Energyville

Sustainable Energy and Intelligent Energy Systems Research

2025 11 26 Genk

Energy Ville

KU LEUVEN vito imec UHASSELT

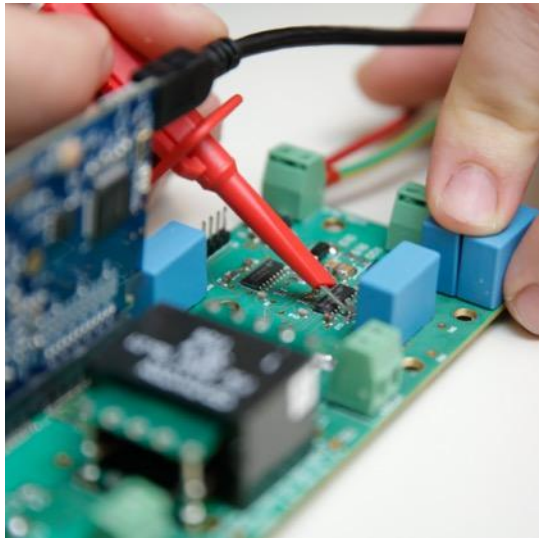
EnergyVille collaboration

Since 2018

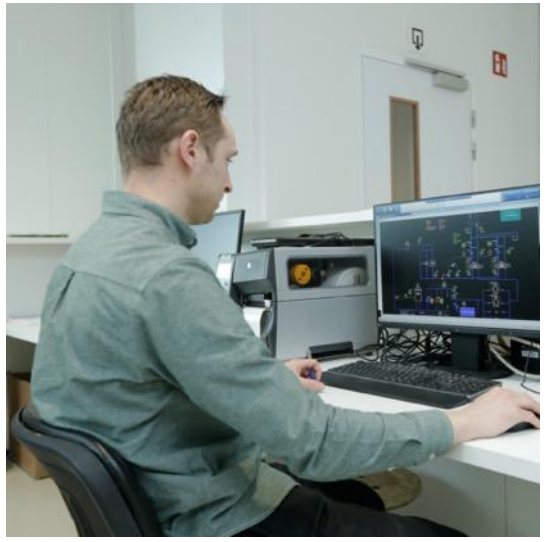
Support & accelerate the transition towards a sustainable energy system

KU LEUVEN vito imec UHASSELT

EnergyVille activities

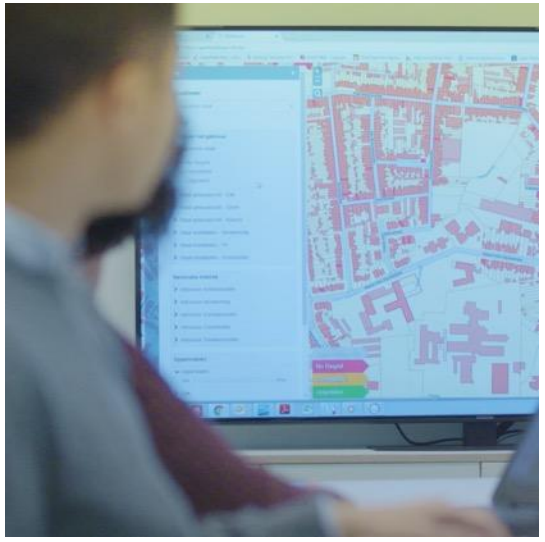


Basic, applied and industry-driven research, both theoretical and experimental



Developing materials, technologies and methodologies resulting in new products and services

