Energy of today and tomorrow

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

In brief

- **Ametys Code:** N7EE04A
- **Open to exchange students:** Yes

Presentation

Objectives

Understand the order of magnitude of electricity consumption in an average household and in France. Compare these figures to the amount of power produced by a human being.

Estimate the surface area of PV required for production and the volume of hydraulic storage required to meet France's electricity consumption needs for two extreme scenarios (high and low consumption).

Description

Working with a design office, students study France's electricity consumption profile. They calculate power balances to ensure 100% PV production and set up hydraulic energy storage (pumped storage power station) to compensate for intermittent production. Small-scale experiments allow students to learn about the orders of magnitude of PV production (relative to surface area) and compare it with what a human being can produce.

Pre-requisites

Concepts of energy and power and the relationships between these quantities.

Basic concepts of electrical circuits and calculations of electrical power