CIBSE UNITED ARAB EMIRATES

2024 STUDENT DESIGN COMPETITION

COMPETITION BRIEF

CIBSE
United Arab Emirates

CONTENTS

1 CHAIRMANS NOTE

Dear Participants,

I extend a warm welcome to each one of you as we embark on an exciting journey in the realm of sustainable engineering and design. This year's Student Design Competition is extension of topic from last year focusing on green retrofitting of existing buildings addressing climate resilience, embodied and functional carbon & energy efficiency , promises to be a captivating event filled with innovation and creativity.

This year UAE witnessed it heaviest rainfall surpassing anything documented from 1949 and based on Third update of Second Nationally Determined Contribution for the UAE submitted in 2023 to UNFCCC states that the building sector was responsible for 27% of green house gas emission in the UAE as of 2019.At the same, the built environment represents an opportunity for emission reduction of 56 % by 2030, making it a critical sector for the UAE to meet its net zero targets for 2050 under the Paris agreement hence looking at the broader impact of our built environment on climate this year retrofitting of existing buildings addressing climate resilience , embodied and functional carbon & energy efficiency is our focus.

Last year's competition was a resounding success, with Manipal university emerging as the winner , University of Bolton as the runner-up and Heriot Watt University as high recommended under retrofitting submission . Their exceptional designs and forward-thinking approaches served as inspiring examples for all of us. They showcased how innovative engineering solutions can transform our built environment into eco-friendly, energy-efficient spaces.

Economy are closely intertwined with the efficiency and sustainability of our buildings. CIBSE continues to support this growth by providing guidance, knowledge, and expertise in building services, ensuring that our built environment aligns with global sustainability goals.

As we look back on the 2023 CIBSE Awards Evening, it serves as a testament to the calibre of talent and dedication within our community. The winning projects and individuals from that evening have set a high standard, and we eagerly anticipate this year's awards ceremony, where we will celebrate the accomplishments of the next generation of engineers and designers. The competition has always been a platform to foster innovation, and I have no doubt that this year will be no different.

So, I encourage all of you to take up the challenge, submit your applications, and bring forth your ideas, solutions, and visions for green retrofitting. Your contributions hold the key to a sustainable and prosperous future. The possibilities are boundless, and together, we can shape a better tomorrow through engineering excellence.

I wish each one of you the best of luck in the competition. I am excited to see your ingenuity at work and witness the transformative power of your ideas.

Warm regards,

Imran Shaikh, Ramboll
CIBSE UAE Chairman

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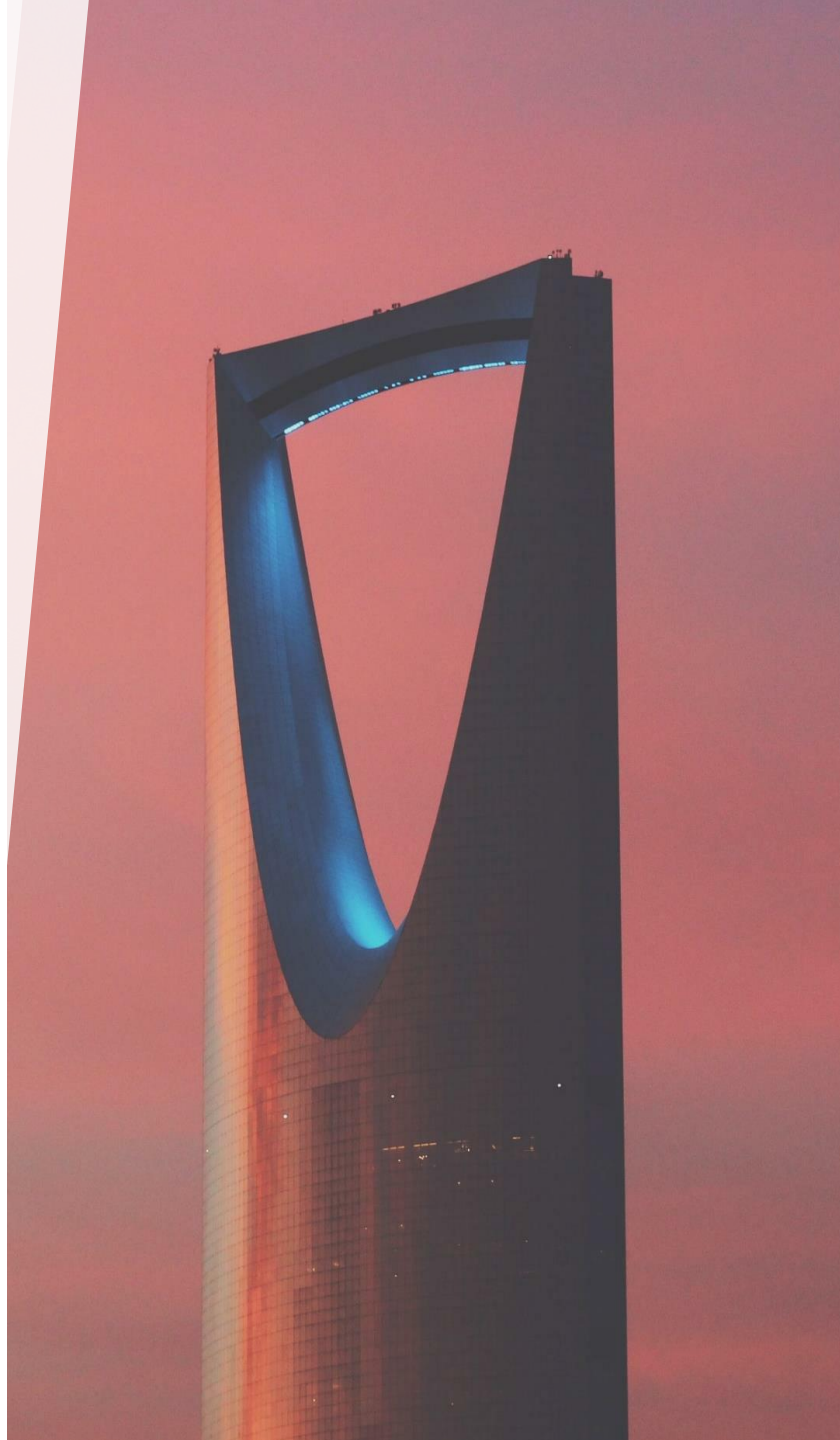
2 2023 Winners

