

EGU22-11884

<https://doi.org/10.5194/egusphere-egu22-11884>

EGU General Assembly 2022

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## Multiobjective and real-options based planning for adaptive and robust water resources

Tohid Erfani<sup>1</sup>, **Kevis Pachos**<sup>1</sup>, Ivana Huskova<sup>2</sup>, Evgenii Matrosov<sup>2</sup>, and Julien Harou<sup>1,2</sup>

<sup>1</sup>University College London, United Kingdom of Great Britain – England, Scotland, Wales (t.erfani@ucl.ac.uk)

<sup>2</sup>University of Manchester, School of Mechanical, Aerospace and Civil Engineering, Manchester, UK

Planning for sustainable future water resources needs to consider multiple goals like cost and resilience. The ability to adapt given uncertainties about climate change, population growth and other unknowns should be embedded into planning approaches. Adaptive planning can help meet future needs and reduce the risk of over-investment, capitalizing on the upside situation of future supply-demand balances being less stressed than anticipated. In this study, we propose a multi-objective real-options based multi-stage formulation well-suited to regulated water utilities with a regular planning cycle. The formulation can be used to explore the trade-offs between long term water management plan's resilience and financial costs while considering the effects of different types of demand growth and supply side uncertainties. Using London's water resource and supply system as a case study, we demonstrate how the generalized approach can be applied to reveal the cost-resilience trade-off delineated by different efficient planning alternatives.