Engineering Skills where they are Most Needed (ESMN)

Invitation to Tender

Commissioning
the second series of
Global Engineering Capability Review (GECR) 2023
research project

Estimated budget: £200,000 to 250,000 (excluding VAT)

Tasks description	*Timeline*
Bid submission deadline	Friday 31 March 2023 (12:00 PM GMT)
Bid assessment and interviews	03 - 06 April 2023 (6th April Interviews - confirmed)
Contracting	April 2023
Project Kick-off Meeting	April – May 2023 (TBC)
Project duration	May 2023 – February 2024 (10 months)

Queries and bids to be sent to:

Wahid Azizi, Programme Manager, Engineering X
wahidullah.azizi@raeng.org.uk

Table of Contents

Introduction:

GECR 2019:

The Global Engineering Capability Review (GECR) 2019 report was the first output of Engineering X's Engineering skills where they are Most Needed' (ESMN) programme. The GECR report shows the breadth and diversity of engineering strengths and weaknesses by investigating the barriers that inhabit safe and innovative engineering practices around the world.

The report was developed by the Economist Intelligence Unit (EIU) with support from ESMN. The findings are based on an extensive literature review and a comprehensive interview programme conducted by the EIU between June and October 2019. The EIU developed the Engineering Index 2019 framework based on the literature review, which looked at policy documents, academia literature and other studies on measuring engineering capability globally, as well as input from the Royal Academy of Engineering. Please visit the GECR 2019 web page to view the Engineering Index 2019 map, interactive report, and to access and download the methodology, dataset, and pdf version of the GECR 2019.

The report begins by providing a broad assessment of countries' engineering strength using the Engineering Index 2019. This framework measures the extent to which 99 countries are able to conduct engineering activities in a safe and innovative way. It highlights top performers for each category or indicator, helping to explain unexpected successes and transferable lessons.

In addition, to bringing the diversity of challenges and solutions to life, the review examined specific engineering capability issues in six different countries: India, China, Colombia, Ethiopia, Thailand and Jordan. It looked at the context and drivers of engineering capability gaps in these countries, as well as suggestions on how to address them. In total, 30 representatives (five per country) were interviewed for the country case studies from academia, business / industry, non-governmental organisations, international organisations (e.g., UNICEF or the World Bank), and news media.

The report highlighted challenges in three areas: 1) lack of collaboration between industry and academia, 2) concerns about quality of engineering education, and 3) lack of continuous professional development opportunities and lack of globally recognised standards for engineers who are currently employed. In addition, the report found that engineering capability gaps differ country by country depending on national goals, as well as a country's education system, income level and economic structure. Therefore, the review emphasised that each country must determine its own engineering priorities, based on its domestic circumstances.

In the course of compiling the GECR 2019 report we discovered significant issues such as: defining the term engineer, and collection and reporting of accurate data in different countries. All data used in this Index are quantitative and were selected based on data availability country coverage and relevance. Please read the GECR 2019 methodology document for further details on the data selection criteria.

The GECR 2019 is the first evidence of its kind to establish a global baseline of current engineering skills and capabilities. It has helped ESMN and our impact partners (awardees) to design and fund interventions to ensure that engineering skills are fostered and deployed appropriately where they are most needed, enhancing necessary technical capacity to tackle some of the evolving challenges our awardees are facing in their countries.

As the GECR 2019 was launched in early March 2020, the COVID-19 pandemic severely affected global dissemination and use of the review. However, feedback collected from some of our stakeholders suggests that the GECR 2019 has been used as a guide and evidence-base

to better understand skills gaps, safety challenges, and how to address these, as well as a useful tool for comparing neighbouring or similar countries' relative strengths and weaknesses. In addition, some ESMN grant applicants used the GECR 2019 as supporting evidence so they can secure funding to enhance safety in their countries, while some university professors found the review a great teaching resource for their students.

GECR 2023 Aim

The GECR 2023 report will further strengthen the evidence base and will be a resource for funders and stakeholders around the world to focus their interventions on enhancing engineering capability and capacity for the safe building, operation, and maintenance of critical infrastructure, improve safety and skills for safety.

