Solar Decathlon India

"With respect to climate change, the world has agreed to a target of 2ºC, but we find ourselves on a pathway towards between 3º and 5ºC. Buildings are at the core of meeting the world's quality of life ambitions and addressing climate change. Of all the options available to us, getting buildings right stands out in terms of timeframe, scale effect, and economics."

– Scott Foster, Director, Sustainable Energy Division, United Nations Economic Commission for Europe[1]

20 May 2024. It was a hot summer afternoon. The electric bus started from Mysuru on its two-hour journey to Bengaluru. Even as the rest of the team continued to engage in their cheer and chatter after what has been a long three days successfully conducting the finals event of the fourth edition of the Solar Decathlon India (SDI), Prasad sat back in his seat right at the back and reflected on the programme.

It was in 2019 that Prasad, after having mentored teams from India for three years for the Solar Decathlon U.S., decided to launch Solar Decathlon India. One of his primary drivers for wanting to create the SDI was the realisation that the SD U.S. organisers and jury members did not quite understand the climatic and economic context of a country like India, which are particularly important in the buildings sector.

Armed with a crisp concept note (Appendix 1), Prasad went around the country looking for partners, sponsors, and believers. He reached out to about 30 institutions – academic institutions, research centres, industry associations, government bodies, and others – before finding two

[1] Source: https://www.ceu.edu/article/2020-10-20/global-net-zero-buildings-are-already-possible-finds-new-study

willing supporters in the Indian Institute for Human Settlements and the Association for an Energy Efficient Economy.

At that time, it was no more than a dream. Now, Prasad had to admit, the intrapreneurial venture had become far more successful than what he had even imagined. As he reflected on the Solar Decathlon India's journey, he also knew that it was time to step up, to take the SDI to the next level. Not only did he need to decide what to do, he also had to figure out how to raise the necessary resources for it.

Introduction

Started in 2002, the Solar Decathlon (https://www.solardecathlon.gov/) is a collegiate competition conducted by the U.S. Department of Energy to prepare the next generation of building professionals to design and build high-performance, low-carbon buildings. The name is derived from the fact that the competition has ten contests that participating teams must address. The success of the Solar Decathlon in the U.S. spawned six official versions across the world – in Africa, Europe, Latin America and the Caribbean, and the Middle East, China and India.

The Solar Decathlon India (https://solardecathlonindia.in/) is a Net-Zero Building Challenge amongst postgraduate and undergraduate students from Indian institutions to learn and design net-zero-energy-water, affordable, and resilient design solutions for real, live projects, to combat climate change through the buildings sector. The SDI is run as an intrapreneurial unit by the Indian Institute for Human Settlements (IIHS) and the Alliance for an Energy Efficient Economy (AEEE), under the aegis of the Indo-US Science and Technology Forum (IUSSTF), and supported by the Department of Science and Technology, Government of India. Prasad Vaidya is

the Director of Solar Decathlon India. Prasad carries almost 35 years of experience as a consultant, academician, and entrepreneur across India and the U.S.

Having been deeply involved with the Solar Decathlon in the U.S. for three years, Prasad was aware of the multiple dimensions of the competition and the challenges involved in, and resources required for, each of them. This experience enabled him to define the SDI in India-specific terms. While the SDI adhered to the overall intent and structure of the SD U.S., Prasad made some significant changes in the Indian version, both to accommodate the market context and in consideration of the resources he would have to raise. Exhibit 1 summarises the key differences between the Solar Decathlon (U.S.) and the SDI.

Exhibit 1: Solar Decathlon (U.S.) and Solar Decathlon India: Key Differences

No.	Parameter	Solar Decathlon (U.S.)	Solar Decathlon India
1	Format	Build Challenge (2002-2023); Design Challenge (from 2013)	Only Design Challenge
2	Periodicity	Bi-annual (Build Challenge); Annual (Design Challenge)	Annual
3	Run by	Government Department	Private intrapreneurial venture
4	Industry partnership requirement	No	Yes
5	Industry Competition	No	Yes (from 2022-23)
6	Educational Content	Webinars	Course
7	Software licences to participants	Not provided	Provided
8	Faculty Development Programme	No	Free to faculty mentors
9	Technical Resource Group / Mentors	Yes (after 2022, learning from SDI)	Yes
10	Outreach for registration	Directly to students	Through faculty members
11	Public awareness, media	Organic	Planned (from 2021-22)
11	Participation Fee	USD 200	USD 75 (2020-23); USD 90 (2024)

