Chapter 3 An Integrated Approach for Sustainable Environmental and Socio-Economic Development Using Offshore Infrastructure

Phoebe Koundouri

Athens University of Economics and Business, Greece & London School of Economics, UK & International Centre for Research on the Environment and the Economy, Greece

Amerissa Giannouli

Athens University of Economics and Business, Greece & International Centre for Research on the Environment and the Economy, Greece

Ioannis Souliotis

Centre for Environmental Policy, Imperial College London, UK & International Centre for Research on the Environment and the Economy, Greece

ABSTRACT

Seas and oceans offer a vast renewable energy resource and production possibilities with great potential for innovation and growth. Multi-purpose offshore platforms are ocean energy and aquaculture synergies developed in order to achieve efficient use of marine space. Regarding the construction and operation of such infrastructures, environmental and socio-economic benefits should be taken into account. This chapter uses the Ecosystem Services approach and the total economic framework for evaluating different designs of multi-purpose offshore platforms and a participatory approach to ensure their public acceptability.

INTRODUCTION

Our seas and oceans offer a vast renewable energy resource and production possibilities with great potential for innovation and growth, by creating new jobs, providing food and energy security, as well as facilitating marine research opportunities. Ocean energy and aquaculture synergies are currently being developed (including offshore wind farms, exploitation of wave energy, expansion of electricity

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connections, and further development and implementation of marine aquaculture), helping to achieve efficient use of marine space.

Multi-use offshore platforms (MUOPs) correspond to the multiple uses of ocean space, including energy extraction, aquaculture and platform-related transport, as well as recreational activities. Hence, an offshore platform could facilitate wind and/or wave energy extraction infrastructure, aquaculture systems, maritime transport and recreational infrastructures.

The 2008 financial crisis has challenged the social and economic progress in the European Union (EU). Economic and environmental challenges, resulting mainly from globalization, climate change and demographic ageing, introduced to the scientific community and policy-makers the need to apply measures that would result in the sustainable development of the economies. These can be measures of mitigation that prevent economic and environmental challenges or adaptation measures that are actions to prevent or minimize the damage that is already caused. In this context, the European Commission (EC) proposed the "Europe 2020" strategy, a 10-year strategy to support employment, productivity and social cohesion in Europe. This strategy aims at smart, sustainable and inclusive growth. Those targets could be achieved through innovation, competitiveness, higher employment, social and territorial cohesion, resource efficiency and environmentally friendly actions. Following these directions, EU has developed a policy scheme to support and fund research projects with interdisciplinary and innovative character.

In line with Europe 2020, EU's Energy Strategy "Energy 2020" (COM/2010/0639) was designed to support the transition to reliable, sustainable and competitive energy systems, which need to overcome scarce resources challenges and growing energy needs by achieving energy affordability for consumers and businesses, as well as combat climate change and air pollution. Specific objectives and research areas of this strategy include the reduction of high-carbon energy consumption the low-cost, low-carbon electricity supply, the alternative energy technologies and sources by using new knowledge and innovative ideas decreasing the dependence on foreign fossil fuels, as well as the public engagement for a greener way of living. By 2020, the EU aims to reduce greenhouse gas emissions by 20%, increase the share of renewable energy to at least 20% of consumption and save at least 20% energy.

Regarding marine development and in order to take advantage of the opportunities that oceans provide, EU initiates Blue Growth, which is a long-term strategy that supports sustainable growth in the marine and maritime sectors as a whole and contributes to the goals of the "Europe 2020". On April 17th 2014 the European Parliament voted the Directive for Maritime Spatial Planning (2014/89/EU), which assists the Member States to develop plans to better coordinate the various marine activities, while ensuring their efficiency and sustainable development. The Directive sets minimum requirements for the establishment of national maritime spatial plans. These plans should identify all existing human activities, considering land-sea interactions, and identify the most effective way of managing them. Under this institutional framework, it is possible to develop innovative MUOPs that support the sustainable management of the marine space with regards to energy and aquaculture possibilities, as well as recreational activities.

Maritime Spatial Planning (MSP) requires the socio-economic assessment of the proposed plans, which should satisfy the conditions of sustainability (social, economic, environmental sustainability it time and space). Hence, MUOPs projects should be evaluated based on a framework that is in agreement with efficient maritime spacing requirements. Like any other investment, investments in innovative marine technological synergies involve costs today for benefits in the future. The identification of the Total Economic Value (TEV) of a project like this is important for the economic assessment stage that is required to be implemented.

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