

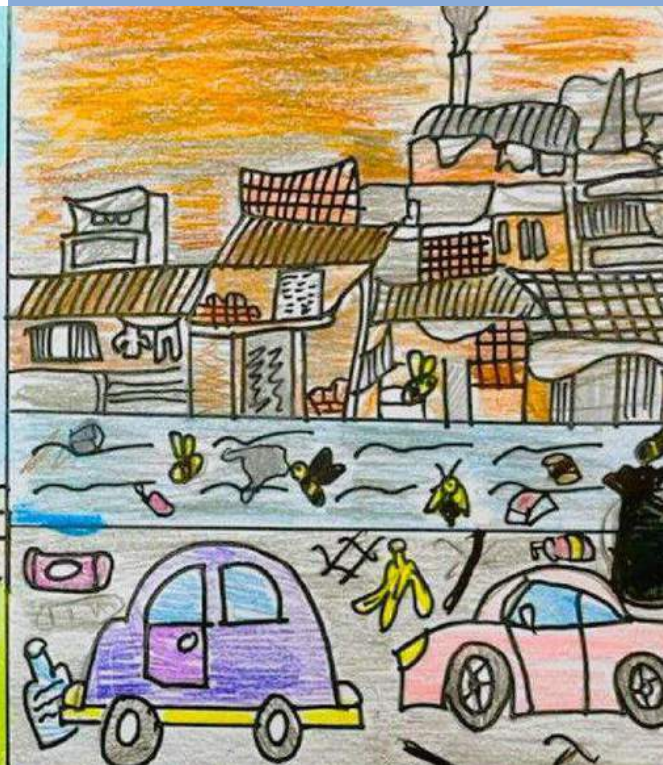
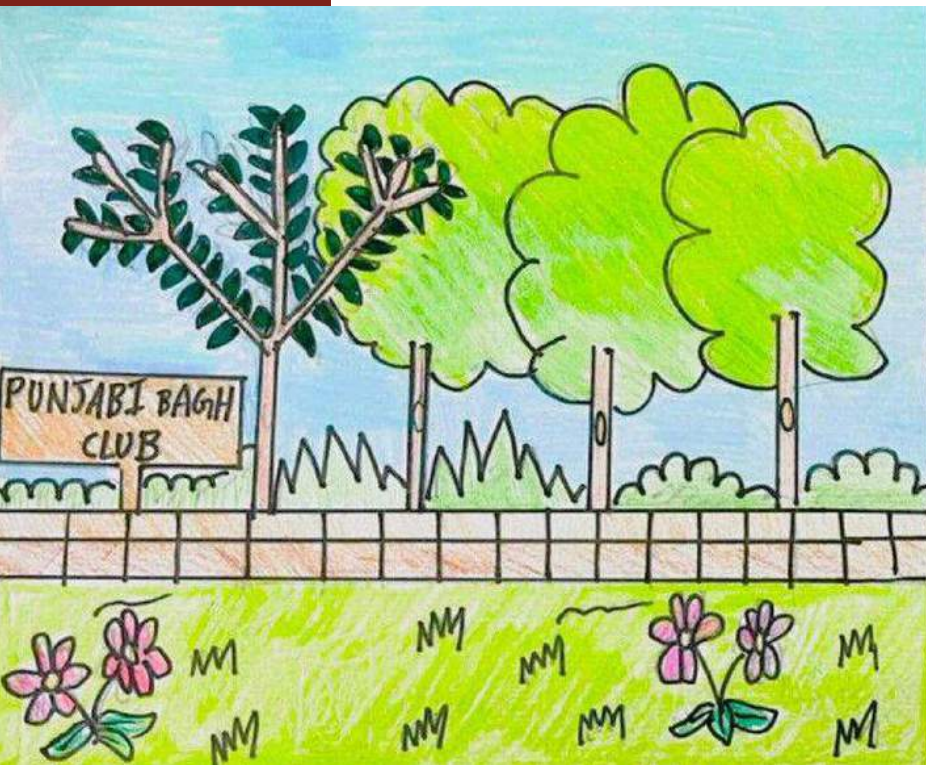
# IGCS EXPERIENCE REPORT 03/2023

Indo-German Centre for Sustainability (IGCS)  
at IIT Madras, Chennai



# experience reports

Neele Mundt



## Experience Report on IGCS Winter School 2023, IIT Madras, India

### IGCS School Participant

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### IGCS School Theme

IGCS Winter School 2023, IIT Madras, Chennai, India

“Microgrid – A Key Contribution Towards Carbon Neutral Society”

### Starting/End date of the student exchange period

20. February – 03. March 2023

### Organizers

IGCS Area Coordinator, Prof. Dr. Frank Behrendt (Technical University Berlin),

IGCS Area Coordinator, Prof. Dr. Krishna Vasudevan (Indian Institute of Technology Madras),

IGCS Postdoc, Dr. Khulud Alsouleman (Technical University Berlin).