GECR 2023 Goals:

The goals of GECR 2023 research project are three-fold:

I. To update the 2019 Engineering Index, enabling longitudinal comparisons to this earlier data.

II. To assess engineering capability gaps that will address the following three high-level questions:

   i. Where is the most harm or risk of harm due to unsafe engineering practices, and where will this be in the future?

   ii. What engineering safety skills are needed specifically?

   iii. How do we create engineers with the skills to reduce the harm and increase safety in their countries?

III. To examine specific capability issues in six countries.

Expected outcomes:

1. The review will further, understanding of engineering strengths and weaknesses and skills for safety priorities and encourage use of the findings and recommendations of the review by policymakers, education institutions, and industry in enhancing domestic engineering capability and capacity.

2. The review will enable Engineering X ESMN to identify new key partners around the globe and encourage them to work in partnership with ESMN and partners to design and implement initiatives to tackle the challenges in order to reduce harm and promote safe and innovative engineering.

3. The review will enable ESMN programme management to recognise relevant new funding partners, stakeholders, and organisations that would be interested in using and sharing the review as well as partnering with Engineering X ESMN in achieving the review findings and recommendations.

4. The review will enable Engineering X to understand countries engineering capability and capacity gaps and to design new programmes and projects to address these.

Expected output/deliverable:

The expected GECR 2023 project output/deliverable is a 50 - 60 pages report that should include the following four sections:

I. The Engineering Index 2023, including the map and datasets
II. Engineering Capability/skills gap 2023, including datasets
III. Country case studies for six countries
IV. Summary of key challenges and recommendations, including an executive summary and key messages.

Inputs:

- Estimated budget: £200,000.00 to 250,000.00 (excluding VAT) available funding from Engineering X ESMN. The estimated budget covers core project activities. You may request additional budget for optional project activities. The project core and optional activities are specified in the section 'Task type' pages 8 - 13.
- GECR 2019 report, dataset, and methodology as a baseline
- Engineering X ESMN programme board and governance: advice, review and approval of the report
- Engineering X ESMN Technical Advisory Group (TAG): technical review of the report
- Engineering X ESMN global network technical support
- Royal Academy of engineering fellowship technical support reviewing the report

Project duration:

We are looking for an agency to deliver the main research publication by February 2024 and launch the report at the UNESCO World Engineering Day for Sustainable Development Conference on 4 March 2024. However, we are open to alternative timelines.

Activity timeline:

Dates	Activity
31 March 2023 (12:00 GMT)	Bid submission deadline
03 - 06 April 2023	Bid assessment and interviews with potential bidders (6th April Interviews - confirmed)
April 2023	Contract signed
April – May 2023	Project Kick-off meeting and agreement on the proposed plan (Date - TBC)
May - June 2023	Initial GECR 2023 framework presented to ESMN board for approval (Date – TBC)
27 July 2023 (Date – TBC)	Present a webinar at the Engineering Skills for Safety Series of Webinars (ESSSW): Where is the harm now and in the future? Global Engineering Capability Review 2023
September - October 2023	The first GECR 2023 draft report submitted to ESMN board for review and comments
December 2023 – January 2024	The final GECR 2023 draft report submitted to ESMN board for review and comments including the plan for launching the review report at the UNESO World Engineering Day for Sustainability on 4th March 2024
January 2024	The final GECR 2023 report presented to ESMN board for approval (Date – TBC)
February 2024	The final GECR 2023 report submitted to ESMN
29 February 2024	Project end date: GECR 2023 Report published on the Academy website
4 March 2024	The GECR 2023 launched at the UNESO World Engineering Day for Sustainability (TBC)
March – May 2024	The supplier presents a webinar about the GECR 2023 to their networks (Date - TBC)
March – September 2024	GECR 2023 Marketing and amplification including creating easily digestible information and messages for sharing with non-technical audiences

Our audience (the who - Table 1):

We divide the audience into the following two groups:

1. Stakeholders who may use the data in their activities

2. Potential Engineering X ESMN stakeholders, including future partners

Our primary audiences, who we hope can make influential policy decisions on engineering safety and skills interventions, are highlighted, and indicated with an asterisk (*).

