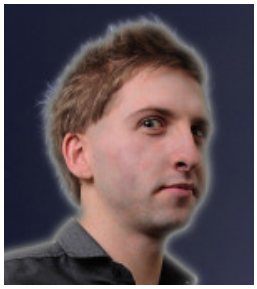

The Energy-Water Nexus describes the numerous and, often, overlooked exchanges between energy and water flows in the built environment which occur in many processes of supplying these important resources from crop-derived biofuel to desalination.

Kelvin's research investigates the influencing factors on the interdependencies between the provision of energy and water- including the socio-political scenario, regulatory constraints, technological capabilities, asset heritage, economics and how all of these may change over space and time.

A numerical model will be developed to the assess the manifestation of these influences at a local level using a case study to demonstrate how this model may be implemented by infrastructure and planning authorities. The model outputs will be used to propose possible methods for extrapolation in order to conduct a “Nexus assessment” at a broader scale and under transient conditions influenced by the development of a combination of key infrastructure technologies. A steady-state future scenario is also theorised where the average demand on utility infrastructure becomes broadly constant and the emphasis shifts from one of resilience to one of optimisation and efficiency.

The modelled scenarios will be used to propose, primarily technical, changes to current infrastructure systems, but with regard to the influencing political, social and economic conditions of the present and the desired future."