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Starting Point

First-hand ecological knowledge and engineering expertize bundled in a three-week program in the capital of energy-efficient building, Vienna.

The Green.Building.Solutions. (G.B.S.) graduate-level summer program took place from **July 21 to August 12, 2018** for the eighth time under the direction of the **OeAD-Housing Office (OeAD-WohnraumverwaltungsGmbH)**. The programme has been developed and is implemented in Vienna together with our partner universities and institutions. Above all with the **University of Natural Resources and Applied Life Sciences, Vienna, Vienna University of Technology, Austrian Institute of Technology, University of Vienna, Danube University Krems, and the University of Applied Sciences Technikum Vienna**. In 2018, 42 international students and professionals took part in the G.B.S. and successfully completed the course. The G.B.S. students primarily study architecture, urban planning, and engineering sciences; however, they worked alongside professionals and students from all faculties relating to the built environment.

Other national **university and university partners** who contribute to the content of the Green.Building.Solutions. Summer University are the MODUL University Vienna; University of Applied Sciences, Campus Vienna; University of Applied Sciences for Management and Communication; Institute for the Danube Region and Central Europe & Danube Rectors' Conference; International Institute for Applied Systems Analysis (IIASA); Passivhaus Austria; innovative gebäude Association for Vienna and Lower Austria; City of Vienna, Department MA50; and the Austrian Federal Ministry of Education, Science and Research. **International partners** also contribute to the success of the Summer University: Waterford Institute of Technology (WIT), Ireland; University of Tokyo, Japan; Bergische Universität Wuppertal, Germany; Ryerson University, Canada; Canadian Green Building Council (CGBG), Canada; and the Centre for Environment and Development Studies (CEMUS) of the University of Uppsala and the Swedish University of Agricultural Sciences, Sweden.

The Initiative

The **Green.Building.Solutions. Summer University** was initiated in December 2011 as a program within INEX, the International Network for Educational Exchange. The project organization was handed over after the first successful year to **RCE Vienna**, the Regional Centre of Expertise on Education for Sustainable Development at the Vienna University of Economics and Business Administration. The organization of the Summer University has been the sole responsibility of the **OeAD-Housing Office** since 2014. The OeAD-Housing Office coordinates the Green.Building.Solutions. together with its national and international partners.

The **OeAD-Housing Office** is a non-profit service organization involved in international, educational, scientific, and research cooperation in Austria. The primary competence of the OeAD-Housing Office is accommodating **10,000 international and national students and guest researchers** in Austria's university cities annually. The not-for-profit provides an optimal start to a successful stay in Austria. The OeAD-Housing Office is an **international pioneer for ecological construction** of student guesthouses. The world's first student dormitory meeting the passive house standard opened its doors in 2005 in the Molkereistrasse in Vienna. In particular, newly built student accommodation is implemented according to the latest ecological standards. **Mineroom**, the OEAD-Guesthouse in Leoben in pure wood construction, won the 2018 Blue and Green Award, won honourable mention in the 2018 FIABCI Austrian Real Estate competition, and won the 2017 Styrian wood construction prize in the category large residential buildings. **GreenHouse** is the first award-winning Net-Positive Energy student residence in the world, winning the 2015 City of Vienna Environment Prize, with 1000 of 1000 points certified as a klimaaktiv Gold building. The unique, modular and flexible **PopUp dorms** are constructed of prefabricated wooden containers to the Passive House Standard in Lakeside City Aspern. The PopUp dorms won the 2018 FIABCI Austrian Real Estate Prize, was nominated for the 2018 City of Vienna Environmental Prize, won the 2016 climate protection prize, and won the 2015 Green & Blue Building Prize. With the realization of the latter buildings, it is now possible for 2,500 students and visiting professors to live in energy-efficient passive or energy-plus houses every year.

Photo, left: mineroom in Leoben (Styria) opened in 2017 © OEAD-WV / J. Konstantinov.
Photo, right: The GreenHouse OEAD-Guesthouse in the Lakeside City Aspern. © OEAD-WV / R. Steiner.