Manipal University
2023 Student Design Competition Year Winner

University of Bolton
2023 Student Design Competition Year Runner-up



3 THE UNITED ARAB EMIRATES (UAE) AND GULF CORPORATION COUNCIL (GCC)

From its humble origins as a fishing and pearling community, the UAE has rapidly evolved into a global centre of commerce, innovation, and technology, all underpinned by a deep commitment to sustainability.

Pioneering projects like Masdar City in Abu Dhabi showcase the UAE's dedication to sustainable urban development through renewable energy and innovative architecture. Within the UAE, examples such as the Dubai Solar Park, one of the world's largest, reflects the emirates determination to harness clean energy to power homes via renewable energy. Expo 2020, now Expo City, also located in Dubai; developed against the theme of 'Connecting Minds, Creating the Future,' exemplifies the regions innovation prowess, drawing global thinkers and entrepreneurship.

Beyond the UAE, the Gulf Corporation Council (GCC) nations have equally transitioned themselves from trading hubs to global leaders in commerce and sustainability. Saudi Arabia's NEOM project by example, envisions futuristic cities in harmony with nature. Qatar's sustainable World Cup 2022 infrastructure showcases eco-centric planning. Oman champions biodiversity, while Kuwait and Bahrain are continually intensifying their renewable energy efforts.

Although the regions focus will ultimately continue in the short-term to remain predominantly focused on new build development, the region is also recognising that a significant portion of its energy consumption lies in its existing structures, making retrofitting essential to reducing its carbon footprint. Dubai alone has in excess of 170,000 existing buildings before considering that of larger regional cities such as Cairo and Kuwait City. As such, the growing need for green retrofitting is due to take centre stage, as existing buildings play a crucial role in the region's sustainability journey and net zero ambitions.

With around 70-80% of the current building stock already constructed and expected to stay in use by 2050, decarbonisation of the existing built environment is therefore a necessity for a better, more sustainable future within the region, and globally, and will be crucial step in its commitment to being a global benchmark for sustainable living.

4 CLIMATE

The global climate crisis is reshaping our planet, affecting every corner of the world. From surging temperatures to erratic weather patterns and rising sea levels, these changes are putting ecosystems, economies, and communities on the line.

The GCC countries, characterised by vast desert expanses and unique geographical features, face particular challenges.

Often, temperatures in this region surge beyond 50°C (122°F). Such extremes not only magnify global issues but also introduce distinctive regional concerns in domains like cooling, water conservation, and energy efficiency.

Saudi Arabia, with its Vision 2030, and the UAE, through its Vision 2021, are just two examples of GCC nations that have recognized and risen to these challenges.

The broader GCC has also been active on the global stage, with many member countries ratifying the Paris Agreement, demonstrating a collective dedication to mitigate climate change impacts and curtail greenhouse gas emissions.

This collective commitment, enriched by the region's tradition of innovation and vision, creates a fertile ground for aspiring innovators to ideate and mould sustainable technologies that cater to both global and regional environmental needs.

Global attraction: delivering net zero in the desert climate

The UAE has a fast-paced, dynamic working environment, with some of the most ambitious building projects on Earth. Alex Smith speaks to regional chair Farah Naz FCIBSE about how CIBSE UAE Region is helping to deliver net zero projects in the desert climate

Posted in April 2023

'Interesting, challenging and rewarding' is how Farah Naz FCIBSE describes her four years as chair of the CIBSE UAE Region. With the UAE government committing to net zero carbon by 2050, building services engineers' skills are in high demand, and the CIBSE UAE Region is doing its utmost to provide guidance and support to help decarbonise existing stock and create resilient buildings in a climate of extremes.

'Everyone's moving towards decarbonisation and how to integrate it. There's been a huge mindset shift,' says Naz, who works as a climate strategy adviser at Aecom. 'It's now up to the engineers to implement these net zero plans – it's what we do best.'

Burgeoning demand for engineers in Dubai and Abu Dhabi may mean long working days for CIBSE members, but it also provides incredible opportunities to deliver globally significant buildings at a very fast pace.

'The region wants you to grow and learn,' says Naz, who led on sustainability and innovation at the Museum of the Future while at Buro Happold. 'You're constantly being pushed. It's about making the impossible possible in a short period of time.'

