Popular Science Summary

Name: Julian Lemos-Vinasco
Section: Dynamical systems
Principal supervisor: Jan Kloppenborg Møller
Co-supervisors: Peder Bacher, Daniela Guericke, Henrik Madsen
Title of project: Decision support tools for smart Home Energy Management Systems (HEMSs)
Project start: 01-01-2019

Headline:
Smart homes to support the energy transition in Denmark.

Popular Science Summary:
In Europe, significant efforts have been made to transition the energy sector from fossil-fuel-based to a model based on renewable energy sources. The energy transition comes with multiple challenges, with smart grids initiatives being created in response.

Recent advancements made in information and communication technologies, electricity storage systems, renewable electricity generation and smart appliances have been made at a residential level as part of smart grid initiatives. This growing trend provides the technical foundation and infrastructure for houses with smart Home Energy Management Systems (HEMSs). Smart HEMSs can be defined as systems providing energy management services to efficiently monitor and manage electricity generation, storage, and consumption in households. The main objective of this research project is to study and develop a set of decision support tools for the deployment of HEMSs in Denmark that can bring the maximum value to home owners. This includes tools for the prediction of renewable energy sources generation and users' consumption, as well as control strategies for the different household components. Moreover, this project intends to contribute with the building blocks needed for functional HEMSs that support the energy transition in Europe.