Potential stakeholders who may use the data in their activities	**Potential Engineering X ESMN stakeholders**
a. **Government Institutions*, (**Ministry of Higher Education) **b. Ministry of Labour*** **c. Policy, Regulatory, and Standardisation bodies*** **d. Professional Engineering Institutions*** e. National Engineering Academies or similar institutions **f. Engineering Universities and Technical and vocational institutions*** g. Engineering-Intensive industries **h. Funding organisations concerned with engineering innovation and engineering safety e.g. LRF *** **i. International and National NGOs e.g. RedR*** j. Advocacy organisations k. Student Engineering Associations l. Community organisations e.g. Engineering without boarders UK	**m. Senior government decision makers in education and labour ministries*** n. Senior or heads of funding organisations **o. Presidents and Deans of engineering universities*** p. Heads of engineering departments q. Senior Academics r. **Professional Engineering Institutions** s. International and National NGOs e.g. RedR t. National Engineering Academies or similar institutions

Table 1

What is the task?

Global Engineering Capability Review (GECR) 2023 report

The expected GECR 2023 research project output/deliverable is a 50 - 60 pages report that should include the following four sections:

I. The Engineering Index 2023, including the map and workbooks and datasets
II. Engineering Capability/skills gap 2023, including hotspot map and datasets
III. Country case studies for six countries
IV. Summary of key challenges and recommendations, including an executive summary and key messages.

Note: The supplier must provide a digital copy of design files, final full report, workbooks and datasets, and maps to the Academy in addition to supporting the Academy to publish the report on its website.

The GECR 2023, 50 – 60 pages report (outputs/deliverables):

The following table describes the tasks for each goal and specifies which are core or optional tasks.

Core tasks: All core tasks are mandatory and must be included in your proposal. The estimated budget of £200,000 to £250,000 covers all core tasks.

Optional tasks: optional tasks are not mandatory to be included in your proposal. If you are interested in including optional tasks in your proposal, you may request additional resources and funding, if necessary to deliver the task. You must justify the costs in the budget and budget narrative.

GOAL ONE: Engineering Index 2023:

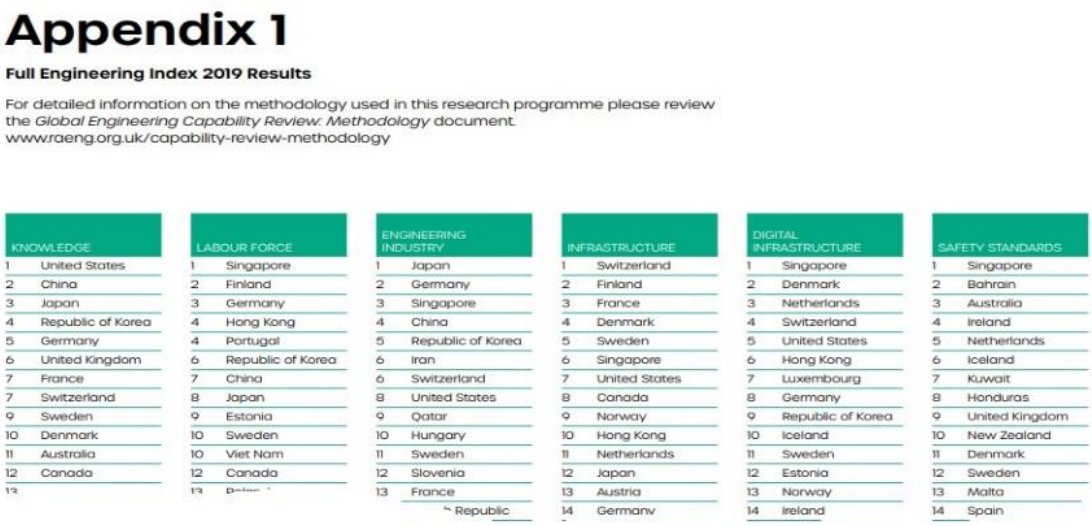
Task No	Task description	Task type: Core/ Optional
i	**Engineering Index 2023** To revise and update the Engineering Index 2019 global framework including the excel workbook and map to measure the extent to which 99 countries can conduct engineering activities in a safe and innovative way. In this scenario, we keep the Engineering Index 2023 framework, quantitative measures (6 domains and 23 indicators) the same for comparability with the Engineering Index 2019	**Core**

ii	**A new Engineering Index 2023** A new Engineering Index 2023 framework that allows comparison with Engineering Index 2019. The framework may include a new literature review, new quantitative measures (domains and indicators) that will allow us to further understanding of engineering strengths and weaknesses, and to better rank and measure the extent to which 99 countries can conduct engineering activities in a safe and innovative way.	Optional
iii	**An expanded Engineering Index 2023** An expanded Engineering index 2023 to include all 140 countries listed in the DAC list of ODA Recipients 2022/23. The current index includes some of the DAC list countries but not all of them. We welcome innovative ideas for adding more countries.	Optional

