SMARTFLOWER

Case Studies

Education

Smartflower Offers Sunny Welcome to Founders Hall, Innovation Hall

"Part-art installation, part-solar energy technology and part-educational tool" — University Architect Brad Moore answers questions on the newly installed SmartFlower.

The Smartflower solar device in front of Founders Hall, April 18, 2023.

Installed this spring outside of the newly-dedicated Innovation Hall and Founders Hall, the new dynamic photovoltaic array Smartflower serves as the "showpiece" for the university.

The Smartflower unfolds each morning, follows the sun's light at the perfect angle and retracts once the sun sets. The fully-integrated system is inspired by nature and will provide clean energy to the two newest buildings in Elon's Innovation Quad.

University Architect and Director of Planning, Design and Construction Management Brad Moore answered a few questions about the newly installed Smartflower, its purpose and what it will add to the university.

What does the addition of the Smartflower mean for campus?

As a display that is part-art installation, part-solar energy technology and part-educational tool, the SmartFlower reduces Elon University's carbon footprint by producing renewable energy for Founders Hall and Innovation Hall.

How does the Smartflower operate?

The Smartflower is designed to mimic how sunflowers naturally absorb solar energy by moving with the sun. The device uses its internal programming and location data to track the sun from east to west and north and south to maximize renewable energy production. The

Smartflower innovative design will allow it to produce 40% more energy than a similarly sized fixed solar panel.

What is the purpose of the flower?

The Smartflower is a visible demonstration of sustainability, creativity and engineering at work. It will generate 2.5 kilowatts hours of renewable energy annually and will help supply clean energy to Founders Hall and Innovation Hall.

What was the decision behind putting a SmartFlower on campus, specifically outside of Innovation Hall and Founders Hall?

As a display of technology made possible by investment and advancement of STEM-related education, the Smartflower is the perfect centerpiece to anchor the plaza outside of Founders Hall and Innovation Hall. The hope is that its presence will inspire Elon's students to go out to change the world with their ideas.

How will the energy harvested by the flower be used to assist facilities on campus?

The Smartflower will provide clean, renewable energy that will supplant a portion of the fossil fuel-generated electrical energy required to power lighting, equipment and building systems within Founders Hall and Innovation Hall.

How unique is the Smartflower on college campuses?

By installing a Smartflower on campus, Elon University has joined a distinct and global group of colleges and universities that have committed to renewable energy production on campus, while encouraging and empowering students to learn about transforming the world with innovative technology.

How will the flower be a "showpiece" for the university?

When students, faculty, staff and other members of the community walk by the Smartflower, they will see a tangible example of our campus investment in STEM. Our Smartflower will serve as a symbol for the university's commitment to sustainability while demonstrating our role as a leader in education and innovation. The Smartflower will be a powerful showpiece because it will spark interest and conversation about renewable energy and the importance of STEM-related education in our future.

Read the original article here.

Humber College And Siemens Canada Open the Sustainable Microgrid and Renewable Technology Lab (SMART Lab)

Lab addresses the energy industry skills gap by providing hands-on learning.

TORONTO, ONTARIO – Humber College is partnering with Siemens Canada to develop a Sustainable Microgrid and Renewable Technology Lab (SMART Lab) at its North Campus. The SMART Lab is an educational and experimental environment designed to train students and professionals in the use of a microgrid system and to conduct research with industry partners.

Although traditional power grids offer reliable power, natural disasters or security breaches can threaten or disturb the grid's supply. The resulting blackouts can have catastrophic and costly consequences for businesses and society at large. Microgrids are decentralized localized energy systems that can operate independently of the public system or in conjunction with the main power grid using energy sources like wind and solar photovoltaics (PV) to reduce carbon emissions. They can adapt to virtually any local requirement and can withstand harsh environments. This resilient, on-site energy production ensures generation, while efficient storage solutions enable reliability of the energy supply. Microgrids can be "islanded" or disconnected from the traditional grid during a natural disaster or cyber threat. The islanding function for microgrids provides several benefits including the ability to maintain power during outages, improved reliability and resilience, increased renewable energy integration, and protection from cyber threats.

