



**XPRIZE**  
**WATER**  
**SCARCITY**

مبادرة محمد بن زايد للماء  
THE MOHAMED BIN ZAYED **WATER INITIATIVE**

للماء

## **COMPETITION GUIDELINES**

Version 2.0

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XPRIZE Water Scarcity is governed by these Competition Guidelines. The Competition Guidelines summarize the high-level requirements and rules of the competition.

XPRIZE may revise these Guidelines at any time during the course of the competition to provide additional information or to improve the quality of the competition. Unanticipated issues that arise may require modifications to these Guidelines. XPRIZE reserves the right to revise these Guidelines as it, in its sole discretion, deems necessary. All currently Registered Teams will be notified of revisions to these Guidelines in a timely manner.

*For the most updated version of the Guidelines, visit <https://www.xprize.org/water/guidelines>.*

For further details concerning the operation of the competition, such as exact dates and locations of events, specific technical thresholds for performance testing, and operational information, please refer to the Competitor Agreement, Rules and Regulations (not yet released), and/or additional official documents that will be forthcoming throughout the course of the competition.

\* Note: Items in **bold** throughout this document are defined in Section 7: Glossary.

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# 1. WATER SCARCITY LANDSCAPE

The United Nations (UN) recognized the human right to water in 2010. But, around the world, 1 in 4 people do not have access to clean water, and 80% of people, across all continents, already suffer from serious threats to their water security. By 2030, we will need 40% more water than is available. Water challenges will increasingly concentrate in densely populated coastal cities. By 2050, nearly 70% of us will be living in cities, while 14 of the world's largest cities, including London, New Delhi, São Paulo, and Tokyo, already experience water scarcity or stress.

Right now, a mere 0.5% of Earth's total water resource is available and usable as freshwater to support 8 billion people. The World Economic Forum has consistently categorized water stress among the world's top risks, and Goldman Sachs called water the "petroleum for the next century." Due to a combination of trends, including population and economic growth, urbanization, and climate change, freshwater is growing more scarce, more contaminated, and less accessible to many.

Imagine a world where clean water is equitably and sustainably abundant, enabling people and the environment to prosper. Achieving this vision requires innovative solutions. **Seawater desalination** is one of the many water enhancement methods and strategies available to humanity today. It is unique in its ability to transform the vastness of Earth's oceans, which contain over 96% of the planet's total water resources into a near-limitless source of freshwater. Seawater desalination offers the prospect of reliable freshwater production, regardless of season. Today's commercially available desalination technologies are nearing the limit of their potential efficiency yet remain costly, beyond the reach of low- to medium-income communities. They also come with a host of negative environmental impacts that make their scaling both difficult and potentially harmful, not only to the planet's fragile ecology, but to humanity itself.

## 1.1 Core Problems

Desalination is at a crossroads. The industry has reached a state of maturity and is a growing market, but big technological breakthroughs have not been seen since the early 2000s. If innovation persists along the current commercial path, advancements will continue to grow marginally. Many innovators have begun breaking away from this path - utilizing advanced and novel materials, rethinking methods and systems, looking at resources holistically, and more.

Listed below are the core problems that prevent the widespread use of desalination to address global water scarcity. XPRIZE Water Scarcity will ultimately work to address these issues, which are the building blocks of the competition's focus, evaluation criteria, and testing methodology.

- **Unaffordable to low- to medium-income communities** - Cost remains the top barrier to desalination. Globally ranging on average \$0.5-\$1.5/m<sup>3</sup>, the cost of desalinated water is competitive; but, only where costly large-scale plants and energy can be afforded.

- **Advancements are increasingly incremental and marginal** - For over 40 years, innovation in desalination has focused on cutting costs through energy efficiency and drop-in solutions. **Reverse Osmosis (RO)** was a step change, but the theoretical thermodynamic limit is now in sight.
- **Inefficient across the water-energy nexus** - Commercially leading seawater desalination technologies remain energy and water intensive. Thermal Desalination recovers 25% of water using about 5 kWhe/m<sup>3</sup> and 10-20 kWhth/m<sup>3</sup>, while RO recovers 50% of water using 2.5-3 kWh/m<sup>3</sup>. Globally, in total, up to 50% more **brine** is produced than desalinated water.
- **Complex and vulnerable operations** - Large-scale, centralized plants are optimized to deliver the lowest cost of desalinated water, but come with extensive and costly capital expenses. They are also complex to operate and maintain, and most new builds show challenges within their first year of operation.
- **Unsustainable life cycle** - Sustainability challenges rise as one of the top barriers to desalination, including in jurisdictions where the existence of regulations may either preclude the use of legacy technologies or make them uneconomic via added mitigation costs, as well as in jurisdictions where the wide-spread use of such technologies, while not technically barred by regulation, could impose unacceptable environmental costs. Significant sustainability challenges in the desalination life cycle arise from potential greenhouse gas emissions stemming from electricity of heat supply, negative impacts on critical marine ecosystems stemming from poor intake design and brine disposal, chemical effluents associated with antifoulants and biocides, and materials, including membrane modules, production and disposal.

Despite these unresolved challenges, the adoption of desalination as a solution to address water scarcity is not only expanding, but gaining momentum, helping communities produce alternate sources of freshwater, but at a growing cost.

## **2. XPRIZE WATER SCARCITY OVERVIEW**

XPRIZE Water Scarcity is a 5-year global competition set to drive a step change in desalination technologies - reimagining systems, methods, and materials. The prize will facilitate the widespread use of desalination in a manner that supports greater socio-economic equity and environmental sustainability.

This competition will address issues across desalination and water scarcity by:

1. Encouraging future desalination systems to be more robust, affordable, and sustainable.
2. Advancing novel membrane materials to make existing desalination systems more robust, affordable, and sustainable.
3. Exciting innovators across the globe to get involved in developing public perception campaigns to address water scarcity from a broader perspective.

Through this multi-tracked competition, \$119 million in total prizes are available to competitors across three competition paths:

- Track A - Desalination: System-Level Innovation - the winning team will reliably and most sustainably generate one million liters of **potable water** per day (1,000 m<sup>3</sup>/day) from seawater at the lowest cost to ensure global accessibility, over the course of 1 year.
- Track B - Novel Membrane Materials - the winning team will demonstrate a novel membrane that can sustainably and cost-effectively treat seawater to potable water quality, using pressure-driven salt-water separation, with an operational lifetime of 10 years or more. The novel membrane should be a direct replacement for or a novel innovation on **seawater reverse osmosis (SWRO)** membranes.
- Ideas Competition - The Value of Water - the winning team(s) will devise the most novel, inclusive, engaging, and sustainable public perception campaign to transform the global perception of the value of water.

Teams may register to compete in one or multiple tracks, including the Ideas Competition.

## 2.1 Competition Timelines & Milestones

The following tables and timelines are intended to provide an overview of major competition milestones and activities. All teams are reminded to closely monitor competition timelines, especially those teams that choose to compete in multiple tracks. All events and dates should be regarded as preliminary and are subject to change throughout the competition.

