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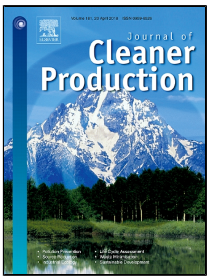

Environmental policies for GHG emissions reduction and energy transition in the medieval historic centre of Siena (Italy): the role of solar energy

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Environmental policies for GHG emissions reduction and energy transition in the medieval historic centre of Siena (Italy): the role of solar energy.

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Abstract

The cities are playing a leading role in action to reduce the global CO_2 emissions. In this paper a greenhouse gas (GHG) balance of the medieval historic centre of Siena (Tuscany, Italy) has been performed for the first time. It was compiled by a top down approach and according to the latest IPCC guidelines released in 2006.

The results show a balance far from carbon neutrality and offer ideas for testing appropriate environmental policies based on improving energy efficiency (such as energy saving and integrated waste management) as well on transition towards renewable energies. The proposed strategies, and in particular the installation of photovoltaic panels on roofs, showed a substantial reduction in gross GHG emissions (-57%) in the short run (about 10 years) and enable carbon neutral status to be reached in the long run (about 30 years). Carbon status further improves when the electricity obtained from the photovoltaic panels is used for private/service sector needs (e.g. lights and electrical appliances), for public/household electric heating and for electric transport. Solar and other renewable resources represent the most desirable solution for decarbonisation but need specific concern in urban systems with a high degree of structural and historical constraints coherently with the scopes of the Global Protocol for Community-Scale GHG Emission Inventories (2014).

Keywords: Siena historic centre, GHG emissions, sustainability, environmental policies, photovoltaic panels.