In addition, the Engineering Index 2023 shall include the following areas:

Task No	Task description	Task type: Core/ Optional
iv	**Spotlight on top performing countries** To offer useful insights from the Index, identify 6 countries, one top performing low-middle income country per category or indicator, to act as role models or good practice for other countries in similar situations. For further information about spotlight on top countries, please refer to Engineering Index 2019 page 15.	**Core**
v	**Definition of the term 'engineer'** As a follow up to GECR 2019, definition of the term 'engineer', and how can they be created in the skills for safety space.	**Core**
vi	**Engineering habits of mind** A follow up on engineering habits of mind to look at the mindset needed for the engineers of the future, with a focus on systems thinking and approaches i.e. what does the engineer of the future need to look like to tackle complex safety challenges?	**Core**
vii	**Engineering Index 2026** Suggestions for an Engineering Index 2026 with increased global coverage.	**Core**

Engineering Index 2019 (screen shot)



Appendix 1

Full Engineering Index 2019 Results

For detailed information on the methodology used in this research programme please review the *Global Engineering Capability Review: Methodology* document.
www.raeng.org.uk/capability-review-methodology

	KNOWLEDGE	LABOUR FORCE	ENGINEERING INDUSTRY	INFRASTRUCTURE	DIGITAL INFRASTRUCTURE	SAFETY STANDARDS
1	United States	Singapore	Japan	Switzerland	Singapore	Singapore
2	China	Finland	Germany	Finland	Denmark	Bahrain
3	Japan	Germany	Singapore	France	Netherlands	Australia
4	Republic of Korea	Hong Kong	China	Denmark	Switzerland	Ireland
5	Germany	Portugal	Republic of Korea	Sweden	United States	Netherlands
6	United Kingdom	Republic of Korea	Iran	Singapore	Hong Kong	Iceland
7	France	China	Switzerland	United States	Luxembourg	Kuwait
7	Switzerland	Japan	United States	Canada	Germany	Honduras
9	Sweden	Estonia	Qatar	Norway	Republic of Korea	United Kingdom
10	Denmark	Sweden	Hungary	Hong Kong	Iceland	New Zealand
11	Australia	Viet Nam	Sweden	Netherlands	Sweden	Denmark
12	Canada	Canada	Slovenia	Japan	Estonia	Sweden
13			France	Austria	Norway	Malta
			Republic	Germany	Ireland	Spain

GOAL TWO: Engineering Capability/skills gap in 40[1] countries:

In this section of the report, we would like to assess engineering capability gaps that will address the following three high-level questions

Task No	Task description	Task type: Core/ Optional
i	**Where is the most harm or risk of harm due to unsafe engineering practices, and where will this be in the future?** Proposed country selection criteria could include: • Countries with high number of deaths and casualties due to accidents at work • Countries with predicted high population growth in the next five years • Countries with high levels of investment in developing engineering infrastructures • Countries listed in the DAC list that are ranked low in the safety standards category of the Engineering Index 2023, which highlights serious life and property safety issues • Countries with potential harm to engineering infrastructure threatened by conflict and war	**Core**

[1] In addition to using the country selection criteria you may consider 29 countries (list will be provided) that includes the 20 countries considered in GECR 2019 and ESMN grants and SCEE country partners.

	• Countries with overused and poorly maintained engineering infrastructures that pose risks to life • Countries with inadequate skilling and enforcement of safety practices • Countries with inadequate skills around planning, management and construction of basic infrastructure, such as health, waste and other • Countries with poor skills policies and profiles that leave them particularly exposed to risks/harms	
ii	**What engineering safety skills, across the five engineering sectors[2], are needed specifically?** Proposed criteria: • Key engineering skills, across the five engineering sectors, needed to address the challenges and mitigate the harm • Engineering skills engineers need to respond to humanitarian crises and to manage post conflict reconstruction and development programmes • Engineering skills needed for safe operation and development of critical systems (WASH, decommissioning and waste, energy, agriculture, transport, digital and security infrastructure, including cross cutting skills: e.g. systems thinking, complex systems management)[3] • Engineering skills for resilience against climate change, natural disasters, pandemics, and other health emergencies • Engineering skills engineers need that will reduce accidents, incidents and fatalities caused by unsafe engineering practices, such as poor design, construction, inspection practices, operation, and maintenance of engineering infrastructures • Engineering skills needed for adoption of (new) technologies and partnerships that will enhance safety and sustainability in engineering practice in the areas of the world which are most in need	**Core**
iii	**How do we create engineers with the skills to reduce the harm and increase safety in their countries?** Issues we would like you to take into account:	**Core**

