# Optimising economic and social impacts through sustainable renewable energy resources

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The power sector accounts for 25% of global $CO_2$ emissions and decarbonization of the entire energy system is critical to meeting the

Paris Agreement goal of reducing global temperature rise to below 2˚C above pre-industrial levels. A new article in *Energy Conversation and Management*, argues that increasing the share of renewable energy sources (RES) is central to achieving this goal and, to that end, the two main RES—wind and solar—must reach 56% of total electricity generation by 2050.

However, the intermittent nature of wind and solar poses challenges to the robustness and stability of the future grid. This study investigates the economic and social impacts of integrated facilities for power production and storage. It considers a combination of intermittent (wind/solar) and non-intermittent (biomass) resources, together with energy storage (batteries, hydrogen and/or methane/ammonia).

Additionally, the study uses a new social index, based on the impact of the energy transition and the general social environment of the region, to assesses the social impact of RES. It then uses this assessment to recommend geographic locations for the transition to RES. The work focuses on Spain, which aims to achieve climate neutrality by 2050, in line with European goals.

The study finds that integrating biomass non-intermittent renewable sources produces a reduction of around 20% in the cost of electricity. Storage alternatives are required to reliably meet demand, the researchers say. These should include storage technologies that allow for seasonal storage since solar energy is more intense during summertime.

From a social perspective, the new energy system can help to mitigate the social distance between regions and creates job opportunities, the study finds. For example, in certain regions of Spain (Teruel and Asturias), integrated facilities can perform well economically and also have a high positive social impact.

In future, the impact of other non-intermittent sources such as geothermal energy could be analyzed. The authors suggest that in a future economic system free of $CO_2$ emissions, ammonia—while currently expensive—could be an energy storage alternative.

**More information:** Antonio Sánchez et al, Towards a new renewable power system using energy storage: An economic and social analysis, *Energy Conversion and Management* (2021). DOI: 10.1016/j.enconman.2021.115056