# **Sustainable Energy Systems**



The Sustainable Energy Systems research group seeks ways to increass the flexibility, efficiency, sustainability, reliability and social acceptance of increasingly complex and dynamic energy systems, which will be mainly powered by renewable energy sources such as solar energy, wind power or bioenergy, it aims to bridge the gap between existing technologies and globally optimized, smart solutions for the future. In this way, the research team is focused on developing ground-breaking solutions for the challenges of future energy systems, allowing for the larger integration of renewable energy, energy storage, communities, resilient networks and efficient intelligent buildings, without forgetting system security assessment and model/data interoperability.

The research group will also work towards roordight oscilations in new and evidence in the control of the contr

- Big Data
   Artificial Intelligence (Machine Learning models)
   Deep Learning
   Cyber-Physical Energy Systems
   Software Engineering
   Energy Cloud Computing

- Eposicité Enabling flexibility in future power grids (H2020 / 2019-2023)
   AITESI Advanced tools towards cost-efficient decarbonisation of future reliable energy systems (H2020 / 2020-2023)
   Combiciasa Combinica parposed for the spatial highly resolved, intra-day PV forecasting for smart distribution grid operation (FNR / 2018-2021)
   Operation Combinicasa –

- All-sky imager (sky cam) "EKO ASI-16" 180" fisheye camera pointing towards the sky to estimate "cloud cover", to identify clouds and clear parts of the sky, to estimate the cloud movements (speed and direct KEPCO 4-quadrant power supply
   NI PXI systems (industrial PC) including several measurement cards
   Nessurement systems and instruments

- Octimal energy management in smart sustainable buildings A chance-constrained model predictive control approach. H. Nagpal, I. I. Avramidis, F. Capitanescu and P. Heiselberg. 2021. In Energy and Buildings, vol. 248

  \* A Comprehensive Multi-Previor Optimal Power Eleva for Previous of Technique Power Eleva for Previous Office Power Po

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