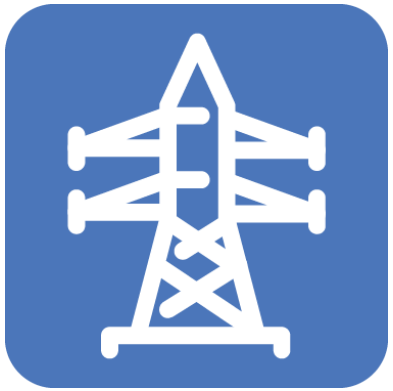
Assisting in human capital development



Giving science-based policy input from local to global level

EnergyVille research topics

Battery storage



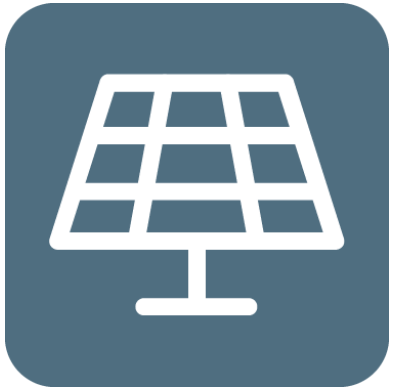
Electrical networks

Energy for buildings and districts

Energy strategies and markets

Power electronics

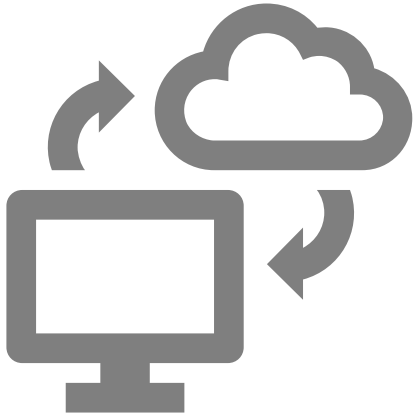
Power-to-molecules



Solar energy

Thermal systems

Transversal themes



Data/AI/modelling

Circularity

Security

Energyville in numbers (2024)

657*
Colleagues

281
PhD students

2
International events at Thor Park

14
EnergyVille representatives at international and national fairs and events

53
Companies active in our Living Lab

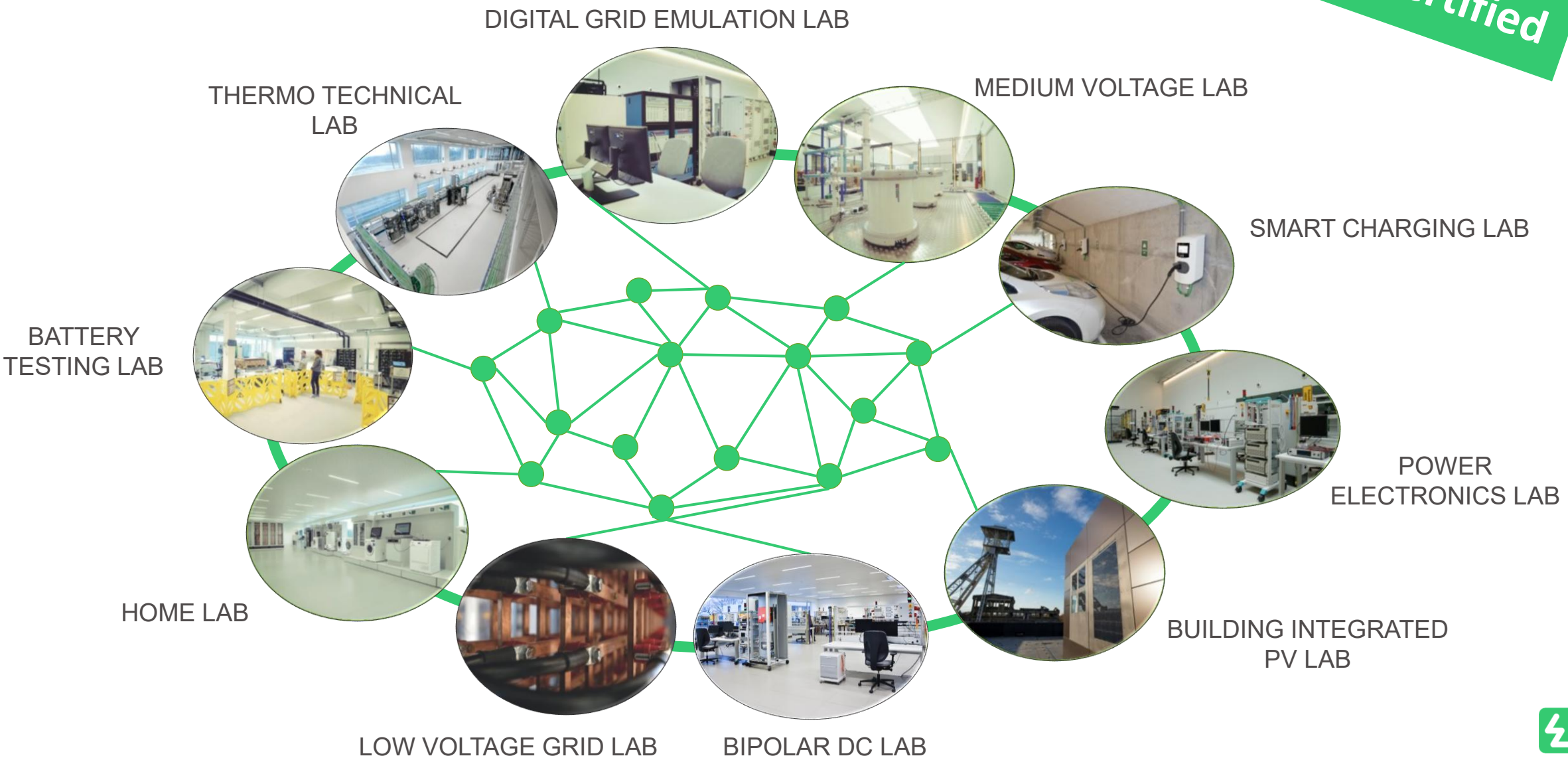
6
New European projects awarded to two or more EnergyVille partners