A **second prize-winning summer school, the "Alternative Economic and Monetary Systems"** began in 2014 focussing on alternative economic models and the conflicts between energy and resource availability, consumption, and the common good. The two academic summer universities were founded by the OeAD-Housing Office Chief Executive Officer, Günther Jedliczka, and **focus on different aspects of sustainability**. In this context, the G.B.S. Summer University takes up the central ecological, economic, technical, and social themes of sustainable design and construction to offer students the unique opportunity to study content focussed on sustainable construction within an interdisciplinary framework, and also to experience the practical

applications of sustainable concepts. The G.B.S. provides **knowledge** that sharpens and deepens the students' **competencies** and **understanding** of sustainable planning, design, and construction.

The participants belong to the generation that bears the brunt of the change from a postmodern industrial society to a circular-economy-oriented society. The participants therefore form a central target group that are **sensitized to the environmentally conscious and responsible use of natural resources** and need to be equipped with the **appropriate knowledge to take action**. The importance of the Green.Building.Solutions Summer University is reinforced by everpresent evidence of more extreme climate change. The associated urgency to quickly reduce greenhouse gas emissions and resource consumption shows that the construction and building sectors are responsible for an enormous share of greenhouse gas emissions worldwide. The circular economy, urban mining, and the reduction of energy consumption in urban metropolises are indispensable measures that must be considered for sustainability in future urban planning, architecture, and construction sectors. Renewable energy production by new technologies and innovative **ecological and sustainable building concepts and materials** should therefore contribute to **natural resource conservation and reducing greenhouse gas emissions**.

Raising awareness amongst future "change makers" about sustainable building concepts, sustainable urban planning, and their technical implementation is crucial: by presenting practical examples, excursions, and hands-on workshops, current ecological, social, and economic challenges become more tangible. Students develop solutions within the summer university and the present their developed concepts at the end of the program. One goal is to export the course material from Austria to the students' **home countries** for implementation abroad. The participants act simultaneously as knowledge multipliers, and are able to implement the new technologies and innovations of the Green Building sector as pioneers.

Preparation Work

The **eighth year of the Green.Building.Solutions.** Summer University builds upon the cumulative experiences of previous years from 2011 to 2017. The concept of an international summer university about sustainable design and construction originated from **Mag. Günther Jedliczka, CEO of the OeAD-Housing Office**. He already recognized the importance of international knowledge exchange and transfer as well as interdisciplinary cooperation and networking before the program began in 2011. The OeAD-Housing Office is a pioneer in Passive House design and energy-efficient construction of student guesthouses. The OeAD-Housing Office developed the G.B.S. together with experts from the architecture and construction sectors as an academic summer program to disseminate know-how internationally

about sustainable construction available in Austria.

The **University of Natural Resources and Applied Life Sciences, Vienna (BOKU)** and the **Vienna University of Technology (TU Wien)** have contributed to the curriculum from the very beginning as primary academic partners with their scientific expertise. The G.B.S. curriculum has been adapted to international standards through regular evaluations by the participants of each individual course and program item, and regular meetings and consultations with the main lecturers and the organisational team.

In 2018, the focus was to select **participants from a broad international pool**. It was possible to select **42 highly-qualified and motivated students** from a wide range of countries. 90 onnline applications were received for the G.B.S. 2018. Students were sought through targeted marketing on relevant international education websites, active and direct advertising at relevant international universities worldwide, and via social media channels. The selection criteria are based upon the quality and enthusiasm shown in the motivation letter, English language level, professional qualifications, and academic performance.

The OeAD-Housing Office is present at several **thematically-relevant events in Austria and abroad** promoting the Summer University as a non-profit educational project. Mr. Jedliczka attends Ecobuild in London, England annually. It is the world's largest trade fair for sustainable building and occurred in March 2018. Lectures and papers were presented at other international conferences and congresses including the "Good Living for All" Congress in Vienna (Austria), the Festival for New Economic Thinking in Edinburgh (Scotland), the Humanistic Management Conference in Tübingen (Germany), the Autarkia Fair in Vienna, the European Association for International Education (EAIE) in Geneva (Switzerland), the Passive House Conference in Munich (Germany), and the International Green Building Council Congress in Toronto (Canada). The responses have been very positive amongst visitors, exhibitors, and lecturers to the ecological student dormitories as showcase examples, and the two international sustainability summer universities of the OeAD-Housing Office. Other G.B.S. network partners include the

First student residence in the world built to the Passivhaus standard opened in 2005, OeAD-Guesthouse Molkereistraße 1, 1020 Vienna.

