



SPACE  
FOR BUSINESS  
BUSINESS  
FOR SPACE



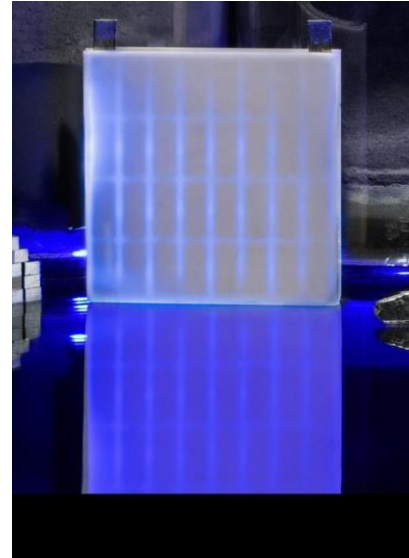
## TECHNOLOGY DESCRIPTION

Thermoelectric energy converters for waste heat utilisation and as an additional power supply. In a thermoelectric energy converter (thermoelectric generator, TEG), thermoelectric materials—usually highly doped semiconductors—operate in a strong temperature gradient between a hot side and a cold side. P- and n-type semiconductor areas with a large cross-section are connected electrically in series and thermally in parallel. They form power thermocouples from which an electrical output voltage can be tapped. An electrical direct current flows when an electrical consumer is connected. Part of the heat flowing into the TEG is converted into electrical energy and is available to the consumer. By connecting numerous elements in series to form so-called TEG modules, the output voltage can be varied in a usable range from a few mV to several hundred volts. The output power can be scaled up to the MW range by suitably coupling numerous modules.



## INNOVATIVE ASPECTS

The technology of thermoelectric generators enables the increase of overall efficiency in energy systems by converting waste heat back into electricity, thereby simultaneously reducing design requirements (lower installed output) and lowering CO2 and pollutant emissions. TEGs, as electrical auxiliary energy generators, are freely scalable; their efficiency does not depend on their size. They enable a grid-autonomous energy supply, preferably in the low and medium power range.



## TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

## COUNTRY OF ORIGIN

Germany

## LATEST UPDATE

06/2024

**TAGS** #energy #converters #thermoelectric #energy harvest #self-sufficient #CO2 reduction

## APPLICATION AREAS

Health      Energy      Electrical & Electronic Engineering      Mechanical Engineering      Safety & Security      Space technologies      Transport & Logistics

# TECH CARD