The Solar Decathlon India

The SDI was launched in 2020, in the middle of the raging COVID 19 pandemic. Therefore, it was launched as a completely virtual competition. Moreover, given that it was in bootstrap mode, and philanthropic funds were almost entirely diverted to pandemic relief efforts, it was important to have a minimum viable product for SDI at its launch phase. Combining his experience from the Solar Decathlon U.S. with discussions with the supporting organisations, AEEE and IIHS, Prasad decided to launch the SDI with three clear and simple principles: (i) A parsimonious set of rules for a Design challenge only, (ii) A strong communications and outreach effort, built around digital and social media, to create wide awareness across all stakeholders in the ecosystem, and (iii) Creation of digital learning materials to help participants learn and participate meaningfully. These early decisions stood the SDI in good stead even after the pandemic, because all stakeholders (academic institutions, industry partners, advisory group members) were now used to working virtually, and thus continued to be involved with the SDI over the years.

From the launch in 2020, the SDI has completed four annual cycles (with a fifth underway) and has attracted more than 6,000 students across upwards of 300 academic institutions from almost all states in India. Each participating team was required to find a proposed building project by partnering with a real estate developer or building owner (Project Partner) and encouraged to seek out professional firms and manufacturers as Industry Partners. In just four years, the SDI has attracted a higher number of participants than any of the other Solar Decathlons in the world, and created a large partnering ecosystem of people and firms from the industry. Exhibit 2 shows the year-on-year participation in the SDI. Student teams of the SDI have collectively worked on

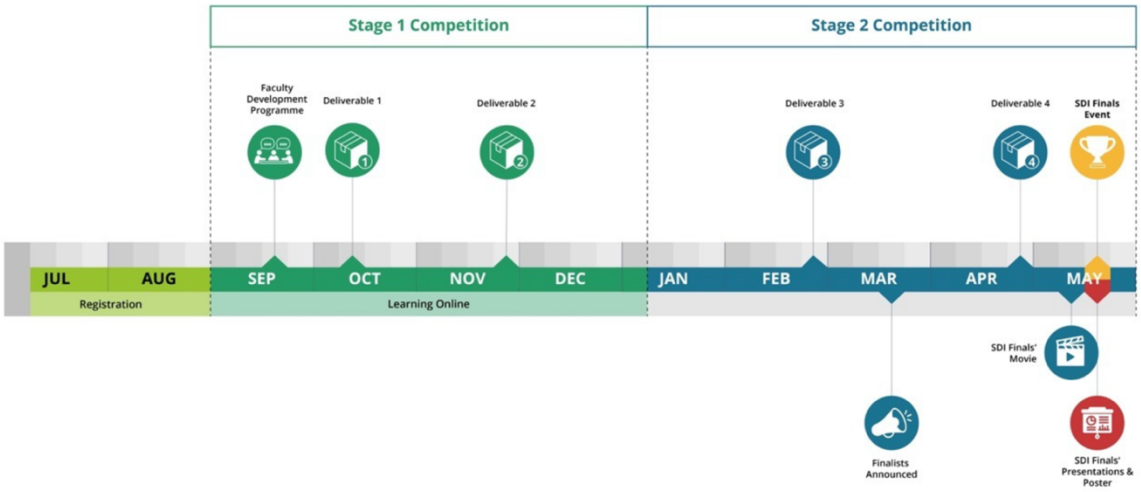
78 million square feet of new buildings to make them net-zero-energy-water, showing how 33 million tonnes of CO_2 emissions can be abated over the life of these buildings.

Exhibit 2: Solar Decathlon India: An Overview

No.	Particulars	2020-21	2021-22	2022-23	2023-24
1	Teams	75	99	154	175
2	Students	948	1264	1780	2111
3	Academic Institutions	103	109	126	188
4	Faculty mentors	165	195	179	272
5	Cities (students from)	51	42	50	70
6	States (students from)	17	23	18	24
7	Industry Partners	113	137	162	229
8	Core Team Size (FTE)	6.2	5.5	6.1	6.1

The SDI runs over a nine-month period, approximately from September to May, with multiple activities across two stages. Exhibit 3 provides a snapshot of the SDI schedule.