### COMPETITION MILESTONES & TESTING LOCATIONS

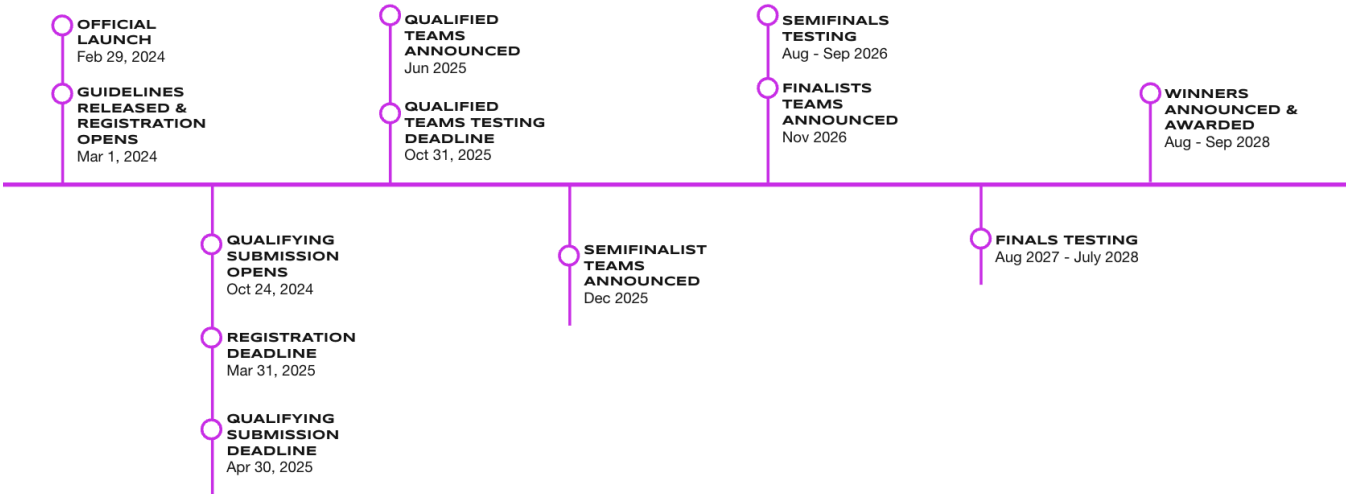
EVENT	TRACK A DESALINATION: SYSTEM-LEVEL INNOVATION	TRACK B NOVEL MEMBRANE MATERIALS	IDEAS COMPETITION THE VALUE OF WATER
Team Registration	Online via XPRIZE POP	Online via XPRIZE POP	TBD
Round 1: Qualifying Submission	Online via XPRIZE POP	Online via XPRIZE POP	
Round 2: Qualified Teams Testing	Team's chosen location	Team's chosen location	
Round 3: Semifinals Testing	Team's chosen location	XPRIZE-selected centralized location	
Round 4: Finals Testing	XPRIZE-selected centralized location	XPRIZE-selected centralized location	

For XPRIZE-selected centralized locations, XPRIZE will arrange and host testing at specific physical location(s), yet to be determined. These locations will be announced well in advance of the testing dates. Where necessary, each team will be responsible for their own travel and for any costs associated with the transportation of their technology.

## Track A: Desalination: System-Level Innovation | March 2024 – September 2028



### TRACK A TIMELINE



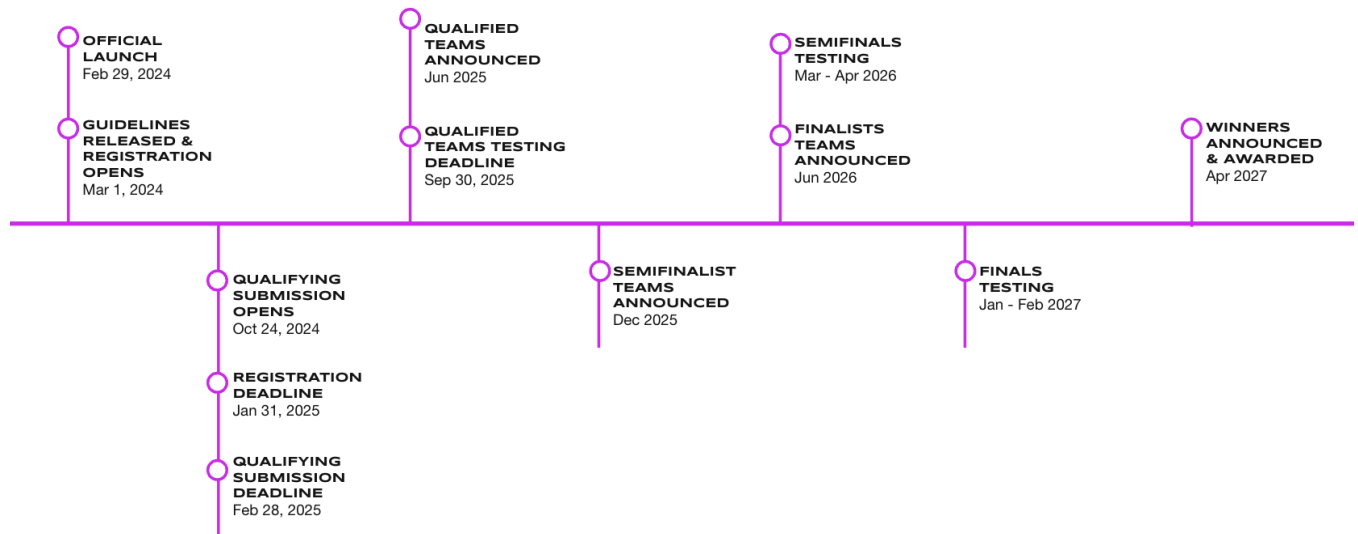
DATE	MILESTONE
February 29, 2024	Official Competition Launch
March 1 - June 1, 2024	Competition Guidelines Public Comment Period
March 1, 2024 - March 31, 2025	Registration Period
October 24, 2024	Qualifying Submission Opens
April 30, 2025	Qualifying Submission Deadline
June 2025	Qualified Teams Announced
October 31, 2025	Qualified Teams Testing Deadline
December 2025	Semifinalist Teams Announced

August - September 2026	Semifinals Testing
November 2026	Finalist Teams Announced
June - July 2027	Finalist Teams Onsite Calibration
August 2027 - July 2028	Finals Testing
August - September 2028	Award Ceremony; Winners Announced

## Track B: Novel Membrane Materials | March 2024 – April 2027



### TRACK B TIMELINE



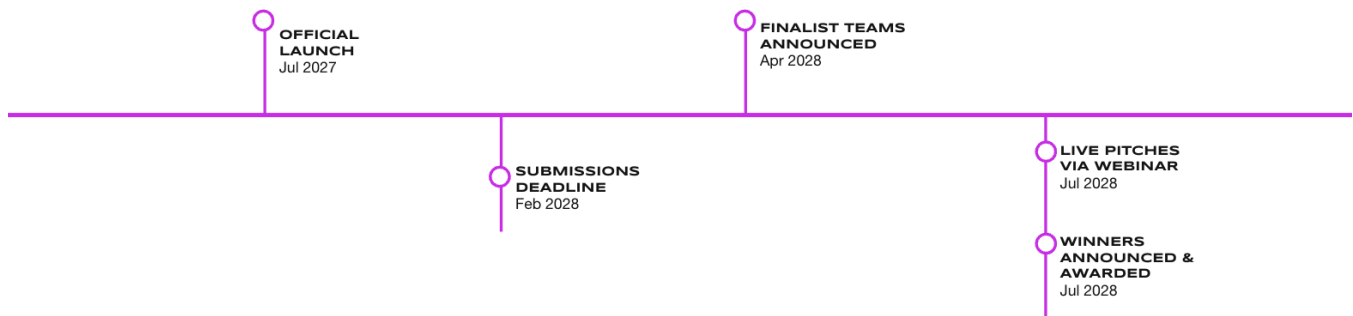
DATE	MILESTONE
February 29, 2024	Official Competition Launch
March 1 - June 1, 2024	Competition Guidelines Public Comment Period
March 1, 2024 - January 31, 2025	Registration Period
October 24, 2024	Qualifying Submission Opens
February 28, 2025	Qualifying Submission Deadline
April 2025	Qualified Teams Notified (Embargoed)
June 2025	Qualified Teams Announced

September 30, 2025	Qualified Teams Testing Deadline
December 2025	Semifinalist Teams Announced
March - April 2026	Semifinals Testing
June 2026	Finalist Teams Announced
January - February 2027	Finals Testing
April 2027	Award Ceremony; Winners Announced

## Ideas Competition: The Value of Water | July 2027 – July 2028



### IDEAS COMPETITION TIMELINE



DATE	MILESTONE
July 2027	Official Competition Launch
February 2028	Submissions Deadline
April 2028	Finalist Teams Announced
July 2028	Live Pitches via Public Webinar
July 2028	Winners Awarded & Announced



## 2.2 Prizes | Purses & Awards

XPRIZE Water Scarcity will have a total Prize Purse of \$119,000,000 (USD), and the Prize Purse will be distributed as detailed below. Please note that milestone awards will be equally distributed between the number of teams moving forward, up to the “amount per award” number indicated in the tables below. If the total amount for milestone awards is not met (i.e. there are less awards made than the number of awards indicated in the tables below), it is at the discretion of XPRIZE to reallocate the funds.