GrünStattGrau innovation laboratory and **SDG Watch** (Sustainable Development Goals), who are committed to implementing the goals of Agenda 2030 at a national level. Discussions with new potential partner institutions and companies take place every year because of well-established relationships with international higher education instituions and also a long-lasting cooperation with **Shepherd PR** from the United Kingdom, and the motivation of the organisational team to expand the network. Passivhaus Austria and the innovative Gebäude Vienna / Lower Austria Association generously support the search for outstanding applicants.

Tuition fees are € 2,490.00 for professionals and a reduced fee of € 2,000.00 for students covers the costs of the summer university and includes three weeks accommodation in the **Passive House of the OeAD-Housing Office Student Residence** in **Molkereistrasse 1, 1020 Vienna**. All participants were offered an additional free week of accommodations again this year. 30 students took advantage of the offer to extend their stays to get to know Vienna better. Accommodation in an OeAD-Guesthouse offers participants the opportunity to **experience firsthand** what it is like to live in a large-scale residential building with **Passive House technologies**.

Sponsors and Scholarships

It is important not only to attract potential participants, but also to attract **industry-relevant companies** to the Summer University with the aim of **financing scholarships for underprivileged students** during the application phase to cover the costs of running the summer university. In this way, an internationally-diversified spectrum of participants is able to be selected, in which students from lesser industrialized countries are given the opportunity to participate. Social sustainability is considered in this way in the program and aligns the participants and organization of the summer university with the three pillars of sustainability. The sponsors of Green.Building.Solutions. 2018 were:

• 10hoch4 • AAP Architekten • Master Builder Leitner Planning and Construction • Ennstal • University of Applied Sciences Technikum Wien • Heimbau • IDM & DRC • Kitzberger Furniture GmbH • City of Vienna MA 50	• Migra • mma16 GmbH (Silver Living) • Porr Construction GmbH • Innovative Gebäude Vienna-Lower Austria • S-IMMO AG • St. Gobain Isover • STO Foundation • Stora Enso	• Swietelsky Construction Company • UPC • Weissenseer Wood-System-Construction GmbH • WBV-GPA • Vienna 3420 AG • Winkhaus • Vienna Business Agency

Special thanks to all our sponsors! Without their support, many students would not be able to attend the Summer University. In addition, the following institutions provided financial support: **Danube Rectors' Conference & Institute for the Danube Region and Central Europe;** the **University of Applied Sciences Technikum Vienna**; special mention goes to the **City of Vienna MA50** and **Sto Ges.m.b.H**, which together with **Sto Foundation** who have been making an onoing significant contribution to the G.B.S. for years. Scholarships from sponsors directly benefit many of the G.B.S. students: 37 scholarships were awarded to students from 25 nations around the world. The scholarships enabled the students to pay a significantly reduced tuition fee of € 490.00 for the Green.Building.Solutions. 2018 Summer University program. In total, there were **42 students from 27 nations** with gender equality reached: 21 female to 21 male participants. Gender equality is viewed very positively, especially as it indicates that this traditionally male-dominated profession is becoming increasingly important for women. Many women have already established themselves in this sector. **Below are the countries where the participants in 2018 originated from**:

Algeria (1)	China (3)	India (1)	Palestine (1)	Turkey (1)
Australia (1)	Columbia (1)	Iran (3)	Philippines (1)	Vietnam (1)
Austria (4)	Croatia (1)	Ireland (1)	Poland (1)	Yemen (1)
Bangladesh (1)	Ecuador (1)	Italy (1)	Russia (3)	
Belgium/Lebanon (1)	Egypt (1)	Jordan (1)	Spain (1)	
Canada (2)	Germany (5)	Kosovo (1)	Syria (2)	

Special thanks are due again this year to the non-profit **Sto Foundation**, whose central purpose is to **promote training of craftsmen and architects**, and to the Sto GmbH. In 2018, the number of scholarships awarded by the Sto Foundation increased from 12 to a total of 16 promoting the application of theory to practice. Of the Sto Foundation scholarships, 12 were awarded to international students, and four were awarded to young and committed German craftspeople and master painters. In the third week, the practical module took place in two parallel sessions: the Sto Hands-On Workshop, and the Design Project Work.