To equip engineers with the knowledge to optimise building services design, CIBSE UAE has recently published three guides. Covering Dubai, Abu Dhabi and Saudi Arabia, they take into consideration the extreme heat of the climate, and pay particular attention to air conditioning and the impact of heat rejection on urban microclimates. 'These guides have played a huge role for new engineers coming in and existing ones who are working,' says Naz. 'They have been very influential in the region.'

5 THE COMPETITION

Welcome to the CIBSE UAE Student Design Competition 2024 - an extraordinary platform for budding Engineers to shape the future of sustainable engineering in the United Arab Emirates, the Kingdom of Saudi Arabia, and wider GCC community.

This year's competition beckons you to channel your creativity and technical expertise towards the art of green retrofitting. We invite you to craft designs for the sustainable transformation of existing buildings, selecting structures that serve as canvases for the implementation of cutting-edge sustainable engineering principles.

As the world witnessed 28th Conference of Parties (COP28) which was hosted in Dubai November 2023, we challenge you to craft innovative solutions that align with the conference's key themes: Innovation and Technology, Inclusion, Frontline Communities, and Finance.

Your mission is to seize opportunities that amplify energy performance and efficiency in existing buildings while embracing sustainable, low-energy, and renewable technologies that reduce reliance on natural resources.

Participants have the flexibility to submit applications either as individuals or as part of a collaborative project team, with a maximum team size of 4 individuals. This approach accommodates both independent creativity and the synergy of collaborative efforts, allowing for a diverse range of innovative ideas and solutions in the realm of green retrofitting for existing buildings.

By taking on this challenge, you'll not only transform your selected building into a beacon of sustainability, but also contribute to both the local and global dialogue on climate action.

Get ready to pave the way for a greener, more resilient future as you delve into the heart of sustainable engineering and take the GCC one step closer to establishing itself as a global benchmark for sustainability.

Let your ideas shine and shape the path towards a more sustainable and inclusive world.

Good luck!

6 THE COMPETITION BUILDING & BRIEF

Imagine the building of your choice is stripped back to its shell & core and re-imagined to avoid the additional carbon emissions associated with demolition and or an entire new build construction project.

Now imagine what your re-purposed building looks like; how does your building address the need for contributing to a livable city.

The page overleaf provides examples of how an existing building may be reimagined to fulfil these criteria,

However, we invite you to utilise your creativity and technical knowledge to expand on this, take it further, or in an entirely different direction, to provide a concept design scheme which is inclusive to your geography and frontline community needs, while embodying cutting-edge sustainable engineering principles and demonstrating commercial viability.

Your existing building of choice could be low rise, high rise or anything in between, but should be based on an existing building of reference; local to your geography, and of which you feel addresses the competition outcomes.

The building of your choice can be located anywhere in the GCC.

The focus is to propose solutions for Net Zero buildings of the future That takes into account the prospects of building of future considering the resilient designs and also takes into account the end of life cycle as well.

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7 EXAMPLE SOLUTIONS OF THE GREEN RETROFITTING OF EXISTING BUILDINGS

Engineering The Solution

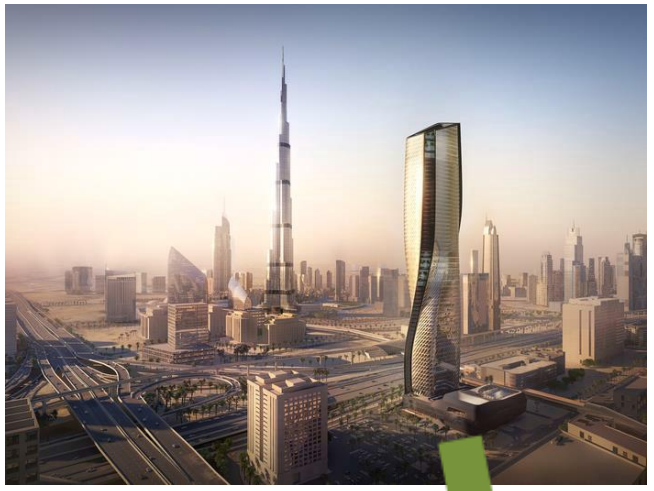
As part of either an individual submission or a collaborative project team, each applicant(s) are to re-imagine an existing building of your choice and bring to life your vision. Remember that every building will require a different solution depending on its size, height and age.

To turn your vision into reality there are a number of practical considerations that you and or your team may want to explore:

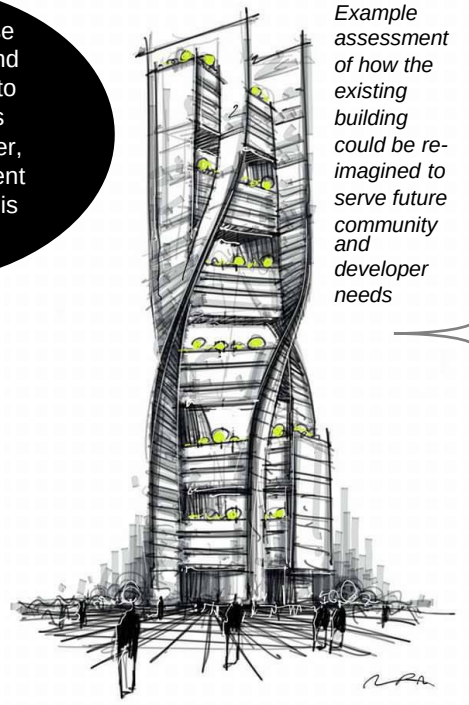
- Understanding the existing structural loading and foundation design is key to identifying the level of intrusive enhancements required.
- As part of a green retrofit, the opportunity is presented to upgrade the building envelope (roof, walls, and foundation) which is essential to minimise heat gains. Proper insulation, air sealing, and thermal bridging solutions help maintain a comfortable indoor environment and reduce energy demands.
- The addition of renewable energy and storage options offers the opportunity to review all services and systems to create more energy efficient processes and improve building performance optimisation.
- Selecting environmentally friendly materials and construction practices is crucial. Using recycled or renewable materials and sustainable construction methods can reduce the project's environmental footprint and promote sustainability.
- Implementing water-saving technologies and practices is another vital consideration. This may involve installing low-flow plumbing fixtures, rainwater harvesting systems, or drought-tolerant landscaping to reduce water consumption and promote sustainable water use.
- Green retrofitting should prioritise indoor air quality (IAQ) to ensure the health and well-being of building occupants. Upgrading ventilation systems and addressing moisture control issues are essential steps in improving IAQ.

Consider how the outlined interventions and building enhancements can be modelled and optimised through the development of a digital twin, which offers a more practical and less-carbon intense way to evolve an existing building for its next stage of life rather than demolition and re-build.

REMEMBER: The above are outline considerations to stimulate inspiration for your submission. In addition, the applicant(s) should carefully read through the assessment criteria (COP28 cross-cutting themes) to ensure your submission addresses the required criteria.



Example of a chosen reference building for green retrofitting



Example assessment of how the existing building could be re-imagined to serve future community and developer needs

Upper Floors

Residential spaces could offer accommodation for one or more from later living, build to rent or private ownership

Middle floors

Offering commercial office and or flexible working spaces for professional and educational needs, and remote working in a post-Covid world

Lower floors

Vertical farms designed to grow food in a sustainable way, using minimal land and water resources. This could include features such as hydroponics, aquaponics, and vertical cultivation, and offers frontline community, inclusion and financial benefits

Ground floor

Food and beverage outlets from cafés to fine dining, using ingredients farmed in the building itself

Indoor farmers-market serving and supporting the frontline community with the ability to buy the products grown in the building

Basement

Battery storage capturing the energy from the solar array on the roof, storing and using to reduce the energy demand of the building.

Edge data centre offering small facility processing data and services as close to the end user as possible to reduce latency and improve user experience. The heat produced is recycled into the vertical farm above

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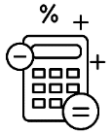
8 ASSESSMENT & SUBMISSION CRITERIA

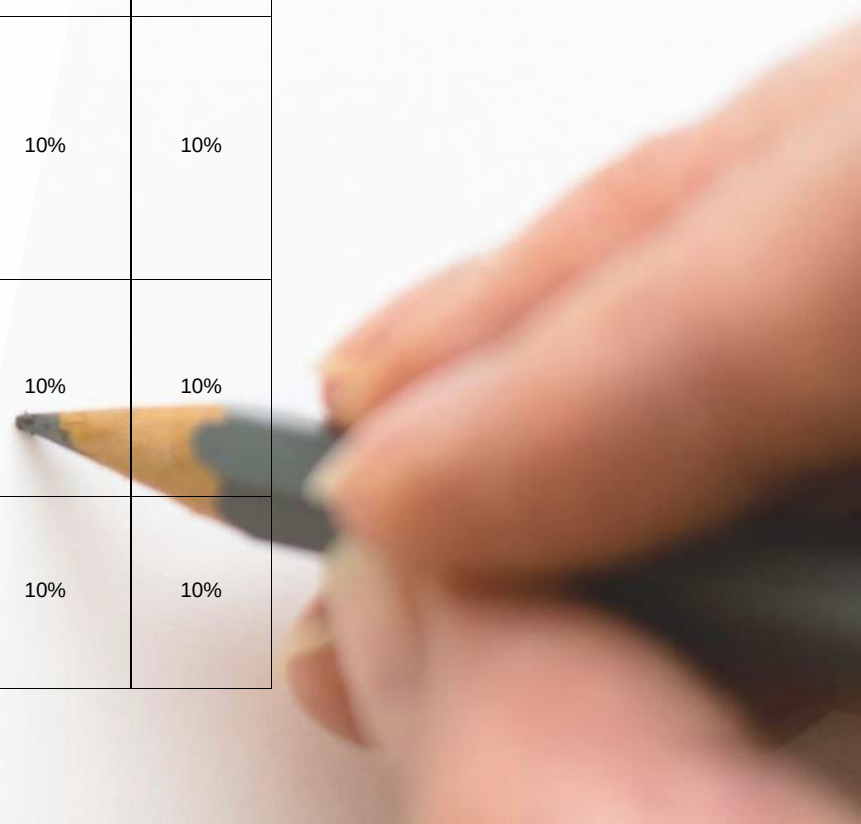
Cross-Cutting Themes		**Assessment Criteria -** *In respect to your chosen building, demonstrate how your specific project goes about addressing the following assessment criteria to:*	**Individual Submission Weighting**	**Group Submission Weighting**
	**Technology & Innovation**	➢ Address the specific challenges and opportunities of emissions reduction for green retrofitting in urban areas with high population density and economic activity while accommodating urban growth or address the unique challenges and opportunities of implementing green retrofitting practices while harnessing local resources, traditional knowledge, and innovative technologies to achieve emissions reduction and sustainable growth in rural settings. ➢ Highlight novel approaches for achieving carbon-neutral or carbon-negative processes within existing buildings. ➢ Demonstrate consideration of the social and economic aspects of energy transition, ensuring a just transition for the affected local communities while showcasing innovative circular waste systems that minimise environmental impact and contribute to sustainability. ➢ Demonstrate understanding of materials selection, construction techniques, and sustainable design principles for existing buildings and its infrastructure.	25%	20%
	**Inclusion**	➢ Present innovative approaches on how gender responsive policy making and better access to finance are central to achieving the climate agenda while addressing the unique challenges faced by marginalised groups within the climate movement and how the implementation of community conscious building adaptations as part of green retrofitting could address this. ➢ Offer innovative ideas for breaking down barriers that hinder women's involvement in climate-related fields and how the adaptation of existing buildings with a focus on inclusivity and community could address this. ➢ Proposes strategies as to how the green retrofitting of existing buildings could contribute toward inspiring and educating young individuals about the intersection of climate change, gender equality, and social justice.	10%	10%
	**Frontline Communities**	➢ Present innovative approaches for incorporating nature-based approaches into your green retrofitted building to tackle climate mitigation and adaptation. ➢ Propose measures as to how your green retrofit could contribute to the enhancement of community resilience in the face of climate-related challenges, ensuring that local communities and livelihoods are protected. ➢ Showcase understanding of how climate action can be designed and incorporated in your green retrofitted building to promote social stability and minimise disparities.	10%	10%
	**Finance**	➢ Demonstrate a comprehensive understanding of the financial links between climate change and public health and how the adaptation of your chosen existing building for green retrofit goes about tackling this. ➢ Highlight the incentives for developers to prioritise sustainable practices as part of your green retrofit adaptation. ➢ Conduct a cost-benefit analysis comparing any short-term financial implications with long-term benefits for all sustainable, low-carbon and renewable energy technology integrations as part of your chosen green retrofit adaptations proposed.	10%	10%