Sustainable Technology of the Future

With the support of the Ontario Government, Humber's investment in the SMART Lab features sustainable digital technology including a microgrid monitoring and controller system, battery energy storage capability, distribution infrastructure, as well as generation and load simulation equipment. Devices such as the solar Smartflower, electric vehicle charging stations, and battery energy storage systems, will be used as part of the microgrid control system to generate and distribute energy locally, allowing for more efficient and sustainable use and consumption of electrical power.

The Smartflower is equipped with solar panels that open up and follow the sun throughout the day, maximizing the amount of electricity that is generated. The Smartflower's solar panels can generate 40 per cent more electricity compared to a stationary panel. These small-scale power grids can operate on their own, or as part of a larger grid.

As the economy becomes more reliant on electricity, continued focus on developing technologies such as smart grids and microgrids is important. Humber College is partnering with industry stakeholders, utilities, technology companies, municipalities, and community planners, to conduct research and offer practical training for individuals who may operate these complex systems in the future.

Hands-on Learning

The SMART Lab will equip Humber learners with knowledge and skills related to the design, operation, and maintenance of microgrids. The lab will be used for applied research projects and allow the college to offer micro-credentials in the field of microgrids and renewable energy, and new curriculum in Electrical and Computer Engineering and Sustainable Energy and Building Technology programs. The SMART lab will also be a key element in Humber taking advantage of its own energy assets to achieve its sustainability goals.

The SMART Lab's benefits extend beyond the campus. With its training, research, and innovation in sustainable technology and microgrids, Siemens and Humber will help fill the current skills gaps in electrical power and utilities, residential development, and manufacturing power management industries and provide current and future professionals with the hands-on technical education required to further expand and adopt microgrid technology into our society.

QUOTES:

"Our energy transition to address climate change and a greener planet requires all hands-on deck. This partnership with Siemens Canada will allow our students to learn about and research the latest in microgrid technology. Humber is a national leader in infusing sustainability not only in our administration and building practices but also in our teaching and learning. Working with Siemens will enable us to train the next generation of professionals in the field of green technology and the SMART Lab will bring Humber another step closer to achieving its own sustainability goals." – Dr. Ann Marie Vaughan, president & CEO, Humber College

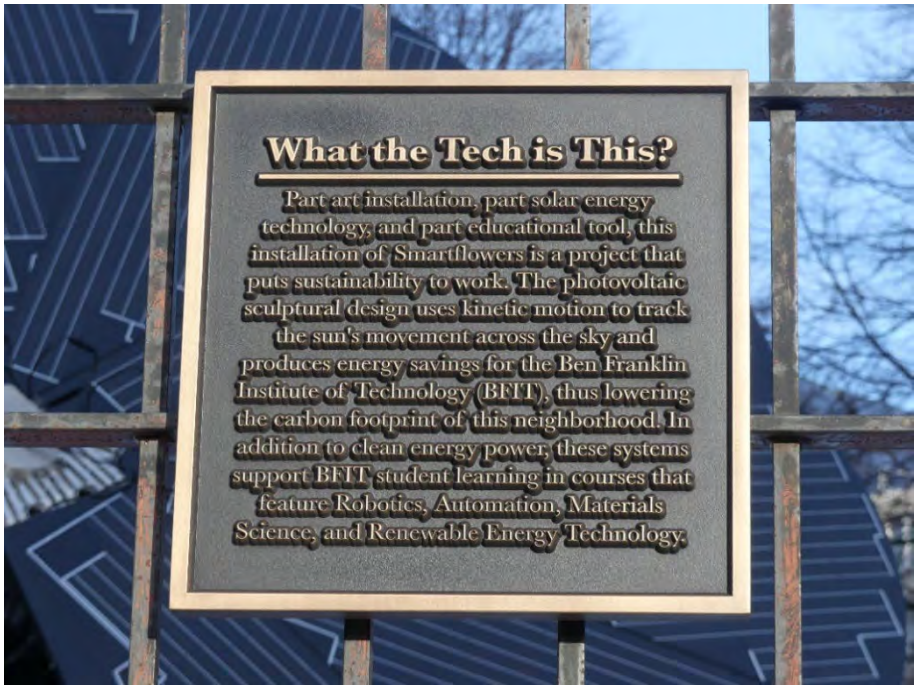
"An effective energy transition to enable decarbonization is a complex effort, and it requires a growing system of partners to tackle this enormous challenge. Siemens is proud to support Humber in offering students training on technologies that prepare them for careers vital to our climate change response and energy economy." – Faisal Kazi, President and CEO, Siemens Canada

