

Water Resources, Processes and Advances

Theme Chairs

[Dr. Jenny Lawler \(QEERI\)](#), [Dr. Suhur Saeed \(Exxon Mobil Research Qatar\)](#)

The Water Resources, Process and Advances Theme examines the scarce water resources in the arid regions and highlights the need to maintain sustainability of water resources under intensification of water demand due to changing populations, climate change and increasing industrialization. Water is a cross-cutting theme across the pillars of the sustainable development goals, intrinsically integrating politics, culture and social values. It is impossible to talk about climate, energy, sustainable cities, food security and even poverty, health and gender equality, without considering water. Rapid development in many arid environments has outpaced the supply of public services, and aging infrastructure and water resources are coming under increasing pressure. New technologies and sustainable water management practices are needed to ensure that current and future water demands for all can be met. Multidisciplinary science, technology, policy and innovation related to the water sector will be included in the sessions under this theme.

Session 1: Water Resources and Large-Scale Water Management

Session Chairs

[Dr. Jenny Lawler \(QEERI\)](#), [Dr. Waleed Hassan \(UNFAO\)](#)

It is well recognized that we have a global infrastructure crisis, in part driven by climate change. Increasing populations, demand from agriculture and industry, and altered hydrological cycles of floods and drought due to our changing climate, make the future security and sustainability of water resources more uncertain. This is particularly true for already arid environments. Large scale and transboundary water management requires innovative solutions for institutional water management, information and data management, and water storage and transmission. Water security research related to sustainable water resource use, solutions for delivering reliable water and wastewater services, and management and mitigation of water-related risks are included in this session.

Session 2: Wastewater Treatment and Resource Recovery

Session Chairs

[Dr. Oluwaseun Ogunbiyi \(QEERI\)](#), [Eng. Christian Pérez Hernández \(Idrica\)](#)

Wastewater treatment is a very important process to protect human health, the environment, and the ecosystem. It contains toxic elements, however, some of these elements can also be recovered and reused for beneficial applications. The ever-increasing urbanization globally has increased the

generation and volumes of wastewater. Its effective treatment is critical to beneficial reuse applications related to domestic and industrial sectors. Treated wastewater provides an alternative source of water especially in arid regions. Globally, over 80% of all wastewaters is discharged without treatment. If chemicals, such as nitrogen and phosphates are discharged in excessive amounts, it causes excessive plant growth which releases toxins into the water. This leads to oxygen depletion and areas where fish and other aquatic life can no longer exist. Resource recovery from wastewater treatment plants in the form of energy, treated sewage effluent (TSE), biosolids, and nutrients, represents an economic and financial benefit that contribute to water sustainability in achieving a circular economy from creating valuable products from traditional waste streams. They reduce energy demands, lower costs, and increase production of renewable energy. Water resource recovery facilities (WRRFs) directly contribute to a circular economy by producing clean water, nutrients, renewable energy, and other valuable bio-based materials from wastewater.

Session 3: Desalination

Session Chairs

[Dr. Abdelnasser Mabrouk \(QEERI\)](#), [Dr. Ahmed Abdallah \(TAMUQ\)](#)

Seawater and brackish water desalination is a sustainable solution for arid areas, where the lack of natural potable water is limiting economic growth. The seawater quality in Gulf saltwater motivates the compromise among desalination technology-based sustainability, reliability, and cost-effective strategies. This session will focus on the latest achievements in science and technology of desalination technology to exchange ideas exerting innovation, pace creativity, and achieve advancements in this rapidly growing field. The latest developments in key desalination industry topic areas, of recent scientific and technology breakthroughs, and of new trends aiming at breaking the cost and energy barriers of desalination will be covered in this session, including thermal and membrane desalination, and emerging desalination technologies.

Session 4: Brine Management and Mining

Session Chairs

[Dr. Dema Al-Masri \(QEERI\)](#), [Dr. Mohammad Al Beldawi \(MoECC\)](#)

Improper management and disposal of brine can have significant environmental impacts, such as soil and groundwater contamination, changes in water chemistry, and harm to aquatic life. At the same time, brine mining and resource recovery from brine is a valuable new direction for industry and economic diversification, where the extra costs of movement towards minimal and zero liquid discharge systems can be realized by valorization of salts, minerals and other brine components. This

session discusses the pathway towards reducing environmental discharge of brines, the latest technology developments in the area, and the trends towards brine as a resource rather than a waste.

Session 5: Water Sector Technology Advances - moving from research towards commercialization

Session Chairs

[Dr. Zhaoyang Liu \(QEERI\)](#), [Dr. Dong Suk Han \(Qatar University\)](#)

Technology commercialization is important to create real-world impact from academic research. This session is focused on how to expand the visibility and impact of research through exploring the different commercialization routes to bring technologies or services to market, including pilot scaling up, intellectual property licensing, and spin-out company forming. The session will share insights through different case studies in the topics of water recycling, reuse and desalination.