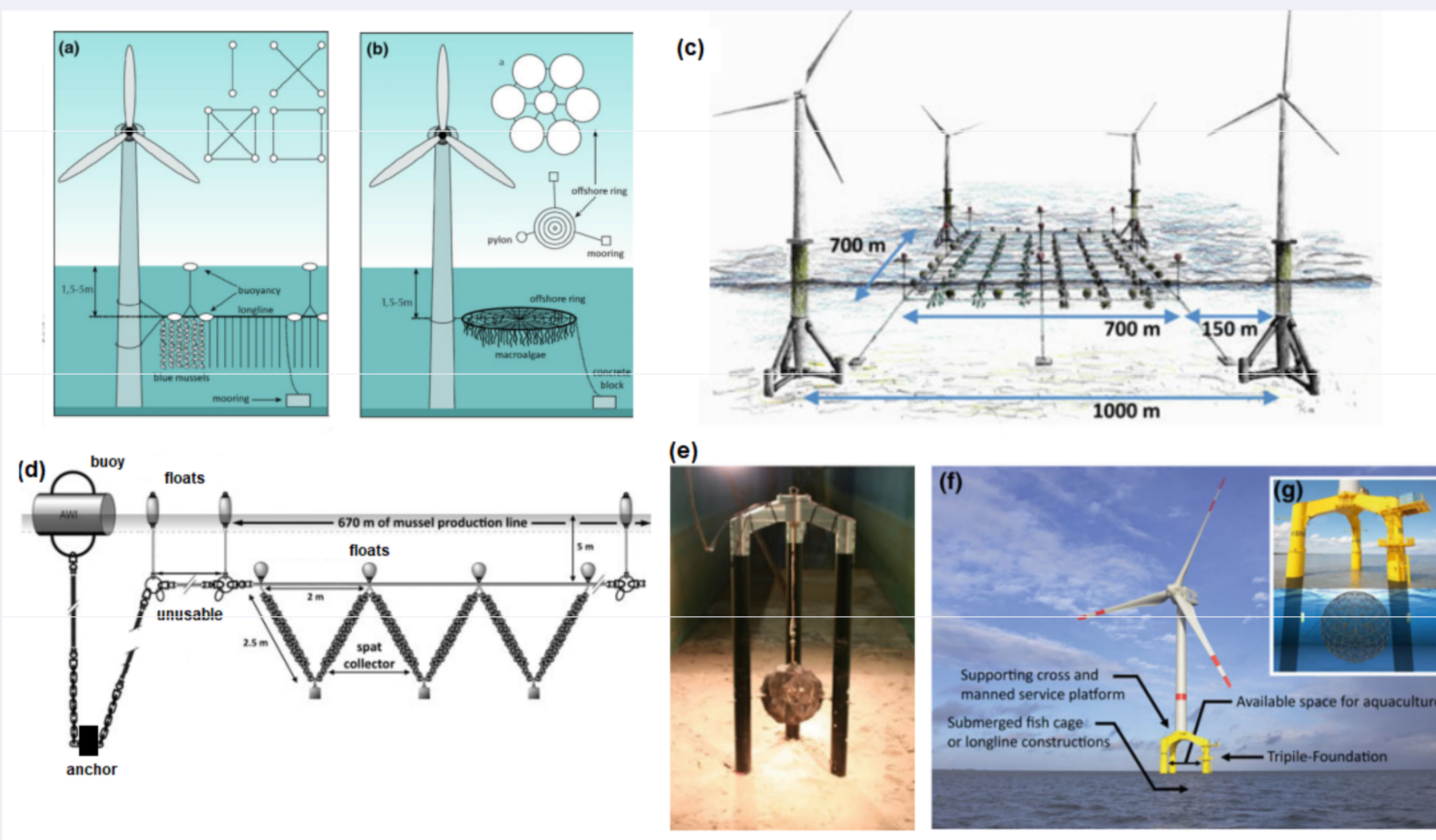


Multi-use platforms

Chances and challenges



(a) Sketch of multi-use concept of longline construction. (b) Concept of ring construction for cultivation of algae and mussels. (c) Conceptual sketch of mussel aquafarm within 4 turbines. (d) Example of a submerged mussel longline. (e) Tripile laboratory model with spherical fish cage. (f-g) Photo animation to give an idea of a fish cage within a substructure of a tripile. Images a-d, f,g by Prof. Bela Buck source: Aquaculture perspective of multi-use sites in the open ocean; image e model test by Nils Goseberg LuFi / LUH.

What are chances of multi-use platforms?

Multi-use offshore platforms are a promising concept. By combining multiple uses, they have the potential to increase the efficiency and the economic viability of offshore wind farms, while simultaneously reducing their environmental impact. An example of combining uses can be:

- wind energy
- floating solar energy
- wave energy
- tidal energy
- hydrogen

as well as

- marine aquaculture

Offshore wind farms require a significant amount of marine space including substations. By integrating other offshore activities, multi-use platforms can reduce the overall footprint of offshore wind farms and increase their potential benefits, while also allowing the financial costs of installation, operation, and management to be shared. The advantages of combining food and energy production are

obvious: spatial efficiency and infrastructure integration, self-sufficient and sustainable food production (Blue Growth) in isolated off-grid locations, nutrient reduction, and an increase in biodiversity due to the sheltering effect of energy production platforms.

What are research aspects / challenges?

Despite these advantages, site-specific technical, administrative, economic, social and environmental barriers continue to hinder the implementation of multi-use platforms combining renewable energy devices with aquaculture production. As an example, the following research questions can be defined:

- What **changes in ocean dynamics** and **marine pollution** are to be expected from the combination of offshore renewable energy (ORE) infrastructure with aquaculture?
- How does the **load on ORE infrastructure or aquaculture change** due to a co-use? Is it possible to optimise the damping of the motion and forces due to a co-use or an adapted structural design?
- What scenarios of multi-use are **socially accepted** in a sea basin?
- How can multi-use systems help to **keep or reach a good ecological status** (according to the EU Marine Strategy Framework Directive)?
- What **impacts and benefits** for the different **stakeholders**, users and marine environment can be expected when "upgrading" an existing OWF with more users?



Example of a floating photovoltaic platform: Conceptual photo animation from a Belgian consortium (Jan De Nul, Tractebel, and DEME introduce SEAVOLT®; image from jandenu.com)