A research agenda is described to further encourage the application of Multidisciplinary Design Analysis and Optimisation (MDAO) methodologies to wind energy systems. As a group of researchers closely collaborating within the International Energy Agency (IEA) Wind Task 37 for Wind Energy Systems Engineering: Integrated Research, Design and Development, we have identified challenges that will be encountered by users building an MDAO framework. This roadmap comprises 17 research questions and activities recognised to belong to three research directions: model fidelity, system scope and workflow architecture. It is foreseen that sensible answers to all these questions will enable to more easily apply MDAO in the wind energy domain. Beyond the agenda, this work also promotes the use of systems engineering to design, analyse and optimise wind turbines and wind farms, to complement existing compartmentalised research and design paradigms.