

Research content for the short video Green-in vs. Black-out\_ Utopia 2023

***"Imagine a future, where we store green power in trees ... with the newly invented ORGANIC BATTERIES for stable power grids".***

***Student statement: "This video depicts how energy could be saved in trees and provide every home with it."***

***Digital twin turns grids into renewable energy storage systems***

***The transformation of the energy system requires a gigantic expansion of the production capacities of renewable energy generation plants. Keywords here are electrification, heat demand, but also hydrogen or synthetic energy sources.***

***The electricity, heat and gas networks have a key role to play here. They smooth out the fluctuations in consumption and generation over the course of the day and the year. Flexibly switchable prosumers (consumers & generators) such as stationary e-cars, appliances or industrial plants help in this process.***

***All prosumers such as private households with PV systems or larger energy communities are actively involved.***

***These are complemented by point source large scale storage. Large hot water tanks bring summer heat to winter district heating. Redox flow batteries (with novel electrolytes made from paper production waste) support hourly and daily grids.***

***The grids interact with each other so that heat, electricity and gas help each other out. Peak load power plants, so-called "peakers," will also be needed in the future to support the grid. With the help of hydrogen as intermediate storage, these will become climate-neutral.***

***The "network as a flexible energy sponge" is made possible by the first digital twin of the European electricity and gas network, including heating networks. This prevents blackouts at an early stage through simulations and contributes to the full use of generation from renewable energies.***

***Highlight from Green Tech Valley:***

***Biobased redox float battery <https://www.ecolyte.at>***

***Research at the site:***

***[Europe-wide digital twin of the power and gas grid](#)***