AWARD	AMOUNT PER AWARD	NUMBER OF AWARDS	TOTAL
<b>Track A - Desalination: System-Level Innovation</b>			
First Place	\$40,000,000	1	\$40,000,000
Second Place	\$20,000,000	1	\$20,000,000
Third Place	\$10,000,000	1	\$10,000,000
Moonshot Awards	\$5,000,000	4	\$20,000,000
Finalists Milestones	\$2,000,000	5	\$10,000,000
Semifinalists Milestones	\$250,000	20	\$5,000,000
Qualified Teams Milestones	The total award will be distributed among all advancing teams upon announcement of the final roster.		\$3,000,000
<b>Track A Total Prize Purse</b>			<b>\$108,000,000</b>
<b>Track B - Novel Membrane Materials</b>			
First Place	\$8,000,000	1	\$8,000,000
Second Place	\$1,000,000	1	\$1,000,000
Third Place	\$500,000	1	\$500,000
Finalists Milestone Award	\$220,000	5	\$1,100,000
Semifinalist Milestone Award	\$10,000	30	\$300,000
<b>Track B Total Prize Purse</b>			<b>\$10,900,000</b>

## Ideas Competition - The Value of Water

First Place	\$30,000	1	\$30,000
Second Place	\$20,000	1	\$20,000
Third Place	\$15,000	1	\$15,000
Runner ups	\$5,000	7	\$35,000
<b>Ideas Competition Total Prize Purse</b>			<b>\$100,000</b>
<b>Total Competition Prize Purse</b>			<b>\$119,000,000</b>

### 3. CRITERIA & TESTING OVERVIEW

XPRIZE Water Scarcity is a multi-track competition comprising two technical tracks as well as an Ideas Competition. The prize is designed to collectively drive meaningful impact and future-proof desalination as a viable solution to water scarcity.

Below is an overview of the technical competition tracks (Tracks A and B). Please note, each track includes its own timeline, milestones, and prize purse, while both entail multiple rounds of evaluations. Evaluations will be conducted by an independent **Judging Panel**, which is responsible for making the final decisions on advancing teams from one round of the competition to the next. Judges will weigh technological promise holistically against the overall aims of the competition, including:

- The proposed solution rationale, including a description of the challenges the solution aims to address
- The degree of technological or operational innovation with respect to the evaluation criteria
- The team's ability to meaningfully demonstrate capabilities within the prize timeline
- Challenges that may hinder the demonstration of solutions, including capital needs
- Evaluation of innovation scalability following the competition

#### 3.1 Track A: Desalination: System-Level Innovation

The core track is seeking the desalination system of the future at a scale that provides reliable, affordable, and sustainable water access to rapidly growing population centers worldwide. The scope of the evaluation is intake to output and is applicable to land-based and offshore systems alike.

At Finals, the Winning Team will reliably and most sustainably generate one million liters per day (MLD) of potable water (1,000 m<sup>3</sup>/d) from seawater for the lowest total cost to ensure global accessibility, over the course of one year. In recognition of the importance of long-term sustainability in desalination, Track A also includes additional prizes referred to as **Moonshot Awards** with further details provided in Section 3.1.1.

Ahead of Finals, either synthetic or real seawater may be used for testing purposes, and XPRIZE encourages teams to use a testing protocol that works with their home testing location for the Qualified Teams Testing and Semifinals testing rounds. For the Finals testing round, teams are encouraged to consider global seawater salinity ranges and other associated properties with those salinity ranges. The Finals Testing site will be confirmed by early 2026. If teams are using synthetic seawater, XPRIZE recommends teams follow the standard ASTM D1141-98 as a reference for testing and synthetic water composition ([Appendix A.1](#)).

## Winning Team Demonstration Overview

Over one year, teams will continuously operate a desalination system that:

- Generates 1,000 m<sup>3</sup>/d (1 MLD) of potable quality water based on [WHO Standards](#)
- Uses seawater with salinity determined by the finals testing location
- Achieves the lowest total cost based on the XPRIZE Water Scarcity Cost Model that will be provided to teams prior to Semifinals Testing.
- Demonstrates sustainable operation that prioritizes environmental responsibility across multiple categories including but not limited to: marine-friendly intake design, brine resource recovery, energy efficiency, greenhouse gas (GHG) emissions, materials lifecycle, and system footprint.
- Ensures reliability by considering uptime, ease of maintenance, and recovery from disruptive events.

## XPRIZE Water Scarcity Cost Model

The XPRIZE Water Scarcity Cost Model is anticipated to include an assessment of capital costs, along with at least one year of operating costs and 3-5 years of projected costs. The model will include assumptions and set costs for specific aspects of cost assessment (e.g., unit cost of energy, energy source). The cost model will be aimed at assessing the cost of desalination technology, however we recognize that new innovations can be more costly than incumbent technology. Therefore, XPRIZE encourages teams to think about how to strive for innovations that can result in cost-effective desalination systems, even if those cost reductions are achieved with future scale in production and manufacturing.

## Track A Testing Rounds

### Track A - Round 1: Qualifying Submission

*Evaluating all submitting (registered) teams; successful teams advance to Round 2: Qualified Teams Testing.*

Teams will submit a single written submission, based on the Track A - Qualifying Submission Template ([Appendix A.2](#)). The submission is meant to clearly communicate the team's technical approach to the competition Judging Panel. Teams are encouraged to provide as much detail as possible within the template constraints and at a minimum must include:

- Details on all proposed innovations within their system including a comparison to currently available state-of-the-art technology.
  - Each innovation should be listed separately and highlight the aspect of the desalination process it is focused on.
- Details of the system that are proposed for each phase of the competition (Qualified Team Testing, Semifinals, and Finals)
  - Teams should describe their approach to sustainability emphasizing how it aligns with the competition's sustainability goals (including but not limited to the following categories: marine-friendly intake design, brine resource recovery, energy efficiency, GHG emissions, materials lifecycle, and system footprint).
  - List the major water treatment process used in the system for pretreatment, core technology, and post-treatment.
  - A list of all planned major components for the system. This does not need to include smaller components such as monitoring sensors, connection valves, etc.
  - Dimensions (Length x Width x Height) in meters.
  - Schematics, diagrams and/or photographs of the proposed systems.
  - A development schedule for the build of the system for each phase of the competition (Qualified Team Testing, Semifinals, and Finals).
  - Estimated energy consumption per unit volume of generated water.
  - Provide the anticipated costs for development and operation of the proposed systems.
  - Details on the intake process, if not using synthetic water.
  - Plans for outtake and discharge during testing and development
- If a team wants to be considered for Moonshot Awards (see [Section 3.1.1](#)), they must state which category(s) and clearly describe the innovations they plan to demonstrate for each category. This information can be restated if details are already included in the main submission.

Teams may submit Track A Qualifying Submissions beginning October 1, 2024. All submissions must be received no later than April 30, 2025 at 19:00 UTC / 12:00 PM PST. The Track A Qualifying Submission Template is provided in [Appendix A.2](#). Teams must provide all requested information in order to be considered for qualification. As part of their submission, teams may also be asked to complete a general prize operations survey.

Qualifying Submissions received before the deadline will be reviewed by the Judging Panel on a rolling basis. Best efforts will be made by XPRIZE to notify teams of their qualification status within 45 days of their submission date. Teams are encouraged to submit their Qualifying Submission as soon as they are able within the submission period so that they have as much time as possible to prepare their solution(s) for later rounds of the competition, if selected as a Qualified Team.

