Health and heating in the city of Temuco (Chile). Monetary savings of replacing biomass with PV system in the residential sector

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The paper conducts a comprehensive analysis of replacing residential use of wood burning stoves for heating with photovoltaic systems for the generation of electricity using storage batteries (PV + storage systems). The research focuses on the city of Temuco (Southern Chile) as a case study, since this city has a high use of firewood for heating (80% of households) and also because this city has been declared by authorities as an area saturated with suspended particles. The total cost corresponds to the acquisition of systems. The reduction of monetary value of the impact of polluting emissions, resulting from the combustion of firewood, on health and traffic accidents is calculated. The interactive tool GDB Compare has been used to calculate the impact of pollution on health both in terms of attributable deaths and disability-adjusted life years. The monetary value of the impact on health has been calculated using two alternative approaches: the value of statistical life and the human capital approach. To identify firewood use requirements, heating degree-days has been used for temperatures ?15 ffiC and ?18 ffiC. The emissions avoided calculations have been refined, including emissions associated with the manufacture and transport of systems through the life cycle analysis. For all scenarios, the main results show that the savings outweigh the costs. © 2019 by the authors.

Ambient particulate matter

DALY

Household air pollution

Temuco

atmospheric pollution

biomass

electricity generation

human capital

life cycle

life cycle analysis

particulate matter

photovoltaic system

public health

wood

Araucania

Chile

Temuco