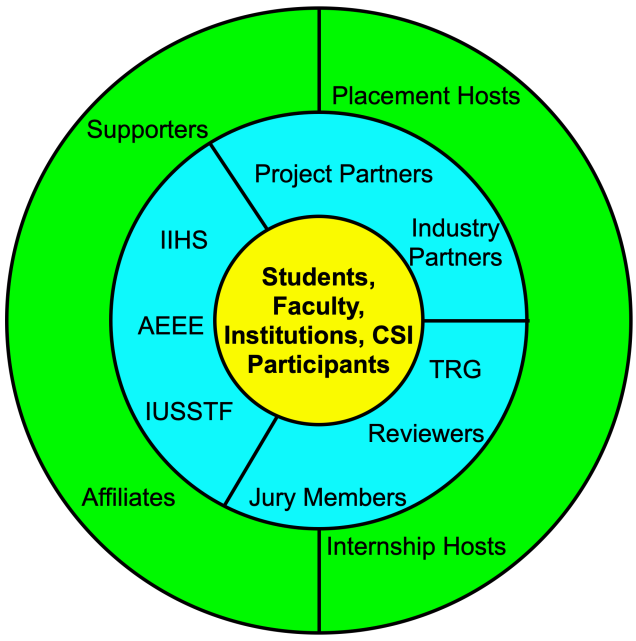
Exhibit 3: SDI Schedule



Given the complex nature of the SDI, it works through a combination of diverse partners for its resources and operations. Exhibit 4 provides a snapshot of the various stakeholders involved in

the SDI. The core, the yellow circle, represents the direct beneficiaries of the SDI, students and their faculty and institutions (who take part in the SDI) and innovators (who take part in the Climate Smart Innovation, an extension of the SDI). The middle circle, in blue, represents the sponsors and other partners who guide the students and innovators through the competition (TRG are members of the Technical Resource Group, essentially selected Alumni of SDI who are available as mentors to the students and faculty), while the outer circle, in green, comprises the market players who provide the students and innovators with extended opportunities and a strong raison d'être to participate in the SDI.

Exhibit 4: The SDI Ecosystem



Even though the SDI is a non-profit social venture, Prasad was clear right from the beginning that none of the stakeholders in the SDI will provide anything for free – they will always get something back for their contributions. Appendix 2 provides details of each of the stakeholders, including what they give to the SDI and what they get in return.

The Pedagogy

While the SDI is essentially a competition, the foundations have been built on a solid pedagogical core to ensure that all participants benefit from the programme, and not just the winners. The pedagogy is structured as a low-floor and high-ceiling learning environment. The low floor is enabled by a low-barrier entry and a supportive learning environment, while the high ceiling is created by expectations across 10 contests (See Appendix 3 for details of the contests), where teams compete against each other over an extended period of about nine months, with multiple comprehensive deliverables designed to promote multidisciplinary learning. Through this process, the SDI pedagogy aims to transform students into T-shaped problem solvers[2].

Since the SDI was filling a gap in existing teaching methods and curricula, it was important to accelerate the learning of the students over the nine-month challenge. While the U.S. Solar Decathlon has industry experts delivering webinars (which are mandatory for the students), the SDI took a more rigorous approach to accelerate learning. Webinars from experts were optional and only focused on best practices and case studies (what industry experts are good at delivering). The fundamentals of building science and theory were taught through mandatory self-paced modules (see Appendix 4 for a listing of the modules) using multiple short, animated videos. This enabled not only students to constantly refer to a consistent set of learning materials, but also afforded faculty members in participating institutions to access these materials and guide

[2] A T-shaped problem-solver is someone who has deep, specific knowledge within a field (the vertical stem in a capital "T"), as well as some level of experience in numerous fields related to their own (the shorter, horizontal crossbar on the top). Such problem-solvers can work with others to tackle multi-dimensional problems, contributing with their own deep expertise, while also being generalists to be able to collaborate and communicate with others who have deep expertise in their own areas.

students better. At the end of the fourth year, the SDI also launched the learning materials as a standalone course through IIHS's academic partnership with Coursera[3].

