Reseberättelse Sweden and Denmark

Omvärld, Young Generation 2024

Technological Forefront of Swedish and Danish Scientific Facilities

This travel log documents the experiences and insights gained by our team during a trip that took us from Lund, Sweden, to Copenhagen, Denmark. Our journey was not only a geographical one but also an exploration of cutting-edge scientific facilities and sustainable technologies. The chosen visits were first MAX IV in Lund and then Amager Bakke and Seaborg Technologies in Copenhagen.

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Purpose of the trip

Our journey to Lund and Copenhagen was a clear choice to perfectly align with the 'Omvärld' theme, which underscores the importance of a thorough comprehension of the international energy and technology sectors. As part of the Young Generation in Nuclear Sweden network, our collective curiosity is thrilled by the intricate interplay of advanced technology in sustainable energy solutions. The three chosen visits follow the theme in different ways:

MAX IV Laboratory in Lund: Our visit to the MAX IV Laboratory is a cornerstone of our trip, as it exemplifies Sweden's dedication to excellence in scientific research and innovation. The facility's state-of-the-art synchrotron light source offers us a unique opportunity to observe the intersection of physics, chemistry, and engineering, and to understand the practical applications of these sciences in addressing complex global challenges.

Amager Bakke in Copenhagen: The exploration of Amager Bakke, a waste-to-energy plant that doubles as a recreational area in the form of a skiing slope, provides us with an actual example of how modern societies can integrate sustainability into urban infrastructure. This visit will deepen our appreciation for innovative approaches to resource management and the potential for such facilities to contribute to a carbon-neutral future.

Seaborg Technologies: The culmination of our trip at Seaborg Technologies represents a deep dive into the future of nuclear energy. Engaging with the team behind the Compact Molten Salt Reactors will offer us insights into the cutting-edge developments in nuclear reactor design, safety, and sustainability. This experience is particularly valuable for young professionals eager to contribute to the evolution of clean energy technologies.

In summary, our expedition is an immersive learning journey that aims to enrich our professional growth and broaden our understanding of the international energy and technology sectors. By directly interacting with industry leaders and experiencing the cooperation between advanced technology and environmental safekeeping, we are equipped to spread forward-thinking solutions in nuclear science, both within Sweden and internationally.

MAX IV

Arrival and Accommodation

Our team embarked on the journey to Lund via train, embracing the scenic route and the anticipation of the visit ahead. Upon arrival in Lund, we quickly settled into our accommodations, eager for the next day's agenda.

Immersive Tour and Educational Sessions

The morning greeted us with grey skies and strong wind as we made our way to the MAX IV Laboratory. Our visit commenced with an engaging tour of the facility's visitor center, which serves as an educational gateway for diverse audiences, from local students to international researchers. Detailed models of the synchrotron's development provided a comprehensive overview of the facility's historic and current capabilities and objectives. All the way from the electron source, through the linear accelerator, to the small and big vacuum storage rings, and lastly to one of the 16 different beamlines in operation.

