Energy and environment

This teaching unit will introduce to you three important topics relative to energy:

1. Heat pumps: these thermodynamic machines have long been known for their use as air-conditioning systems. They are also increasingly replacing heating systems that use fossil fuels, thanks to their high efficiency and the use of a primary energy source - electricity - that can be decarbonised. These machines are expected to be deployed on a large scale over the next decade. This course provides an introduction to the physics of these machines and how they work. Heni Dallagi (PhD, IRPHE CNRS).
2. Hydrogen, an abundant resource in the universe, is often presented as the energy of the future. But what is it really? This course, given by an expert in the field, presents the reality of the sector, from production to use, including transport and storage, its advantages compared with other energies and its disadvantages, which have to be carefully compared. Pierre Crespi (PhD, Air Liquide)
3. Nuclear energy: Myths and realities about nuclear energy! This course is dedicated to nuclear energy an energy that can be promoted (as in France, where more than 70% of electricity production is of nuclear origin) or totally decried, as in Germany for example, where nuclear power stations have been shut down since the Fukushima accident. The urgency of climate change is significantly reshuffling the deck, with many experts agreeing that some nuclear energy technologies may prove useful, or even essential, on the difficult road to decarbonised electricity production. The aim of this course is to present an overview of the different options, their advantages and disadvantages, without underestimating the dangers associated with this energy source. Frédéric Mermaz is an expert in the field. He works for the French nuclear safety agency. Frédéric Mermaz (IRSN).

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