A pleasant offshoot of the digital learning materials is that they caught eye of the educational regulator, the Council of Architecture (COA)[4]. The SDI, along with a group of industry experts and academics formed a sub-committee under the COA to collaborate on SDI and climate change related issues. The culmination of these efforts was that the COA sent a circular in early 2023 to all colleges that teach architecture to (i) award academic credit to students who participate in the SDI, and (ii) teach subjects related to climate change, and specifically on net-zero buildings. This addressed an important problem of students having to do the SDI in addition to their current learning workload. Now SDI participation can be part of their courses, at least for architecture students, who form a big part of the SDI participant base.

Another pedagogical innovation in the SDI was the introduction of different divisions, which represent different challenges and business models – apartment buildings for build-sell, school buildings for build-own-operate and office buildings for build-lease-operate. This enabled students to learn and apply their skills in domains of their interest, as also of market relevance. The introduction of the product development division in year 3 added to the richness of the student experience. It also filled the gap of not having the Build Challenge, without consuming as much resources and time as the Build Challenge. In fact, the Solar Decathlon U.S. stopped the

[3] There was a tension about this from the beginning. The learning materials were initially guarded as the USP of the SDI in the first two years. Then, as the SDI gained momentum, they were able to shed the insecurity and make those materials available to everyone, regardless of their participation. This is in the interest of increasing impact at the risk of losing a participation hook.

[4] The COA is a statutory body that oversees and regulates professional practice and educational curricula for architecture in India, to help them develop curriculum guidelines.

Build Challenge in 2023, perhaps vindicating the SDI's decision to stay away from that resource-hungry component.

Engaging with Industry

Apart from the financial support of IIHS and AEEE, the SDI also worked assiduously to cultivate industry partners who support the initiative in other material ways as well. Two partnerships are worth mentioning. The first is with Infosys, one of India's leading IT services companies, who have generously offered to host the SDI Finals free of cost every year on their campus in Mysuru, India. The second in-kind supporter is DesignBuilder, one of the world's largest provider of simulation software in the buildings sector, who have provide free versions of their software for all SDI participants for the duration of the competition.

Moreover, the SDI also engages deeply with industry on the execution aspect of the initiative as well. Unlike the Solar Decathlon U.S., the SDI makes it mandatory for each team to work on live building projects floated by a real estate developer or a building owner (Project Partner), an entity that has a financial interest in the outcome. Student teams could either find their own Project Partner or request the SDI team to find one for them. Teams are also encouraged to find and collaborate with Industry Partners as they work through their innovations. Project Partners and Industry Partners welcomed the opportunities to engage with academic institutions and students. Moreover, the SDI Jury members are industry experts, who assess student innovations through the lens of the marketplace. Each year during the finals, the SDI holds a career fair that gives the Project Partners and Industry Partners access to the finalists. All of this has built an active and vibrant ecosystem around net-zero buildings.

In 2022, the SDI introduced the Climate Smart Innovation (CSI) Exhibition and Award to highlight industry innovators working on climate change in the building sector. The CSI is a platform to connect startups working in the net-zero building sector with investors and potential customers. The CSI exhibition and pitches are held at the SDI Finals and offer early-stage entrepreneurs and innovators in the building sector an opportunity to inspire the next generation of students and connect with leading practitioners from the design, construction, and real estate industry. This initiative is expected to have multiple benefits. One, it gives students exposure to innovations in the sector that have successfully moved from idea to market. Two, it gives Project Partners and Industry Partners an opportunity to be exposed to and evaluate emerging innovations for use in their own ventures.

Running the SDI

The SDI is run by a small team, each handpicked by Prasad, called the Core Team. All Core Team members are employees or on contract with either IIHS or AEEE, and most of them work only part time on SDI. Since Prasad's intent in starting the SDI came from technical grounds and not commercial, each of the core team members come from a technical background – architecture, engineering, and related domains. There are almost no non-technical managers, marketing professionals, or such like in the SDI team. Apart from this technical core, there are three other characteristics of the SDI team. One, all team members are young and come with a passion to work on climate change and sustainability. Two, given the limited experience of the team members, there is no hierarchy in the team – each team member reports directly to Prasad. Three, while individual team members own up to individual tasks, all team members are involved in all tasks.

In addition, the SDI leans on the IIHS and AEEE organisations for support in various areas like communication, development of learning materials, human resource management, event management, finance, legal, operations, and technology, among others.

