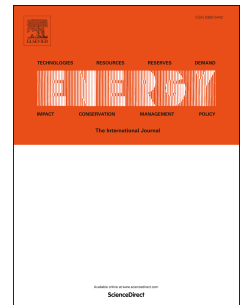


# Accepted Manuscript

Thermo-economic analysis of a multiple-effect desalination system with ejector vapour compression

Oumar Samaké, Nicolas Galanis, Mikhail Sorin



PII: S0360-5442(17)32155-2

DOI: [10.1016/j.energy.2017.12.112](https://doi.org/10.1016/j.energy.2017.12.112)

Reference: EGY 12061

To appear in: *Energy*

Received Date: 13 February 2017

Revised Date: 12 December 2017

Accepted Date: 20 December 2017

Please cite this article as: Samaké O, Galanis N, Sorin M, Thermo-economic analysis of a multiple-effect desalination system with ejector vapour compression, *Energy* (2018), doi: 10.1016/j.energy.2017.12.112.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## THERMO-ECONOMIC ANALYSIS OF A MULTIPLE-EFFECT DESALINATION SYSTEM WITH EJECTOR VAPOUR COMPRESSION

Oumar Samaké, Nicolas Galanis, Mikhail Sorin\*

Génie mécanique, Université de Sherbrooke, Sherbrooke QC, Canada J1K2R1

\* Corresponding author, email: [Mikhail.V.Sorin@USherbrooke.ca](mailto:Mikhail.V.Sorin@USherbrooke.ca)

### Abstract

A new formulation for the evaporation, flashing, condensation processes taking place in the effects of thermal desalination systems which simulates the operation of both forward and parallel/cross configurations is coupled with an exergo-economic model based on the SPECO method. The thermo-economic model uses accurate properties for the seawater, brine, pure water and vapour and is solved with an equation solver which does not require the development of a specific solution algorithm as in most previous studies. This flexible model is used to analyze the influence of the number of effects  $N$  and the temperature difference  $\Delta T_e$  between effects on the technical and economic performance of multi-effect desalination systems with ejector vapour compression. In particular, it is shown that the performance calculated by an earlier black-box approach is not attainable by technically and economically realistic systems. It is also shown that for each feed configuration and a given number of effects there exists an optimum value of  $\Delta T_e$  which minimizes the cost of the produced potable water. This last result forms the basis of a procedure that combines black-box results with the optimum value of  $\Delta T_e$  and can be used to select the appropriate system for any specific application.

**Keywords:** multiple effect evaporation; vapour compression; exergo-economic analysis; system design; forward feed; parallel/cross feed

Download English Version:

<https://daneshyari.com/en/article/8072407>

Download Persian Version:

<https://daneshyari.com/article/8072407>

[Daneshyari.com](https://daneshyari.com)