### **Track A - Round 2: Qualified Teams Testing**

*Evaluating all qualifying teams; up to 20 teams advance to Semifinals.*

Competing teams will demonstrate a working prototype system while adhering to local environmental protection regulations. Teams will continuously operate their integrated systems in their chosen test location, generating a volume of 1 m<sup>3</sup>/d (1,000 liters per day) over two weeks, at 30% uptime.

Teams must submit Track A Qualified Team Testing documentation no later than October 31, 2025 at 19:00 UTC / 12:00 PM PST. Team performance will be evaluated against all competition criteria which will be detailed further in the Qualified Team Testing **Rules and Regulations** to be released in January 2025. XPRIZE reserves the right to visit and inspect teams testing procedure and hardware during testing.

### **Track A - Round 3: Semifinals**

*Evaluating up to 20 teams, up to 5 teams advance to Finals.*

Competing teams will demonstrate a working pilot-scale system while adhering to local environmental protection regulations. Teams will continuously operate their integrated systems in their chosen test location, generating a volume of 100 m<sup>3</sup>/d (1,000 liters per day) over four weeks, at 50% uptime.

Teams must submit Track A Semifinals Testing documentation no later than September 2026. XPRIZE reserves the right to visit and inspect teams testing procedure and hardware during testing. Further details will be provided in the Track A Semifinals Rules and Regulations to be provided in January 2026.

### **Track A - Round 4: Finals**

*Evaluating up to 5 teams.*

Competing teams will showcase their market readiness by operating at demonstration small plant scale. Teams will continuously operate their integrated systems for 12 consecutive months in a centralized test site arranged by XPRIZE. Over the course of a year, teams will generate a volume of 1,000 m<sup>3</sup>/d (1 million liters per day), at 70% uptime, while effectively mitigating disruptions to service, such as simulated power outage, algae bloom, oil spill, and a flash flood (dry run).

XPRIZE will arrange and conduct Finals testing at a centralized test site starting in Summer 2027, which will be announced in early 2026. Each team will be responsible for their own travel expenses and for any costs associated with the transportation of their system. Further details will be provided in the Track A Finals Rules and Regulations to be provided in early 2027.

### 3.1.1 Track A: Moonshot Awards

For desalination to become a lasting and effective solution, sustainability must be considered in the design of solutions. In addition, considering the growing density of coastal communities, the land available for large-scale desalination plants is growing scarce. To address these concerns, there are four moonshot awards designed to incentivize audacious achievements, worth up to \$5,000,000 each, which will be awarded to any team who participates in Finals and scores the highest in the specific category of that Moonshot Award:

- Marine-Friendly Intake Design: Minimizing the impact on marine environments. Biomass assessment via entrainment and impingement (when applicable); at a minimum, performance must be as good as subsurface intake.
- Brine Circularity: Recover and use at least 70% and closest to 100% of all components (i.e., water, salt, etc.) that make up a brine stream while demonstrating a viable economic model for the use of the collected brine components as resources.
- Energy Efficiency Step Change: Closest to approaching the theoretical thermodynamic limit of 1.06 kWh/m<sup>3</sup> at 50% water recovery; no more than 1.5 kWh/m<sup>3</sup>.
- Minimal System Footprint: Aiming for a footprint close to or less than 100 m<sup>2</sup>/MLD.

Moonshot awards are targeted at finalist teams that go above and beyond in these four categories. Further details will be provided in the Track A Finals Rules and Regulations to be provided in early 2027.

### 3.2 Track B: Novel Membrane Materials

Track B is pursuing the search for a novel membrane to cut the cost of water and increase reliability and sustainability, paving a future path for existing SWRO desalination plants. The novel membrane should be a direct replacement for or a novel innovation on seawater reverse osmosis membranes.

The Winning Team will most sustainably and cost-effectively desalinate seawater to potable water quality using pressure-driven membranes, demonstrating an operational lifetime of 10 years or more.

For Qualified Teams testing, either synthetic or real seawater may be used. If using synthetic seawater, XPRIZE recommends teams follow ASTM D1141-98 ([Appendix A.1](#)).

#### Winning Team Demonstration Overview

- Treat seawater with standard and accelerated lifetime testing protocols
- Achieve potable water quality per [WHO standards](#)
- Ensure the highest permeability without compromising salt rejection

- Demonstrate the most durable, recyclable materials use, and quantify the materials life cycle with a **Life Cycle Analysis (LCA)**
- Prove a minimum operational lifetime of 10 years through robust performance testing

## Track B Testing Rounds

### Track B - Round 1: Qualifying Submission

*Evaluating all submitting (registered) teams, successful teams advance to Round 2: Qualified Teams Testing.*

Teams will submit a single written submission, based on the Track B - Qualifying Submission Template ([Appendix A.3](#)), detailing their proposed SWRO membrane solution, including feasibility and scalability plans toward the target Single-stage SWRO plant (post competition): 300,000 m<sup>3</sup>/d, 800 psi, 35-45% WR. Teams are encouraged to provide as much detail as possible within the template constraints and at a minimum must include:

- **Innovation Plan:** This plan must highlight any novel approaches, technologies, or methodologies introduced in developing the novel SWRO membrane. It should detail the innovative aspects and their potential impact on the industry.
- **Scalability Plan:** This plan must outline the strategy for expanding membrane production capacity to 5,000 square meters per day (m<sup>2</sup>/d) within a three-year timeframe post-competition. It must also include detailed information on the composition of materials, the manufacturing process, and the projected production rate at full scale.
- **Feasibility Plan:** The feasibility plan must demonstrate the capability to produce a flat sheet membrane that can be rolled into a spiral wound element, conforming to existing industrial standards for RO modules, with a nominal membrane area of at least 400 square feet (ft<sup>2</sup>).
- **Robust Performance Plan:** This plan must outline a detailed methodology (testing protocols) for conducting rigorous accelerated lifetime testing to simulate the long-term performance of the novel SWRO membranes, aiming for a projected lifespan of more than 10 years within a multi-week testing period. *Note: While XPRIZE has provided a sample performance testing plan in [Appendix A.4](#) for reference, teams must develop and submit their own detailed methodologies that go beyond the provided conditions. The plan submitted should reflect the team's original approach to addressing the challenges of long-term SWRO membrane performance. The use of the sample plan as-is will not be accepted.*

Teams may submit Track B Qualifying Submissions beginning October 1, 2024. All submissions must be received no later than February 28, 2025, at 20:00 UTC / 12:00 PM PST. The Track B Qualifying Submission Template is provided in [Appendix A.3](#). Teams must provide all requested information in order to be considered for qualification. As part of their submission, teams may also be asked to complete a general prize operations survey.

Qualifying Submissions received before the deadline will be reviewed by the Judging Panel on a rolling basis. Best efforts will be made by XPRIZE to notify teams of their qualification status within 45 days of their submission date. Teams are encouraged to submit their Qualifying Submission as soon as they

are able within the submission period so that they have as much time as possible to prepare their solution(s) for later rounds of the competition, if selected as a Qualified Team.

## **Track B - Round 2: Qualified Teams Testing**

*Evaluating all qualifying teams, up to 30 teams advance to Semifinals.*

Competing teams will be evaluated for their technical maturity and ability to fulfill live demonstration round requirements. Teams will evaluate their membranes at their chosen test location and provide their results to XPRIZE.

Teams are expected to submit documentation (such as water quality report, performance metrics report, robust performance analysis, and compliance and sustainability report, among others) and a video showcasing their operational solutions, explaining their approach, and addressing how they meet the evaluation criteria of the Semifinals.

Teams must submit Track B Qualified Team Testing documentation no later than October 31, 2025 at 19:00 UTC / 12:00 PM PST. Team performance will be evaluated against all competition criteria which will be detailed further in the Qualified Team Testing Rules and Regulations to be released in January 2025. XPRIZE reserves the right to visit and inspect teams testing procedure and hardware during testing.

## **Track B - Round 3: Semifinals**

*Evaluating up to 30 teams, up to 5 teams advance to Finals.*

Competing teams will be evaluated for the safety, performance, sustainability, and scalability potential of their novel membranes. Teams will submit their potential scalability plans, Safety Data Sheets (SDS), and life cycle analysis.