[2] The Academy considers the following sectors of engineering:
1. MECHANICAL (Mechanical, aeronautical, marine and manufacturing engineering)
2. CIVIL (Civil, structural, environmental, public works and building services engineering)
3. ELECTRIC (Electrical, electronics, control, and biomedical engineering and healthcare)
4. CHEMICAL (Chemical, fuel, process, mining and materials engineering),
5. COMPUTING (Telecommunications networks and systems, computing and informatics)
6. OPEN (areas not covered above)

[3] We are working on these areas already in Engineering X and other global reviews have been produced on these topics that should be considered by the team conducting GECR; find other review links at 'useful resources' on pg 19

	• Engineering Skills that would enable countries to tackle the UN SDGs • Engineering skills that lead countries to conduct engineering activities in a safe and innovative way such as advancement of new technology (AI, VR, and Cyber security) • Multidisciplinary approaches and systems needed to create the skills needed for an uncertain and challenging future i.e. for resilience and preparedness Overall, we want to know how great the harm is and how it might be mitigated, using any available official data. Where data is unreliable, we are open to new ideas and approaches to deliver this, such as proxies from non-traditional sources. Proposed qualitative indicators could include: • Government commitments to enhance engineering education programmes that can address the challenges identified and availability and efficacy of engineering programmes • Industry commitment to training and professional development, including safety standards • Future trends and commitments towards transforming Industry - Academia partnerships • Government commitments to enhancing the engineering labour force (from a legal and budgetary stand point) • What are the skills interventions that would have most impact per pound invested? Proposed quantitative indicators could include: • A follow up to GECR 2019 sectoral GDP growth forecast across 6 engineering sectors for all 20 countries, as presented in annex 2 of the GECR 2019. We intend to keep the framework the same as GECR 2019 for comparability. Please note that these 20 countries are part of the 40 countries as stated above. Note: we are open to new ideas and suggestions such as regional and sectoral approaches, if the county by country approach is not feasible due to data reliability and unavailability.	

GOAL THREE: Capability issue case studies[4]:

To examine specific capability issues in six countries: the case studies can expand and adding more details to the 'where the harm is' and a further deep dive into national, regional, and sectoral issues.

[4] Select six countries with the highest level of harm that have been ranked low in the Safety Standards domain of the Engineering Index 2023. In addition, try to select at least some countries where ESMN has worked or has active projects.

Task No	Task description	Task type: Core/ Optional
i	**Six countries' specific capability issues** Proposed list of activities: • Identify the countries and their capability issues (national or sectoral) • Select countries that have been ranked highly in section two (where the harm is) • Analysing why the capability issue exists • Identifying skills and priority actions to address the capability issue Note: We are open to innovative ideas, such as bringing in country partners who will value and make use of the data, to help develop this section, as well as taking regional or sectoral approaches if the country approach is not feasible due to data reliability or unavailability.	**Core**
ii	**A new framework and approach for the country case studies** • You can propose a new framework and approaches to develop the country case studies. We welcome innovative ideas.	Optional

Country case study, GECR 2019, (example):

Jordan

Water provision for one of the world's driest countries

Knowledge = 51st
Labour force = 47th
Engineering industry = 71st
Infrastructure = 74th
Digital infrastructure = 68th
Safety standards = 61st

With one of the world's lowest levels of water availability per head, Jordan is verging on a water crisis. In 2015, 94% of the population had access to safely managed water and 80% of the population had access to safely managed sanitation. However, multiple factors threaten the future water supply.[99] The climate is naturally arid, receiving less than 200 millimetres of rainfall each year (and even less in its desert areas), compared to 818 millimetres in the United States.[99] The aquifers are refilled, and lower rainfall in the future will only exacerbate this disparity. Existing water constraints mean that Jordan is able to provide only 150 cubic metres of water per person annually, well below the 500 cubic metres that the UN uses to indicate water scarcity.[103] It is clear that Jordan faces substantial challenges in water provision, sanitation and wastewater management.

