

Business Distinguished Scholar Seminar Series

Rethinking Salt Supply Chains: Cost and Emissions Analysis for Co-production of Salt and Freshwater from U.S. Seawater

Is it feasible to build desalination plants for the co-production of salt and freshwater from U.S. seawater that could lead to a restructuring of supply chains for salt imports? As it is predicted that climate change will increase water stress worldwide, an increasing number of countries are using desalination plants to generate freshwater. In most such cases, residual concentrates must be disposed of, and the disposal cost is increasing as countries are becoming more environmentally conscious. Selective salt recovery can help to alleviate this issue, as it reduces the need for concentrate disposal and generates additional revenue.

To gain some insights into the costs and benefits of co-production plants, we have collected data on current desalination practices and salt imports in the U.S., along with the manufacturing costs and energy requirements for co-production plants. We have used this data to build an optimization model to determine an optimal number and location of co-production plants in the U.S. and their potential markets for the sale of co-produced salt. In our analysis, we have considered a different total number of co-production facilities, and for each configuration we evaluated the resulting net water cost and carbon emissions impact. Our results indicate that there exists the potential for building several co-production plants in the U.S. that would be both financially competitive with existing desalination plants and lead to a reduction in carbon emissions. This information might be of use to both governments and businesses when they make decisions about the type of desalination facilities built and the implemented “polluter pays” policies.



Prof Greys Sošić Chair and Professor The University of Southern California

Greys Sošić is a professor and chair of the department of Data Sciences and Operations at the USC Marshall School of Business. She teaches supply chain management, sourcing and supplier management, and sustainable supply chains in Marshall's MBA and MSc programs. She conducts research in the area of supply chain management, sustainable supply chains, competition and cooperation in supply chains, and applied game theory.

She has published papers in journals including *Management Science*, *Operations Research*, *Manufacturing and Services Operations Management*, and *Production and Operations Management*. Her latest papers are “Rethinking Salt Supply Chains: Cost and Emissions Analysis for Co-production of Salt and Freshwater from U.S. Seawater” and “Incentives and Emission Responsibility Allocation in Supply Chains,” both forthcoming in *Management Science*, and “Stable Recycling Networks under the Extended Producer Responsibility,” published in *European Journal of Operational Research* (2020).

Greys was a finalist in the 2006 JFIG competition, and received the Dean's Awards for Research Excellence in 2007 and IISE Transactions Design & Manufacturing Best Paper Award in 2018.

She has served as an associate/senior editor at *Management Science* (2014-2017), *MSOM* (2008-2020), *Operations Research* (2018-present), *POMS* (2011-present), *IIE Transactions* (2009-present) and the *Decision Sciences Journal* (2010-2016). She was VP for meetings of the MSOM society.

Greys holds a Ph.D. in management science from the University of British Columbia, and master's and bachelor's degrees in mathematics from the University of Zagreb, Croatia.



Date: 20 May 2021 (Thursday)

Time: 10:00 am – 11:30 am (HK Time)

Venue: Zoom meeting  Meeting ID: 973 9325 0821
Please join Zoom Meeting, link: <https://lingnan.zoom.us/j/97393250821>

Language: English

*** All are Welcome ***