

## School of Chemistry

### Aims and Objectives: Session 2023-2024, Semester 1

#### Module CH1301: The Impact of Chemistry

**Course Title:** Fuels of the Future

**Duration:** 7 hours

**Lecturer:** Dr P. A. Connor

**Aims:** To introduce different types of energy and fuel resources that are available and to give an appreciation of the advantages and disadvantages of each type. To encourage an awareness of how the energy needs of the future can be met in a sustainable way.

**Objectives:**

1. Define and differentiate the concepts of energy and fuel. Cover the various energy sources available, distinguishing renewable and non-renewable types. Look at energy demands now and in the future, and whether they can be sustainably maintained. Discuss the different applications for energy use and the best fuels available.
2. Fossil Fuels: be able to discuss the advantages and disadvantages of various fossil fuels, including cleanliness and available lifetimes of various forms. Estimate enthalpy of combustion from bond energies. Know how different forms can be converted, e.g. natural gas to gasoline, coal gasification.
3. Electricity. Is electricity a fuel? What are the advantages and disadvantages of the various forms of generation, eg Coal, Gas, Fission, Fusion, Wind, Wave, PV. Which ones are most sustainable? How can we store electricity and do we need to?
4. Alternative fuels: to be able to discuss the various 'new' fuels available, H<sub>2</sub>, bio-ethanol, bio-diesel. To know about the advantages and disadvantages of the fuels and their various production techniques, such as: electrolysis, reforming, biomass, photo-chemical production.