Individual Submissions to Include:

- White Paper (Up to 3 pages, A3 Paper Size)
- Supporting Poster (Min. A3 Paper Size)

Group Submissions to Include:

- Concept Report (Up to 10 pages, A3 Paper Size)
- Supporting Presentation (Up to 10 Slides)



8 ASSESSMENT & SUBMISSION CRITERIA

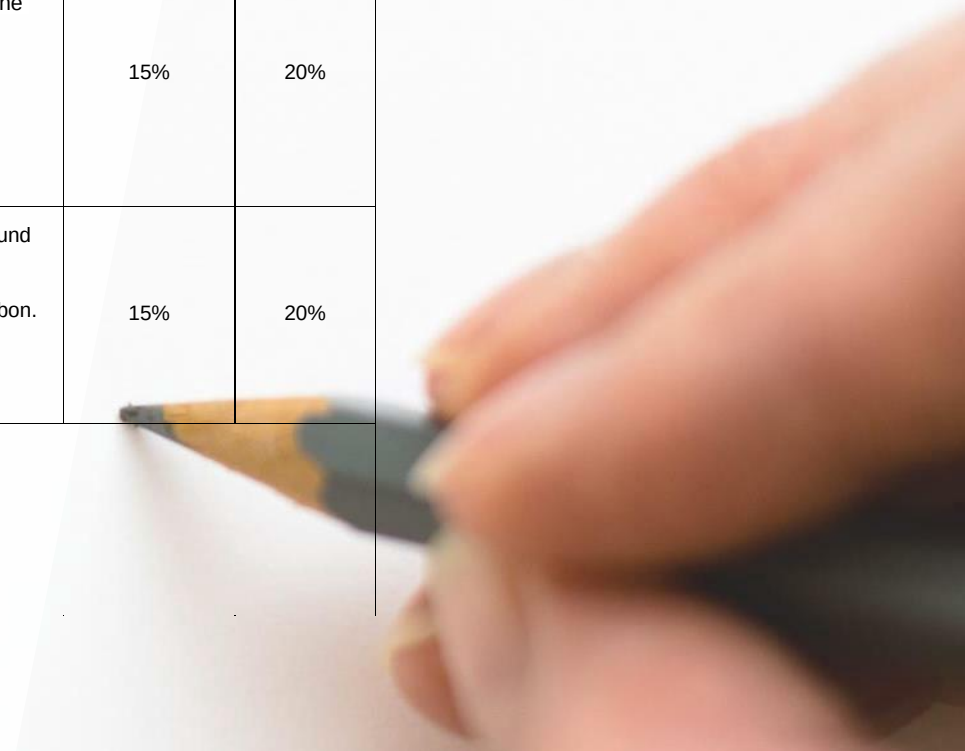
Cross-Cutting Themes		**Assessment Criteria -** *In respect to your chosen building, demonstrate how your specific project goes about addressing the following assessment criteria to:*	**Individual Submission Weighting**	**Group Submission Weighting**
	**Climate Resilience**	➢ Discuss the innovative approaches how existing structures can be made climate resilient regarding extreme weather events. ➢ Enhance and build capacity in the context of involving government, businesses and communities to mitigate and adapt to harsh Weather events.	15%	10%
	**Embodied carbon**	➢ Propose strategies that minimize the embodied carbon produced during manufacturing of building materials (material extraction, transport to manufacturer, manufacturing), the transport of those materials to the job site, and the construction practices used. ➢ It is good to have a qualitative explanation, however, quantitative description shall be appreciated. ➢ Offer actionable strategies for creating low-carbon built environments specifically catering for existing buildings, while showcasing innovative and renewable energy sources, technologies and practices that can drive emissions reduction.	15%	20%
	**Energy Efficiency and Functional carbon**	➢ Discuss and include design strategies that shall enhance the building energy efficiency using innovative techniques around ➢ Air-conditioning, ventilation, lighting and and heating. ➢ Also include ways the way renewables can be integrated in the existing building design thus reducing the functional carbon. ➢ It is also encouraged to discuss the end-of-life cycle of materials in terms of recycling and repurposing	15%	20%

