



## **Long-term energy security in a national scale using LEAP. Application to de-carbonization scenarios in Andorra**

Oriol Travesset-Baro (1,2), Eric Jover (1), Marti Rosas-Casals (2,3)

(1) Observatori de la Sostenibilitat d'Andorra (OBSA), Sant Julià de Lòria, Andorra, (2) Sustainability Measurement and Modelling Lab (SUMMLab), Universitat Politècnica de Catalunya (UPC), Terrassa, Spain, (3) Research Institute in Science and Technology for Sustainability - IS.UPC, Universitat Politècnica de Catalunya (UPC), Barcelona, Spain

This paper analyses the long-term energy security in a national scale using Long-range Energy Alternatives Planning System (LEAP) modelling tool. It builds the LEAP Andorra model, which forecasts energy demand and supply for the Principality of Andorra by 2050. It has a general bottom-up structure, where energy demand is driven by the technological composition of the sectors of the economy. The technological model is combined with a top-down econometric model to take into account macroeconomic trends. The model presented in this paper provides an initial estimate of energy demand in Andorra segregated into all sectors (residential, transport, secondary, tertiary and public administration) and charts a baseline scenario based on historical trends. Additional scenarios representing different policy strategies are built to explore the country's potential energy savings and the feasibility to achieve the Intended Nationally Determined Contribution (INDC) submitted in April 2015 to UN. In this climatic agreement Andorra intends to reduce net greenhouse gas emissions (GHG) by 37% as compared to a business-as-usual scenario by 2030. In addition, current and future energy security is analysed in this paper under baseline and de-carbonization scenarios. Energy security issues are assessed in LEAP with an integrated vision, going beyond the classic perspective of security of supply, and being closer to the sustainability's integrative vision. Results of scenarios show the benefits of climate policies in terms of national energy security and the difficulties for Andorra to achieving the de-carbonization target by 2030.