

Lessons from Energy Transitions: Future Integrated Solutions that Sustain Nature and Local Communities, NE England, UK (G557)



Tutor(s)

[Gioia Falcone](#): Rankine Chair of Energy and Engineering, University of Glasgow.

[Bob Harrison](#): Director, Sustainable Ideas Ltd.

Overview

This course considers the past and future energy transitions in the northeast of England, and their impact and legacy on the region's industrial sector, local communities and nature conservation. It is hoped that lessons learnt from the past experiences in the region will help a sustainable energy transition. The course will cover CCS, hydrogen generation, wind and nuclear power, geothermal energy and the repurposing of legacy assets.

Duration and Logistics

A 6-day field course with site visits supported by classroom sessions. The course will be based in the town of Hartlepool, County Durham, to provide easy access to nearby coastal and inland locations.

Level and Audience

Fundamental. The course is intended for professionals working in energy transition, nature conservation and community engagement; those responsible for policy on energy and conservation matters; and energy sector investors.

Exertion Level

The course requires an **EASY** exertion level. Outcrops include coastal sections and inland exposures all with easy access. There will be some walks along beaches and easy paths through dunes with a maximum distance of around 5km (3 miles) or less.

Objectives

You will learn to:

1. Describe and explain the overall potential of the region for integrated solutions with the context of the present energy transition.
2. Characterize the locations of potential projects and explain technical factors that affect these and their feasibility.
3. Describe how wider factors can affect feasibility of the projects including the environmental and social impacts.
4. Evaluate strategic choices for local and regional policy makers, as well as landowners and investors.
5. Make predictions and assessments of other regions in the UK for the potential development of similar projects.

Course Content

Course Details

The UK has seen major energy transitions before – from wood to coal, from coal to oil, gas and nuclear, and now to renewable sources such as wind and geo-energy. In 2019, the UK was the first major economy to commit to achieving Net Zero by 2050, but this latest transition may prove the hardest to achieve so far, as the replacement sources have a lower energy density than those being substituted, and the existing fossil-fuel-based supply is constrained and exacerbated by recent geo-political events.

For example, it is claimed that developing CCS technology in the UK could reduce the cost of meeting the nation's climate change obligations by up to £5bn each year. It is also claimed that thousands of jobs could be created through implementation of CCS hubs in Britain's oldest industrial centres, but local content remains unclear.

The legacy of past energy interventions means this latest transition must not only supply 'clean energy', but also sustain our natural environment and local communities.

When discussing each element of the energy transition, we will try to put into context: the impact on the environment (traffic, emissions, noise, disruption to infrastructure); the number of jobs that may be created in the area; the impact on nature; the reduction of carbon footprint; and the risks and mitigations.

Day 1: Arrive in Hartlepool

Classroom:

- 'Setting the scene' lecture on the need for energy transition, put into a global, nationwide, and local context

Overnight in Hartlepool

Day 2: Coal mining legacy

Fieldwork:

- Coal – understand the impact, importance and history of the coal-mining industry for the region. Also, consider how its legacy may be used in the energy transition while helping to sustain and improve the natural environment of the area
- Geothermal energy – an introduction with special mentions of heat pumps, mine water treatment and re-use of old oil and gas wells
- Visit Dawdon Mine water treatment scheme in Seaham for geothermal heat source
- Visit Horden Nature Reserve – from abandoned colliery with polluted dunes and beaches to part of Durham's Heritage Coast

Overnight in Hartlepool

Day 3: CCS

Fieldwork:

- Walk along North Sands to visit Bunter Sandstone outcrop in Hartlepool – discuss CO2 storage site selection, containment, capacity and injectivity; deep saline aquifers vs depleted gas fields; whether existing oil and gas infrastructure can be re-used for CCS
- Visit ConocoPhillips Ekofisk oil terminal and refinery in Seal Sands
- Visit Greatham to discuss Brent platform decommissioning (Able Ltd), also manufacturing and decommissioning of wind turbine parts

Overnight in Hartlepool

Day 4: Nuclear energy

Fieldwork:

- Visit the nuclear power plant in Greatham
- Visit sites north and south of the river in Teesmouth Nature Reserve
- View Redcar offshore wind farm from beach at Teesmouth or offshore visit

Overnight in Hartlepool

Day 5: Hydrogen storage

Fieldwork:

- Visit salt caverns in Saltholme (which also hosts an RSPB wildlife reserve) and at Wilton – such caverns could be used to store hydrogen
- Gas terminal and processing plant at Coatham (CATS and Breagh gas field) – need natural gas (reformed with steam) to produce blue hydrogen
- NZT development site – redevelopment of abandoned Redcar steel works
- Local council – public acceptance, job local content and social license to operate

Overnight in Hartlepool

Day 6: Departure

Departure and travel home