Teams will also submit 3 samples of 4" x 6" flat sheet membranes to be tested in a centralized lab arranged by XPRIZE. Team performance will be evaluated against all competition criteria which will be detailed further in the Semifinals Rules and Regulations to be released in December 2025. If the solution assessment deviates from the detailed test methods in the Semifinals Rules and Regulations, appropriate testing will be developed in collaboration with the evaluation lab and the competition team. In this case, the team is responsible for providing the necessary test equipment.

## **Track B - Round 4: Finals**

*Evaluating up to 5 teams.*

Competing teams will be evaluated for all capabilities of their novel membranes, including separation and robust performance, sustainability, scalability, and cost.

Teams will submit their cost analysis and updates to the scalability plan and SDS, if any changes were made to the membrane.

Teams will also submit 6 samples of 4" x 6" flat sheet membranes to be tested in a centralized lab arranged by XPRIZE. Team performance will be evaluated against all competition criteria which will be



detailed further in the Finals Rules and Regulations to be released in Summer 2026. If the solution assessment deviates from the detailed test methods in the Finals Rules and Regulations, appropriate testing will be developed in collaboration with the evaluation lab and the competition team. In this case, the team is responsible for providing the necessary test equipment.

### 3.3 Ideas Competition: The Value of Water

Details about the Ideas Competition will be shared at a later date. Teams may register to compete in one or multiple Tracks, including the Ideas Competition. Progress and success in one Track does not imply commensurate progress or success in the other, and vice versa.

## 4. SAFETY

Safety is a top priority. All reasonable efforts should be made to maximize safety and minimize any potential hazards of any individuals involved with and/or impacted by the Team's testing protocols and any other activities conducted by the Team under the competition. Teams are required to ensure protections for safety throughout all aspects of the competition by ensuring the following minimum safety standards are in place throughout the competition period:

- Insurance: While XPRIZE does not require teams to provide us with proof of insurance, teams are encouraged to carry appropriate levels of insurance coverage to mitigate potential risk and ensure a safe working environment throughout the team's participation in the competition.
- Reduction of Risk of Physical Injury: Teams should take appropriate measures to reduce any potential risk of physical injury to any persons involved with or impacted by testing and/or other activities conducted under the competition.
- Property Damage Prevention: While it is expected that some equipment will be in an experimental or prototype form, all due precautions must be taken to ensure the safety of all personnel and property in and around such equipment at the testing locations.
- Documentation of Safety Protocols and Systems: Teams will provide documented safety protocols and systems ahead of any rehearsals or physical testing. More details will be provided prior to testing events.

XPRIZE reserves the right to discontinue testing at any time for any actual or possible hazard or perceived safety violation by a Team under guidance from the judges or associated personnel. Additional details regarding specific safety protocols will be issued ahead of testing events.

## 5. TEAM REGISTRATION

XPRIZE competitions are driven by teams of innovative groups and individuals, comprising subject matter experts, enthusiasts, start-ups, student teams, amateurs, industry veterans, and all problem-solvers in between; a winning idea can come from anyone, anywhere.

Taking part in an XPRIZE competition is an exciting and challenging journey that requires a significant commitment of time, expertise, and resources. Each team will be responsible for the total costs of their participation in the competition, including R&D, general operations, travel and other related expenses. For testing rounds conducted at a central test site, XPRIZE will organize and pay for the testing environments.

Teams and individuals are encouraged to collaborate and combine skills during the competition especially to add technical and subject matter expertise to their roster. Teams may recruit additional experts and are permitted to add new members to their team at any time throughout the competition. Teams who decide to merge must notify XPRIZE 10 business days before an official team merger.

Additional details regarding team mergers are provided in the **Competitor Agreement**.

To support team collaboration, XPRIZE will host informational sessions and facilitate team networking meetings throughout the competition. These sessions will allow teams to get to know each other and receive important competition updates. All interested teams are encouraged to join, but participation in these sessions is not mandatory.

While global in focus, English is the official language of the competition. All teams must be prepared to communicate with XPRIZE and submit their technical submissions and general inquiries in English.

## 5.1 Team Registration Process

For Tracks A and B - To participate, all teams must first create an account and log in to the [Prize Operations Platform \(POP\)](#).

To register a team, compete and/or be eligible for any part of the prize purse, any other monetary reward, or any non-financial benefits from the competition, a Team must qualify as an Eligible Entity, which for the purposes of the competition is defined as an entity that is:

1. An "Individual" (assuming that the individual is the only member of the Team) whose primary legal residence is in a jurisdiction where the Competition is not [prohibited](#). A Single Individual does not need to register as a legal entity unless more members join the Team.
2. A legitimate "Legal Entity" such as a corporation, LLC, Sole proprietorship, nonprofit, or if not US territories, a trading vehicle, public or private limited companies, etc., that is properly registered in a jurisdiction where the Competition is not [prohibited](#) and is in good standing in that jurisdiction. A Legal Entity may also be known, in non-US Jurisdictions, as a trading vehicle, public or private limited companies.

POP is an XPRIZE designed online platform through which teams will register for the competition, pay the registration fee, and submit required documents throughout the competition. All teams must appoint a Team Leader and a Team Administrative Point of Contact, who will be responsible for maintaining communications with XPRIZE. Teams are expected to maintain their POP profiles throughout the competition, ensuring their profile is up to date with the most recent team information.

Teams may register to compete in one or multiple Tracks of the competition, including the Ideas Competition. Progress and success in one track does not imply commensurate progress or success in the other, and vice versa, however, there may be synergy between tracks. To register to compete, teams must:



Teams will be allowed to register more than one entry in the Competition; provided, however, that each registered entry to participate in the Competition (Entry or Entries) registered by Team, shall be substantially different from the other Entry or Entries also registered by Team. A separate Registration Fee will be required for each additional Entry within the same track.

As of the date that submission of Entries is required, each Team must own (or will own) all technologies, methods, resources and Intellectual Property Rights in Team’s Entry or Entries and/or has (or will have) all appropriate license rights in any and all third-party technologies, methods, and resources (“Third-Party Technology”) in such Entry or Entries. Please refer to the Competitor Agreement for additional details.

Registration submissions are due by the registration deadline of each competition track. However, it is recommended that teams register as soon as they are able so that your team has access to Registered-Team-only events and activities. Additionally, XPRIZE encourages teams to begin designing their technologies at the earliest opportunity in preparation for the Qualifying Rounds of their respective track(s).

Any person or entity can participate in the Competition, no matter their citizenship or nationality, unless prohibited by US law—see [Sanctions Programs and Country Information | US Department of the Treasury](#). If a Team has a Team Member who is ordinarily resident in such destinations, it will be up to the team to obtain a license of authorization issued by the U.S. Government.

## 5.2 Registration Survey

Each team will complete a Registration Survey. The Registration Survey activity will be assigned to teams in POP automatically upon creating a team profile. This submission will be used to obtain an initial landscape of competitors, and to support the facilitation of collaboration opportunities between teams. The aggregate information from these submissions may be shared to support team collaboration opportunities. XPRIZE Water Scarcity Operations Team will not distribute specific details about any team without permission.

## 5.3 Registration Fees and Deadlines

Registration fees are required as a simple qualifier to ensure competitors can obtain the appropriate

resources to fully compete in the prize. All fees collected go toward supporting prize efforts, including **Alumni Network** development and prize impact work. Team Registration must take place by the registration deadlines below.

TRACK	REGISTRATION FEE IN USD	REGISTRATION DEADLINE
A	\$700	March 31, 2025 19:00 UTC / 12:00 PM PST
B	\$500  * Teams competing in Track A receive complimentary registration for Track B should they choose to compete in both tracks.	January 31, 2025 20:00 UTC / 12:00 PM PST
Ideas Competition	Free	TBD

XPRIZE has sole discretion to register and qualify additional teams across both Tracks from the close of their respective registrations until a date determined by XPRIZE. Teams that register during this period must meet all preceding registration, submission, and testing requirements and pay a late registration fee of USD \$2,000. *There is no guarantee late registration will be granted to a team.* Potential teams should contact XPRIZE directly for more details.