"It is essential that post-secondary institutions have the latest learning tools and equipment so students can develop the skills they need to succeed in the workforce. That's why our government is proud to support this new SMART lab and the collaborative partnership between Humber and Siemens, which will provide students with the hands-on education and training they need for the in-demand jobs of today and tomorrow. It is projects like this that help find sustainable solutions within industries, prepare students for the workforce, and help drive our economy forward." – Jill Dunlop, Ontario Minister of Colleges and Universities

Read the original press release here.

Benjamin Franklin Institute of Technology Makes an Investment in Knowledge with Two Smartflowers

Benjamin Franklin once wrote that “An investment in knowledge pays the best interest,” and what is a more appropriate investment for our future than training students for a career in green energy? The Benjamin Franklin Institute of Technology (BFIT) installed two Smartflowers on their campus courtyard in the Fall of 2020. The courtyard, located in Boston’s historic South End district, is also home to a plaque that explains the significance and function of the Smartflowers to passers-by and members of the community.



Benjamin Franklin Institute learned about the Smartflower through a board member who recognized the connection between the product and the college's core value to integrate sustainability into all curricula offerings. The President of BFIT, Dr. Aisha Francis, connected with several organizations on this issue area, including Smartflower, and worked with the company to bring its innovative technology to campus to expand BFIT’s program concentrations in renewable energy technology. “Benjamin Franklin Institute of Technology seeks to build upon established and emerging aspects of the solar industry through our programs, curricula, and related projects. Solar innovations are a key element of responsible development and having Smartflowers on-site dovetails nicely with the sustainable programming we deliver at BFIT,” said Dr. Aisha Francis, President and CEO of BFIT.

Bringing sustainability to the BFIT curriculum is a journey that the institute has embarked on enthusiastically, with 90% of all their programs having some form of sustainability integrated into them. The introduction of the Smartflowers have also played a large role in shaping programs like the Energy Technology program and the Mechatronics program, which involve close study of the two units.

Students were even able to watch and participate in the Smartflower installations! As part of the Renewable Energy Technology concentration, students can learn more about solar energy, what makes the Smartflower tick, and how to provide maintenance for these unique systems. "The Smartflower's advanced robotics and increased efficiency gives our students a unique opportunity to learn about solar innovations. We don't want to only lecture at our students, but give them a real-world, hands-on experience to become leaders in the renewable energy and design workforce," said Dr. Marvin Loiseau, Dean of Academic Affairs at BFIT.

As to how the residents of the South End have reacted to the new solar system in their community? It's been sparking up conversations left and right! The two Smartflowers are in a high-traffic area of the community that sees buses, cars, and pedestrians pass by every day. "Everyone is looking at the Smartflower… it's so important for the community to understand what it is and for them to think about how Smartflower and solar energy can work for them," said Dr. Loiseau.

The twin Smartflowers have also introduced another big talking point for the South End community: how innovative technology can and must intersect with historic preservation. Founded in 1908, the history of the BFIT campus building is clear to all who see it. However, just because the history of a building should be maintained and preserved does not mean that it cannot adopt new technologies. The installation has set an example to the rest of the South End district that there are ways to make historic buildings renewable and modern without intruding on the architecture of the building.

"This is a win-win for everyone. We've created an opportunity for students to get real-world experience from new technology while showing our community how to reduce energy costs, carbon emissions, and contribute to a sustainable future," said Dr. Loiseau.

