

Morecambe Bay and Duddon Estuary Tidal Barrage

What is a tidal barrage?

- A tidal barrage is a structure built across an estuary or bay
- The structure contains **turbines**
 - The barrage allows water to flow into the bay or river during high tide
 - Water is then released at low tide
 - As the water moves it turns the turbines which are then used to generate electricity
- Tidal energy is a **renewable energy** source
- The best locations for tidal energy are those with large **tidal ranges**

Tidal barrage schemes in the UK

- There are several tidal barrage projects in development in the UK including:
 - **Morecambe Bay and Duddon Estuary**
 - Swansea Barrage
 - Mersey Tidal Power project
- A 2021 study found that tidal energy has the potential to provide 11% of the UK's electricity demand

Advantages and disadvantages of tidal barrages

Advantages	<ul style="list-style-type: none">• Reliable – every day there are two high tides and two low tides• Tidal energy is constant and will never stop• It is renewable and does not lead to greenhouse gas emissions
Disadvantages	<ul style="list-style-type: none">• Cost – building tidal barrages is expensive• Barrages can damage marine ecosystems• The location is limited to estuaries and bays with strong tides

Morecambe Bay and Duddon Estuary

Location

- The proposed barrage is located across Morecambe Bay and Duddon Estuary in Lancashire
- The **ebb tide** can go out up to 12km forming the largest **intertidal** area in the UK
- It covers 310 km²
- The rivers Wyre, Lune, Kent and Leven flow into Morecambe Bay, and the Duddon Estuary is to the north-west
- The area is characterised by:
 - **saltmarshes**
 - **sandflats**
 - **mudflats**
 - sand dunes
 - shingle beaches

Why is it a good location for tidal energy?

- Morecambe Bay has one of the largest **tidal ranges** in the world
- At its greatest, the tidal range is approximately **10 meters**
- There are extensive areas of mudflats and sandflats, which means large amounts of water can be held to generate power

Morecambe Bay and Duddon Estuary tidal gateway project

- The proposed **tidal gateway project** is a £10 billion scheme
- The plan was proposed by the **Northern Tidal Power Gateways** project
- This is a '**multi-use development**' which will provide energy but also improve transport infrastructure in the region
- The project would create **two tidal barrages**:

- Barrage one will be 14km, across Morecambe Bay from just south of Morecambe to south of Barrow in Furness
- Barrage two will be 5.5km across the Duddon Estuary from north of Barrow in Furness to Millom

Energy generation

- The tidal gateway project will include **132 turbines**
 - The turbines will have a lifespan of **120 years**
- The turbines would generate **eight million megawatt hours** of energy – sufficient for an estimated **two million homes**

Transport infrastructure

- The barrages would include a dual carriageway forming new transport links
 - This would link the **M6** to the east of, Lancaster and Morecambe to the **A590** in Barrow-in-Furness and the **A595** into Cumbria
 - It is estimated that this will **reduce the distance** between Lancashire and south Cumbria by 50%
 - Travel time is estimated to decrease by 75%
- This would reduce:
 - fuel use by **750,000 litres** each year
 - congestion on the M6

Social impacts

- Improved mobility, people will be able to travel more easily to other areas
- Better healthcare access
- Improved infrastructure will enhance people's quality of life

Economic impacts

- It is anticipated that over 7,000 jobs will be created in construction and 6,000 on-going jobs
- Increased recruitment for industries in south and west Cumbria
- Reduced regional inequalities, boosting local economies

Environmental impacts

- The barrages will include **fish passes** to allow fish to move between the open sea and the area behind the barrages
- **Reduced CO₂ emissions**
- Protection against **coastal flooding** and **sea level rise**
- Impact on the **habitats** and feeding patterns of shrimps, eels, and fish as well as those of local and migrating birds
- Harm to wildlife caused by contact with the turbines

Morecambe Bay and Duddon Estuary environment

- The **intertidal** area of Morecambe Bay and Duddon Estuary is an internationally important habitat for waterfowl and seabirds
- It is an important site for **migratory birds** such as oystercatchers, curlews and little terns, as well as native birds and marine life
 - It is estimated that over 250,000 birds use the Morecambe Bay area for feeding every year
- The area has **high biodiversity** levels due to the wide range of habitats
 - The RSPB lists Morecambe Bay as one of the most important areas for bird life in Europe
 - Over 25% of the UK **natterjack toad** population lives on the sand dunes around the bay
 - Over 33% of the UK **orchid species** are found in the area, including the rare **Lady's Slipper Orchid**
 - The area is an important habitat for butterflies and moths, including two of the fritillary butterfly species which are in population decline
 - The area also has the only **grey seal colony** in Cumbria
- There are several nature reserves and RSPB sites around Morecambe Bay and Duddon Estuary
 - **Special Area of Conservation (SAC)**
 - **Special Protected Area (SPA)**

- **Site of Community Importance (SCI)**
- **Marine Protected Area (OSPAR)**
- **Ramsar wetland site**
- It also has several **Sites of Special Scientific Interest (SSSI)**
- Duddon Estuary is also part of the SPA