Individual Submissions to Include:

- White Paper (Up to 3 pages, A3 Paper Size)
- Supporting Poster (Min. A3 Paper Size)

Group Submissions to Include:

- Concept Report (Up to 10 pages, A3 Paper Size)
- Supporting Presentation (Up to 10 Slides)



9 REGISTRATION & COMPETITION SCHEDULE

- All local Universities with Architectural and Engineering curriculum can participate.
- For group entry submissions, participants must collaborate with student colleagues from the same university.
- The competition is limited to fulltime Undergraduate and Post Graduate students, or alumni students whom have graduated within 24 months only.
- There is no entry fee for participation in the competition.
- Submissions must be sent via email to the designated competition email address: uae@cibse.org

Milestone Dates:

➢ Applicant(s) Entry Closing Date	15th September 2024
➢ Announcement of Finalists	15th October 2024
➢ Announcement of Award Winners and Prize Distribution	31st October 2024

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10 AWARDS & PRIZES

Awards for winning submissions due to take place at our prestigious and highly anticipated Annual UAE Awards Evening, on October 31st, 2024.

Winners Prize:

- AED 5,000 prize money for the winning applicant(s).
- Article publishment of the winners submission on the CIBSE official blog page.
- Opportunity for the announced finalist(s) to present their a synopsis of their submission at the CIBSE Annual Awards evening to regional industry professionals and VIP/VVIP guestlist.

Runners Up Prize:

- AED2,000prizemoney for the winning applicant(s).
- Article publishment of the winners submission on the CIBSE official blog page.
- Opportunity for the announced finalist(s) to present a synopsis of their submission at the CIBSE Annual Awards evening to regional industry professionals and VIP/VVIP guestlist.

All Entries:

- All participating applicants shall be provided with participation certificates from CIBSE.
- All short-listed, runners up and winning applicants shall also be published on the CIBSE / CIBSE UAE social media platforms.
- All participating full time students can avail the free student membership from CIBSE, or at a significantly reduced rate for those studying on a part-time basis, gaining access to a plethora of exciting benefits.

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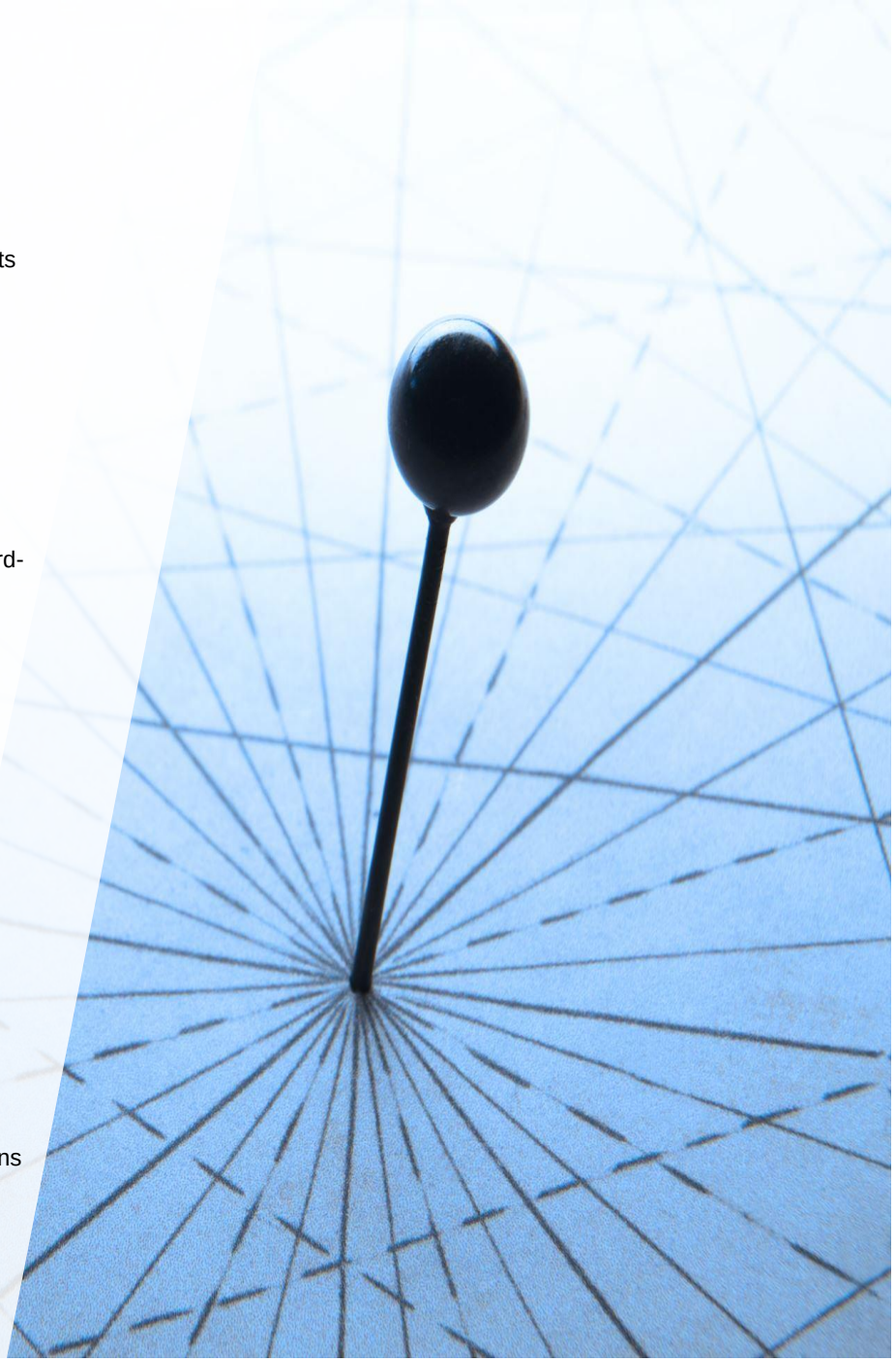
11 ELIGIBILITY

