Marine algae

This section looks at macro-algae such as seaweed. To turn macro-algae into usable fuel, most of the water should be removed by filters and centrifuging before the oil contained in the algae is extracted. In 2013 most of the macro-algae in Ireland grew naturally off the west coast but no significant quantities of this were harvested.

The trajectories below are compared to the amount of macro-algae growing naturally off the west coast but the intention would be to harvest purpose-grown commercial stocks, not natural ones.

Trajectory 1

Trajectory 1 assumes that macro-algae cultivation is not a significant source of liquid biofuel.

Trajectory 2

Trajectory 2 assumes that 400 km^2 of sea, equivalent to approximately half of Ireland's natural macro-algae stocks, is used for the commercial growth and collection of macro-algae by 2050.[64] While feasible, this represents an unprecedented offshore agricultural proposition. The algae grown on this area of sea produces 3 TWh/y of energy output.

Trajectory 3

Trajectory 3 assumes that by 2050 marine algae is commercially grown in an area of 900 km^2, the same size as the lower range estimate of the total natural macro-algae stocks in Ireland. This amount of algae produces 7 TWh/y of energy output.

Trajectory 4

Trajectory 4 assumes that by 2050 an area of 2,100 km^2 is used to cultivate algae, which is the higher range estimate of Ireland's total macro-algae stocks. The algae grown on this area of sea generates about 16 TWh/y of usable energy per year. It is possible that cultivation at such large trajectories requires the addition of nutrients to help the algae grow. Water movements mean that such nutrient additions cannot be contained, so there is a risk of causing uncontrolled algal blooms. These might increase greenhouse gas emissions through ammonia and nitrous oxide production.

Figure 40. Marine algae, (TWh (primary energy)/yr).