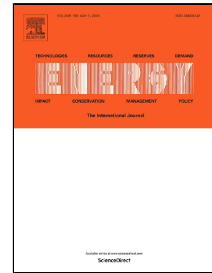


Accepted Manuscript

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PII: S0360-5442(18)30828-4
DOI: 10.1016/j.energy.2018.05.009
Reference: EGY 12842
To appear in: *Energy*
Received Date: 03 October 2017
Revised Date: 03 March 2018
Accepted Date: 01 May 2018

Please cite this article as: Francesca Poggi, Ana Firmino, Miguel Amado, Planning renewable energy in rural areas: impacts on occupation and land use, *Energy* (2018), doi: 10.1016/j.energy.2018.05.009

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Planning renewable energy in rural areas: impacts on occupation and land use

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Abstract

Reflecting on the role of rural areas in the 21st century is, nowadays, a central theme in the important debate on the long-term renewable energy development. It is the case that while cities demonstrate an ever-growing pattern of energy consumption, rural areas keep themselves as almost low-density territories and with the greatest potential of renewable energy sources. This means a new smart specialization of rural areas as green energy exporters to fuel urban areas, providing effective and long-lasting answers to the climate change, the reduction of energy dependency and respective social, economic and environmental impacts. Nevertheless, the implementation of renewable energy sources requires safeguarding the balance between occupation and land use and, at the same time, preservation and respect for the environmental, cultural and scenic values of these privileged territories. The present paper describes the first stage of an exploratory empirical study on the various impacts caused by the implementation of different renewable energy sources in rural areas. With reference to the County of Loures in Portugal, factors and geographical determinants, underlying the localization of recently implemented photovoltaic power plants and wind farms, have been identified. The level 5 Corine Land Cover 2007 datasets and satellite images have been used along with the information collected during on-site field work. The delimitation of infrastructure areas associated with renewable energy production, has enabled an understanding of the changes in land occupation over the time period of a decade and how these aspects are linked to the spatial dimensions of planning and land management. The results obtained demonstrate the emergence of a functional dichotomy between the preservation of lands with strong agricultural potential and the massive expansion of renewable energy production across rural areas. This allows us to understand how the implementation of renewable energy sources is ever more linked to the local decision-making process associated with spatial planning. The role that municipalities can play in the definition of strategies to ensure an efficient, balanced and sustainable renewable energy zoning in rural areas will therefore be crucial.

Keywords: *Rural areas; renewable energy sources; photovoltaic power plants; wind farms; Corine Land Cover 2007; municipal energy planning*

1. Introduction

At present, rural areas occupy 90% of European Union territory and contain 57.4% of its population [1], playing a determinant role in sustainable development. In this context, the need for tackling climate change and CO₂ emissions provides ever increasing challenges, namely the possibilities to explore endogenous energy potential [2]. It is the case that while cities demonstrate an ever-growing pattern of

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