To be eligible for participation, candidates must adhere to the following criteria:

1. Student Status: Participants must be currently enrolled as students at a recognised University or educational Institution. Both individual students and student teams (max no. of members for a team = 4) are eligible to participate.
2. Team Composition: Teams can consist of students from various disciplines relevant to the competition's theme, such as civil engineering, architecture, environmental science, and sustainable design.
3. Submission Language: All competition submissions, including reports, white papers, presentations and posters, must be in English.
4. Measurement Units: All measurements and units used in the submission must adhere to the metric system.
5. Submission Requirements: Submissions must be sent via email to the designated competition email address: uae@cibse.org. Submissions must include all required documents and information as specified in the competition guidelines.
6. Originality and Copyright: Submissions must be original works of the participants. Works that have been previously published or infringe on third-party copyrights are not eligible. Proper references and citations must be provided for all sources used in the submission.
7. Submission Legibility: Entries must be clearly presented and legible. Illegible or poorly presented entries may not be accepted for review.
8. Submission Deadline: All submissions must be received by the specified due date. Any requests for extensions must be formally approved by the organiser prior to the original submission deadline.
9. Approval for Delay: If a submission is delayed beyond the due date, participants must obtain written approval from the competition organiser, clearly stating the reasons for the delay.
10. Permission for Publication: If the submitted work contains copyrighted materials owned by others, participants must obtain necessary permissions from the copyright holders to include these materials in their submissions. Details of copyrighted works must be specified in the entry documents.
11. Organiser's Rights: By submitting their works to the competition, participating universities agree that the competition organiser committee has the right to publish articles or advertisements associated with the winning entries in various channels.
12. Evaluation Criteria: Submissions will be evaluated based on the assessment criteria outlined and the incorporation of feedback from regional and industry experts forming the judging panel.
13. Compliance: Any submission that does not comply with the eligibility criteria outlined above will be subject to disqualification. Even after the winners are announced, awards may be revoked, and prizes may be asked to be returned if the submission is found to violate any of the eligibility conditions.
14. Participating students or student teams are encouraged to carefully review and adhere to these eligibility criteria to ensure that their submissions are considered for review in the competition.



12 The Chartered Institution of Building Services Engineers

The Chartered Institution of Building Services Engineers (CIBSE) stands at the forefront of the building services engineering industry, providing a vital platform for professionals and students alike to engage, learn, and collaborate. With a rich legacy in shaping the future of sustainable and efficient building systems, CIBSE is a global leader in advancing the knowledge, standards, and practices that define modern construction and engineering.

CIBSE's commitment to fostering a thriving community of professionals extends to students as well. The Organization offers an exceptional avenue for students to become an integral part the building services engineering community. By visiting our main landing page at https://www.cibse.org/ students can access a wealth of resources and opportunities aimed at enriching their educational journey and professional growth.

For students pursuing full-time and professionally related courses, CIBSE offers an incredible opportunity to unlock a treasure trove of benefits at no cost. Even part-time students can access these benefits at a significantly reduced rate. The perks of student membership are extensive, including access to the renowned CIBSE Knowledge Portal. This repository houses a comprehensive collection of technical guidelines, standards, manuals, and more, catering to the wide spectrum of Building Services Engineering topics.

In addition to the valuable knowledge repository, student members receive a monthly subscription to the CIBSE Journal. This publication covers a broad array of subjects including Building Services, Engineering, Sustainability, and Industry developments, ensuring that members stay up-to-date with the latest trends and innovations.

