Ocean waves provide concentrated, abundant, inexhaustible and non-polluting renewable energy, but Malaysia’s coastal waves hold only half the power considered viable for competitive electrical generation.

Now a research team, headed by Norhafizan Ahmad of the University of Malaya, has found a practical way to harness low-energy waves for small-scale electricity generation in coastal and island nations.

The first prototype wave energy generator has been tested near the coastal area of Terengganu, Malaysia. The system converts wave energy to low-pressure airflow, which drives an air turbine connected to a generator. While the airflow oscillates as waves move in and out, the turbine blade is designed to capture this back-and-forth flow while rotating in only one direction.

So far, the research team has fabricated a special design solution allowing the turbine blades to be used at low-pressure airflow levels. The team is now working on the optimisation of the turbine blades with funding from the Ministry of Energy, Green Technology and Water.

“Malaysia has a total coastline of 4,675 kilometres, so there is a great potential for the utilization of wave energy, especially along the coast and islands,” says Ahmad. “Based on our analysis, the total available wave power in Malaysian seas is more than 39,000 megawatts. This means that if 30% of the coastal area is harvested, then almost 12,000 megawatts of energy could be extracted, which is equivalent to half the present energy needs of Malaysia.”

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