58
Publications in international journals with two or more EnergyVille partners

*April 2025

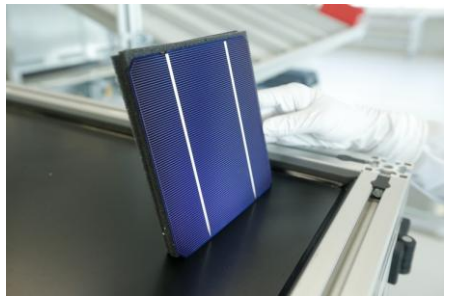
Energy Systems Labs

DIANA certified



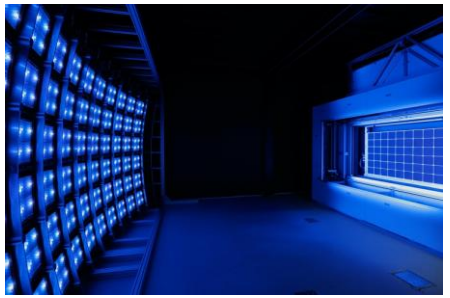
Materials & Devices Labs

Thin film PV Lab



PV solar cell lab

PV module Lab



PV reliability lab

Outdoor PV metrology lab

Indoor PV metrology lab

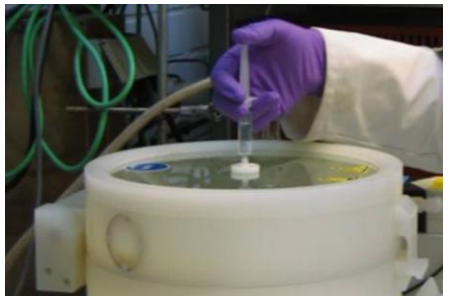
Battery lab

Dry room in the battery Lab

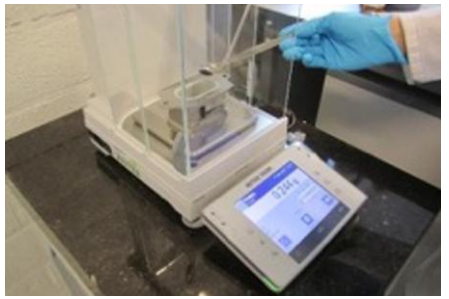
Battery material interface lab

