EUROPEAN UNIVERSITY

Energy in Transition Flagship

Additional information

Its **research & educational pillars** span the following domains:

1. **Energy Production & Energy Conversion [Primary production step]**
   - **a.** Responsible photovoltaic (PVs)
   - **b.** Bioenergy production
   - **c.** Nuclear energy production

2. **Carbon capture, conversion & utilization or storage**
   - **a.** Direct air capture (DAC)
   - **b.** Bioenergy with Carbon Capture and Storage (BECCS)
   - **c.** Target: carbon neutral/negative industry/society
   - **d.** Utilisation of carbon and hydrogen (e.g. hydrogenation)

3. **Energy storage & carriers**
   - a. Battery Energy Storage Systems (BESS)
   - **b.** Power to X (PtX)
     - **i.** Synergistic approach to achieving net-zero emissions by combining carbon removal, renewable energy production, and the manufacturing of sustainable fuels
     - **ii.** Converting renewable energy (wind, solar) into hydrogen, ammonia, …

4. **Smart energy management and utilization**
   - **a.** Smart energy systems (integrating sensors, automatization, real time data)
   - **b.** Power electronics, grid infrastructure
   - **c.** Forecasting, User's behaviour

5. **Circular Design & End-of-Life:**
   - **a.** 3R-strategy for a Circular Economy: Reduce, Reuse, Recycle
     - **i.** Minimizing raw materials, energy use, hazardous substances, system losses, and waste throughout the lifecycle while maintaining efficiency (Reduce)
     - **ii.** Second life (reuse)
     - **ii.** Design installations/applications/components (e.g. PV modules, batteries) for recycling (recycle)
   - **b.** Synergies of CO_2 and H_2 based circular economies
   - **c.** Implementing more circularity in nuclear sector (e.g. avoid generation of (long lived) radioactive waste, use low carbon concrete)

6. **Regulatory, Economic & Societal Dimensions**
   - a. Social framework: stakeholder acceptance and perceptions
   - b. Legal dimension
   - c. Carbon accounting and Life Cycle Assessment (LCA)
   - d. Techno-economic assessment (TEA)