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Zurück zur Erde: A Workshop on Human-Nature Relationships and Sustainability for Students and Teachers

Co-organized by Goethe Institute and the Indo-German Centre for Sustainability (IGCS)





## Experience Report from Winter School 2023, IIT Madras, Chennai, India

Recently, I had the opportunity to participate the IGCS Winter School 2023, organized by the Indo-German Centre for Sustainability. The school took place in Chennai, India at the Indian Institute of Technology Madras. From 20th of February to 3rd of March, myself and almost 30 other students from mostly India and Germany learned a lot about Microgrids and renewable energies, as the topic of the Winter School 2023 was “Microgrid – A Key Contribution Towards Carbon Neutral Society”. It was a great addition to my master’s program of environmental geography and management at Kiel University.

### Program

Typically, we had lectures in the morning and most days after lunch. Most of the time they were held in person, sometimes the lecturer was presenting via Video Chat. For the first day the focus was on everyone getting to know each other and the campus. We would pair up and present our partner to the group, after some time to talk and asking each other questions. This was already an interesting cultural exchange, as I learned that names in India have mostly a meaning to them, which the parents chose carefully. We would also play games in the

big group, finding out what everyone had in common or where differences occurred.

Later on, we were taken on a tour around campus. The campus of IIT Madras is located in the middle of Chennai. But it is more like a gated community, as you can only get in or out through three gates in total. In combination with a lot of trees and greenery and very little traffic, it was like being in a park. After our guided tour through different Institutes, important buildings, and recreational centers we had dinner as a big group.

A typical day, for me, would start at 8 am with breakfast at the guesthouse, where we were accommodated in. The IGCS building was only 10 minutes walking distance. At 9 am lectures started, after each one we had around 30 minutes break. After the first lecture of the day, we were able to get tea and a snack, then we had another lecture at 10.30 am, followed by another break and a third lecture or panel discussion.

Lunch was served just outside the lecture room from 1 to 2 pm. After lunch we had another lecture, a tea break and the groupwork or we would only have groupwork. During group working time we were free to meet up somewhere else on campus or stay. At 5 pm the latest we were

off for the day. For lunch and tea breaks we were able to have a more informal exchange with the lecturers and the IGCS Team, as they would often times stay for the day or at least some more hours. Dinner, just like breakfast, was offered in the guesthouse, but we were free to explore other options on campus or outside of it. In the afternoons we got off and were able to explore the city by going to markets, sights or the close by mall. Of course, there was also the option to explore the campus further. Since there was no program for the weekend in between our two weeks stay, I and some others, decided to spend 2 days in nearby Pondicherry. In the afternoons we had time to work on our group projects, which we started already on the second day.

This gave us a lot of time to do research and prepare our presentation. I also really liked how every group had a mentor who could offer guidance and a lot of helpful tips, even outside of group working time. The panels mentioned above were also very interesting. One included IGCS researchers from different departments, where everyone gave their perspective towards Microgrids. The second one was towards the end of the Winter School and carried by us students. Here, we discussed further questions and concerns, which lead to an interesting exchange due to the different academic

backgrounds we have. This way some people were able to answer questions other proposed. On Friday of the first week, we took a day trip to Auroville, a town 150 km south of Chennai. There we got a tour of the community, with focus on their energy production and supply. We were shown their Microgrid System, first in theory and then in praxis. Questions could be asked towards the end or meanwhile. This way, we got to experience this very interesting town from different perspectives. At the beginning of the 2nd week, we separated into groups a toured the campus once again. This time we visited several laboratories where mostly students worked on their own project, such as batterie development and thermal photovoltaic systems. We also had a group of French students come in towards the end of 2nd week. They were presenting their project on nuclear energy, which was a very different perspective than before. On the last day, presentations of the group work took place. Every group was given time to show their results and answer questions. Later on, after taking a lot of group photos, we went to the IIT Madras secretary's office. There we discussed the past two weeks and were given our certificates.

## Organization

Starting with the application process it was quite easy. It was very clear what documents were necessary and for me getting them was quite easy. Some of them I already had, or I could request them very easily. I would also like to thank my professor for writing such a nice letter of recommendation. In December, shortly before Christmas, I got an E-Mail regarding my acceptance for the program. On the one hand side this was quite nice, as I was on Christmas break and had a lot of time to organize what's necessary, on the other side most other people were also on break which slowed the process. Especially for the Invitation letter it would have been nice to get it directly after confirming my participation, since it was one of the documents needed for my Visa. Personally, my Visa process took quite some time. After sending my documents to the Consulate General of India in Hamburg it took almost one month until I was able to pick it up. Even though I submitted it within a few days of getting my invitation letter I only got my Visa the week before flying.

Anyways, the communication with the organization team was very good, either via E-Mail or the WhatsApp- Group, which was made immediately, everyone was very helpful and did their best to answer all the

questions. The WhatsApp-Group also helped to get in contact with other participants, which was nice for arriving or helping each other with the Visa process. During the Winter School everything was very organized. We were given a clear structure, for example through an elaborate schedule, and questions were always welcome.

In general, we grew together as a group very quickly and everyone was very helpful to each other. Even though, it showed who had an electrical engineer background or already worked a lot within this topic, as they were able to discuss the lectures and had more in depth questions.

