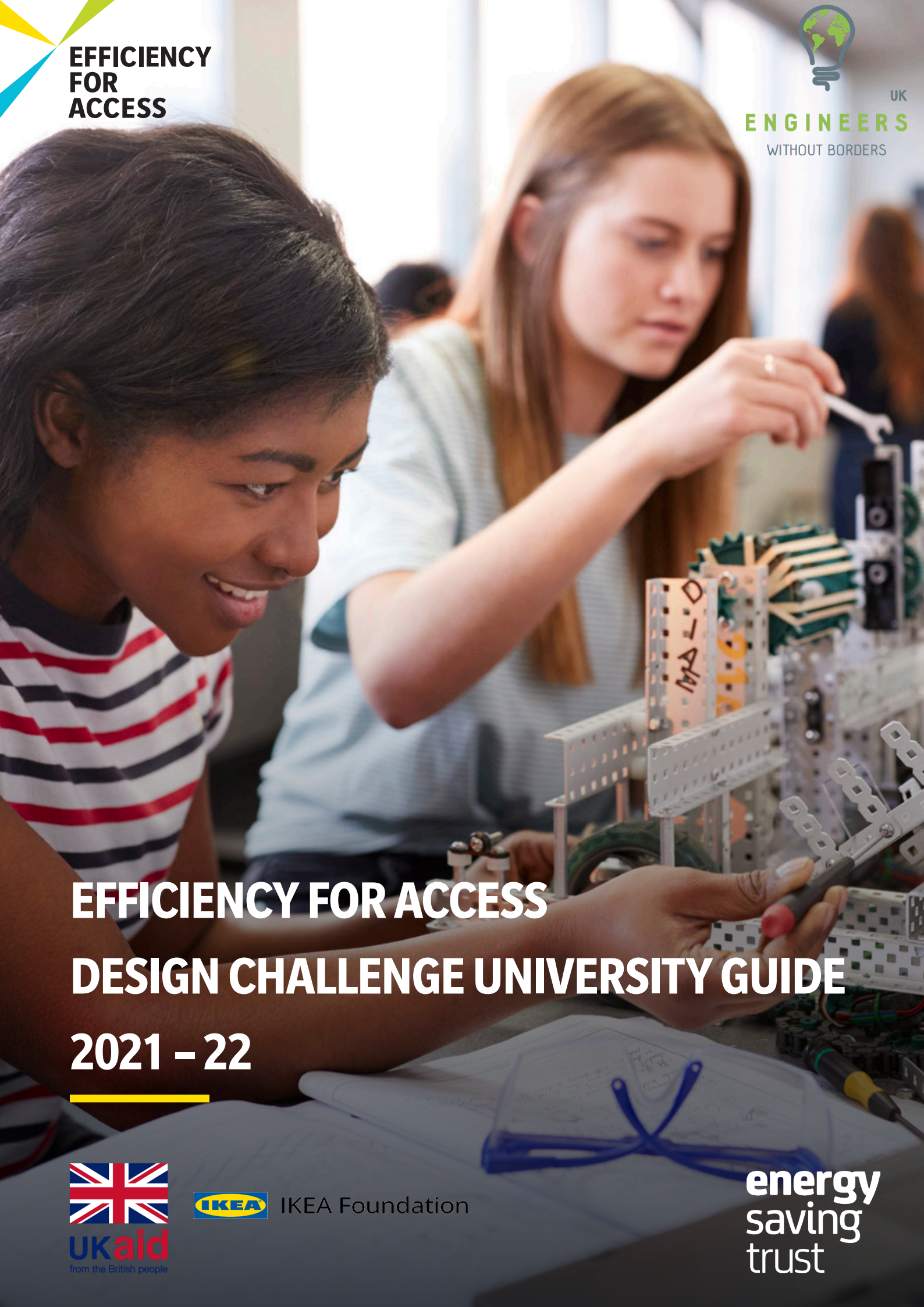
EFFICIENCY FOR ACCESS

UK ENGINEERS WITHOUT BORDERS



EFFICIENCY FOR ACCESS DESIGN CHALLENGE UNIVERSITY GUIDE 2021 – 22

UKaid from the British people

IKEA Foundation

energy saving trust

OVERVIEW

The Efficiency for Access Design Challenge is a global, multi-disciplinary competition that empowers teams of university students to help accelerate clean energy access. To provide sustainable energy for all, we urgently need to enhance the efficiency and affordability of high performing appliances. The Challenge invites teams of university students to create affordable and high-performing off-grid appliances and supportive technologies.