Wind tunnel & soiling lab

Design and synthesis of organic semiconductors

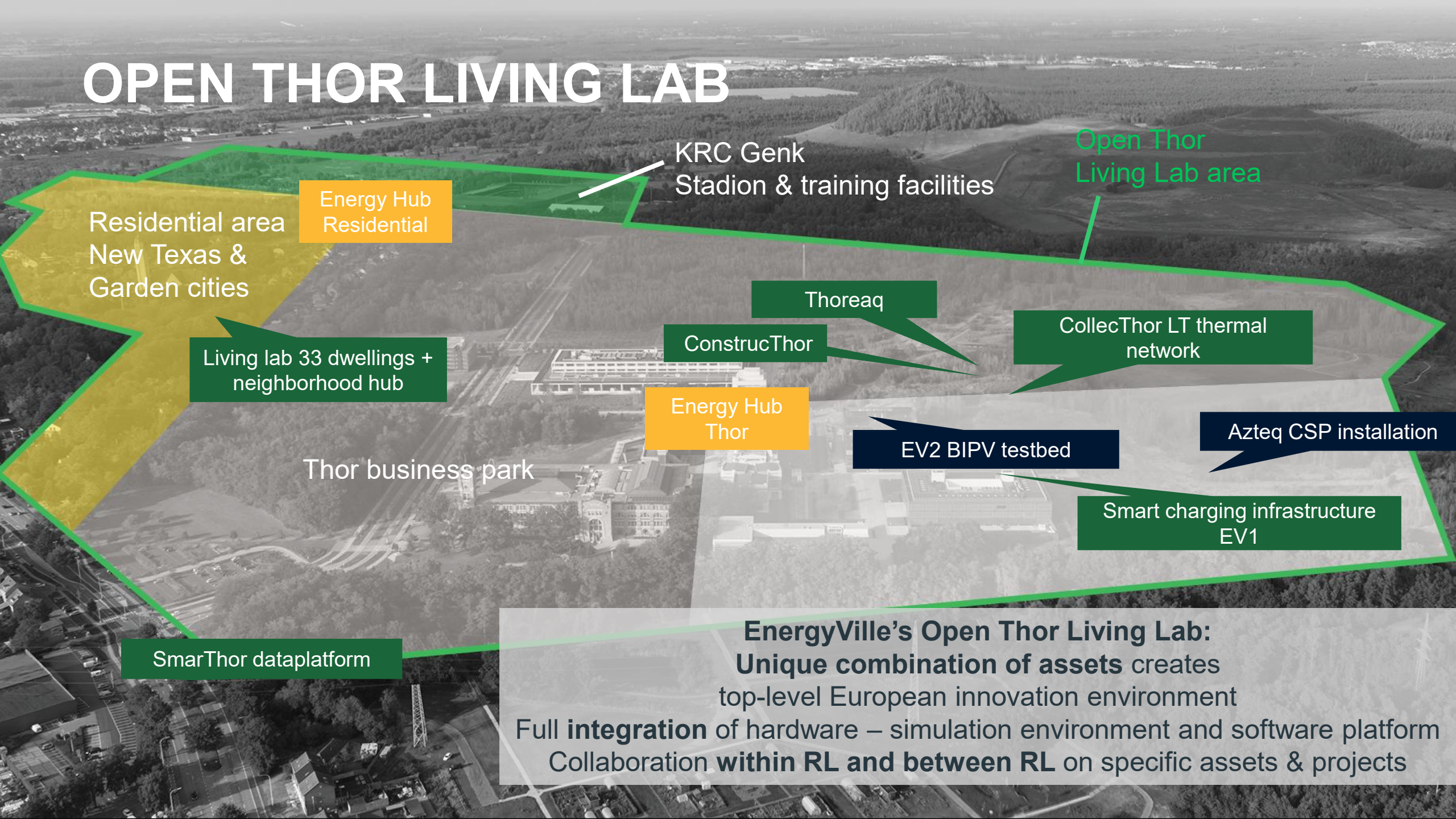


Design and synthesis of inorganic materials



Lab for electrochemical engineering

OPEN THOR LIVING LAB



EnergyVille's Open Thor Living Lab:
Unique combination of assets creates
top-level European innovation environment
Full **integration** of hardware – simulation environment and software platform
Collaboration **within RL and between RL** on specific assets & projects

