

Examine the economic and environmental advantages of using renewable energy sources.
(30 marks)

The most common sources of renewable energy are solar, wind, HEP (rivers, waves, tidal), geothermal and biofuel (wood waste supplies). These provide a long term economically viable alternative to fossil fuels, reduce harmful greenhouse gas emissions and provide an opportunity to reduce Ireland's dependence on imported fuels. Wind energy is both Ireland's largest and cheapest renewable electricity resource. In 2016 Wind provided 85% of Ireland's renewable electricity and 20.9% of our total electricity demand. It is the second greatest source of electricity generation in Ireland after natural gas.

With the possibility of 80% of our needs being met by renewable by 2050 (Sustainable Energy Ireland), it is thought we could save 1.2 billion euro to the Irish economy with only 20% of our energy being met by renewables, eg. reduced costs of importation and carbon dioxide emissions. On top of this, 20% of Irish GDP could be derived from the exportation of energy through interconnectors into Europe, creating almost 100,000 jobs from harnessing renewable energy and the provision of this energy to homes/ businesses. Development companies, investors and landowners gain financially as a multiplier effect takes action from investment. Local authorities also benefit, with the norm of each megawatt providing 5,000 euro for the local authority through rates payments. Local farmers gain an extra income from their land, while the provision of the energy creates jobs in remote regions. Ireland's location on the fringe of Europe gives excellent access to ocean breezes (south westerlies) from the Atlantic. Our remote mountainous topography in the west also provides excellent suitable locations for wind farms which are traditionally economically deprived areas. Ireland's 226 wind farms (276 all-island) are almost exclusively onshore, with only the 25MW Arklow Bank Wind Park situated offshore as of 2017.

While wind energy is clean, plentiful and renewable, our dependence on imported fossil fuels will also be reduced. While the **disadvantages of coal include the emission of greenhouse gases, CO₂, sulphur dioxide, nitrogen oxides, sulphuric acids, arsenic and ash**, wind energy provides none of these. The environmental advantages also include the fact that there is no impact on the current global crisis of climate change. Here a rise in temperatures (predicted between 1.4C and 5.8C) could lead to desertification (famine and mass migration from the Sahel region, which is suffering at present), as well as longer growing seasons and higher output in temperate climatic, mid-latitude regions (eg. Ireland). Computer models indicate that 21st century temperatures will tend to warm more rapidly over continents, the largest increase of which will be over North America and North Central Asia. Summer heat waves will increase in frequency. Also regular droughts are expected in Southern Europe. These are all benefits to wind energy generation