By bringing together and inspiring students, the competition aims to foster innovation in the off-grid appliances sector. It also seeks to help address barriers that limit market expansion in this area. Furthermore, the Challenge seeks to forge beneficial partnerships between universities, researchers, and industry partners at a global level. In this way, it will further strengthen academic capacity within the off-grid sector.

Efficiency for Access is a global coalition working to promote high performing appliances that enable access to clean energy for the world's poorest people. It is a catalyst for change, accelerating the growth of off-grid appliance markets to boost incomes, reduce carbon emissions, improve quality of life, and support sustainable development. Current Efficiency for Access Coalition members have programmes and initiatives spanning three continents, 44 countries, and 22 technologies.

The Efficiency for Access Coalition and Engineers Without Borders UK are delighted to collaborate on the delivery of the Efficiency for Access Design Challenge. The Efficiency for Access Coalition is coordinated jointly by CLASP and Energy Saving Trust. The Challenge is funded by UK aid and the IKEA Foundation.

The Efficiency for Access Design Challenge is a unique opportunity...	
...for students to:	**...for universities to:**
Enhance their employability in the energy access sector.	Participate in a real-world design challenge to enhance student learning.
Understand users' needs in off-grid settings better.	Connect with a global community of peers interested in off-grid appliances.
Gain experience in considering the ethical, environmental, social, and cultural aspects of engineering design.	Access webinars sharing the latest information from off-grid companies and partnership events with academic and industry partners.

The competition started in September 2019. In the second year of the competition, over 100 students from 15 universities in Bangladesh, India, Kenya, Uganda, Sweden and the UK were supported by over 30 industry partners.

The Efficiency for Access Design Challenge team would like to invite you to participate in the Challenge this 2021 – 22 academic year, with other universities from Sub-Saharan Africa, South Asia, Europe, and the UK. Participation is free and each university can enter up to three teams of up to five students.

Universities must confirm participation by completing this sign up form by 31st July 2021 to participate in the Efficiency for Access Design Challenge 2021 – 22

ABOUT THE CHALLENGE

Who can participate?

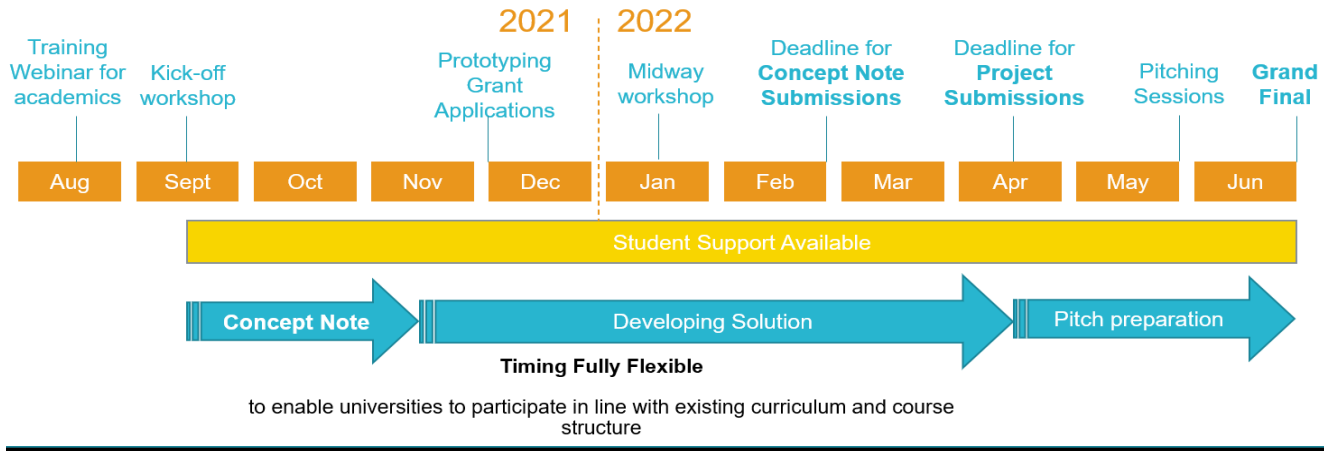
The Efficiency for Access Design Challenge is open to students who are in the final year of their undergraduate or master's degree. Students may be inspired by globally responsible engineering or interested in broadening their career options. With access to the latest knowledge on new horizon technologies to help meet future needs or the opportunity to apply their skills to real world design challenges of today, this competition is a unique opportunity for all involved.