Expanding the water network

In 2016 the Ministry of Water and Irrigation announced a new national strategy covering the next decade. It targets five areas for improvement:

1. Integrated water resources management
2. Water, sewage and sanitation services
3. Water for irrigation, energy and other uses

Under stress

Jordan's water challenge is compounded by the global refugee crisis. In 2019 the number of refugees hosted by Jordan reached 2.9 million, making it the 10th-largest refugee-hosting country in the world and the second largest relative to national population, with 72 refugees per 1,000 residents. Although the majority of these refugees (2.2 million) originated from Palestine and have lived in Jordan for several decades, displacement triggered by the civil war in Syria has led to the arrival of 676,000 Syrians in the past few years. Most Syrian refugees in Jordan live in urban areas, and over 80% live below the poverty line.[105]

This influx of refugees, coupled with overall population growth, has placed additional stress on Jordan's water infrastructure, particularly in the northern governorates.[106] The water and sanitation conditions in refugee camps are dire; at the largest

Summary of key challenges, recommendations, and marketing:

Task No	Task description	Task type: Core/ Optional
i	**Summary of key challenges** • Identify and outline key global challenges and proposed recommendations and solutions that our audience, such as governments, international funders and the global engineering communities, could implement to address them. • A paragraph about how to use the report and partners to approach would be very useful. For further details about our key audience, please refer to table 1 page 7. • The report executive summary	**Core**
ii	**Translation** • Translation of the executive summary, summary of key global challenges and proposed recommendations and solutions into three languages: French, Spanish, and Arabic.	Optional
iii	**Evaluation of the GECR 2023 impact after 18 months** • A description of an evaluation plan and assessment of the impact of the GECR 2023 after 18 months that can also be used to help us scope the third series of the GECR 2026.	**Core**
iv	**Launching the GECR 2023 at the UNESO World Engineering Day for Sustainable Development on 4 March 2024** • A proposal for launching the GECR 2023 on 4 March 2024 to celebrate the UNESO World Engineering Day for Sustainable Development in full coordination with ESMN and Academy's Communications team (TBC).	**Core**
v	**Marketing and amplifications:** • A marketing strategy about how you will engage external stakeholders in coordination with ESMN and Academy's communications team to promote the review findings after the report is launched. This should include how you could create easily digestible information and messages for sharing with non-technical audiences.	**Core**

Submitting a bid/proposal - format:

The bid documents should include the following information, against the following headings:

I. Project plan: A full description of the project plan for producing the GECR 2023 that includes: i) Engineering Index 2023, ii) Engineering Capability/Skills Gap framework, ii) capability issues case studies, and iv) summary of key challenges and recommendations. For further details, please refer to 'what is the task' page 8 – 14. (max. 1200 words)

II. Research methodology: A description of research methods and approaches (data collection, data sources, data analysis, data gap, estimating data gaps and data disaggregation where this is possible). (max. 600 words)

III. New ideas and scope for GECR 2023: Please indicate ideas of any additional scope for expansion of the GECR 2023, and new ideas that have not been explored in this ITT. (max. 600 words)

IV. Project timeline: a detailed project activity timeline including research phases, delivery of draft and final outputs/deliverables, marketing, and amplification plan during and beyond the project completion date. This should include approaches to project management, how you intend to work with the Academy and other stakeholders and what support you would need from us at each stage.

V. Company track record: A description of the track record of the provider in delivering similar engineering indexes and analysis and in working with and for international organisations, foundations, or charities. Please include an example of similar or related projects you have done in the past. And any other experience of work conducted for others. (max 600 words)

VI. Team capacity: A short bio of each of the team, their roles and responsibilities for this work, and their past experience on similar projects. We hope the proposed team includes some engineers as well. (max 600 words per person)

VII. Launching the GECR 2023 at the UNESO World Engineering Day for Sustainable Development on 4 March 2024: a proposal for launching the GECR 2023 on 4 March 2024 to celebrate the UNESO World Engineering Day for Sustainable Development in full coordination with ESMN and Academy's Communications team (TBC). (max 600 words)