Halcyon Arts Lab Shows Their Community What a Clean Energy Future Looks Like with Smartflower

A Smartflower was installed at the Halcyon Arts Lab in Washington DC earlier this year. The unit provides power to the Halcyon Arts Lab, which is located on the site of the historic Fillmore School that was built in 1893 and demonstrates their commitment to being on the forefront of clean, renewable energy.

The culture at Halcyon revolves around celebrating exploration and creativity, bringing together change-makers in art, science, and social enterprise, and providing them with the environment to flourish. Given the non-profit organization's enthusiasm in advocating for innovation in business and the arts, the Smartflower fits right in, acting to inspire others and to demonstrate how art, business and science can co-exist. "Our Smartflower conveys a message about how powerful an artistic, aesthetically compelling representation of our commitment to clean, renewable energy can be," said Nicole Dowd, the Director of Arts Programs at Halcyon.

For Halcyon, their Smartflower also acts as another way for them to interact with their visitors and passers-by, starting conversations about the intersections between renewable energy, innovation, and art. "One thing that's great about the Smartflower is that even people who haven't seen one before immediately recognize the solar panels – they know what this is for as soon as they see it. The Smartflower makes them smile, gives them a chance to learn about renewable energy, and shows them that

there are more and more innovative ways to make solar power work for your building," said Josh Mandell, the COO of Halcyon.

The Smartflower was originally introduced to Halcyon by Campion Hruby Landscape Architects, an architectural firm dedicated to forging meaningful connections between people and nature through modern, sustainable design. Halcyon initially looked at roof-mounted panels but could not find options that provided power, was easy to install, and complimented the historic estate the Arts Lab calls home. "For a beautiful, historic building like ours, a rooftop system wasn't an option. We were really happy to find an option that adds to the aesthetic of our property and provides lots of power without the complications of cranes or roof-mounted systems," said Josh.

However, the Smartflower is only one part of Halcyon's investments into creating a clean energy future. A handful of thoughtful sustainability updates have been added to the Halcyon Arts Lab during the past few years, as well as to Halcyon's other main facility. The Halcyon Arts Lab uses geothermal heat beneath the facility, and the outdoor area around the Smartflower is mindfully landscaped with native plants to reduce runoff and erosion.

When asked about what the most inspiring part of the Smartflower was, Nicole had this to say: "The Halcyon Arts Lab provides housing and studio space to emerging civic-minded artists. Their work deals with everything from criminal justice issues, to disability rights, to immigration and refugees, to questions of race and gender equity. For them to walk into our building every day and pass the Smartflower – such a beautiful, artistic symbol of what the future can look like for clean energy – it reminds them of the many ways art can impact society."

The King Juan Carlos University in Madrid Commits to Sustainability and Cost Savings with Smartflower

King Juan Carlos University (URJC), Spain

The King Juan Carlos University (URJC), located in Madrid, Spain, is making huge strides to showcase its commitment to sustainability. Their commitment comes not only in the form of conventional renewable energy production and energy-efficient classrooms, but also in the form of Spain's first Smartflower installed in a public university.

On December 2nd, Javier Ramos, the Rector of URJC, hosted a ceremonial opening for the installation of a Smartflower at their Fuenlabrada campus. The opening ceremony took place at the same time as the kick-off for the COP25 Climate Summit, a climate change-focused conference held by the United Nations in Madrid, Spain. Ramos applauded the coincidence, and stated that the URJC wants to make their Fuenlabrada campus "a space where we approach the challenges of the United Nations' 2030 Agenda for Sustainable Development."

When speaking about the Smartflower, Ramos highlighted the symbolism of the newly installed all-in-one solar system. "This installation is meant to make the Fuenlabrada campus an area where we can reach the goals in the 2030 Agenda for Sustainable

Development... Just as sunflowers seek the light, the university's spirit will constantly seek the light of knowledge," said Ramos.

Several town hall authorities and members of the URJC community attended the opening ceremony. It is estimated that the university will save approximately €5,400 from its sustainable infrastructural changes in the first year. Being the university with the second-highest number of students (over 46,000 enrolled) in the Madrid region, it is no wonder that the URJC is taking such large strides to demonstrate their commitment to sustainability. Here's to hoping that other universities in Spain follow suit!