## 5.4 Competitor Agreement

To be considered to advance to subsequent stages of the competition, all **Registered Teams** are required to sign the **Competitor Agreement** to acknowledge the terms expected of teams upon entering the competition. This document contains vital information detailing the requirements teams must meet to remain eligible for the competition. Competitor Agreements will be signed when a team makes their registration fee payment. The Competitor Agreement is available in POP for teams to review before signing.

### 5.4.1 Impact Survey

Team Impact Surveys are collected throughout various phases of the Competition. Team representatives are asked to complete surveys to capture baseline data of the teams, the industry, and the technology around the prize. All data is confidential and only shared publicly as aggregate data.

### 5.4.2 Team Marketing Assets

Team Marketing Assets will be used to create a team page in POP. Teams will be required to create a team name and can share a logo, social media handles, and a team photo to be used by XPRIZE to showcase competitors throughout the Competition.

### 5.4.3 Team Communication Toolkit

Teams should refer to the Team Communication Toolkit whenever they will use their team logo. The team must refer to the Team Communication Toolkit when using the XPRIZE Water Scarcity logo, or any other sponsor logos to market themselves or the prize. The Team Communication Toolkit will also have instructions on how to submit assets for approval to the XPRIZE brand team.

### 5.4.4 Pay It Forward Program (Voluntary)

The XPRIZE Foundation is a 501(c)(3) non-profit foundation that strives to help solve global grand challenges. XPRIZE operates based on its benefactors' philanthropic considerations and support. Further, XPRIZE aims to support scientists, engineers, and entrepreneurs in pursuing their dreams of solving these challenges, and creating new technologies and companies that benefit humanity.

As such, XPRIZE requests that teams entering its competitions consider participating in its voluntary "Pay It Forward" program. This program seeks to help underwrite the XPRIZE Foundation's long-term operations and sustainability to continue to find solutions to the world's greatest challenges. For clarity, all teams who are "non-profit organizations," including any entity exempt under Section 501(c) of the US Internal Revenue Code, are ineligible to participate in the "Pay It Forward" program.

Each Team's registered legal entity entering the Competition, whether formed as a privately held corporation, LLC, or other business entity ("Company") who opts in to the voluntary "Pay It Forward" program will be asked to issue to the XPRIZE Foundation a 10-year option, equivalent to a Company-selected percentage (minimum of 1.0%), of authorized shares of its registered legal entity entering the Competition. The options exercise price will be set at the same price per share for the Company's next financing event following enrollment in the program. If a sale or transfer of the Team Technology or any Intellectual Property Rights therein or significant assets to another entity occurs before a financing event, options rights will transfer to the new entity at the transfer price. If the transfer occurs post-financing, the options will follow the same right as the other shareholders in the Company.

Any value derived from these options will be used by the XPRIZE Foundation as a donation to further its mission.

Teams may choose to opt in or out of the Pay It Forward program when signing the Competitor Agreement. Please refer to the Competitor Agreement for additional details.

### 5.4.5 Competitor Undertaking

XPRIZE Water Scarcity's title sponsor is The Mohamed bin Zayed Water Initiative (MBZWI), a nonprofit organization committed to harnessing the power of international cooperation, technological innovation, and strategic deployment, to overcome global water scarcity for the benefit of current and future generations.

While it is hoped that the XPRIZE Water Scarcity competition will bring forward novel solutions, it is also understood that identifying such solutions is only a first step toward addressing water scarcity and that real progress will also require accelerated commercialization, scaling and adoption. Taking this into account, the Title Sponsor has sought to introduce a mechanism into the design of the competition via which it may contribute to the accelerated commercialization of solutions emerging from this competition, while simultaneously creating potential future revenue sources that could support further work on this and similar humanitarian initiatives.

The specific mechanism involves a guaranteed 5% participation right in any future securities offering that is deeded to the Title Sponsor by competitors advancing to the semifinals. This right is conveyed via the execution of a Competitor Undertaking at the outset of the competition, but only comes into effect if a competitor advances to the semifinals of the competition.

In function, the Competitor Undertaking would simply allow the Title Sponsor to participate proportionately up to 5% in any securities offering (e.g., equity raise, convertible note issuance, etc.) related to solutions developed via the competition and based on whatever terms the semifinalist competitor had independently obtained and accepted from a lead investor(s) in such an offering, providing the Title Sponsor an opportunity to participate as a “minority, follow-on investor” in any equity raise. Additionally, competitors advancing to the Semifinals would agree over the same period to notify the Title Sponsor of any planned sale of their equity or intellectual property (IP) rights arising from such solution(s).

Additional information regarding the Sponsor’s Competitor Undertaking can be found at: [www.xprize.org/prizes/water/faq](http://www.xprize.org/prizes/water/faq).

## 5.4.6 Intellectual Property

As of the date of submission, each Team must own, or hold appropriate license rights to, all technologies, methods, resources, and Intellectual Property included in its submission.

XPRIZE will adhere to national or international regulations regarding ownership of the data used to validate team’s insights produced as part of the competition. Teams will retain ownership of their Intellectual Property on any technology or data integration techniques and processes they bring to the competition, and which they develop as part of their competition entry. All details relating to team technology, innovations, or methods submitted to XPRIZE at the submission deadlines will remain strictly confidential unless clearly and specifically noted.

Please refer to the Competitor Agreement for additional details.

## 6. ADVISORY BOARD AND JUDGING PANEL

### ADVISORY BOARD

- **Selection of Advisors.** XPRIZE will appoint a panel of relevant subject matter and technical experts to serve as the **Advisory Board (AB)** for the Competition. The AB will advise XPRIZE regarding various aspects of the Competition. Each member of the Advisory Board (“Advisor”) will enter into an agreement with XPRIZE that will: (i) outline Advisor’s duties and obligations; (ii) require Advisor to maintain confidentiality of XPRIZE and team confidential information, in accordance with the Competitor Agreement; and (iii) require each Advisor to acknowledge that they shall make no claim to any team’s intellectual property.
- **Independent Advisory Board.** The AB will be independent of XPRIZE, Sponsor(s), and all teams and team members. No Advisor, nor any member of the Advisor’s immediate family, shall participate, nor have any financial or other material interest, in XPRIZE, the Sponsor(s), and/or any team or team member. All members of the AB shall promptly disclose to XPRIZE any such current, former, or expected future conflict of interest with XPRIZE, the Sponsor, or any team or team member.
- **Role of Advisory Board.** The duties and responsibilities of the AB may include, but not be limited to: (i) assisting with the establishment of qualifications for prospective Judges; (ii) recommending members of the Judging Panel; (iii) advising on the development of testing protocols and judging criteria; (iv) and providing input toward the development of these Competition Guidelines.

### JUDGING PANEL

The Judging Panel will comprise subject matter and technical experts who serve as an impartial and independent evaluation team for all aspects of the competition. Judges evaluate, score, and determine teams and ultimately select all award winners based upon the judging criteria of the competition.

- **Selection of Judges.** XPRIZE, in its sole and absolute discretion, will appoint the Judging Panel based on competition requirements as well as recommendations from the Advisory Board. Each Judge will enter into a Judging Agreement with XPRIZE that will: (i) outline the Judge’s duties and obligations; (ii) require each Judge to maintain confidentiality of XPRIZE and team confidential information in accordance with the Competitor Agreement; and (iii) require each Judge to acknowledge that they shall make no claim to any team’s intellectual property.
- **Independent Judging Panel.** The Judging Panel will be independent of XPRIZE, Sponsor(s), and all teams and team members. No Judge, nor any member of Judge’s immediate family, shall participate, nor have any financial or other material interest, in XPRIZE, the Sponsor(s), and/or any team or team member. All members of the Judging Panel shall promptly disclose to XPRIZE any such current, former, or expected future conflict of interest with XPRIZE, the Sponsor, and/or any team or team member.