The craftspeople together with the students and professionals from the building industry learnt how to apply two modern composite thermal insulation wall systems for high performance buildings under the careful supervision of master trainers from Sto. Two types of full-scale wall models were built: a timberframe, cellulose and wood fibre insulation wall and a timberframe with EPS insulation wall. There were three wall models per wall type for a total of six full-scale wall models. Each full-scale wall model details the connection between wall and window from the timber structure built up to the finishing exterior and interior renders. Also included in the model is

the detail to accommodate exterior shading; an essential detail for preventing overheating in highly insulated buildings. The Hands-On workshop is one way to practically apply the theoretical knowledge learnt in the previous two weeks. It is also a chance for the students from different disciplines to work closely together, raising understanding of other professions and breaking down prejudicial barriers. 17 G.B.S. students participated in the Sto Hands-On Workshop in teams of two to three people. The craftspeople took the lead supporting the trainers and teaching their colleagues about the skill needed to apply the different layers of renders well.

The other practical application of learnt theories from the previous two weeks is through the group design work. Students were grouped into five persons taking into account gender equality, ethnic diversity, and even distribution of professional skill. Teams were built with at least one architect/architecture student, one civil or energy engineer, and an even distribution of students from other adjacent faculties. The group project design is an exercise in the integrated design process, where all students have equal say in the design from the very beginning. High performance buildings require a flat hierarchy in order to be able to consider the needs of all stakeholders during the entire design and construction process.

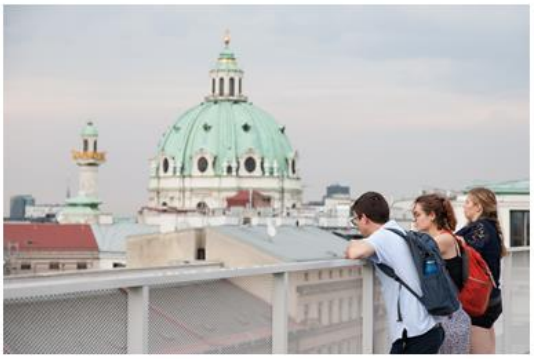
The Hands-On Workshop, together with the design project work, was held in the TU TVFA Work Hall. The spacious hall offered the opportunity for interaction between the 12 working groups. Students from the Sto Hands-On workshop and the group design exercise are able to move freely between the project groups and are able to observe the progress of both simultaneously. After the wall models were built, the students presented the finished models to the entire class. The discussions that followed the presentation contributed significantly to the exchange of knowledge and experience within the international and interdisciplinary group.

Photo, left: The models were built together in groups. © PR Große / Sto Foundation.
Photo, right: Interdisciplinary learning during the Sto Foundation Hands-on Workshop. © Sto Foundation / Sto GmbH.

"Alternative Economic and Monetary Systems" and Sustainable Networking

The two-week long **"Alternative Economic and Monetary Systems" (AEMS)** Summer School took place for the fifth time this year at the BOKU in parallel to the G.B.S.. The AEMS presents alternative approaches to contemporary economic systems and the associated problems. Current issues were not only discussed, but alternative solutions were also developed. There were also joint events with the G.B.S. to provide a networking and exchange opportunity between the architecture and economics students.

Ernst Ulrich von Weizsäcker, Vice President of the **Club of Rome**, held the Keynote Speech at the official AEMS Opening on July 25 in front of an audience of 300 in the ceremonial Cupola Hall of the TU Vienna. His keynote described the necessary taxation of environmental pollution, dwindling resources due to a constantly growing world population, and revolutions in economic theories. The "**The Economy of the Future**" Panel Discussion was chaired by Professor Helga Kromp-Kolb, climate expert and initiator of the Center for Global Change and Sustainability at the BOKU, who opened the discussion with a keynote speech about planetary borders. Professor Christian Kreiß, Professor of Finance at the University of Aalen was invited to join Dr. Weizsäcker and Professor Kromp-Kolb on the podium. Eric Frey, Managing Editor of the daily newspaper Der Standard, moderated the discussion.



Photo, top: Exchanging ideas with a view of the Church of St. Karl in the background.
Photo, centre: The audience at the evening lecture by J. Utz.
Photo, bottom: The G.B.S. students in front of Exner House, BOKU Vienna.

