

Ocean power

Although Japan is surrounded by ocean, little attention has so far been given to utilising ocean energy. As of 2010, Japan had no installed capacity for generating power from ocean sources (wave generation, tidal stream and tidal range). However, in the post-Fukushima period, the country is taking initiatives to tap energy from alternative sources. Indeed, as an island country, Japan has very good potential to generate power from the kinetic energy of waves (Johnston, 2011). Some experimental projects were initiated in 2013. Unlike solar or wind power, ocean energy is believed to be less fluctuating to weather conditions. Technologies are being developed to tap both wave and tidal power.

Level 1

Level 1 assumes that Japan continues to give little or no attention to ocean energy. With no investment in ocean energy technology, Japan will have no capacity for generating power from the ocean.

Level 2

Level 2 assumes that there is some, although low, efforts in this sector, which leads the country to increase its combined ocean energy capacity to 1.5 GW in 2030 and 5.4 in 2050. At this level, Japan will produce 42 TWh/y of electricity in 2050.

Level 3

Under Level 3, it is assumed that moderate efforts are made to enhance ocean capacity. By 2050, capacity increases to more than 8 GW, which generates 65 TWh/y of electricity.

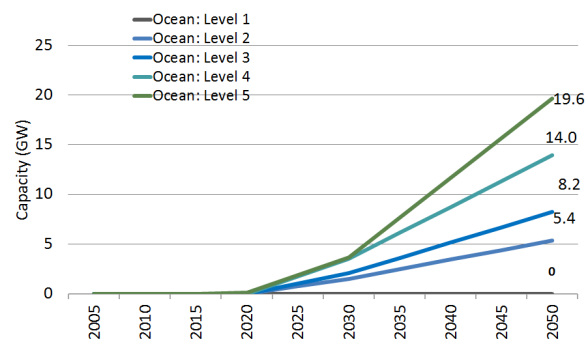
Level 4

Level 4 assumes that Japan maximises its efforts to deploy ocean energy and by 2050 the country's installed capacity increases to 14 GW (12.03 GW for wave energy and 1.92 GW for tidal energy). This capacity will generate 110 TWh/y of electricity in 2050.

Level 5

Level 5 represents Japan's physical and economic potential for developing ocean power capacity. At this level, Japan's capacity reaches 20 GW in 2050, which generates 155 TWh/y electricity.

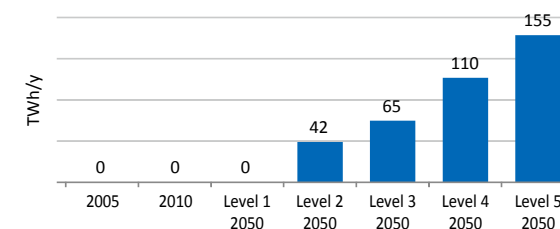
Figure 1 Japan's ocean power capacity versus time



Source: Authors.

For detailed references related to the level settings, please see the Excel spreadsheet model (Zhou et al., 2014).

Figure 2 Ocean electricity generation under different scenarios



Source: Authors.