Module 2: Renewable Energy Technologies

Purpose:

This module aims to introduce delegates to the fundamentals of key renewable and sustainable energy technologies with a view to distinguish key factors that should be considered in diversifying their portfolio of assets and activities, and prepare them for planning, construction, and operation.

Intended learning outcomes:

- Adopt the right terminology when describing sustainable energy future projects and investments.
- Identify the key aspects of the energy production, transmission, and utilisation, and distinguish key players nationally and internationally.
- Understand fundamentals and principles, technical configurations, current landscape, advantages and disadvantages, key cost drivers and emerging trends in onshore and offshore energy technologies.
- Discuss technologies which are key to achieving the ambitious net zero targets, including geothermal, carbon capture, utilisation and storage, hydrogen production, and waste to energy conversion.
- Appreciate which technologies are more appropriate based on current activities, project portfolio and human capital of an organisation.

Who is this module/course for:

- Engineers and middle level managers interested to increase their understanding on principles of current and emerging renewable energy technologies, with the view to qualify the ones that are most appropriate for their organisation's future strategy.

Syllabus:

The course will cover the following topics:

- Basic definitions
- Fundamental concepts of supply and value chain
- Infrastructure and distribution
- Onshore energy technologies (wind energy, solar energy, bioenergy, storage systems)
- Offshore energy technologies (fixed and floating wind energy, wave and tidal energy, multi-purpose generation systems)
- Geo-resources fundamentals: geothermal engineering and CO2 capture and sequestration
- Hydrogen production, storage, and utilisation
- Waste to energy conversion

Delivery method:

The module will be delivered through a combination of online live or pre-recorded lectures, self-study, and group activities. All online sessions will be recorded and remain available for 4 weeks after completion of the module. Delivery will span across 4 weeks of study as follows:

0. Pre-study (week 0): Delegates will be provided with material relevant to the module, including open access reading and key references on next generation sustainable energy technologies.

1. Week 1:
    - Theoretical part: Basics of sustainable energy generation. Definitions, the energy system and the supply chain, and analysis of the current infrastructure and distribution.
    - Practical part: Delegates will work in groups, identifying their organisation's position across the supply chain.

2. Week 2:
    - Theoretical part: Onshore renewable energy technologies including wind energy, solar energy, bioenergy, and energy storage systems will be discussed, with a focus on technology characterisation, existing and future technological trends, advantages and disadvantages.
    - Practical part: Delegates working in groups, will develop a plan for their organisation to get involved in bidding for a given location utilising onshore renewable energy technologies.

3. Week 4:
    - Theoretical part: Offshore renewable energy technologies including fixed and floating wind energy, marine (wave and tidal) energy, and multi-purpose generation systems will be discussed, with a focus on technology characterisation, existing and future technological trends, advantages and disadvantages.
    - Practical part: Delegates working in groups, will develop a plan for their organisation to get involved in bidding for a given location utilising offshore renewable energy technologies.

4. Week 5:
    - Theoretical part: The emerging topics of geothermal energy, CO2 capture and sequestration, Hydrogen production, storage and utilisation, and Waste to energy conversion will be discussed, with a focus on technology characterisation, existing and future technological trends, advantages and disadvantages.
    - Practical part: Delegates working in groups, will derive priorities for their organisations' strategies with respect to all types of renewable energy technologies in the short and mid-term time horizon, based on their existing portfolio and upcoming opportunities in the UK, EU and beyond.

Timing:

In Week 0 we will introduce the module and the material through a 1-hour live session. Then, for each of the following weeks (1-4) there will be a 2-hour of recorded video to watch when it suits you, followed by a 2-hour live session as follows:

Week 0: Tue 25.10.22 @ 1400-1500
Week 1: Tue 01.11.22 @ 1400-1600
Week 2: Tue 08.11.22 @ 1400-1600
Week 4: Tue 22.11.22 @ 1400-1600
Week 5: Tue 29.11.22 @ 1400-1600

Assessment:

The course is at a postgraduate level and assessment will be via the group activities and end-of-module written work. Attendees who complete the assessments successfully will receive a CPD certificate from the University of Strathclyde. In the future, successful candidates may be able to earn credit points towards postgraduate qualifications through the Accreditation of Prior Learning route.

Registration:

The delegates can directly register on University of Strathclyde's MyPlace page for this module where there is a link available for online payment. For further information about registration please contact lynn.o-brien@strath.ac.uk.