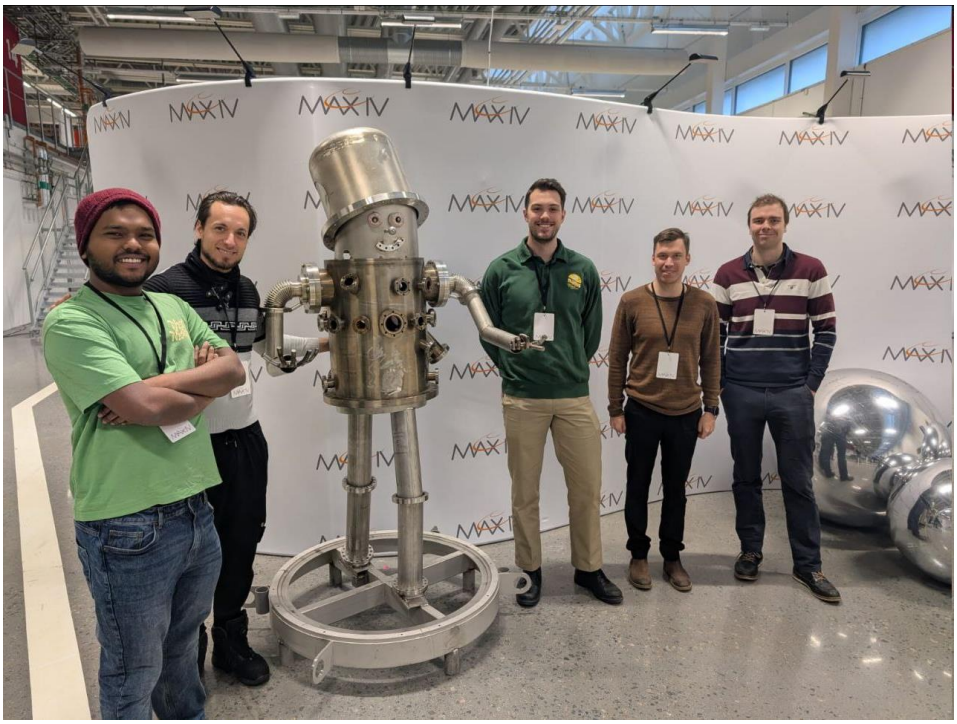

Figure 1: Team photo at the visitor center

Exploration of the Beamlines

Equipped with a better understanding of the facility, we proceeded to the heart of MAX IV – the beamlines. Our guide, Emil Cronemyr, led us to numerous high-tech labs along the big and small rings, each turn revealing another beamline, each with its own design and customization for a specific scientific purpose. We were introduced to the intricacies of the Balder, BioMAX, and ForMAX beamlines, among others, gaining insights into the groundbreaking research conducted at each station.

The ForMAX beamline, in particular, captured our attention with its impressive integration of tomographic imaging and scattering techniques.

Reflections and Departure

As our visit to MAX IV concluded, we reflected on the profound impact of such facilities on the advancement of science and society. The team left with a deeper appreciation for the meticulous work behind each experiment and the collaborative spirit that drives the laboratory's success. Our departure from Lund was not just a physical journey but a transition filled with newfound knowledge and inspiration.

Amager Bakke

Arrival and First Impressions

After our enriching experience at MAX IV, we journeyed to Copenhagen, where the innovative Amager Bakke facility awaited us. Upon arrival, the striking architecture of the plant immediately commanded our attention, symbolizing Denmark's commitment to sustainability and modern urban design. Unfortunately, the skiing slope had just closed so we missed out on going up to the top.

Guided Exploration and Sustainability Insights

Our exploration began with a trip to a conference room beside the colorful visitor center at the top floor of the plant. Here, our guide, Marjun Hoydal, showed us a presentation about sustainability, statistics about Amager Bakke and much more. The team was invited to partake in a discussion about the usefulness of a well integrated and sustainable industry such as this. After the presentation, we were led by Marjun into the plant, who expertly navigated us through the facility's multifunctional spaces. The integration of waste management with recreational amenities was immediately apparent, due to the sloping of the roof. After getting blinded by the big furnace and fear of heights we were led into the waste management control room as shown in figure 2 below. The enormous waste pile and the automatic high-tech system of the claws immediately caught our eyes. Equipped with infrared sensors for temperature control

and blending techniques the claws could optimize what kind of waste and how much of it is going into the furnace after demand.