SDI: The Road Ahead

Over the four years of its existence, the SDI has gained significant momentum on multiple fronts. Participation in SDI has surpassed the combined participation in all the other Solar Decathlons across the world. The COA circular has given legitimacy for participation in academic institutions. Some of the largest real estate developers in India have signed up as empanelled Project Partners. At the finals event in 2024, multiple investors came forward expressing interest in the innovations and innovators at the SDI. Several organisations made commitments to hire SDI Alumni as they transitioned their businesses with a focus on climate change and to meet their aggressive ESG goals.

Clearly the SDI is playing an important role in driving the transition to net-zero buildings in India. But the road ahead is still long. A lot more needs to be done to promote net-zero and climate resilient infrastructure. While SDI does not face competition in the traditional sense, it still needs to address a huge infrastructure market and drive ongoing change in India. It is perhaps best positioned to drive this transformation. How can Prasad and team do it?

Questions for Discussion

This case describes the successful evolution of an entrepreneurial but non-profit venture. The case explained how Prasad Vaidya, the Director of the SDI made strategic choices and extracted the required resources from the ecosystem to make the venture successful so far. Please study the case carefully and be prepared to discuss your answers to the following sets of questions.

1. What makes the SDI an entrepreneurial venture? What are some differences between the SDI and other entrepreneurial definitions and ventures? Are there other organisations or ventures or initiatives that you have come across that are similar to the SDI?
2. What are the parameters that SDI have used to define their success? What other parameters would you add to evaluate the SDI?
3. Against the identified parameters above, the SDI has performed well. What do you think are the reasons for the SDI's success?
4. What are the approaches the SDI has used to raise resources, both financial and non-financial? How are some of these approaches different or innovative compared to how purely commercial ventures have defined and raised resources?
5. If you were to run the SDI over the next five years, what are the targets you will set, and the growth paths you will consider? What resources will you need? What approaches will you use to raise them?

Appendix 1: Solar Decathlon India, A Concept Note: 2019

Synopsis

Create the next generation building industry workforce to solve the next generation's environmental and social challenges. Using a national competition platform, reach out to the 100,000 architecture students across India and invite them to design net-zero-energy, net-zero-water buildings. Using a combination of online education and competition-based problem-solving, develop affordable and industry-ready solutions. Move the construction industry and the government institutions.

Background

What is Solar Decathlon?

It is an annual collegiate competition that challenges student teams to design super-efficient zero energy buildings powered by renewable energy. The competition has 10 areas of evaluation (hence, Decathlon) which include net zero energy performance, constructability, affordability, aesthetics, amongst others. Online webinars on building science and best practices are an integral component of participation. Last year, over 80 teams participated in the Design Challenge and about 20 participated in the Build Challenge. The Decathlon was started by the US DOE in the USA but is now conducted in Europe, China and the UAE (Middle East). Is it time for an India version?

Why India?

Final energy demand in India will increase by 5,000 quads in the next 30 years. To contribute to a 2°C pathway, India must achieve a 50% reduction in building energy demand and related greenhouse gas (GHG) emissions by 2050. Notwithstanding some sporadic efforts in the last 15 years, the opportunity in buildings has been difficult to tap for efficiency, resilience, and the clean-tech sector at large. This difficulty stems from lack of policies and energy code adoption, and the conservative outlook of the building sector. Cooling demand in buildings is expected grow 20-fold in the next 20 years, and most of the effort so far for reducing the energy and environmental impacts is on the equipment manufacturers' side. There are no widespread solutions being implemented on building design to lower cooling demand. The large potential of integrative approaches to design-construction remains untapped. India's population is very vulnerable to climate change impacts and sensible design solutions for residential and commercial buildings need to be developed now. A delay each year results in a huge lost opportunity and adds to a backwards-looking building stock.

The education of architecture and civil engineering in India is stuck in the 20th century. The Council of Architecture lists 460 architecture schools with an average annual intake of 40 students. These institutes produce about 18,000 architects annually, with virtually no expertise on dealing with climate change, building science, energy codes, energy/ water performance, or renewable energy. Add to this over a thousand civil engineering colleges with the same story.

I mentored CEPT University's Team for Solar Decathlon over the last three years. The students learned tremendous amounts and came up with innovative solutions and designed affordable net-zero energy/water projects, while partnering with developers and design firms. Yet, only one

other college from India has participated in the Solar Decathlon, and the event is out of reach for most Indian students.

This is why a regional Solar Decathlon that addresses the context of India and the global south, and one that is accessible to the community is needed.

