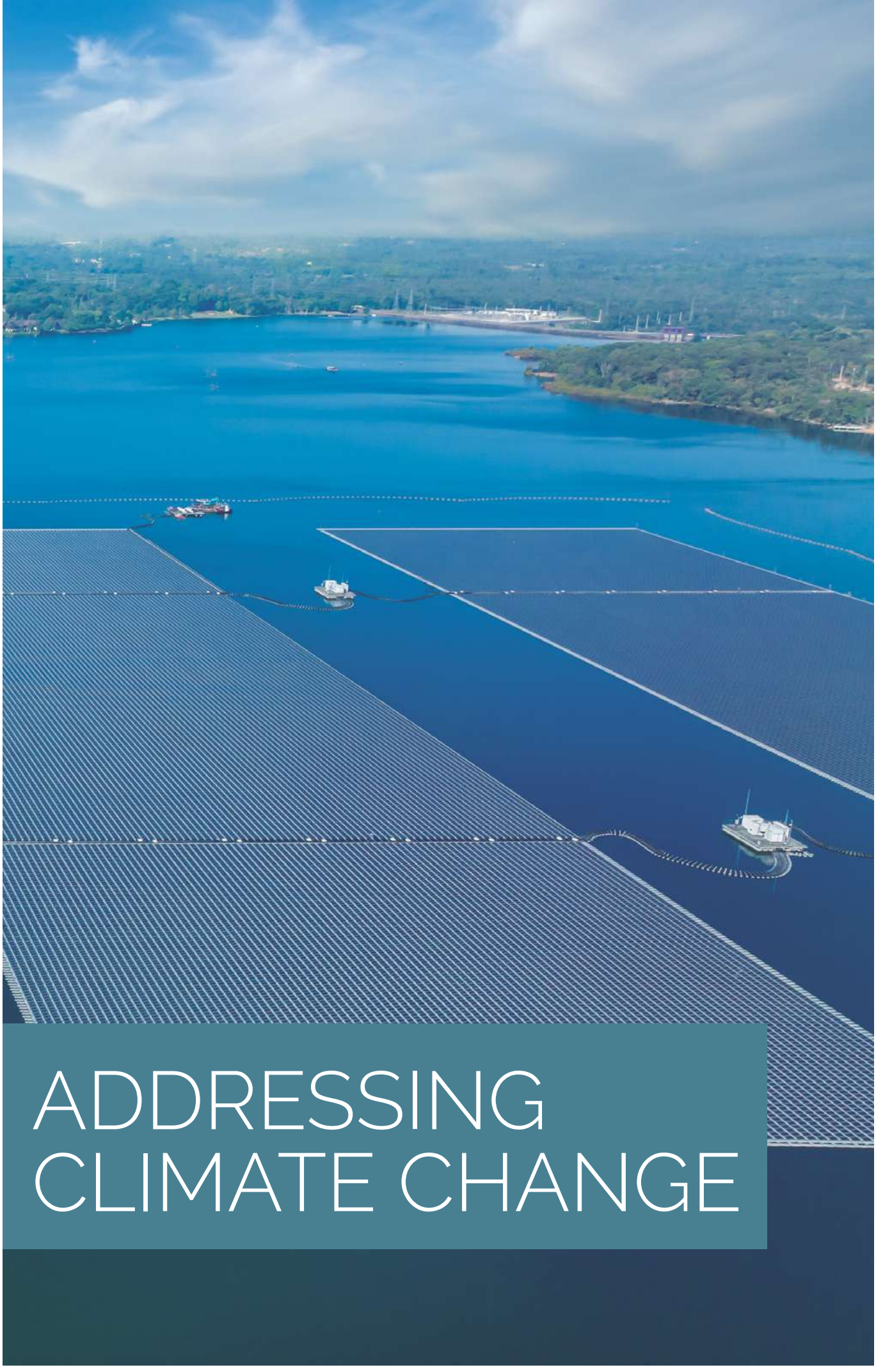

ADDRESSING CLIMATE CHANGE

THE ROLE OF THE SIWTP IN ADDRESSING CLIMATE CHANGE

By Dr. Art K. Umble, director of the Stantec Institute for Water Technology & Policy

