

# QUANTUM SOLUTIONS FOR THE ENVIRONMENT Challenge

## ABOUT THE CHALLENGE

### PRIZES

1st Prize: €7,000

2nd Prize: €2,000

Most Creative  
Solution: €1,000

In celebration of the 60th anniversary of John Stewart Bell's groundbreaking Bell's Inequality paper, Equal1 is proud to launch a student competition to honour the legacy of the Belfast-born physicist who revolutionised our understanding of quantum mechanics. This competition seeks to inspire the next generation of Irish scientists, engineers, and software developers to explore innovative ways quantum principles can be applied to address environmental challenges.

Third-level students enrolled in a science, mathematics, engineering, or software STEM program in a third-level institution in Ireland or Northern Ireland are invited to propose ideas that apply quantum principles to tackle pressing environmental issues. Participants will have the opportunity to showcase how quantum science can deliver real-world impact, from optimising renewable energy systems to developing sustainable materials and conservation solutions.

## WHO CAN PARTICIPATE?

Third-level students enrolled at a third-level institution in Ireland or Northern Ireland in a science, mathematics, engineering, or software STEM bachelor or master's program, excluding those currently enrolled in a PhD program.

## CHALLENGE FORMAT

The competition will be conducted in two phases:

**Phase 1:** Teams will submit a report detailing their idea, accompanied by a video presentation (up to 10 minutes). Based on these submissions, five finalist teams will be chosen to advance to Phase 2.

**Phase 2:** Finalists will present their final solutions to a panel of academic and industry experts during an in-person event.

# OFFICIAL RULES

## Scope

Undergraduate and master's students in Ireland are invited to propose and develop projects that explore the transformative potential of quantum technologies in addressing environmental challenges.

The focus should be to:

- Define and outline a real-life environmental problem
- Develop a quantum-based solution and explain its impact

Competition participants will be expected to present at least one of the following: theoretical concepts, software-based models and simulations, interactive tools, video walkthroughs, 3D prototypes, physical representations, and/or mock implementations that effectively demonstrate how quantum principles can be applied to address environmental challenges.

## Team Requirements

- Teams may consist of 1 to 4 members
- Each team member must be a third-level student, excluding those currently enrolled in a PhD program, who is enrolled at a third-level institution in Ireland or Northern Ireland in a bachelor or master's STEM program
- Each team member must provide proof of enrollment via a registration letter from their university upon project submission
- A participant may only be part of one team

## Evaluation Criteria

Projects will be evaluated on the following:

**Innovation:** Originality of the idea and application of quantum concepts

**Environmental Impact:** Potential to positively impact environmental challenges

**Critical Thinking & Analysis:** Depth and rigor in the approach

**Feasibility:** Practicality and clarity of the proposed implementation

**Presentation:** Clarity, organization, and effectiveness in communicating ideas

## Challenge Details

### PHASE 1

#### Requirements

To participate, teams must submit the following online at the dedicated [Quantum Challenge](#) page:

1. **Team Members:** Name, email, university, course of study and expected graduation date for each team member.
2. **University Registration:** Letter of registration from their university for each team member.
3. **Report:** A report, of a maximum length of eight (8) pages, following this format:
  - i. Title Page
  - ii. Team Introduction
  - iii. Introduction
  - iv. Method (or Proposed Method in Phase 1)
  - v. Results (Phase 2 Only)
  - vi. Discussion (Phase 2 Only)
  - vii. Conclusion (Phase 2 Only)
  - viii. References
4. **Video:** A video presentation (up to 10 minutes) introducing the team, outlining the problem and describing the methodology.
5. **Participation Terms & Conditions:** [Terms & Conditions](#) document signed by each member of the team.

#### Submission Details

- All Phase 1 materials should be submitted, in English, on the Submission Form provided at [Quantum Challenge](#)
- Submission deadline: February 16, 2025
- Submissions must be original work and free of plagiarism

#### Judging Panel for Phase 1

Judges with scientific and/or academic backgrounds will evaluate submissions based on the evaluation criteria and will select five finalist teams for Phase 2.

## PHASE 2

### Requirements

Finalists will:

1. Extend the team's Phase 1 report, using the Challenge Report Template, to further elaborate on the idea, incorporating new details.
2. Prepare an in-person presentation, including:
  - 20-minute presentation
  - 20-minute Q&A session with the judging panel

### Submission Details

- Extended reports and presentation materials must be submitted to Equal1. Submission information will be provided to the five finalist teams
- Submission deadline: March 30, 2025

### Judging Panel for Phase 2

A panel composed of at least five judges from academic and industry backgrounds will conduct evaluations in person.

## Timeline

<b>November 20, 2024</b>	Competition criteria and guidelines published
<b>December 6, 2024</b>	Kick-off meeting and Q&A session*
<b>February 16, 2025</b>	Deadline for Phase 1 submission
<b>February 28, 2025</b>	Finalists notified
<b>March 30, 2025</b>	Deadline for Phase 2 submission
<b>TBD</b>	In-person presentations
<b>TBD</b>	Announcement of winners

\*Questions should be submitted in writing prior to the kick-off meeting to [quantum.challenge@equal1.com](mailto:quantum.challenge@equal1.com).

## Contact

For questions about rules, guidelines or submission process, and scientific guidance:

[quantum.challenge@equal1.com](mailto:quantum.challenge@equal1.com)

## Resources

Registered participants will receive suggested resources and readings on quantum applications in environmental science to guide their research.