VIII. Marketing and amplifications: Please describe your marketing strategy and how you will engage external stakeholders in coordination with ESMN and RAEng communication to promote the review findings after the report is launched. This should include how you could create easily digestible information and messages for sharing with non-technical audiences (max. 600 words)

IX. Budget: A detailed account of the total cost of delivering this contract. The overall cost for delivery of the support (including VAT), fee structure if applicable, including cost per day for different staff included in the contract, and day-rate for additional ad hoc activities. All other related costs should be factored into the proposal, including (but not limited to) travel costs, time spent attending events, account management etc). Please submit this as an additional document in Excel, with each budget line clearly broken down. You may include budget for optional tasks and any other items that go beyond the budget or different activities that we could consider at the bottom

of the sheet. In addition, please submit a budget narrative to justify related costs. (max. 1000 words)

X. Evaluation of the GECR 2023 impact after 18 months: A description of an evaluation plan and assessment of the impact of the GECR 2023 after 18 months that can also be used to help us scope the third series of the GECR 2026. (max. 600 words)

XI. Company details: Information about the organisation, including registration number, bank details for financial reference purposes, evidence of public and product liability insurance, and written confirmation of willingness to provide audited accounts should they be required. (max. 400 words)

Company experience:

Engineering X Engineering Skills where they are Most Needed (ESMN) programme has high visibility among many stakeholders internationally including government, industry, academia, donors and NGOs internationally with high expectations of Academy capacity to deliver quality outputs with high impact.

The successful proposer will need to meet these expectations by delivering quality outputs and outcomes, as described above. For these reasons, the successful proposer will need:

1. Excellent quantitative and qualitative research skills.
2. Cultural competency and confidence in discussing and addressing engineering capacity issues with senior decision makers internationally.
3. Excellent report writing skills and ability to present narrative and numbers in a way that engages and promotes understanding
4. Knowledge of the context – international development, engineering education, engineering profession and the role of engineering and technology in economic growth and development.
5. Sensitivity and support for the Academy's mission, vision and strategic aims, and values as well as alignment with the objectives of the Engineering X Engineering Skills where they are Most Needed (ESMN) programme.
6. Independence
7. Capacity to put forward innovative ideas and suggestions to inform next steps for the Engineering X Engineering Skills where they are Most Needed mission.
8. A relevant code of ethics
9. Capacity to deliver the main research publication by February 2024 and launch the report at the UNESCO Conference on 4th March 2024.

General provisions:

We reserve the right to change any aspect of the Invitation to Tender and the tender process, including amending substantive, or procedural provisions, extending any timescale, not making any awards, or suspending, or discontinuing the process (subject to treating all bidders equally).

The interview process is a second stage assessment and only organisations that meet the essential criteria will be invited to interview. The second stage will prove an opportunity to check aspects of the first level proposal and gain any further information as needed.

Any non-compliance with the procedural rules, including any late submission, for whatever reason, can lead to disqualification, subject to exceptional circumstances, which are consistent with all bidders being treated equally.

We reserve the right to reverse a contract award and/or terminate a contract, on the basis of any material inaccuracy in a proposal revealed after the contract is awarded, including after formalisation of the contract.

All costs relating to bids are the exclusive responsibility of bidders.

Bid assessment and selection criteria:

We will likely require those shortlisted to attend an interview. The selection criteria used by the Academy to select a supplier, including indicative weightings, are as follows:

a) Proposed project plan and delivery of the project: Creativity, quality and appropriateness of the proposed plan including new ideas, project timeline and compiling engaging outputs and using your networks and expertise to amplify the published report. (30%)

b) Track record and team competency: Track record in delivering high quality research projects globally and experience and competency of project team. (30%)

c) Appropriateness of the proposed research methodology you will use to produce the GECR 2023 report. (20%)

d) Budget: Overall value for money and appropriateness of budget for a charity. (10%)

e) Value alignment - Diversity and inclusion: Our programmes and activities aim to catalyse a step change in the diversity of the workforce and the prevalence of inclusive cultures across engineering. We want to see you using an equity lens of considering unheard voices, raise awareness of the barriers faced by minority groups, and to maximise impact. (10%)

Timelines:

Tasks description	*Timeline*
Bid submission deadline	Friday 31 March 2023 (12:00 PM GMT)
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Queries and bids to be sent to: Wahidullah Azizi, Programme Manager, Engineering X wahidullah.azizi@raeng.org.uk

Useful resources:

i. Engineering Skills where they are Most Needed (ESMN)
ii. GECR 2019 – Link to pdf report, data set, feedback and webinar
iii. Global review on Safer End of Engineered Life
iv. Safer Complex Systems
v. Global review of the engineering response to COVID-19: lessons learned for preparedness and resilience
vi. World Risk Poll 2021: A Changed World?
vii. UNESCO Engineering Report
viii. Safer complex systems case studies
ix. Open burning of waste in Africa

Who are we?

