

Integrated Assessment Tool for the Decarbonization of Energy Supply: An Application to the Spanish Electricity Market

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Abstract

The Decarbonisation Of Electricity Supply Poses A Major Milestone In The Mitigation Of Climate Change. Integrated Assessment Models (Iams) Provide A Relevant Instrument For The Quantification And Comparison Of The Economic And Environmental Impacts Of Various Electricity Decarbonisation Scenarios, Despite Having Rarely Been Applied To A National Context. In This Paper, An Iam Able To Calculate Such Impacts On The Electricity Sector In Spain Is Presented. Developed Using The Latest Iam Modelling Literature, The Proposed Model Is Able To Estimate Changes In Temperature, Climate-Induced Economic Losses, And Investment Needs For Climate Mitigation Corresponding To A Range Of Electricity Decarbonisation Scenarios On A Time Horizon To 2050. The Findings Show That Scenarios That Undertake Deeper And Earlier Cuts In Co2 Emissions From Electricity Generation Would Achieve Better Welfare Results, And That Further Reliance On Fossil Fuels Would Imply Higher Costs Than The Investment Needed For Renewable Energy Deployment In Spain. The Findings Constitute An Insight Towards The Formulation Of Policies That Address The Decarbonisation Of The Spanish Electricity Supply.

Keywords: Climate change, Energy transition, Energy economics, Economic modelling, European Green Deal