Jürgen Utz, architect from Stuttgart, Germany and Head of the DGNB Academy, gave a highly motivating evening lecture on August 7 about sustainable construction and building evaluation. Habitat managers from **Isover/St. Gobain** were also invited to the evening lecture, bringing the students together with various building product professionals providing an opportunity for a fruitful exchange for both sides.The inspiring discussions were stimulated by a vegan buffet

and Viennese wine on the roof terrace of Campus Gußhausstraße (TU Vienna). The fantastic view of the sunset and the Church of St. Karl were a relaxing end to the evening.

Further extracurricular events were organised to promote an exchange of ideas and cooperation between the two summer universities. A movie night was organized at the Votivkino for both student groups showing "Tomorrow: Take Concrete Steps to a Sustainable Future" by Cyril Dion and Mélanie Laurent. Tomorrow is a film about active solutions to current problems. All students were invited to a panel discussion at Palais Harrach about **"Monetary Reform"** with **Christian Felber,** the Intiator of the Economy of the Common Good, Helene Schuberth from the National Bank of Austria, and Professor Richard Werner from the University of Southampton. Non-academic **joint sporting activities** were organized on several evenings where summer university participants from both summer universities could play football, volleyball, and tennis at the 48er Platz Sports Club. There were also plenty of opportunities for the students to get to know each other better in private and to exchange ideas in a relaxed atmosphere during the warm summer evenings sometimes swimming in the Old Danube and dining in traditional Austrian restaurants.

Photo above: A. Schmitt (DE), G. Lang (Passivhaus Austria), R. Kayoko (DE), T. Uzun (DE), and A. Fedorova (RU) at the Opening Ceremony.
Photo, centre: Welcome Speech by DI S. Sattler (BOKU).
Photo below: V. Kupfer-Moser (AT) and Co-Initiator and academic Program Supervisor DI Dr. K. Stieldorf (TU Vienna).

Opening Ceremony: "Kick Off"

The Green.Building.Solutions. academic summer program officially opened on the evening of Monday, July 22, in the conference venue of the Austrian Federal Ministry of Education, Science and Research, Palais Harrach. 80 invited guests were present including representatives of the supporting scientific institutions, partner companies, and the sponsors together with the 42 participants. Scholarship holders had the opportunity to meet their sponsors personally. Scholarships are set-up on an individual basis where each sponsor directly sponsors one or more students.

Michael Bauer-Leeb from **Büro Weitsicht** moderated the opening ceremony. All guests were welcomed with an impressive keynote speech by Professor Dr. Helga Kromp-Kolb and short introductions by Mag. Günter Jedliczka, CEO of the OeAD-Housing Office, Professor DI Dr. Karin Stieldorf, primary academic advisor from the Vienna University of Technology, and DI Stefan Sattler, key advisor from the BOKU. By presenting exciting ideas and facts, the opening presentations conveyed the urgency for ecological design and construction as an effective measure against the fast-acting impacts of climatic change. Three G.B.S. participants presented their expectations of the G.B.S. 2018 before the evening concluded with discussions over a regional organic vegetarian buffet and Viennese wine.

G.B.S. Summer University Curriculum

The Green.Building.Solutions. Summer University is a modular university course over a **period of 3 weeks** and an academic workload of **7 ECTS credits equaling 175 lecture hours**. The individual modules were created and the lecturers were selected for the individual teaching units following the academic advice of our partner universities. All participants receive a digital syllabus with the contents of the individual lectures and workshops for the entire program. The Green.Building.Solutions. **curriculum** has **three modules** whose content considers the scientific, technical, and socio-economic criteria:

- **Module 1, Sustainability in Building and Urban Planning**: The essential contents include a general introduction to the historical development green architecture and active house design, sustainable architecture, circular economy, socio-economic parameters of sustainability, sustainability in urban planning, and integrated spatial and energy planning, construction ecology, green roofs, green walls,

Photo above: Visiting the new TÜWI Building lecture hall (Türkenwirt Student Services Building) of the BOKU.

Photo centre: Street view of TÜWI (Peter-Jordan-Straße, 1190 Vienna).

Photo below: The students listening attentively to the architect about the photovoltaic pergola installation details.

and building greening, and building information modelling.

