



Cyprus
University of
Technology

Faculty of Geotechnical
Sciences and Environmental
Management

Doctoral Dissertation

**Techno-Economic Analysis of Energy and
Environmental Policies: Supporting the Formulation of a
Cost-Effective Decarbonisation Strategy in Cyprus**

Chryso Sotiriou

Limassol, April 2021

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DEPARTMENT OF CHEMICAL ENGINEERING

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Approval Form

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Cyprus University of Technology

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Abstract

In order to align its ambition with the global Paris Agreement on Climate Change, the European Union (EU) declared that it aims to achieve 'climate neutrality' by 2050, i.e., achieve zero net emissions of greenhouse gases into the atmosphere. Decarbonisation by the mid-21st century requires a strong commitment to emission abatement measures, but national emission reduction pledges are usually made for the medium term. At the same time, climate policy is changing fast in the EU and becoming increasingly ambitious. In this context, this doctoral thesis aims to expand existing and develop new methodologies for assessing policies to identify cost-effective climate change mitigation strategies that are beneficial to society and in line with the goal to achieve 'climate neutrality' by 2050, and thereby to provide meaningful and realistic support to policymakers. The research is mainly applied at a national level for the EU Member State of Cyprus, across those sectors of the economy that are not subject to the EU Emissions Trading System. Impacts on public finances and air pollution related side-benefits of decarbonisation are also examined. Beyond country-specific methods and data, working within the EU policy context allows the methods and policy recommendations of this work to be applied in any EU member state and in other countries of the world that are faced with similar decarbonisation challenges.

Keywords: *climate change mitigation; emissions abatement; policy insights; abatement cost curves; cost optimisation; multi-objective optimisation; climate neutrality*