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«Infrastructure and Construction Project Management»

Postgraduate Diploma Thesis

Evaluation of Business Models in Desalination Plants

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Abstract

Water scarcity is a global phenomenon that is expected to become increasingly relevant in the future. Access to freshwater is already affected by climate change, a continuously increasing global population and a booming global tourism industry. The demand for freshwater is, therefore, expected to significantly increase in the future while supply might be compromised due to climate change. In this context desalination is expected to have a critical role in the future, and many new (desalination) plants are expected to be built. Resting on this assumption, this thesis explores the advantages and disadvantages of new business models, i.e. Public-Private Partnership models, in relation to traditional models. The thesis focuses on the Greek paradigm but draws from European and global experience in the field.

The literature review suggests that the prevalent desalination technology in Greece is Reverse Osmosis (RO). The main technological challenge of desalination projects is minimizing the environmental impact, usually by utilizing renewable resources. The main institutional challenges are finding the most suitable funding mechanism and choosing an appropriate business model.

The thesis utilizes two case studies to analyze and draw conclusions on the advantages and disadvantages of different business models as well as potential innovative technology used. The first case study is about the desalination plant Sol Brine on the small island of Tinos, where the major environmental challenge of brine disposal is addressed successfully. The second case study is about a desalination project in the municipality of Mandra which was constructed with the traditional business model. The interview with the representative of the municipality highlighted the challenges and limitations encountered throughout the construction and early stages of operation.

The evaluation of the two projects highlighted the importance of a more flexible business model such as the PPP model in relation to the traditional model. PPP models can access additional funding through private funds, can provide better risk management and a long-term solution to the problem. However, in both models, i.e. traditional and new, a solid institutional framework, wide social acceptance, and technological competence is required for the success of the project.

Keywords: Desalination Plant, Water Scarcity, Business Models, Evaluation, Public-Private Partnership (PPP), Traditional Contract Model.