- **Module 2, Principles of Passivhaus Design:** The main contents of this module encompass an introduction to principles of Passivhaus design, the international development of Passivhaus buildings, climate-sensitive design, thermal comfort, and thermal bridges, building physics, acoustics, construction ecology, high performance heating and cooling systems, grey energy, national and international standards, daylight planning in buildings, lighting laboratory, integrated planning and solar architecture, constructive adaptation of passive house technology, architecture in the context of ecologically sustainable construction and planning concepts, and future perspectives of ecological architectural concepts.
- **Module 3, Renewable Energies and Business Concepts**: The main contents are building technologies, energy efficiency in buildings, building controls, decentralised renewable energy possibilities in intelligent buildings, dynamic thermal simulations in the planning process, highly efficient building systems, heat pumps, innovative cooling strategies, photovoltaic systems, solar thermal systems, building life cycle assessments, and building certifications and sustainable economics.

The Austrian Institute of Technology (AIT), the BOKU, and the TU Vienna are primarily responsible for implementing the modules. Significant contributions also come from the University of Vienna and Architect Georg Wolfgang Reinberg. The focal points of the modules **are building simulations and energy-efficient building services, architectural and construction standards, as well as social and cultural aspects**. The module contents must be incorporated in the participants' design projects during the third week.

Excursions, guided tours, and site visits are included in the program to ensure an **application-oriented and sustainable learning experience**. The lecturers are able to convey the theories discussed in the courses vividly in relation to the built projects. Visiting the Lakeside City Aspern, the largest new district development in Europe gave an overview of sustainable urban planning. Upon arriving at the Lakeside City Aspern, the first stop was the cutting edge and energy-efficient **Aspern-IQ Technology Centre**. There, the students received an overview about the district sustainabile planning concept. The students visited two exemplary and prize-winning **OeAD-Guesthouses: GreenHouse, the world's first net-zero energy student residence** with on-site electricity generation on the photovoltaic roof and on-site energy storage, and the **PopUp dorms, temporary prefabricated modular timber student accommodation** built to the Passivhaus standard. Different aspects of the sustainable design were explained during the guided tour through the Lakeside City: how sustainability influenced the architectural design, the incorporation of urban greenery, and implemented energy efficiency measures. At the **B.R.O.T.**

Community, the residents showed how they live in a self-organised sustainable community. The residents were participatory stakeholders in the design process allowing them to include elements such as a green roof garden and to include common indoor and outdoor shared spaces. Lunch followed in the **WienWork** cafeteria, a not-for-profit specializing in training programs to reintroduce people who have been unemployed for long periods into the work force. All examples shown in the Lakeside City Aspern illustrate ecological, economic, and social sustainability on both macro and micro scales.

Other buildings visited during the three-week program include,

- The AIT laboratories and ENERGYbase
- Energy World Spittelau, Vienna (District Heating & District Cooling)
- The Lighting Laboratory at the Danube University Krems
- Historical and contemporary buildings as part of an architectureal city tour in the Vienna City Centre by the Architecture Centre Vienna (AZW)
- New TÜWI Net-Positive Energy Building at BOKU Türkenschanze
- Vienna University of Technology: Plus-Plus-Energy Office High-Rise

Group Project Work

Each year, the final week is dedicated to a group design project to assess the depth to which the students were able to understand the contents of the lectures, exercises, and field trips in the previous two weeks. The topic of the **final project work** in 2018 was **"Working, living and staying in Karlstein, Lower Austria, with the focus on sustainability and life quality"**. The assignment is based on an increasing trend that not only Vienna, but also other major European cities are experiencing: mass migration from rural areas to already **overcrowded urban areas and large cities**. In urban areas, there is often a lack of affordable living space, low quality of life, and and little social infrastructure. The task within the framework of the project work was therefore to design an affordable, high quality of life, and energy-efficient residential building directly on the Thaya River. Pedestrian accessibility, affordability, adaptability, and sustainability were essential project criteria. The timeliness and functionality of the building were defined as important criteria to allow the buildings to be flexible and usable for future generations.



Picture, left: Students at work during the project work, A. Mahmoudi (DZ), N. Fahimi (IR), Y. Wang (CN), Architect G. Reinberg and Prof. DI Dr. K. Stieldorf supervise the projects and give critical feedback.