Intent of Solar Decathlon India

The Solar Decathlon India will create excitement about high performance building design, with participating teams taking on real building projects. It will build the skills through a combination of education and problem solving and create the next generation of designers and engineers who can effectively respond to climate change. It will be rooted in the context of the global south to create ready-to-use solutions that also cost effective. Each collegiate team will partner with the industry and generate real and affordable solutions for their projects. The partnerships will help the diffusion of knowledge into the building industry.

Each year, the design challenge can be modified to focus on the most pressing unsolved problems. The Solar Decathlon Secretariat will be housed in a host institution and will partner with the USDOE, AEEE, and other eminent institutions in India to conduct the competition. The roster of participating colleges will increase from around 20 in the first year to over 100 in the 5th year of the competition.

Local, state and central government stakeholders will be brought in each year to witness the solutions for a positive take home message and to give them a chance to adopt these innovative solutions.

Anticipated Results (over 5 years of the competition)

Over 200 real building projects will have affordable design solution for mitigation and adaptation, including net zero energy and water performance. Just these 200 projects can result in 10 million tons of CO_2 reduction over the life of the buildings.

Over 200 faculty members across India will get trained on high performance buildings, and they will incorporate the competition approach in their curriculum.

From 20 to 100 collegiate student teams, over 3,000 new professionals will be able to design net-zero buildings, and fully implement the ECBC (energy code). They will have the know-how of performance, constructability and affordability. They will catalyze the change in India's building stock.

Operating Budget

INR 5 crores annually, or about USD 700,000.

Appendix 2: The SDI Stakeholders

1. Direct Beneficiaries

1.1 Students & Alumni

These are the students who comprise the teams that participate in the SDI.

What they give	What they get
Registration Fee: Rs. 7500 per team (in Year 5)	Education and learning resources on designing net-zero buildings through self-learning modules and webinars
Time and effort working on the competition	Mentorship and guidance from faculty members and TRG members
	Opportunity to work on live projects and latest technologies with project partners and industry partners
	Exposure to recent innovations in the sector through industry partners and CSI participants
	Exposure to job opportunities through the Career Fair in the SDI finals and through the SDI alumni network
	Recognition for the divisional winners and runners-up and the grand winner, trophies and cash prizes for winners
	Certificate of completion for all team members
	Opportunity to come back as TRG members in future runs of the competition
	Access to potential investors and customers for their project ideas
	Grants to support efforts for product development etc.
	A body of work they can show as work experience

1.2 Faculty

Every student team needs to have a faculty guide. This faculty guide needs to be affiliated to the institutions where at least one of the participating students is currently studying. The objective of the faculty is to be the local expert, guide, and motivator for the participating team.

What they give	What they get
Time and effort guiding their team in the competition	Educational content and resources on designing net-zero buildings through self-learning modules and webinars
	Dedicated faculty development programme
	Opportunity to collaborate with faculty from other institutions
	Opportunity to partner and build relationships with industry
	Exposure to recent innovations in the sector through industry partners and CSI participants
	Opportunity to teach and mentor in areas that are not part of the curriculum, and to experiment with new ways of teaching/mentoring
	Opportunity to compete for the Outstanding Faculty Mentor award, which results in a trophy and financial support for attending a conference

1.3 Colleges / Universities

These are the academic institutions in which participating students are currently studying.

What they give	What they get
A letter stating that their students are participating	New opportunity for their students and faculty
Academic credit to students (optional)	Option to offer a new elective course on Net Zero Building Design, based on the self-learning modules and the faculty involved in mentoring students in the competition
	Faculty development programmes for their faculty
	Recognition for college / university if their teams win or finish as runners-up
	Industry relationships
	Placements for their participating students in nationally recognized organizations

1.4 CSI Participants

These are the innovators and exhibitors participating in the CSI exhibition and pitches.

What they give	What they get
Time and effort working on the submission	Exposure of their entrepreneurial venture to multiple stakeholders –students, faculty, experts, and industry players
Travel and logistics expenses and time for participating in the CSI exhibition	Review comments from industry experts
	Exposure to recent innovations in the sector through other CSI participants
	Recognition for the finalists and the winner
	Opportunity to become industry partner / reviewers / jury members in the student competition
	Access to potential investors and customers for their business / startup venture

2. Sponsors and Partners

2.1 Organisers (IIHS, AEEE, IUSSTF)

These comprise the core sponsors and supporters of the SDI.

