

Introduction

In the 2050 Low Carbon Economy roadmap, the EU set a goal of reducing emissions to 80% below the 1990 level.

Through increasing the share of zero-emitting RES in the electricity mix, the power sector can almost eliminate its emissions by 2050. One of the major challenges for the adoption of renewable energy solutions is how to combine such intermittent resources into a hybrid energy system including energy digitalization.

The scope of this work is the integration of different technologies including a data-driven approach to identify the renewable energy potential in islands with interconnections in insular power systems for the maximization of renewable energy sources penetration and increase decarbonization.

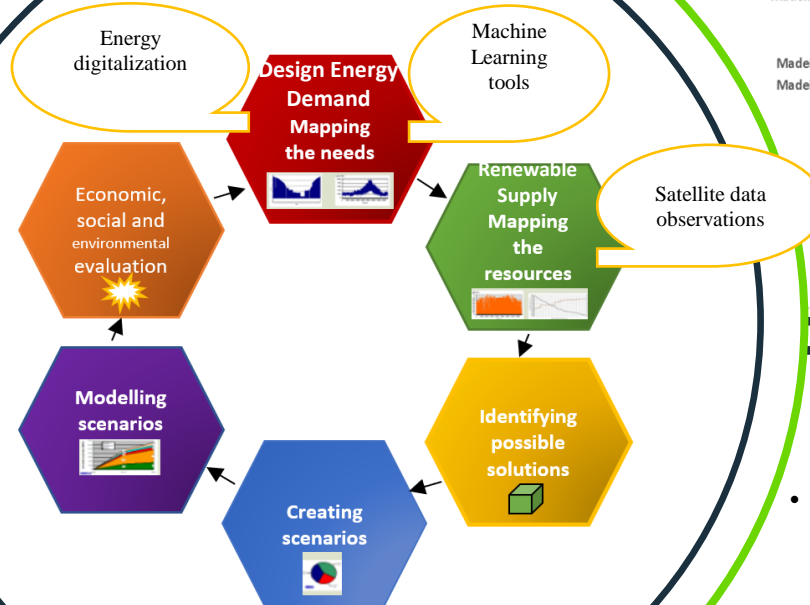
Materials And Methods

The present work is intended to provide pathways for increasing penetration of renewable energy in electricity systems in islands.

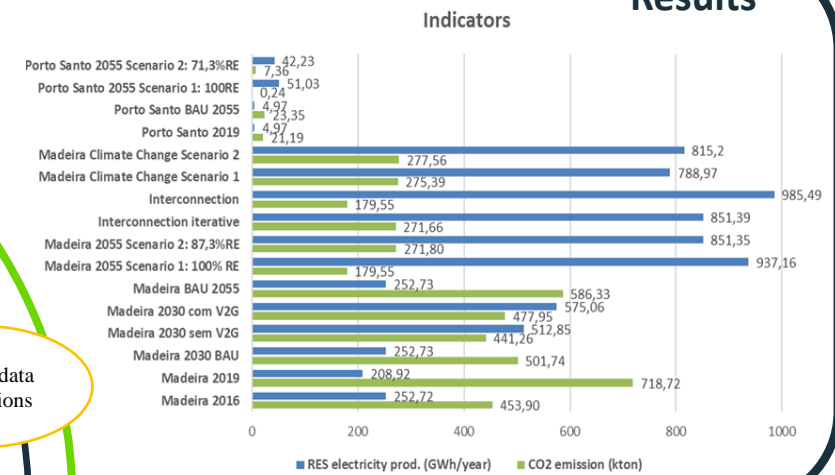
The methodology proposed generates the required data for energy modelling tools such as EnergyPlan for demand and supply following a data driven approach and can be applied in several geographical areas in order to fulfill the concept of Sustainable Island.

The methodology was applied in the case study of Madeira and Porto Santo Island.

Research Highlights



Results



Conclusion

- Results indicated that Madeira 2055 Scenario 1 with 100% renewable energy, Interconnection between Madeira and Porto Santo Island and the scenario1 Porto Santo 2055 100% renewable energy are the most balanced solutions.
- Carbon dioxide emissions were reduced 60% in the Madeira 2055 Scenario 1 and after interconnection 1, in comparison with the CO₂ obtained from calibration model in accordance with the targets.
- In Porto Santo Island a total reduction of 99% of carbon dioxide emissions in 2055, scenario 1.