Students can participate in teams of up to five members. Each university may nominate up to three teams to participate in the Challenge. Whilst it is expected that most team members are engineering students, we encourage multi-disciplinary teams, which include students studying other relevant subjects, at each university's discretion. Multi-university teams will be also encouraged, as students from a range of backgrounds can add value to teams and strengthen collaboration between universities.

When does it happen?

The Challenge starts in September and ends with the Grand Final in June 2022. The timing of the Challenge is deliberately flexible, to enable universities to participate within existing curriculums and course structures. Universities decide whether to schedule the project to run over multiple terms or condense the participation period. It is anticipated that students will receive credit for participation, in accordance with each university's curriculum. The Efficiency for Access Design Challenge team is available to provide support in embedding the competition within existing curriculums.

Key Dates



Sign up to register your university: Complete the sign-up form by 31st July 2021. Please note that there will be opportunities later in the year to verify any of the information that you provide at this stage.

Before September, universities will receive:

- A key contact to liaise with and to help academics prepare for the upcoming year.
- Academic training webinar to brief universities on the Challenge.
- Access to the Challenge brief, including the detailed Assessment Framework and details of resources and support available throughout the year.

The Challenge begins in September: Projects can commence at any point from September onwards and should start with a **digital kick-off workshop** facilitated by the Efficiency for Access Design Challenge team.

Concept Note: Students should submit their Concept Notes at any point from September onwards. They are encouraged to submit Concept Notes within one month of the kick-off workshop. **28th February 2022** is the deadline to submit Concept Notes.

Concept Notes should outline what students plan to focus on and should be no more than four A4 pages. Students will be provided with a template to submit their Concept Notes. These provide a crucial opportunity for the Efficiency for Access Design Challenge team to provide any feedback about how students plan to approach the problem they want to work on, and provide curated support through a relevant industry mentor. Students will not be assessed on their Concept Note and it will not be used to decide whether the team can participate or not. When they submit their Concept Notes, students also sign up to the Challenge's Terms and Conditions.

Concept Note Feedback: Students will receive feedback on their Concept Note submission within one month of their submission.

Midway workshop: The Efficiency for Access Design Challenge team will facilitate an optional digital engagement opportunity halfway through the year to support students in their design process and address any questions. These sessions will be open to students from all participating universities to attend. Students will be encouraged to present their solution and work to date, as well as engage with other student teams.

ABOUT THE CHALLENGE

Throughout the year: The Efficiency for Access Design Challenge team will provide support with regular check-ins to both universities and students, as well as, with connecting academics and industry partners.

Project Submission: All teams are required to submit their Project (a 4,000-word (maximum) report and a three-minute video) by **Friday 15th April 2022.**

Feedback: Students will receive feedback on their submission in **May 2022.**

Pitching sessions: Students will pitch their project ideas to a judging panel in **May 2022.**

Grand Final: All students participating in the Efficiency for Access Design Challenge are invited to a digital Grand Final in **June 2022.** The Grand Final will include various activities, including a panel discussion, a showcase of prototypes and the awards ceremony.

For further information, please contact: EforAchallenge@est.org.uk

THE CHALLENGE

The Efficiency for Access Design Challenge is an opportunity for you to work at the forefront of energy access. You will be required to design affordable, super-efficient appliances that can be used in an off-grid context, i.e. powered by a solar home system or a mini-grid. You will work on solutions in countries where this need is critical for large numbers of people. Focusing on Sustainable Development Goal 7 – Affordable and Clean Energy, special attention should be given to countries that are lagging the furthest behind. Lack of access to clean energy and other basic services is closely correlated with a country's position on the Human Development Index.

The Challenge is focused on affordable and efficient appliances that can help improve people's quality of life or increase business productivity.

We want students to identify an opportunity for an appliance to make a difference in people's lives. We want their designs to be a significant improvement on currently available solutions, or a completely new appliance, and have the potential to scale.

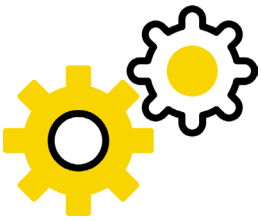
The focus is on energy consumption and the appliance's primary source of energy should be electricity (DC - Direct Current). Energy generation is also out of the scope.

The Challenge is open as to which appliances students choose to focus on, if they have clearly identified a user need that their design will seek to address.

This year 32 teams from 15 universities in Bangladesh, India, Kenya, Sweden, Uganda and the UK worked on their projects on different technologies.