In the decades leading up to today, the gradual, often imperceptible shifts in climatic patterns across the globe raised little concern because linking consequential impacts to human health and environment directly to those changes were generally unnoticeable to many. Clearly, this is not the case in our current decade. Without doubt, the impacts of our changing global climate are being manifest in the largest scales where "atmospheric rivers" can pound coastlines and inlands for days and weeks at a time causing widespread destruction of property and infrastructure, to the smallest of scales where wildfires can destroy entire neighborhoods or even towns in a matter of hours.

How are water professionals to respond? What is our role? What is our responsibility? Addressing climate change in the water sector at any scale requires a 3-tiered, hierarchical approach that integrates science, technology with policy, as illustrated in the figure 1. Water industry professionals and organizations must be engaged in each tier, providing actionable leadership.

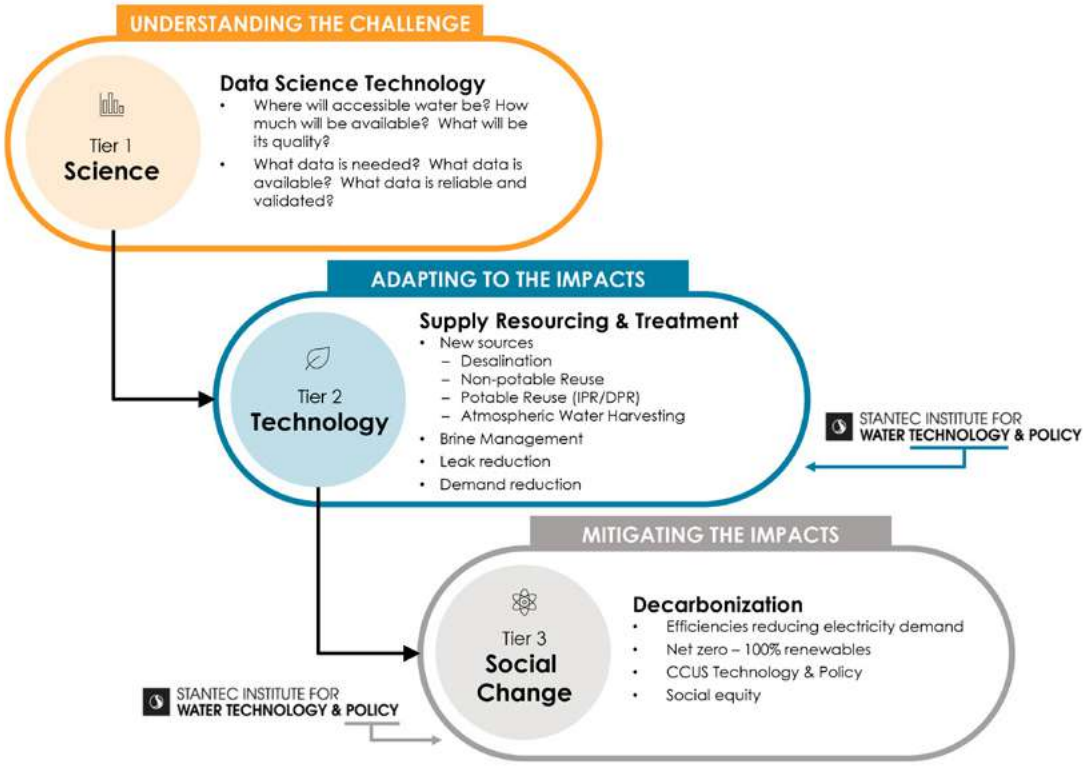

Figure 1

Tier 1:Understanding the Challenge

Decades of gathering climate data from satellites, aircraft, weather balloons, marine vessels, and networks of terrestrial stationary weather stations, to support scientific research into the causes and effects of changing global climatic patterns coupled with powerful computing systems, scientists have been able to devise scenarios projecting probabilities of impacts across the globe from various levels of atmospheric temperature rise. The basis of these models has contributed greatly to our collective understanding of the influence humanity has had on climate. Critical to each scenario is the effects on water's availability, its distribution, and its quality for human consumption and use. To date, climate models indicate sufficient water exists to support humanity's future. Its equitable distribution, however, is not favorable, and the quality of the resource is in decline. Both realities mean that the technological challenges facing water professionals in the coming decades are unprecedented, requiring perhaps the highest level of innovative thinking our industry has ever known.

Tier 2: Adapting to the Challenge

Nature's forces made manifest from shifting global climate patterns leaves us no choice but to adapt as quickly as possible, prioritizing our actions in accordance with the most immediate needs. We must maximize the limits of existing technology while maximizing our efforts to innovate with new. Though adaptation has mostly been reacting to climate impacts, innovative adaptive technologies will play a huge role in building resiliency into our future. This means accelerating our efforts in applied research with pilots and demonstrations focused on reducing water consumptive demands in heavy use sectors including energy, heavy industry, agriculture, and municipal, broaden applications for reuse, increase desalination efficiencies for higher recoveries at lower energy inputs, develop beneficial resource recovery from brines, provide higher quality of treatment at lower costs, and aggressively detect and eliminate leaks in distribution systems. Academics, consultants, technology developers, venture capitalists, and regulators must all collaborate in pushing technology envelopes if we are to attain a water-balanced future.