Energy Ville
ENERGY IN TRANSITION

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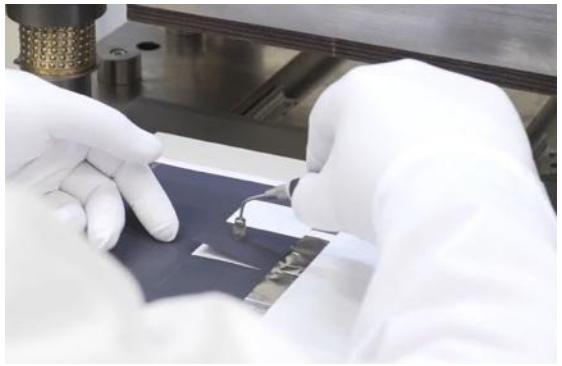
Research topics detailed

Battery storage

New materials for batteries

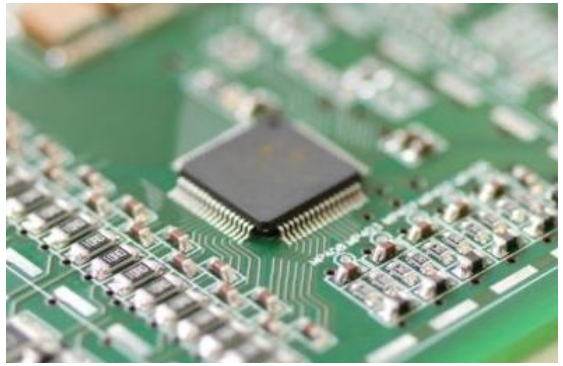
Modelling, characterization and testing of batteries and battery materials