5 refrigeration projects

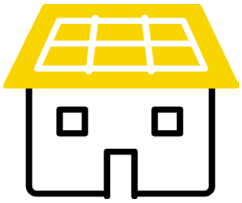
4 e-cooking projects



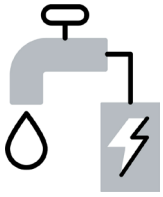
11 agricultural projects

3 power management projects

1 solar home system project



1 infrastructure project



3 water purification projects

4 healthcare projects

STUDENT SUPPORT

The Efficiency for Access Design Challenge team will provide a curated programme of support to students, including:

Mentoring

The Efficiency for Access Coalition has an extensive network of contacts with specialists from the off-grid industry. Each student team will be introduced to a relevant industry mentor, who will support them in their project.

> "Through the Efficiency for Access Design Challenge students gain invaluable experience of working collaboratively to tackle some of the really big challenges global society is facing today so that when they graduate, they'll be ready to start applying their new technical skills to create the society we all want to live in. "
>
> Jon Leary, Senior Researcher, Modern Energy Cooking Services Programme

Prototyping Grants

Grants to support student teams in developing prototypes will be available through an application process. This is a great opportunity to develop project concepts and empathise with the end user. Prototype development is optional, though it may have an added benefit and value for the student teams.

This opportunity brings the students projects one step closer to market and will help them to visually demonstrate their concept to the judging panel during their pitching. The team's application for the prototyping grants should include a needs statement signed off by the respective academic's supervisor and a detailed budget. More details and deadlines on the application process will be available once the Challenge starts in September.

Resources

Universities participating in the Challenge will gain access to a comprehensive **digital library** of reports, market surveys and research papers from the Efficiency for Access Coalition. These resources will support students in the development of their Concept Notes and solutions. Student teams will also have access to VeraSol-Certified Products Database, which is an off-grid appliance data platform. Industry partners will deliver thematic webinars throughout the year and **previous years' recorded webinars** will also be available.

Learning & Networking Opportunities

The Efficiency for Access Design Challenge team is developing a programme of online workshops, live webinars, career conversations and other digital events to enhance learning opportunities for students and their departments. This will include sessions to help students better understand off-grid contexts and ensure end-users are at the centre of their designs. Career conversation events will be opportunities for students to hear first-hand accounts of industry experts' experience working in the sector and their advice for students entering a career, in both open forums and more intimate sessions.

The Efficiency for Access Design Challenge team will use the concept notes, which teams submit when entering the Challenge, to assess the specific needs of each team, and adapt the planned activities accordingly.

For further information, please contact: EforAchallenge@est.org.uk

ASSESSMENT

Participating students will work in teams to deliver design and innovation projects that focus on affordable and high-performing off-grid appliances and supportive technologies.

Project Submissions

Teams will need to submit their project submission by 15th April 2022. It will consist of a 4,000-word (maximum) report and a three-minute video. Other supporting documentation e.g. posters or prototypes can be photographed or included within the submission, if deemed useful.

The students will own the Intellectual Property of their work but will be required to give for the Efficiency for Access Design Challenge team permission to have the ability to use the research outcomes for a wider benefit. This will be achieved by students agreeing to license their work under Creative Commons license CC-BY 4.0.

Assessment Stages

The project submissions will be evaluated in two stages and informed by the assessment framework on the next page.

First stage: a review panel, comprised of experts from the sector, will review the submissions (including the video) and provide feedback to the teams in May 2022.

Second stage: a judging panel, comprised of funders, industry experts and investors in the sector, will assess the student teams' submissions during the pitching sessions in May 2022.

The Grand Final

The last stage of the competition, the Grand Final, will be held online in June 2022. All students and universities participating in the Efficiency for Access Design Challenge will be invited to the Grand Final. The Grand Final will include many opportunities for networking between students and specialists from the off-grid industry and the chance to showcase some of the submissions from the year.

The Grand Final will also include presentations from off-grid industry experts and engaging panel discussions. In addition, many experts and investors from the sector will also be invited. The Grand Final will include an award giving ceremony to award teams with gold, silver, and bronze awards.

Assessment Framework

What are the Reviewing and Judging Panels looking for?

The Assessment Framework on the next page provides some guidance on what both the Reviewing Panel and Judging Panel will be looking for in your solution. It should be useful in helping you to structure your project submission. For your submission, regardless of chosen technology, you should demonstrate how your design: addresses a need someone or a community is experiencing, and provides an improvement in terms of innovation compared to existing alternatives while ensuring it is a sustainable solution and with consideration given to scaling up to market. Depending on what your solution is, some criteria may not be applicable. **Each point is given a score of 1 –5, 1 indicating poor potential, 3 as moderate and 5 as strong.**

Innovation: How does your design compare and improve on solutions that are currently available to your target end-user?

