

Less polluting and more affordable future desalination

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ABSTRACT

The systems of nine desalination configurations are analyzed for efficiency, cost and polluting effects to map a road towards the most fit future desalination systems as well as research and development programs related to their advancement. The motive for this analysis is the rising consumption of apparently depleting fossil fuel resources and their associated rising emissions. The configurations are presented. The methodology of analysis is briefly described and the methodology details are referenced. The relevant results are summarized. The effects of variable power demand and variable oil price index are evaluated. Power-driven desalination processes run independently by efficient fuel-driven prime movers where renewable energy resources are absent and power-driven membrane desalination processes run by photovoltaic solar cells where the sun shines are likely to gain popularity. The load factor of a power plant of a variable power demand is improved by running a desirable power-driven night product in demand. Zero liquid discharge desalination requires more basic research.

Keywords: Thermal and membrane desalination; Fossil fuel driven and solar-power driven desalination; CO₂ emission; Zero liquid discharge; Changing oil prices; Variable-power/constant water production and night product