Tier 3: Mitigating the Impacts

Achieving emissions reduction targets necessary to meet a 1.5oC maximum temperature rise by the end of this century requires massive efforts in mitigating the impacts of climate change, that is reversing the current trends. Though technology plays a crucial role by providing opportunities for the reversing actions such as carbon capture and storage and utilizing captured CO2 in goods and products for societal benefit, the real challenge facing mitigation is a social one. This means that our collective social behaviors with respect to carbon requires a major paradigm shift. This includes fully decarbonizing all aspects of our economic activities that drive our GDP, it

means being fully circular in managing all our wastes, it means pushing water consumption limits to unprecedented levels. Accomplishing this means governments must promulgate regulatory incentives that entice permanent behavioral change and eliminate all rebound effects.

The Institute for Water Technology & Policy at Stantec Consulting Services, Inc., was launched in 2021 to dig into the challenges the water industry faces posed by climate change for the benefit of our clients and the water industry. Emphasizing technology solutions for adaptation and collaborating with the data science exploits of Tier 1, the Institute sits firmly in Tier 2, conducting applied research for clients striving for resiliency solutions to climate change impacts, both immediate and for decades to come. However, because a sustainable future depends highly on our capacity and political will to decarbonize all aspects of our water economy, Stantec's Institute mission also lands it square within Tier 3 activities. Here, the Stantec Institute is focused on devising strategic policy positions with our clients and the broader water industry to influence public awareness of opportunities to invest in long-term mitigation of climate change impacts, regulatory frameworks that incentivize decarbonization, and coupling legislative policy to financing mechanisms. In each of these areas, the Institute engages in strategic partnerships with academia, technology developers, management consultancies, and others, to develop the most comprehensive approaches practical.

About the Author

STANTEC INSTITUTE FOR WATER TECHNOLOGY & POLICY

Dr. Umble is a global leader in promoting sustainability of the water environment. As director of the Stantec Institute for Water Technology & Policy, he is responsible for the execution and publication of applied research associated with climate change mitigation, circular economy, emerging contaminants, machine learning, and process intensification. He is focused on accelerating the adoption of water and wastewater treatment technology through strategic partnerships with key stakeholders in the water industry. His experience includes leading Stantec's Global Wastewater Treatment Sector, active in numerous environmental projects worldwide, university teaching, and managing a publicly owned water and wastewater utility.