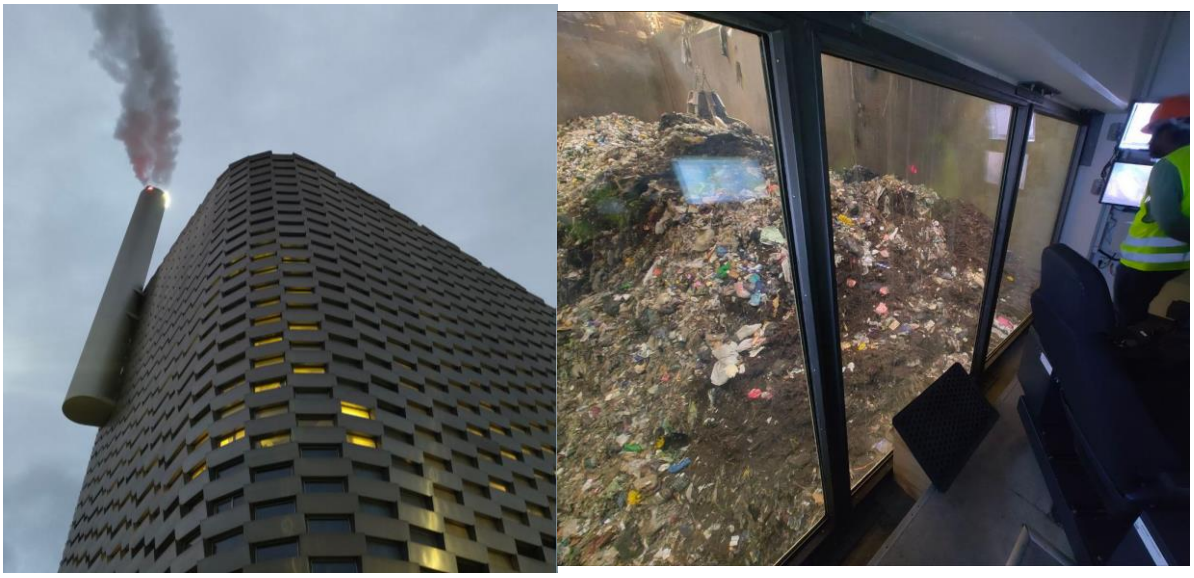

Figure 2: Left – Outside view of Amager Bakke from the parking lot. Right – Inside view of the control room for waste management

Deep Dive into Carbon Capture Technology

Another highlight of our visit was the in-depth session on Amager Bakke's carbon capture pilot project. We were introduced to the cutting-edge processes that enable the plant to capture CO2 emissions, transforming waste into clean energy and contributing to Copenhagen's zero-carbon goals. The facility's ambition to become CO2-neutral was not only inspiring but also a testament to the potential of such technologies in combating climate change.

Reflective Departure

As we departed from Amager Bakke, our team was filled with a sense of optimism for the future of sustainable energy and waste management. The visit provided us with a comprehensive understanding of how visionary design and technology can be integrated to create a facility that not only serves its functional purpose but also stands as a beacon of environmental safekeeping and community engagement.

Seaborg Technologies

Arrival and Introduction to Seaborg

Following our insightful visit to Amager Bakke, we continued our journey to Seaborg Technologies. Upon arrival, we were struck by the vibrant atmosphere of the facility, a reflection of the innovative spirit that drives the company's mission to revolutionize the nuclear energy sector.

Presentation on Compact Molten Salt Reactors

Our visit commenced with an engaging presentation by our guide Jacob Groth-Jensen, who provided an overview of Seaborg's Compact Molten Salt Reactor technology. The presentation highlighted the safety profile, technical opportunities, and the company's vision for a sustainable energy future. The team's passion for their work was palpable, setting the stage for an immersive experience. A lego figure prototype was on display in the offices for easy understanding of the design.

Figure 3: Prototype of Seaborg's compact molten salt reactor vessel

Tour of the Research and Development Labs

Donning stylish lab coats, we were escorted to the laboratories where Seaborg's groundbreaking research comes to life. The hands-on demonstrations of experiments within glove boxes and molten salt loop setups offered us a rare glimpse into the practical challenges and advancements in nuclear reactor technology.

Cultural Insights and Employee Engagement

A standout aspect of our visit was the observation of Seaborg's vibrant company culture. The youthful energy of the employees, especially notable in a nuclear company, was evident throughout the facility. We were invited to witness their Friday after-office tradition, complete with games, complimentary snacks, and beverages. The camaraderie was on full display as the team gathered for a group photo, celebrating their 'grow a mustache' challenge for the month.

The visit to Seaborg Technologies was not only educational but also an opportunity to network with some of the brightest minds in the nuclear industry. Discussions with the staff provided valuable insights into the challenges and potential of deploying Compact Molten Salt Reactors on a global scale.

Departure with Renewed Perspective

As we concluded our visit to Seaborg Technologies, we left with a renewed perspective on the potential of nuclear energy to address global energy needs. The company's innovative approach and commitment to clean, reliable energy solutions resonated with our team, but the uncertain question whether such a bold design can reach the market still lingers.

Lessons Learned and Insights

- Having a relaxed environment (AW) with employees is good for networking and learning more deeply about the company. Go to Seaborg on Fridays.
- Write notes about some interesting topics learned to write about in the report.
- Don't try to push too many visits into a tight schedule. Too many and you won’t be able to take in the information as well.
- Think outside the box when identifying potential visits. Amager Bakke is not nuclear but was still very interesting.
- Come a bit early to Amager Bakke if you can so you can go up to the top and take in the views. Our visit was very late so we missed this unfortunately.