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MEDIA RELEASE

SFU, KPU researchers team up on solutions for clean food and water

May 03, 2017

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Sustainable waste-heat technologies being developed for the next generation of closed greenhouses

Researchers at Simon Fraser University and Kwantlen Polytechnic University are teaming up to develop sustainable clean-tech solutions that will provide potable water and clean food globally, in areas challenged by climate change and fast-growing populations.

The researchers are recipients of a Natural Sciences and Engineering Council of Canada (NSERC) College University Idea to Innovation grant, valued at more than \$725,000. The funds will advance their project, "From Waste to Clean Food," as they work together with industry partners.

The project combines the expertise of SFU's Laboratory for Alternative Energy Conversion (LAEC) and KPU's Institute for Sustainable Horticulture. Industry partners include Argus Control Systems, a pioneer company in greenhouse automation and control, the B.C. Greenhouse Growers' Association (BCGGA) and Nexus Biofuel, a B.C. biofuel plant company capable of converting farm and municipality waste into high quality fuel.

Working with industry partners, researchers are developing and testing the next generation of 'closed' greenhouses (CGs) equipped with waste-heat-driven technologies.

SFU researchers, led by mechatronic systems engineering professor Majid Bahrami, the project's principal investigator, are developing new, waste-heat driven technologies for the next generation of CGs. These will cover an array of key clean technologies for growing crops and providing potable water that are crucial for closed greenhouses. These technologies will use solar and geo-thermal energy, or waste-heat from biofuel plants, data centers, power plants or other sources.

"Closed greenhouse systems collect and store energy from the sun or other waste-heat sources such as biofuel facilities," explains Bahrami. "They are sealed buildings that control temperature, humidity and CO₂ concentration for optimum plant growth year-round, and are used to produce sustainable clean food and fresh water, under any climatic conditions."

Bahrami invented patent-pending **Hybrid Atmospheric Water generator (HAWgen) technology**, which can derive water from the atmosphere using waste-heat. He has just received the **Mohammed bin Rashid Al Maktoum Global Water Award** for his invention.

While CGs are operational in some places, Bahrami says there is immense room for improvement in their energy and water consumption as well as their environmental and carbon footprint. "Providing clean, reliable and sustainable crops is a great priority and a global challenge," he says. "We are hopeful that this research will set a new course for dealing with this

critical issue.”

KPU’s team, led by Dr. Deborah Henderson, director of the Institute for Sustainable Horticulture, and LEEF Regional Innovation Chair, has developed expertise in new cropping systems specifically related to greenhouse production, and is ready to apply these technologies to crop challenges in KPU’s semi-closed geothermal greenhouse.

“A closed greenhouse can create optimal conditions for reliable food and nutraceutical production year-round,” says Henderson. “The holdback has always been energy cost, particularly cooling and water consumption. We are hopeful that this research will provide new technology to address these critical capacity-limiting issues, and have the added value of being clean technology.”

Currently, three major crops (tomato, pepper and cucumber) are grown in greenhouses due to their high production rate and tolerance to conditions. Targeted technologies in this project will provide opportunities for other crops, especially those currently imported, allowing growers to expand their crop diversity and build resilience in their businesses.

One area of high interest is nutraceuticals, herbs with dietary supplement and medicinal values, which require accurate climate control. They offer tremendous potential for creating value-added crops and emerging markets for Canadian growers.

While clean energy research is carried out, parallel research into Chinese nutraceutical crops will complement the new acupuncture diploma program at KPU.

The project is one of 37 across Canada sharing in \$37.4 million in funding for colleges, institutes and CEGEPs to support applied research and development activities with industry partners. The projects are funded through NSERC’s College and Community Innovation program, which expands the capacity of Canadian colleges to work with local business in developing new technologies and their commercialization.

ABOUT KWANTLEN POLYTECHNIC UNIVERSITY:

Kwantlen Polytechnic University has served the Metro Vancouver region since 1981, and has opened doors to success for more than 200,000 learners. Four campuses—Richmond, Surrey, Cloverdale and Langley—offer a comprehensive range of sought-after programs in business, liberal arts, design, health, science and horticulture, trades and technology, and academic and career advancement. Over 19,000 students annually have a choice from over 120 programs, including bachelor’s degrees, associate degrees, diplomas, certificates, citations and apprenticeships. Learn more at kpu.ca.

ABOUT SIMON FRASER UNIVERSITY:

As Canada’s engaged university, SFU is defined by its dynamic integration of innovative education, cutting-edge research and far-reaching community engagement. SFU was founded more than 50 years ago with a mission to be a different kind of university—to bring an interdisciplinary approach to learning, embrace bold initiatives, and engage with communities near and far. Today, SFU is Canada’s leading comprehensive research university and is ranked one of the top universities in the world. With campuses in British Columbia’s three largest cities – Vancouver, Burnaby and Surrey – SFU has eight faculties, delivers almost 150 programs to over 35,000 students, and boasts more than 145,000 alumni in 130 countries around the world.

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