Baringa Partners and Energy and Environmental Economics (E3) have independently developed two of the leading models (RESOM and PATHWAYS) used to develop viable pathways to deep decarbonisation targets, one focused primarily on the UK, and one on California and the USA. Whilst applying different methodologies, the conclusions and key messages from the modelling have proved very similar.

RESOM has been used to support DECC's bioenergy and heating strategy development, the CCC Bioenergy Review, National Grid's heating strategy, and analyses of energy policies. The E3 model has been used to set targets and describe transparent cases for the US in the UN Deep Decarbonization Pathways Project (http://unsdsn.org/what we do/deep-decarbonization-pathways/) and to help California develop its policies to comply with its aggressive legislated carbon reduction targets (https://www.ethree.com/documents/E3_PATHWAYS_GHG_Scenarios_Updated_April2015.pdf.)

In this presentation we compare and contrast modelling approaches along with their respective strengths and weaknesses. RESOM is based around an overall optimisation process, minimising an objective function of total system cost. In contrast, PATHWAYS is a tool to develop detailed scenarios using "bottom up" forecasts of energy demand, and user-defined technology adoption rates, with a detailed hourly representation of the electricity sector.

In spite of the differences in methodology, the key findings are remarkably similar. All of the deep decarbonisation cases rely on three 'pillars': energy efficiency, making final energy consumption more efficient; energy supply decarbonisation, reducing net carbon emissions from energy conversion; and fuel switching to energy carriers that have lower net CO_2 emissions factors.

The similarity in messages derived from these different approaches strongly suggests that the transparency of analysis, data and models is at least as important as the details of underlying techniques and methods. Given that this is a world-wide problem that calls for substantial learning and sharing of knowledge, we believe that this should be a key focus of policy makers, academics and industry and will be a key part of successfully mitigating carbon emissions as we learn from each other.