What they give	What they get
Funding	Drive the Net Zero movement in India, consistent with their institutional objectives
Management and Logistics Support	Access to new ideas and innovations from students and young entrepreneurs
Brand Equity and Credibility	Grow their stakeholder networks (academic institutions and industry) and thus create new opportunities for academics / research / consulting
	Spin-off projects and initiatives, with the ability to raise funds
	Strengthen their knowledge and experience to drive policy advisory work
	Recognition, Brand Equity and Credibility

2.2 Industry (Project Partners, Industry Partners)

As explained earlier, Project Partners are real estate developers or building owners who provide live building projects for participating student teams to work on. Industry Partners are building designers, consultants, manufacturers, and the like, with whom student teams can collaborate to validate their innovations etc.

What they give	**What they get**
Time with participating teams	Be part of the Net Zero movement in India
Data for projects	Access to new ideas and innovations from students and young entrepreneurs
	Grow their stakeholder networks (academic institutions and industry) and thus create new opportunities for their businesses
	Access to potential investors and their thinking about new ideas in the net-zero domain
	Project partners get free designs for their building projects
	Industry partners get to show their equipment / expertise to potential customers (Project Partners)

2.3 Knowledge Partners (TRG Members, Reviewers, Jury Members)

The Technical Resource Group (or TRG) comprises practicing architects and designers (including past participants in the SD U.S. and the SDI) who help participating teams to complete the various stages of the competition. Reviewers and jury members are industry experts, who assess student innovations through the process, through the lens of the marketplace.

What they give	**What they get**
Time and effort with participating teams / their submissions	Honorarium for their efforts
	Be part of the Net Zero movement in India
	Access to new ideas and innovations from students and young entrepreneurs

	Grow their stakeholder networks (academic institutions and industry) and thus create new opportunities for themselves / their firms
	Access to potential investors and their thinking about new ideas in the net-zero domain

3. Market Players

3.1 Supporters / Affiliates

Over the last five years, the SDI has created a wide network of organisations that support the initiative by providing a range of resources – financial, in-kind, technical, networks, and the like.

What they give	**What they get**
Financial Resources	Be part of the Net Zero movement in India
In-kind Resources	Access to new ideas and innovations from students and young entrepreneurs
Indirect Support	Grow their stakeholder networks (academic institutions and industry) and thus create new opportunities for themselves / their firms
Brand Equity and Credibility	Access to potential investors and their thinking about new ideas in the net-zero domain

3.2 Recruiters

What they give	**What they get**
Internship / Job opportunities	Be part of the Net Zero movement in India
Time and costs for participating in the SDI Finals	Access to bright young innovators and entrepreneurs who have already been tested and filtered through the SDI gauntlet
	Access to potential investors and their thinking about new ideas in the net-zero domain

Appendix 3: The SDI Competition Categories and Evaluation Parameters

Student teams can choose to participate in one of five different Building Division categories.

1. Multi-Family Housing
2. Construction Worker Housing
3. Educational Building
4. Office Building
5. Community Resilience Shelter

Under each of these categories, student teams are judged on ten criteria.

1. Energy Performance
2. Water Performance
3. Embodied Carbon
4. Resilience
5. Affordability
6. Engineering & Operations
7. Architectural Design
8. Collaborative Innovation
9. Health & Wellbeing
10. Value Proposition

Alternatively, student teams could also choose to participate in a newly Product Division (introduced in 2022), where they are judged on the following criteria.

1. Cooling Performance
2. Co-benefits
3. Target Market Size
4. User Desirability
5. Ease of Installation
6. Technical Feasibility
7. Financial Feasibility
8. Novelty
9. Go-to-market Strategy
10. Value Proposition

Appendix 4: Self Learning Modules

All participants in the SDI must complete a set of self-learning modules in the online format. The following is the list of self-learning modules.

- Energy Performance of Your Building
- Heat Transfer & Your Building Envelope
- Passive Design & Shading
- Thermal Comfort, IAQ, Ventilation of Occupants
- Natural Ventilation of Your Building
- Designing Right-sized HVAC with Load Calculations
- Water Sufficiency for Your Building & Occupants
- Mechanical HVAC and LEC
- Cost Estimation & Affordability
- Resilient Design for Your Building
- Embodied Carbon in Buildings