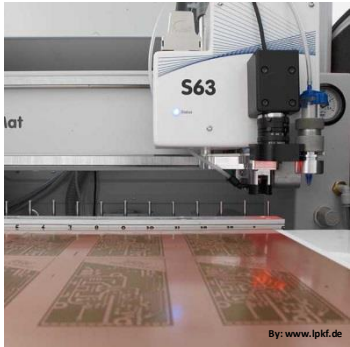
## Case study

A development department is going to evaluate new concepts for maintenance free IOT devices by the use of thermoelectric generators but they need access to design and measurement equipment to test this. EnABLES will provide access to the facilities required. A typical project will offer 10 days access to the Fraunhofer IMS researchers and equipment required.

### Responsible

Dr. Gerd vom Bögel



	 <p>By: www.rohde-schwarz.com</p>	 <p>By: www.lpkf.de</p>
<p><b>Recirculating Chiller Heater Water Bath / LAUDA</b></p>	<p><b>High Frequency Measurement Equipment / Keysight, R&amp;S, Anritsu</b></p>	<p><b>Milling plotter / LPDF S63</b></p>
<p><b>Keys specifications</b></p>		
<ul style="list-style-type: none"> <li>• Regulated temperature - 30 to 100 °C +/- 0.01 °C</li> <li>• Testautomation equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Signal-Generator, Oscilloscope, Network- &amp; Spectrum-Analyser up to 110 GHz</li> <li>• Wideband baseband and RF</li> </ul>	<ul style="list-style-type: none"> <li>• Fully automatic</li> <li>• High speed milling</li> <li>• High resolution</li> </ul>