Engineering X

Engineering X is an international collaboration founded by the Royal Academy of Engineering and Lloyd's Register Foundation that brings global experts together to engineer change. We take an evidence-based approach, create diverse and global expert communities around our challenges, and listen to unheard voices, particularly from the Global South, to inform our programmes. We bring together partners from around the world to tackle the most pressing engineering, safety, and sustainability problems and deliver impact.

In the next 5 years we want to work in partnership to implement our vision of engineers playing their key role in addressing global challenges. Our initial funding period is until 2026 but we expect to continue beyond that date.

Watch this video to get a sense of what Engineering X is.

The Royal Academy of Engineering

The Royal Academy of Engineering is a charity that brings together an unrivalled community of leading business people, entrepreneurs, innovators and academics from every part of engineering and technology to harness the power of engineering to build a sustainable society and an inclusive economy that works for everyone.

In collaboration with our Fellows and partners, we're growing talent and developing skills for the future, driving innovation and building global partnerships, and influencing policy and engaging the public.

Together we're working to tackle the greatest challenges of our age.

Lloyd's Register Foundation

Lloyd's Register Foundation is an independent global charity with a unique structure and an important mission: engineering a safer world. We reduce risk and enhance the safety of the critical infrastructure that modern society relies upon in areas such as energy, transport, and food. We do this by supporting high quality research, accelerating technology to application and through education and public outreach. Our unique structure comes from the fact that we own a significant trading company, Lloyd's Register (LR). We share the same mission and work together to make the world a safer place.

Our missions

Engineering Skills Where they are Most Needed (ESMN) - Population growth in emerging economies is driving huge investment in critical infrastructure. However, a skills gap that is exacerbated by a reliance on multinational organisations and temporary, non-domestic workforces is limiting capability to operate and maintain such infrastructure safely. This mission implements capacity-building programmes to address these needs.

Safer Complex Systems (SCS) - We live in a world where the critical infrastructure upon which we rely is increasingly made of complex interconnected systems. Our safety is endangered when localised issues result in much wider often unanticipated consequences. This mission develops and implements practical solutions to improve the safety of complex systems.

Safer End of Engineered Life (SEEL) - The end of life and decommissioning of engineered products and structures bring safety challenges that span many countries and industries, harming human health and the environment. These issues often displace safety risks to parts of the world least able to manage them. We raise awareness and build communities around challenges, from tackling open burning of waste to making the decommissioning of offshore structures and ships safer, and advocate for system change.

Transforming Systems through Partnership (TSP) – To solve the most pressing sustainability and development challenges, academics must work in partnership with industry, government and communities to build trust, engineer appropriate solutions and scale their uptake, whilst training the next generation to do so too. TSP achieves this by catalysing partnerships between universities and local or national industry partners to address sustainable development goals.

Pandemic Preparedness (PP) – This mission supports the UK and global engineering community to learn from the current COVID-19 pandemic through evidence building and global sharing of lessons on best practice approaches in the prevention, preparedness, response, and recovery from pandemics.

Our values

Diversity and inclusion is a critical thread that runs through the Royal Academy of Engineering's Strategy 2020–2025 as we strive to build a sustainable society and an inclusive economy that works for everyone.

Engineering X works with diversity and inclusion front of mind. We work globally and strive to amplify unheard voices and stories within our programmes as we tackle under-reported issues, as well as developing diverse communities around our challenges.

We work across different disciplines and sectors and our communications must be clear, accessible and inclusive. We take an evidenced-based approach to building programmes that address urgent challenges, supported by our expert networks and partners.

We currently have 5 missions running and have ambitions for further growth. These missions focus on complex safety and sustainability challenges, and operate through advocacy and grant programmes, champions networks and workshops, and research. We are currently working in 31+ countries and our community is growing all the time through our networks of grant holders, safety champions and partners.