OPTILE

Multi-criteria optimisation for offgrid marine renewable electrical production

DURATION: 36 months | **LAUNCH:** 2022 | **BUDGET:** €1,546K

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CONTEXT

Isolated sites and microgrid are among the most relevant markets for marine renewable energy systems. Designing the electrical system and its integration must be optimized carefully in order to cover the needs at a realistic cost. The traditional optimisation method focuses on fixing the adequation between production and consumption with optimised energy converter and storage power. **This approach can be improved by considering optimisation criteria from other fields of disciplines: reliability, machine position, electrical grid, carbon dioxide estimation, consumption control, cybersecurity and electrical stability. Previous works underline that sequential optimisation does not allow an optimal production system.**

OBJECTIVES

To propose economic and environmental solutions for the supply of isolated electrical grids

EXPECTED RESULTS

- Development of a method to select and size the optimal offshore renewable energy for an isolated microgrid
- Validation of the method by real-time co-simulation of electric and communication grid
- Definition of a new key performance indicator to optimise renewable energy farm
- Application of the reliability method to an extended optimisation system

TECHNOLOGIES

STAGES OF THE VALUE CHAIN

Preparatory studies | Design | O&M

SCIENTIFIC CONTENTS

- **Bibliography on offshore renewable energy sources and storage:** price, maintenance, reliability, lifetime, system life cycle, CO_2 impact, implantation
- **Key performance indicators calculation** for multi-criteria approach: failure, machine position, coast, optimised electricity price
- **Development and implementation** of a multifactor joint optimisation method
- **Real-time simulation** of an electrical network taking into account cyber security aspects
- **Application cases :** island, aquaculture and oil & gas infrastructures

PARTNERS

France Energies Marines, TotalEnergies, Entech smart energies, CorPower Ocean™, Saumon de France, Nantes Université, Université de La Réunion, ESS rennes

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