Moreover, CIBSE offers access to professional development through CPD courses across various technical domains, fostering continuous learning. Being part of CIBSE means being connected to an extensive network of communities, societies, and networks that fall under its umbrella. This platform allows students to connect, learn, and collaborate with like-minded individuals who share their passion for engineering excellence.

Mentoring is a vital aspect of CIBSE's student membership, providing guidance from seasoned professionals to help shape students' careers. Lastly, CIBSE equips students with the knowledge and guidance needed to pursue professional registration within the institution, solidifying their status as accredited building services engineers.

For those based in the United Arab Emirates (UAE), our regional CIBSE UAE landing page serves as a gateway to all local CIBSE activities. By visiting https://www.cibse.org/get-involved/regions/united-arab-emirates, students can access region-specific information, events, and initiatives that cater to the unique needs of the UAE's building services engineering community.

We invite students to explore the dynamic world of building services engineering with CIBSE, were opportunities, knowledge, and connections await. Should you have any questions or wish to learn more, please feel free to reach out to us. We look forward to welcoming you into the vibrant CIBSE community and supporting your journey in the field of building services engineering.

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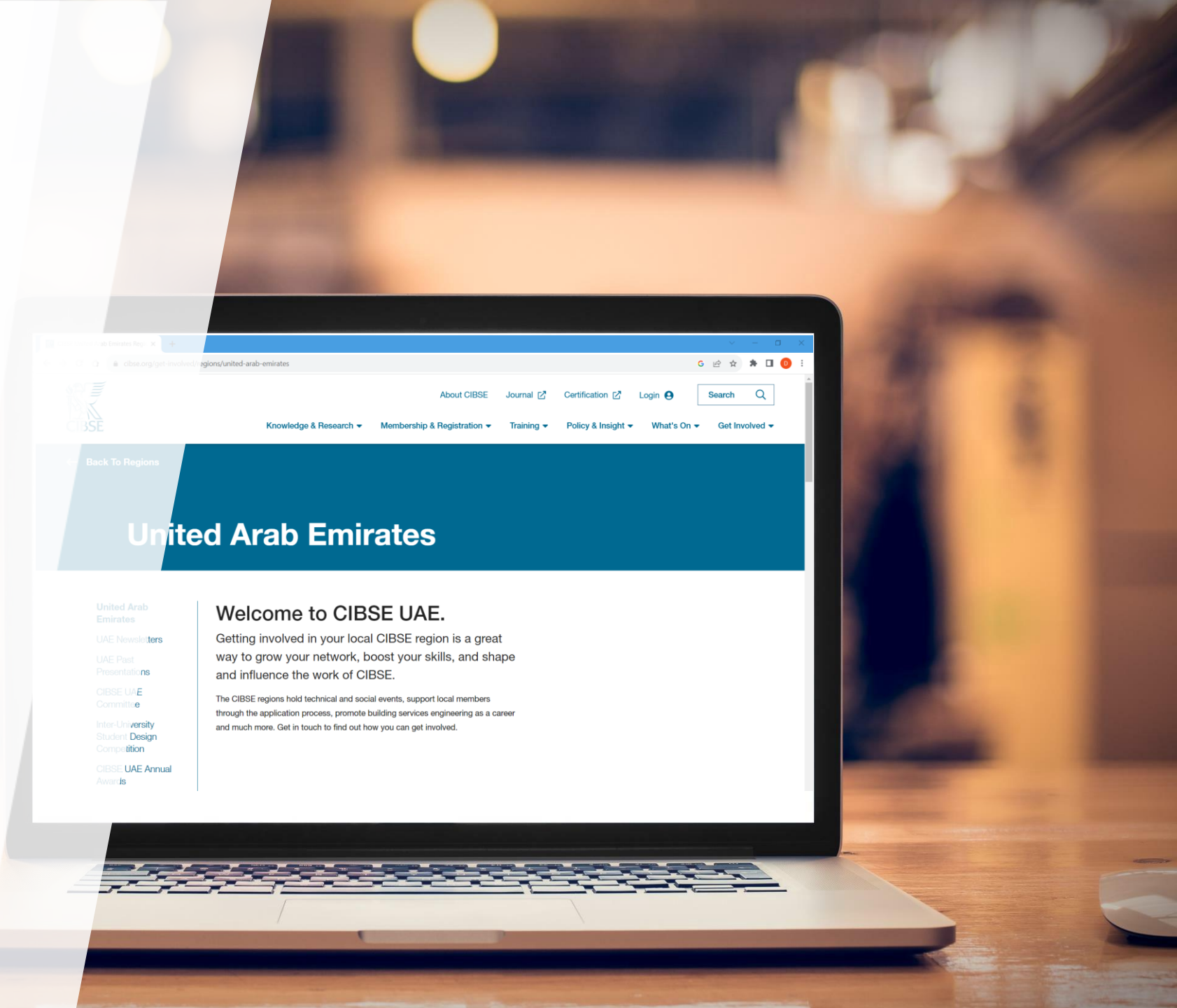
13 GET IN TOUCH

Have a question? Want to know how you can get involved in your region? Get in touch by email or connect with us on social media:

https://www.linkedin.com/company/cibseuae/

https://www.cibse.org/get-involved/regions/united-arab-emirates



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