A convincing **overall concept** had to consider not only **affordability,** but also reflect the **aesthetic and ecological project requirements** to reflect all aspects of the integrated design approach. Different **construction methods** were proposed for the building: either a "core-activated concrete", "light wood system", or a combination of both systems could be applied to the group design project. Wood is a raw material that is plentiful in Austria, and thus should be considered in the project work. The design exercise required designing spaces for social interactions between the residents in the multifamily house establishing an environment where a sharing economy can take place, or for cooperation in an environmentally-conscious and sustainable housing cooperative (e.g. through food cooperatives). The high-performance residential building design uses the Sefaira, whole building simulation program to calculate an annual **zero or plus energy balance** for the building design incorporating photovoltaic panels, solar thermal systems, heat pumps, and other renewable and high-performance building systems into the overall design. **Ecological building materials from renewable sources** such as wood, and wood fibre board insulation were part of the design proposal. Each project team submitted their detailed building concept as one or more A0 posters and also as a PowerPoint presentation. Local conditions were observed firsthand when the site was visited during an excursion. Each group received feedback and guidance from both a practical and research-based perspective from sustainable and Passive House architect, **Arch. Georg Wolfgang Reinberg,** (Architekturbüro Reinberg ZT GmbH), and **Professor DI Dr. Karin Stieldorf** (Vienna University of Technology, Faculty of Architecture), during the entire summer university program. This made it easier for the students to establish a reference point for the design project during all lectures and to incorporate the contents directly into their projects. A **detailed design concept** was developed using an **integrative planning process** considering input from all students in the group from the beginning of the design process instead of developing the design sequentially from the initial architect's sketch. Each group consisted of five to six people with different backgrounds: discipline, ethnicity, and gender balance. Great care was taken to divide the students into groups ensuring that **all disciplines**, i.e. architecture, building physics, engineering sciences, urban planning, and others were represented by at least one student per group. Consideration of the social, economic, and ecological sustainability parameters within the architectural design program was particularly important during the project work.

Closing Ceremony: Touch Down

The final **results** were presented at the closing event in the ceremonial Cupola Hall of the Vienna University of Technology at Karlsplatz. All participants presented their group project work to the **jury** consisting of the experts **Arch. G. Reinberg, Prof. DI Dr. K. Stieldorf, Prof. DI P. Franz**

(University of Applied Sciences FH Technikum), and a guest professor from China, **Prof. L. Yunjiang (Three Gorges University)**. The jury posed questions about essential details of the project work to each group, allowing for further insight into each project concept to be illuminated to the audience. The **A0 posters** designed and exhibited by **each working group** and the **PowerPoint presentations** with all project information stimulated many discussions amongst the students and the audience.

The Green.Building.Solutions. graduation ceremony followed the final presentations on Saturday, August 11th in the Cupola Hall. Eugene Quinn of Space and Place animatedly moderated both the final persentations and closing ceremony. This year continued the presentation of the project work in relation to the **home countries of the participants** by performing energy calculations using the local climate data of each participant. The challenges and potential possibilities of implementing the building design in relation to the associated advantages and disadvantages were discussed between the jury and the students. As the students originated from 27 countries, the local climates, building traditions, and building regulations were compared during the student presentations. The afternoon presentations were followed by the **official closing event**. Eugene asked the students about their **expectations, and learning outcomes, experiences** during the summer university praising them as inspiring "Eco-Heroes" and "Green Builders" transitioning from the seriousness of the final presentations to the evening festivities. A formal ceremony handing over the summer university participation certificate follows the presentations. As a souvenier of their time during the summer university, all participants receive a group photo and an Austrian Fair Trade chocolate bar in an organic cotton bag specially printed with the G.B.S. logo. The evening drew to a close in the charming ambience of the Cupola Hall over an organic buffet and Viennese wine.


Photo, left: Mag. G. Jedliczka, CEO of the OEAD-Housing Office and Initiator of the Green.Building.Solutions. Summer School and Moderator E. Quinn (Space and Place).
Photo, centre: Students R. Tumpa (BD), A. Obaid (YE), S. Rodriguez (CO), A. Savchuk (RU), A. Hillegeist (DE), A. Erken (CN), and S. Alam (IN).
Photo, right: Tutor and Architekt M. Turrini (right) with students Z. Ahmad (LB), M. Barakat (SY) and R. Alji (PS).

3 Day Excursion

For the first time this year, a three-day architecture excursion after the Summer University was offered to students to experience exceptional architectural examples of sustainability. Each day of the excursion focused on a sustainability pillar: social, ecological, and economic. The programme included the **Karl-Marx-Hof** from the "Red Vienna" period from 1918 to 1934. It was an exceptional period in the history of Vienna as the city was governed democratically for the first time by the Social Democrats.