- **Role of Judging Panel.** The duties and responsibilities of the Judging Panel will include, but not be limited to: (i) evaluating teams' compliance with the Competitor Agreement as they relate to prize operations, these Competition Guidelines, and the Rules & Regulations for the purposes of the Competition; and (ii) the awarding of points and selection of teams that will proceed to each subsequent round of the competition.
- **Grounds for Judging Panel Decisions.** Official decisions made by the Judging Panel will be approved by a majority of the Judges that vote on each such decision after careful consideration of the testing protocols, procedures, guidelines, rules, regulations, criteria, results, and scores set forth in the Competitor Agreement, these Competition Guidelines, Rules and Regulations, and all other applicable Exhibits to the Competitor Agreement. If any vote of the Judges results in a tie, then the Judging Panel shall determine, in its sole and absolute discretion, the mechanism to settle the tie. Similarly, if one or more teams are tied at any stage during the competition, the Judging Panel shall have the sole and absolute discretion to settle the tie.
- **Decisions of the Judging Panel are Final.** The Judging Panel shall have sole and absolute discretion: (i) to allocate duties among the Judges; (ii) to determine the degree of accuracy and error rate that is acceptable to the Judging Panel for all competition calculations, measurements, and results, where not specified in the Rules & Regulations; (iii) to determine the methodology used by the Judging Panel to render its decisions; (iv) to declare the winners of the competition; and (v) to award the prize purses and other awards. Decisions of the Judging Panel shall be binding on XPRIZE, teams, and each team member. XPRIZE and teams agree not to dispute any decision or ruling of the Judging Panel, including decisions regarding the degree of accuracy or error rate of any competition calculations, measurements, and results. Teams shall have no right to observe other teams' testing or evaluation, or to be informed of other teams' calculations, measurements, and results, unless such information is made publicly available by XPRIZE.



## 7. GLOSSARY (AND KEY TERMS)

**Advisory Board (AB):** A select group of prominent advisors who contribute their wisdom, knowledge and guidance to various aspects of the prize.

**Alumni Network:** The XPRIZE Alumni Network provides ongoing support for teams post-competition for their continued success with a vibrant platform where alumni can connect, learn, and grow.

**Brine:** Water with a high salt concentration left over after treating water through desalination; most times mixed with chemicals used in the process. At present, discharging it back into the sea is the most common and economical practice, posing major risks to ocean life and marine ecosystems.

**Brine Circularity:** The concept of finding innovative and sustainable ways to close the loop on brine - utilize and manage the brine that is produced as a byproduct of current desalination processes.

**Capital Expenditure (CapEx):** The cost of developing or providing products, parts, or systems.

**Competitor Agreement:** A legal and binding document that details the responsibilities of competitors for the prize.

**Finalist Team:** A team that has been selected by the Judging Panel from the pool of Semifinalist Teams, based on the strength of their performance at Semifinals Testing.

**Interested Team:** A team or individual that is interested in participating in the competition and has created a profile in the XPRIZE POP system.

**Judging Panel:** Subject matter and technical experts who serve as an impartial and independent evaluation team for all aspects of the prize.

**Life Cycle Analysis (LCA):** A methodology for assessing the environmental impacts of a product, service, or process throughout its entire life cycle, from raw material extraction to disposal.

**Moonshot Awards:** Special recognitions awarded to pioneering innovations in defined categories that represent significant breakthroughs that push the boundaries of what is possible, and a commitment to sustainability.

**Operating Expenditure (OpEx):** The ongoing cost is an ongoing cost for running a product, business, or system.

**Operations & Maintenance (O&M):** The performance of day-to-day activities required to maintain operations.

**Potable Water:** Safe and clean to drink and be used for cooking. It's important for potable water to be free from harmful bacteria and other contaminants.

**Prize Operations Platform (POP):** The standard internal XPRIZE portal for teams to input data for use in this Competition.

**Prize Purse:** This refers to money offered, won, or received as a prize. It also refers to the overall amount of funds allocated to all prizes in this competition.

**Qualifying Submission:** A formal plan that outlines and shows proof of the team's capabilities and their progress towards developing a technology that meets the Competition goals.

**Qualified Team:** A team that has been selected by the Judging Panel from the pool of Registered Teams based on the strength of their Qualifying Submission.

**Registered Team:** A team that has completed the registration survey, paid the required registration fee, signed the Competitor Agreement, and signed the Sponsor's Competitor Undertaking. Registered Teams are eligible to submit a Qualifying Submission.

**Reverse Osmosis (RO):** A water purification process in which an external pressure is applied to a semi-permeable membrane. This pressure forces water from a region of higher solute concentration to a region of lower solute concentration, effectively removing contaminants.

**Rules and Regulations:** A document detailing the testing protocols, specific rules, dates/times, and other details that will govern the competition and will be binding on teams.

**Semifinalist Teams:** A team that has been selected by the Judging Panel from the pool of Qualified Teams based on the strength of their Qualified Teams Testing.

**Seawater Desalination:** Desalination is a water treatment process in which salts are removed from the water to produce water for different uses, including agricultural, drinking, and industry.

**Seawater Reverse Osmosis (SWRO):** A desalination method that uses pressure to force seawater through a semipermeable membrane, removing salts.

**Supervisory Control and Data Acquisition (SCADA):** Systems used for controlling, monitoring, and analyzing industrial devices and processes.

**XPRIZE Water Scarcity Cost Model:** A cost model developed for the prize competition that includes capital costs plus at least one year of operating costs and near-term future projections. The cost model will include assumptions and values for fixed costs that all teams will use.

# APPENDIX

## A.1 Chemical Composition of Substitute Ocean Water

This recipe is based on ASTM D1141-98 (2021). The chlorinity of this substitute ocean water is 19.38 g/kg, and the pH, after adjustment with 0.1 N NaOH solution, is 8.2.

COMPOUND	CONCENTRATION (g/L)
NaCl	24.53
MgCl <sub>2</sub>	5.20
Na <sub>2</sub> SO <sub>4</sub>	4.09
CaCl <sub>2</sub>	1.16
KCl	0.695
NaHCO <sub>3</sub>	0.201
KBr	0.101
H <sub>3</sub> BO <sub>3</sub>	0.027
SrCl <sub>2</sub>	0.025
NaF	0.003
Ba(NO <sub>3</sub> ) <sub>2</sub>	0.0000994
Mn(NO <sub>3</sub> ) <sub>2</sub>	0.0000340
Cu(NO <sub>3</sub> ) <sub>2</sub>	0.0000308
Zn(NO <sub>3</sub> ) <sub>2</sub>	0.0000096
Pb(NO <sub>3</sub> ) <sub>2</sub>	0.0000066
AgNO <sub>3</sub>	0.00000049

## **A.2 Track A: Desalination: System-Level Innovation - Qualifying Submission Template**

The Qualifying Submission form provides the Judging Panel with the required information to evaluate the capabilities and potential of the registered teams to progress to the Qualified Teams Testing Round. This form template **must be filled out in full** in order for teams to be assessed, and judged to advance to the next round.

Fully Registered Teams may submit Track A Qualifying Submissions beginning October 1, 2024. Completed Qualifying Submissions must be uploaded in **PDF format** in **POP** by **April 30, 2025, at 19:00 UTC / 12:00 PM PST**. The maximum file size for the submission must not exceed **1 GB**.

Teams should follow the below principles when completing their Qualifying Submission;

- Clear: Documentation will be needed to prove and validate the feasibility of the Submission. Relevance rather than volume of information is recommended;
- Concise: Presentation of all information submitted creates a logical, succinct case for the Submission; and
- Convincing: The Submission derives a solid, convincing conclusion for its significance in advancing the field of seawater desalination.

The Judging Panel will focus first and foremost on the quality of technical ideas and potential for success. However, a well-organized and well-written Qualifying Submission is the best way to ensure the Judging Panel understands your Submission so they may evaluate your proposed technology.

Documents must be formatted with a **12-point font size**, using either **Times New Roman** or **Arial** fonts. The text should be **single-spaced**, with **1-inch margins on all sides**. All teams are required to submit their documents in **English**. These formatting guidelines are essential for maintaining uniformity across all submissions. Please note that the Judging Panel will not review any submissions that do not adhere to the above requirements or that extend beyond the stated page limit (noted in each section below).

