Reducing costs of electric power generation through the integration of desalinated water production into insular weak electric systems

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ABSTRACT

An assessment of both electric generation and desalinated water production in the islands of Lanzarote and Fuerteventura has been carried out. The electric system is made up of small groups consisting of two different technologies. The cost of generation has a steep profile, existing a difference between on-peak and off-peak electricity prices, being the difference between the first and the latter of double its value. Water production is performed through reverse osmosis-based technologies. Annual costs for water production in both insular systems are higher than €27 M, an estimated 10% of the total electricity generated. The process of water production can be adjusted to time slots at the lowest cost of production, since water can be stored and there are generators available at the installations. Several simulations are proposed for water and electricity production, achieving a reduction of more than 11% in desalination costs.

Keywords: Optimization; Desalination; Economic dispatch; Integrated water–electricity

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