

Offshore wind

Offshore wind development in Japan is relatively new. As of 2010, Japan had negligible offshore capacity. Offshore wind has great potential for catering to Japan's domestic energy demands (JWPA, 2012) and reduce the country's overdependence on conventional energy.

Level 1

Level 1 assumes that Japan's offshore wind capacity does not take off. Technology is frozen, the build rate is zero and thus there is no expansion of the country's offshore wind capacity. The trend continues all the way to 2050 and Japan has negligible offshore capacity of 0.03 GW in 2050.

Level 2

At this level, thanks to limited efforts in exploring Japan's offshore potential, capacity takes off to reach 2.4 GW in 2030 and then a slow but gradual increase continues. By 2050, Japan will have a total of 4.5 GW capacity, which will deliver about 12 TWh/y of electricity.

Level 3

Level 3 assumes that more effort is put into the offshore sector. Improved assessment of potential, offshore site identification and cost reductions lead Japan to gradually expand its offshore wind capacity to 3 GW in 2030 and 6.5 GW in 2050.

Under this level, Japan will produce 17 TWh/y of electricity in 2050.

Level 4

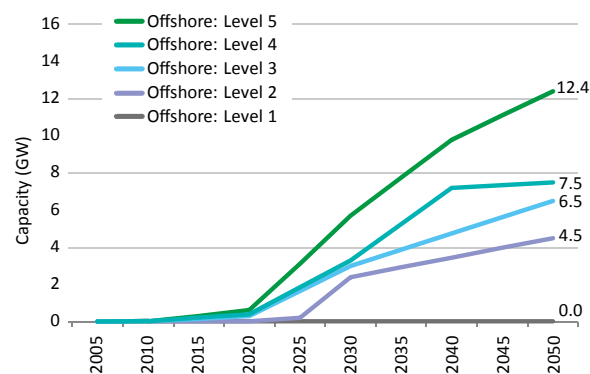
Under the Level 4 assumptions, Japan follows an aggressive strategy towards construction and operation of offshore wind. Capacity reaches to 3.3 GW by 2030 and then to 7.5 GW by 2050. The resulting electricity generation would be roughly 20 TWh/y.

Level 5

Level 5 represents Japan's physical and economic potential for developing offshore capacity. At this level, Japan's capacity reaches 12.4 GW in 2050, which generates 33 TWh/y electricity.

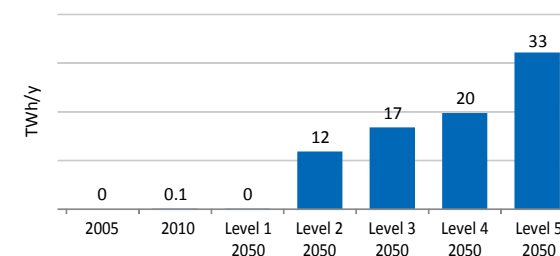
For detailed references related to the level settings, please see the Excel spreadsheet model (Zhou et al., 2014).

Figure 1 Japan's offshore wind capacity versus time



Source: Authors.

Figure 2 Offshore wind electricity generation under different scenarios



Source: Authors.