New battery cell architectures

Exploratory cell concepts

New battery concepts

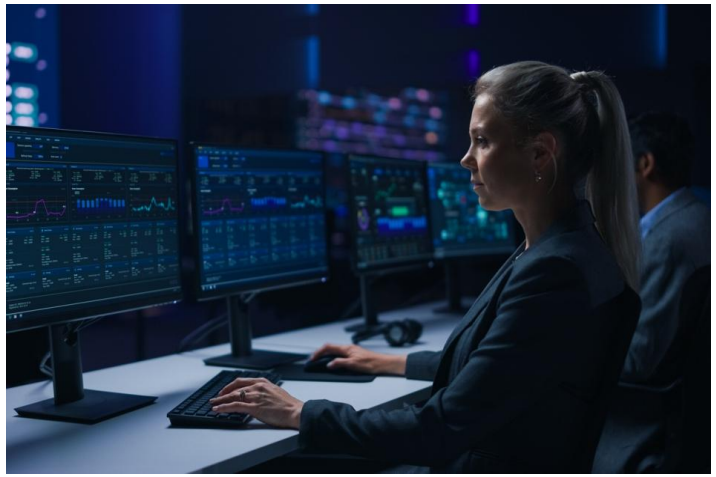


Battery Management Systems

Battery integration support

Electrical networks

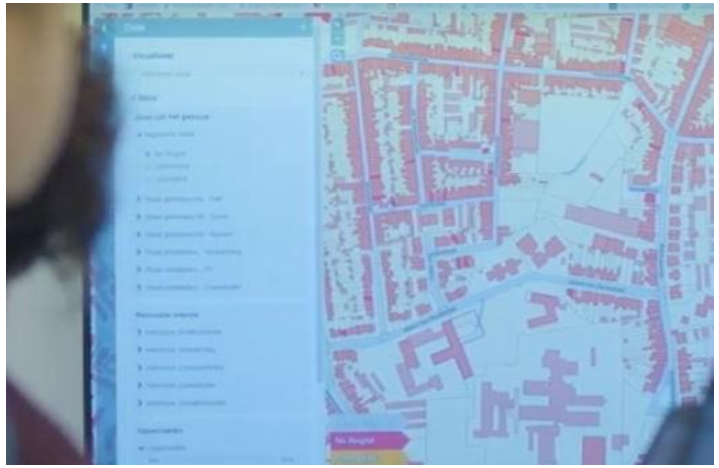
Towards HVDC grids



Decision support for grid operators

LVDC/DC nanogrids

Energy for buildings and districts



Building & energy performance optimisation

Building materials, buildings and energy technology life cycle evaluation

Home energy management systems

Energy strategies and markets

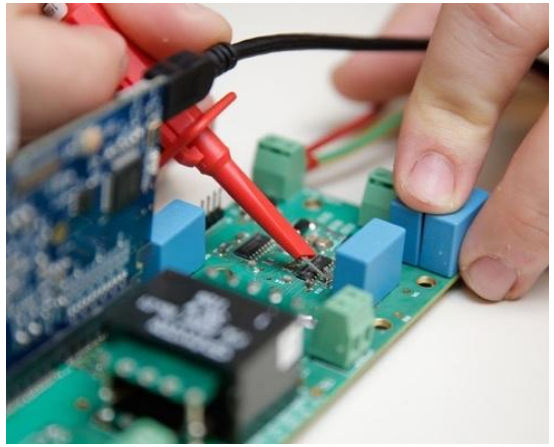
Energy market design

Energy scenarios: long-term energy system planning

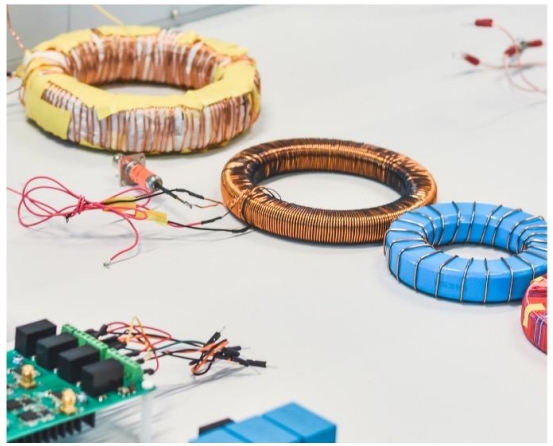
Energy monitoring and policy advice

Interoperable flexibility trading solutions for energy markets

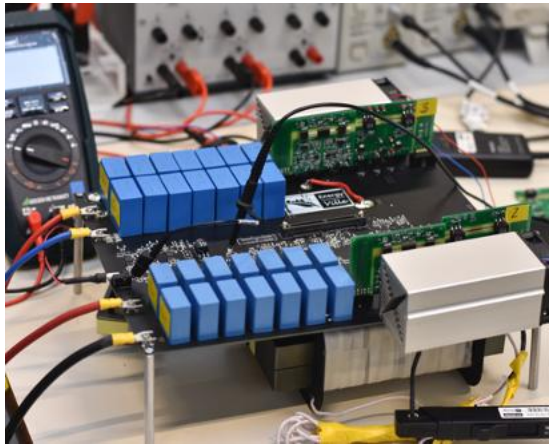
Power electronics



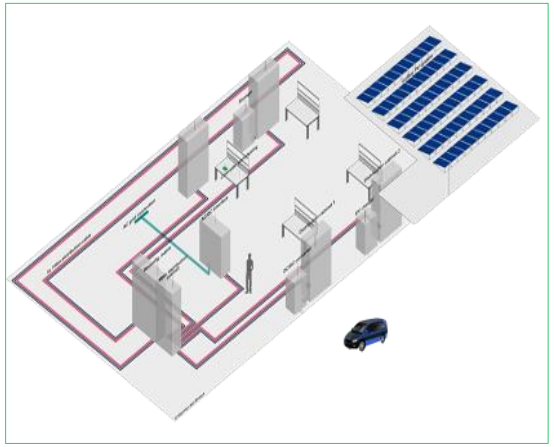
New materials (GaN & SiC) for advanced and novel power devices