Judges will want to see that you have demonstrated and understood the technological context that you are targeting, and that you have gone through a well-informed design process to improve on solutions currently available to the end user.

- **What is the potential of your design to improve energy efficiency compared to existing alternatives?** Consider how you define energy efficiency (energy used per service provided) and what the baseline is for comparison.
- **What is the potential of your design to reduce production costs compared to existing alternatives?** Consider materials used, price of components and cost of assembly.
- **What is the potential of your design to improve usability compared to existing alternatives?** Consider its ease of use, reliability and safety.

Sustainability: How does your design contribute to a positive impact on the environment?

Judges will want to see that you have understood the effects your solution could have and how you demonstrate your solution is worthwhile and contributes to achieving SDGs.

- **Is your design improving the environmental impact throughout its lifecycle compared to existing alternatives?** Consider the whole product lifecycle: materials used, reparability and end of life.
- **How does your design contribute towards greenhouse gas emissions reduction compared to other technologies that exist in the market?** Consider the sustainability of your business model (including manufacturing, distribution and operating) and its scalability.
- **How does your design contribute to the Sustainable Development Goals (SDG), in particular SDG7 - Affordable and clean energy? How well have you demonstrated you understood the potential connections with the other 17 SDGs and its associated targets?** Consider how the different areas of this assessment framework are contributing to this.

Social Impact: What difference does your design make to people's lives?

Judges will want to see how you have researched the needs of the people your solution could benefit. They will want to understand why you think your design will improve peoples' lives, and how you have considered social inclusion and equality in your solution.

- **How well have you considered who will be using the design? How well have you understood their needs?**
- **What is the likely potential of the design to improve quality of people's lives? How does your design improve the desirability of your target end-user?** Consider what their livelihood was before and the improvement your design will bring to them.
- **How well has your design considered the Sustainable Development Goal's commitment to 'Leave no one behind'?** In particular, consider gender equality and disability inclusion.

Scalability: How feasible is it that your design could get to market at scale?

Judges will want to see that you have considered the business case. Including considering the market opportunity, including market size, for your solution, and demonstrated how people will be able to access and afford this.

- **How well have you considered the potential market for your product?** Consider the target customer, size of market and customer value proposition.
- **How well have you considered how people will be able to access and afford your product?** Consider affordability, potential customer payment models and existing financial models.
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PARTNERS

Efficiency for Access is a global coalition working to promote high performing appliances that enable access to clean energy for the world's poorest people. It is a catalyst for change, accelerating the growth of off-grid appliance markets to boost incomes, reduce carbon emissions, improve quality of life and support sustainable development.

Efficiency for Access consists of 16 Donor Roundtable Members, 16 Programme Partners, and more than 30 Investor Network members. Current Efficiency for Access Coalition members have programmes and initiatives spanning 44 countries and 22 key technologies. The Efficiency for Access Coalition is coordinated jointly by CLASP, an international appliance energy efficiency and market development specialist not-for-profit organisation, and Energy Saving Trust, which specialises in energy efficiency product verification, data and insight, advice, and research.

Engineers Without Borders UK engages and galvanises the engineering community to serve all people and our planet better than ever before. Part of a global movement of over 60 Engineers Without Borders organisations, they inspire, upskill and drive change across the engineering sector and together take action to put global responsibility at the heart of engineering. An example of their work is the award-winning Engineering for People Design Challenge. Every year they educate over 10,000 students to understand their responsibility and develop the skills to act on this.

The Foreign, Commonwealth & Development Office (FCDO) pursues the United Kingdom's national interests and project the UK as a force for good in the world. FCO promotes the interests of British citizens, safeguard the UK's security, defend our values, reduce poverty and tackle global challenges with our international partners.

The IKEA Foundation (Stichting IKEA Foundation) works to create a better everyday life for the many people. As the philanthropic arm of INGKA Foundation, the owner of the IKEA Group of companies, the IKEA Foundation focus on improving the lives of vulnerable children by enabling their families to create sustainable livelihoods, and to fight and cope with climate change.

Energy Saving Trust is an independent organisation dedicated to promoting energy efficiency, low carbon transport and sustainable energy use. We aim to address the climate emergency and deliver the wider benefits of clean energy as we transition to net zero.

We empower householders to make better choices, deliver transformative programmes for governments and support businesses with strategy, research and assurance – enabling everyone to play their part in building a sustainable future.

For further information, please contact: EforAchallenge@est.org.uk

CONTACT US

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