

**CONCOURS POUR L'ADMISSION EN FORMATION INITIALE POUR
L'OBTENTION DES DIPLOMES D'OFFICIER CHEF DE QUART
MACHINE ET DE CHEF MECANICIEN 8000 kW**

ANGLAIS

(Durée : 2 heures)

Nota : L'usage d'un dictionnaire est interdit.

Are underwater ocean turbines a new spin on clean energy? A group of scientists and engineers have launched a crowdfunding campaign, called *Crowd Energy* to develop a new technology that harnesses the power of ocean currents to provide a clean and limitless form of renewable energy. Their idea is to use giant underwater turbines to capture the energy from deep-ocean currents, such as the Gulf Stream off the coast of Florida.

While energy generated from these turbines may not be able to completely replace fossil fuels, as the group claims, the devices could still be an important source of clean energy. Ocean currents are one source of natural energy that no one has tapped into before, either because they weren't aware of it or didn't have the technology to capture it. Of course the notion of using underwater turbines to harness energy from deep ocean currents raises concerns over the potential environmental impacts. While the system is designed to minimize the threat to marine life, in-ocean studies must be done to investigate the potential effects.

The *Crowd Energy* project grew out of a desire to find a source of limitless clean energy, as an alternative to fossil fuels and nuclear energy. Most people are familiar with solar or wind power, but they are limited by their quality and consistency.

Companies, such as General Electric, have attempted to adapt wind turbines for use in the ocean, but these are designed to capture low-density energy carried by air, not high-density energy from ocean currents. *Crowd Energy* aims to make a different approach and have developed a system called the "ocean energy turbine" that rotates much more slowly than a wind turbine, but generates a lot more rotational force.

Because ocean currents affect global weather systems, some have expressed concern that turbines may interfere with these patterns. The main concern is how the turbines could affect nearby marine ecosystems. The turbines would be located at depths of 91 meters or more, in areas of fast-moving water where not many things live. Off the coast of Florida, the main animals to worry about are sea turtles and marine mammals such as whales.

In reality, the sensory systems of these animals are good enough to detect and avoid the turbines. In addition, the blades themselves would be slow moving and have gaps large enough for creatures to swim through. Still, it's impossible to know exactly what the impact of these systems will be without testing them at sea.

Crowd Energy plans to test their turbine prototype at Florida Atlantic University in Boca Raton. Their goal is to have four full-scale turbines working and generating power by the end of 2016, according to the group's website. Ocean energy is still in its infancy in the U.S but the Maine company Renewable Power installed its first underwater turbine in 2012 and plans to add two more in the next three to four years.

Meanwhile, the company Scottish Power has also generated energy from the ocean. The Northern U.K. country has been a pioneer in harnessing wave and tidal energy and is looking at using underwater turbines on an industrial scale. The company tested a 30 meter underwater turbine in ocean waters off the Orkney Islands. The giant turbine produced one megawatt of electricity, enough to power 500 Scottish homes. If all goes well, the company plans to build a fleet of turbines off the Scottish coast.

1^{re} QUESTION (valeur = 8)

Translate into French from « **Companies such as to.....** » **without testing them at sea.**»

2^e QUESTION (valeur = 4)

Répondre aux propositions suivantes (répondez a, b, c ou d)

1. Crowdfunding is the practice of funding projects by means of.....
 - a) borrowing money from local state governments
 - b) loans from private banks
 - c) raising money from a large number of people via the internet
 - d) selling stocks.

2. The *Crowd Energy* company was started in.....
 - a) North America
 - b) South America
 - c) Europe
 - d) Asia.

3. Underwater turbines are planning to be used into harness energy.
 - a) rivers
 - b) channels
 - c) oceans
 - d) shallow water.

4. No one has used ocean currents as a natural energy source before because:
 - a) the financial cost is too high
 - b) ocean currents are not strong enough to produce energy
 - c) there was no technology to do it
 - d) governments were against it.

5. The first underwater turbine was installed in 2012 in.....
 - a) Florida
 - b) Boca Raton
 - c) United Kingdom
 - d) Maine.

6. Marine life at risk from this new energy project are.....
- a) sharks
 - b) whales
 - c) sea horses
 - d) fish.
7. Studies of the environmental impact from underwater turbines.....
- a) have been tested
 - b) will be tested
 - c) will never be tested
 - d) are not important.
8. Orkney Island, where an underwater turbine was tested, is off the coast of.....
- a) Ireland
 - b) The Channel Islands
 - c) England
 - d) Scotland.

3^e QUESTION (valeur = 8)

“The ocean’s currents have enough usable power to replace all fossil and nuclear energy dependence forever”

Develop your ideas (about 150 - 200 words).

Nota :

1. *Aucun document n'est autorisé.*
2. *Délits de fraude : « Tout candidat pris en flagrant délit de fraude ou convaincu de tentative de fraude risque l'élimination, sans préjudice de l'application des sanctions prévues par les lois et règlements en vigueur réprimant les fraudes dans les examens et concours publics ».*