## Academic growth

Before coming to IGCS Winter School I did not have a lot of experience, nor knowledge about Micro Grids, therefore I did not have a lot of expectations either. Mainly, I was hoping to gain a general understanding of the technology and their planning aspects. As I live in Germany I was especially interested in the implementation of Micro Grids in Germany. But was also curious how Germany and other, different countries with different and individual needs may take advantage of such systems.

Within the topic of Renewable Energies, my focus in my previous studies was rather

towards Wind Power Plants. Within this topic I learned about its regulatory framework, legal restrictions, and other spatial planning aspect. My academic background is around climate change, conservation and spatial planning.

For example, in my region Wind Power Plants are quite prominent. In general they have a good reception considering aspects of sustainability and more, but problems may be 'Not In My Backyard'-Mindsets or animal protection. I was wondering what kind of conflicts Photovoltaic Systems and other Renewable Energy Production or Supply Systems could bring, and how a fast growing country like India may perceive it. What are the differences or similarities and what challenges each System and Country has.

Looking back at the Winter School, I learned a lot and gained valuable input regarding the topic of Micro Grids and Renewable Energies. I now have better understanding of the technical aspects and engineering perspective, which was the main focus of the school. We started with a basic understanding of electricity as a form of energy and its advantages compared to other kinds of energy, such as its ability to be stored and transported, it is easily accessible and does not create pollution, at least during consumption. Along with that

we talked about energy access and how a lot of people, mostly in rural areas, are not connected to electricity, what it means to not be connected and, about the meaning of the term of being electrified.

With the technical aspects of Micro Grids other topics like the use and functioning of batteries and energy production systems came along as well. Through a lot of lectures we learned about the Installation of Micro Grids in India and in Germany, how they can be part of holonic energy system architecture when they are not an island system but still connected to the big grid. Luckily, we had the opportunity to be taught by a lot of Indian experts of the field, who covered topics like Micro Grid control and methods of decentralized control applied in India, solutions for energy storage, policies the country has and how the country approaches thermal energy. Other topics were the modelling and optimization of energy systems, Hydroenergy and its potential and technique for Micro Grids, Generation of solar energy and new, flexible and efficient solutions to store the energy. Furthermore, we heard about Power quality and its challenges, how municipal solid waste can be transformed into energy, (centralized) control methods and about the economics which should be looked at within this whole topics.

The presentations were held through lecturers from IIT Madras and other German and Indian universities, but also people from companies outside from university were introducing their work to us. Another very interesting part were the student lectures, where participants of the School introduced projects they are working on currently and shared their knowledge with the rest of us. One topic was the rural development and management in India. Another one was about Energy demand response and how demand can be classified and analyzed through a Reliability Analysis via diverse Scenarios. Personally, I found the presentation on Deep Reinforcement Learning for Micro Grid control quite interesting. Building on the challenges of Micro Grids in terms of their complexity and oftentimes unbalanced demand and offer, Deep Reinforcement Learning leads to more flexibility, better adaptation and learning ability. This is very promising, but can still be worked on, as this method should be further developed.

For me, the activity the most helpful might have been the group work. Here I had the chance to dive more into the Application of Micro Grids in Germany and India. The topic covers my area of interest very well and gave me the chance to do more in depth research and look further into parts of it that occurred along the way. Even though, I

always had a lot of group work projects beforehand, I think you learn something new about yourself every time. I, for example, realized that I am more organized and efficient working than I was aware. Overall, working in group can be very nice and uplifting but it can also become rather challenging.

I also think non-official activities, such as lunch and tea were very helpful to get into contact with researchers who work on topics I am very interested in. They gave interesting insights in their work and could offer helpful tips or even possible connections. For example, I met a teacher, who is from the same university as me, but from a different department. If it was not for the Winter School I probably would have never met him personally.

## Personal growth

I made a lot of new friends within the two weeks of Winter School. From past experiences I know how quick and well you can get to know people who were total strangers before. Of course we were able to connect academically, but more importantly I met very interesting people from India and Germany who I hope I can stay in contact with. I think it was very smart from the organization team to put one Indian and one German student in each room at the

guest house. This really helped us to grow together quickly and I was able to get a lot of insights into Indian culture. My recommendation for fellow students regarding the IGCS Summer and Winter School would be to just apply. Besides of all the valuable input I mentioned previously, it is also a great opportunity to meet new people and experience an other culture. Without the Winter School I would not have had the chance to learn so much about India and the region of Tamil-Nadu. As we

lived on campus it felt like we were actual students of IIT Madras. And the balance of Indian and German students made it very easy to learn about cultural differences. Also, it was a great way to meet people from your field of interest and be able to grow your network which may help for future projects.

### About the IGCS Schools

*IGCS' flagship teaching project are the annual interdisciplinary Summer and Winter schools. The annual schools are held under the motto of one of our IGCS focus areas and are organized by the respective area coordinators and their partners. The itinerary is about two weeks long and consists of lectures, discussions, group work and field trips. The Winter Schools take place at IIT Madras in Chennai in February / March while the Summer School takes place at one German partner university in June / July. For more information on IGCS' events, see [here](#).*