Novel Magnetic components (inductor and Transformers) for wide bandgap power converters

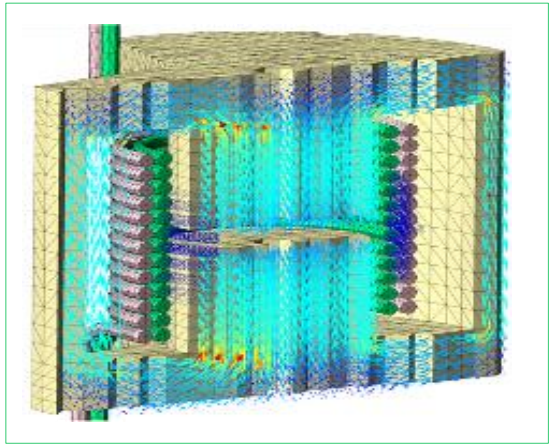


Compact, efficient, and cost dense power converters



DC Nanogrids

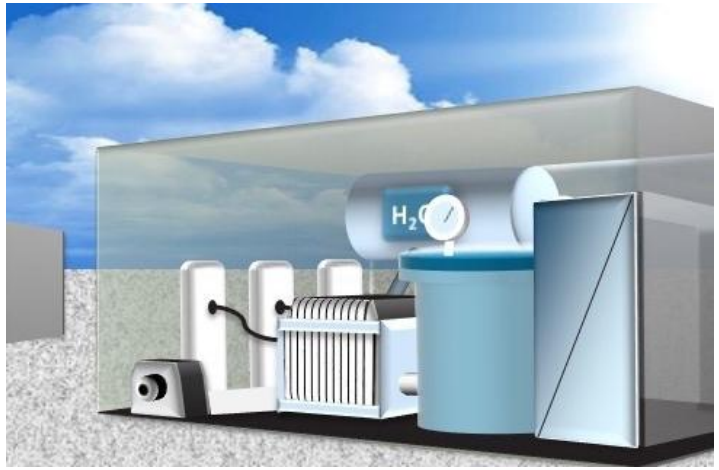
AI for Design of Power Converters



Multiphysics modeling

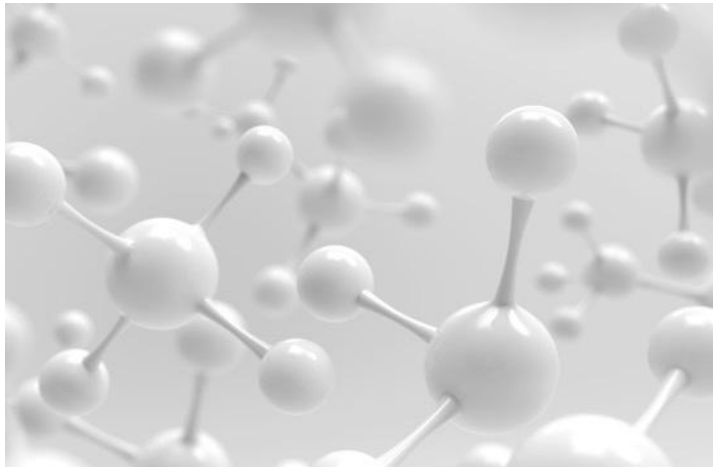
Reliable power converters

Power-to-molecules



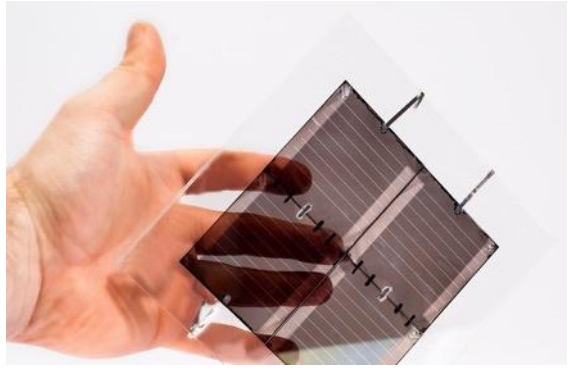
More efficient electrolysers

Electroreduction of CO_2

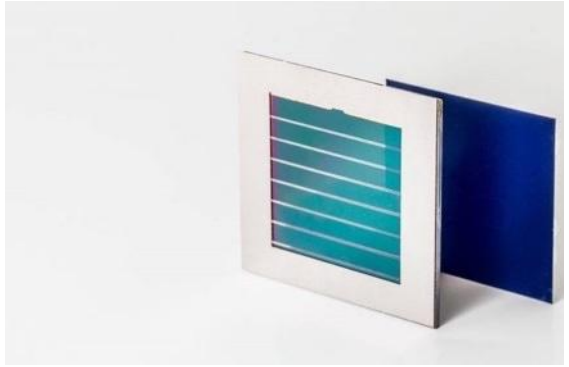


Electrosynthesis with CO_2

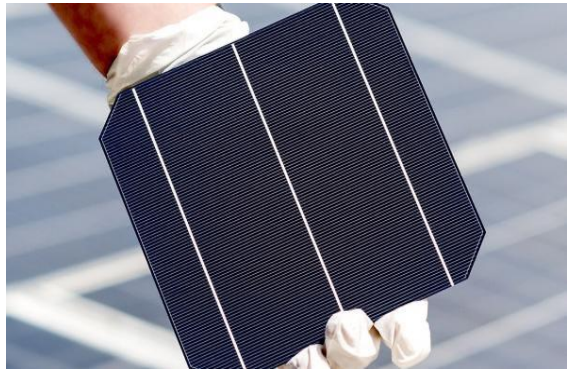
Solar energy