## **Section 1: Team Information (Maximum 1 page)**

- 1. Team Name:**
- 2. Team Lead:**
  - a. Full Name:
  - b. Email Address:
  - c. Phone Number:
- 3. Team Members:** (List key members and their title)
- 4. Affiliated Institution(s) or Organization(s):**
- 5. Team Location(s):** (Primary office or headquarters)

## **Section 2: Innovation Plan**

Details on all proposed innovations within the system including a comparison to currently available state-of-the-art technology. **(Maximum 2 pages)**

- Each innovation should be listed separately and highlight the aspect of the desalination process it is focused on.

## **Section 3: System Design and Development Overview**

Details of the systems that are proposed for each phase of the competition (Qualified Team Testing, Semifinals, and Finals) **(Maximum 10 pages)**

- Teams should describe their approach to sustainability emphasizing how it aligns with the competition's sustainability goals (including but not limited to the following categories: marine-friendly intake design, brine resource recovery, energy efficiency, GHG emissions, materials lifecycle, and system footprint).
- List the major water treatment process used in the system for pretreatment, core technology, and post-treatment.
- A list of all planned major components for the system. This does not need to include smaller components such as monitoring sensors, connection valves, etc.
- Dimensions (Length x Width x Height) in meters.
- Schematics, diagrams and/or photographs of the proposed systems.
- A development schedule for the build of the system for each phase of the competition (Qualified Team Testing, Semifinals, and Finals).
- Estimated energy consumption per unit volume of generated water.
- Provide the anticipated costs for development and operation of the proposed systems.
- Details on the intake process, if not using synthetic water.
- Plans for outtake and discharge during testing and development

## **Section 4: Moonshot Award Details**

If a team wants to be considered for Moonshot Awards (see [Section 3.1.1](#) of the Competition Guidelines), they must state which category and clearly describe their innovations they plan to demonstrate. This information can be restated if details are already included in the main submission. Teams may propose innovations to all categories. **(Maximum 1 page per category)**

## A.3 Track B: Novel Membrane Materials - Qualifying Submission Template

The Qualifying Submission form provides the Judging Panel with the required information to evaluate the capabilities and potential of the registered teams to progress to the Qualified Teams Testing Round. This form template **must be filled out in full** in order for teams to be assessed, and judged to advance to the next round.

Fully Registered Teams may submit Track B Qualifying Submissions beginning October 1, 2024. Completed Qualifying Submissions must be uploaded in **PDF format** in **POP** by **February 28, 2025, at 20:00 UTC / 12:00 PM PST**. The maximum file size for the submission must not exceed **1 GB**.

Teams should follow the below principles when completing their Qualifying Submission;

- Clear: Documentation will be needed to prove and validate the feasibility of the Submission. Relevance rather than volume of information is recommended;
- Concise: Presentation of all information submitted creates a logical, succinct case for the Submission; and
- Convincing: The Submission derives a solid, convincing conclusion for its significance in advancing the field of membrane materials.

The Judging Panel will focus first and foremost on the quality of technical ideas and potential for success. However, a well-organized and well-written Qualifying Submission is the best way to ensure the Judging Panel understands your Submission so they may evaluate your proposed technology.

Documents must be formatted with a **12-point font size**, using either **Times New Roman** or **Arial** fonts. The text should be **single-spaced**, with **1-inch margins on all sides**. All teams are required to submit their documents in **English**. These formatting guidelines are essential for maintaining uniformity across all submissions. Please note that the Judging Panel will not review any submissions that do not adhere to the above requirements or that extend beyond the stated page limit (noted in each section below).

## **Section 1: Team Information (Maximum 1 page)**

- 1. Team Name:**
- 2. Team Lead:**
  - a. Full Name:
  - b. Email Address:
  - c. Phone Number:
- 3. Team Members:** (List key members and their title)
- 4. Affiliated Institution(s) or Organization(s):**
- 5. Team Location(s):** (Primary office or headquarters)

## **Section 2: Executive Summary**

Provide a brief overview of your submission, including the key innovative aspects of your proposed seawater reverse osmosis (SWRO) membrane solution, your plans for scalability and feasibility, and how your solution meets the competition's goals. This section should highlight the significance of your approach in advancing the field of membrane materials. ***(Maximum 1 page)***

## **Section 3: Development Strategy**

3.1. **Innovation Plan:** Detail the novel approaches, technologies, or methodologies your team has introduced in developing your SWRO membrane. Explain how these innovations will impact the desalination industry. Include relevant technical specifications, diagrams, and references to support your claims. ***(Maximum 3 pages)***

3.2. **Scalability Plan:** Outline your strategy for scaling membrane production to 5,000 square meters per day (m<sup>2</sup>/d) within three years post-competition. Provide details on materials composition, manufacturing processes, and how you plan to achieve full-scale production. ***(Maximum 2 page)***

3.3. **Feasibility Plan:** Demonstrate the feasibility of producing a flat sheet membrane that can be rolled into a spiral wound element, conforming to existing industrial standards. Include technical specifications that show your membrane meets the requirements for nominal membrane area and compatibility with existing RO modules. ***(Maximum 2 pages)***

## **Section 4: Robust Performance Plan**

Describe your methodology for accelerated lifetime testing of your SWRO membranes, aiming for a projected lifespan of more than 10 years within a multi-week testing period. Include testing protocols, performance criteria, and any preliminary test results if available. ***(Maximum 2 pages)***

## A.4 Robust Performance Sample Testing Plan

To ensure comprehensive membrane evaluation, rigorous accelerated lifetime testing should be conducted to simulate the long-term performance of SWRO membranes, aiming for a projected lifespan of more than 10 years within a multi-week testing period. This includes testing for:

- pH tolerance: Membrane must show less than a 2X increase in NaCl passage after immersion into HCl at pH 1, 50 °C for 48 hours and NaOH at pH 13, 50 °C for 48 hours.
- Temperature and salinity stability: Membranes must demonstrate a performance of at least 2 LMH/bar & 99.3% salt rejection in 38 g/L NaCl, 35°C (95°F), pH 8, 800 psi (55.2 bar), 8% recovery.
- Compaction resistance: Membranes must maintain over 90% of their permeability at 800 psi with 18 MW deionized ultrapure water.
- Biofouling resistance: Membranes must exhibit the least flux decline, comparable to or better than Hydranautics SWC6 performance, over 1 week of exposure to real seawater dosed with bacterial nutrients to stimulate biogrowth.
- If the solution approach involves chlorine resistance, chlorine will be added to the test, and material stability will be evaluated. The evaluation criteria are as follows: for > 1,000 ppm-hr exposure with < 2X increase in salt passage, 50% of points will be awarded; for 10,000 ppm-hr exposure with < 2X increase in salt passage, 100% of points will be awarded; and for 100,000 ppm-hr exposure with < 2X increase in salt passage, 150% of points will be awarded. *Note: if a solution includes external input, appropriate testing will be designed.*
- Scaling resistance: Membranes must exhibit the least flux decline, comparable to or better than Hydranautics SWC6 performance, over 1 week of accelerated simulated exposure to real seawater with unadjusted pH (~8.3 pH).
- Oxygen stability: Membranes must show less than a 2X increase in salt passage following 1 week of exposure to fully oxygenated real seawater (i.e., no sodium bisulfite (SBS) or de-aeration applied).

This sample performance testing plan is for reference only, teams must develop and submit their own detailed methodologies that include but can go beyond the provided conditions. The plan submitted should reflect the team's approach to addressing the challenges of long-term SWRO membrane performance. The use of the sample plan as-is will not be accepted. Since a global or universal standard testing method to evaluate SWRO membrane lifetime does not currently exist, XPRIZE aims to develop a unified and standard testing protocol that all teams will be required to follow during testing. However, XPRIZE is open to technical input from teams as part of the process to develop the prize's standard testing protocol. Official testing procedures will be published in the Semifinals Rules and Regulations.