Javier Ramos, the Rector of URJC, speaks at the opening ceremony

Trinity High School Uses Smartflowers to Support Students and Community

Trinity High School, USA

Trinity High School believes in using technology to address and solve real-world problems, which is why they installed three Smartflowers on their campus in Washington, Pennsylvania in the spring of 2019. The Trinity Area School District received funding from the Local Share Account (LSA) grant that provided a way to purchase their very own Smartflowers as well as their wind turbine project.

While Trinity High School's Administration researched other options for solar, such as traditional rooftop static solar panel systems, the Smartflower was ultimately chosen. "We decided to pursue the dynamic Smartflower to incorporate more technology and expand the curricular basis as well as career options for students," said Donald Snoke, Assistant Superintendent of the Trinity Area School District.

Trinity High School's Smartflowers aren't just used as a clean energy power source—they're used as an educational tool for students. The Smartflowers have been integrated into the school's curriculum in order to benefit AP students, college prep students, and students who plan on attending tech and trade schools or are entering directly into the vocational arena. Courses such as AP Environmental Science, Physics, Industrial Technology, and Vocational Agriculture will utilize Smartflower technology as part of their curricular focus. "The rigor and relevance of the secondary curriculum have expanded greatly. The bar has been raised and our students, staff and community members have been the beneficiaries," said Snoke.

The three Smartflowers are also used to give back to their community, producing energy to supplant the energy consumption in the Trinity High School Freight Farm.

The Freight Farm produces 1200 heads of lettuce per week, all of which is donated to the greater Washington County Food Bank. “The belief that we are utilizing technology to solve problems, much like an engineer does, is intriguing,” said Snoke, “We are being viewed as the innovators in our county and state.”

Reactions from the students, faculty, staff, and community have been highly positive. Local businesses have been exploring the possible applications of the Smartflower in different industries, while David Volkman, the Assistant Secretary from the Pennsylvania Department of Education, was highly impressed by the integration of Smartflowers into Trinity High School’s curriculum during his visit and stated that the Trinity High School model should be applied throughout the state of Pennsylvania.

“Our Smartflowers are extremely important for the Trinity Area School District,” said Snoke, “Our students, faculty, and staff are stunned and excited, and the community has taken notice of the innovative direction the Trinity Area School District is taking… Our Smartflowers are a definite source of pride and accomplishment for the members of the Trinity Area School District.”

Mary Baldwin University

Mary Baldwin University, USA

“An innovative, tangible example.”

“When students and other members of the community walk by, they’ll see that we have an innovative, tangible example of our campus commitment to sustainable energy sources.”

– Sam Stoner, Sustainability Coordinator at Mary Baldwin University

Innovation Montessori Ocoee

Students with Smartflower at Innovation Montessori Ocoee, USA

“The impact these make is really important.”

“The flower, using that as a teaching tool, saving the planet, of course is a goal, but showing the students [in] real time the impact these things can make is really, really important. In having Innovation in our name, we try to inspire these kids any way we can.”

– Sherilyn Moore, President of the Innovation Montessori Ocoee Board of Directors

Virginia Wesleyan University

Ribbon Cutting Ceremony at Virginia Wesleyan University, USA

“A symbol for the University’s commitment.”

“Our Smartflower will serve as a symbol for the University's commitment to the environment while demonstrating our role as a leader in bringing the latest in solar technology to the region.”

– Scott D. Miller, President of Virginia Wesleyan University

Rockingham County Schools – Mohawk Group & Groundswell

Rockingham County Schools, USA

“Truly a gift that will keep on giving for years to come.”

“The future of our planet lies in the hands of our young people. The ability to put those hands-on renewable energy tools and education to learn firsthand about the importance of preserving and properly utilizing our natural resources is truly a gift that will keep on giving for years to come for members of our community.”

– Karen Hyler, Public Information Officer at the Rockingham County Schools