Two hotels were visited, the ecological flagship project **Boutique Hotel Stadthalle** and Social Business **Magdas Hotel.** The Boutique Hotel has an award-winning complete sustainability concept ranging from sustainable transport, on-site urban farming, energy-efficient building concept, and upcycling. Many of the innovations have been implemented as innovation projects showcasing and testing the robustness of the latest research projects in sustainability.

Magdas Hotel is an outstanding and also award-winning socially sustainable hotel employing new immigrants who have come to Austria as refugees. The main concept behind the hotel is to provide a means of employment where former refugees can visibly show the success of integration through regular contact with the general public. A positive side effect is that the hotel provides a relaxed place for international exchange as the immigrants and hotel guests originate from several different nations. Run as a non-profit project of Caritas, there is a team of volunteers who work the garden, knit lampshades, and help out where needed. With architecturally outstanding interior design, it is a refurbished building incorporating recycled and upcycled elements in the décor and donated art work from the students of the Academy of Fine Arts Vienna.

The **VinziRast mittendrin** is an innovative, worldwide unique social housing project where formerly homeless and new immigrants live in shared flats with students. The building not only has shared apartments, but also a restaurant run by the tenants, a workshop, and an event location. The building design includes many shared spaces encouraging maximum interaction and understanding between tenants. The concept began as a research project and continues to be run by the charitable organization, VinziRast. Other excursion highlights included **Harry Glück's residential park in Alterlaa**, the largest social housing building complex in Europe; **LISI House** (Living Inspired by Sustainable Innovation) in the Blue Lagoon, the Vienna Univeristy of Technology's self-sufficient building and international Solar Decathlon winner from 2013; and the communal living complex in the **Sargfabrik** (coffin factory) with bathhouse and fruit trees on the roof garden. Other destinations included a bus tour to St. Pölten to view and learn about ecological construction methods and materials on the construction site of the **Gemeinnützige Sanierungs-**

und BeschäftigungsGmbH (GESA). GESA translates into "non-profit renovation and employment corporation". The non-profit provides training programs for people who have been unemployed for long-periods, integrating them into the workforce with specific skills for the construction industry. During construction of the training facility, the company included their trainees in the construction process using their building as a learning lab. The project is unique as it is the newest Austrian example of ecological construction, using over 90 % renewable materials such as straw bale, wood fibre board insulation and clay plasters in the building construction. A tour of the **Energy and Environment Agency of Lower Austria** gave insight into how innovations in energy-efficient building were integrated into a commercial building and how the innovations later became part of standard construction practice in Austria. The excursion was offered free of charge to G.B.S. participants and was financed by the Sto Foundation.

Future Outlook

The dates for the next Green.Building.Solutions. in 2019 have already been set: **July 20 to August 11, 2019**. Preparations are already underway; in 2019, the focus will once again be on **exploring the three pillars of sustainability** within the context of the built environment focusing upon the **relationship between thermal bridge-free building envelope details, high performance renewable building systems, and providing a high quality residential environment for sustainable communal living** through **high quality teaching**. On the basis of practical examples, Green Building designs will continue to be developed and designed around a current issue with input and advice from professors and experts from various specialist fields. **The number of participants** will be **increased** in 2019 in order to provide a larger audience with advanced knowledge in proven methods to build sustainable buildings. The number of lecturers and highly-skilled assistants will be increased to acommodate the increasing number of participants. By having a larger team, effective communication and high quality of sustainable teaching can thus be assured.

The **Club of Rome** is a **new, important partner** to the Green.Building.Solutions. The urgency, importance, and relevance of our academic summer program is reflected in the new partnership with the interest by the Club of Rome. Austria is a world leader in green building technologies. Therefore, the organizers are interested to replicate the Geen.Building.Solutions. locally in other, new international locations where there is a great demand for Green Building technologies. The importance of i**nternational knowledge transfer** and **interdisciplinary cooperation** is increasing over time; therefore the chance for duplication should be taken to disseminate Austrian expertise internationally.

Group photo of all partipants at the G.B.S. 2018 Closing Ceremony on August 11, 2018 in the Cupola Hall of the TU Vienna.

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