New silicon PV and thin film PV material and device developments



Tandem cells



High efficiency PV cell and module technology

PV power converters (including modelling, testing and reliability)

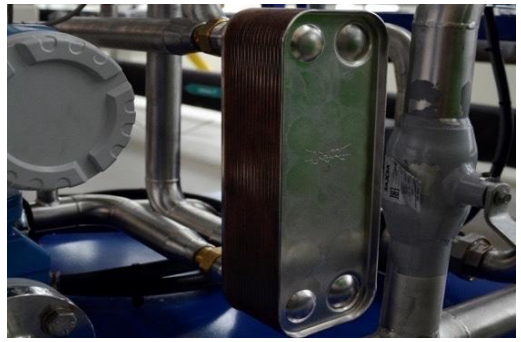
Integration of PV in buildings, vehicles, infrastructure and agriculture

PV cell and module analysis and performance optimisation

PV energy yield metrology, simulation & forecasting

PV module reliability, recycling and re-use

Thermal systems



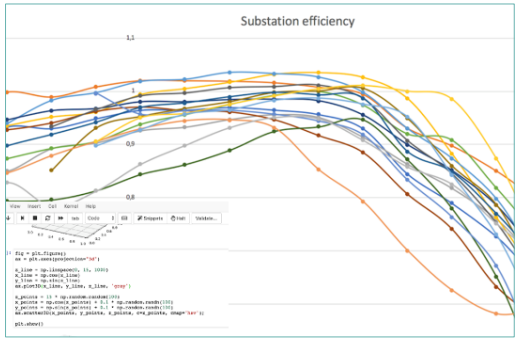
Optimal heat recovery

Low-temperature power generation

Flexible heat pumps

Smart District Heating and Cooling control

Network design



Analytics