

UNIVERSITY OF ALBERTA FUTURE ENERGY SYSTEMS

\$75 Million

from the Canada First
Research Excellence
Fund (2016-2023)

9+

University
of Alberta
faculties

110+

individual
research
projects

150+

University
of Alberta
researchers

850+

students &
post-doctoral
fellows

SHAPING THE FUTURE OF ENERGY

As it travels from the place where it is generated to the place where we use it, energy moves through a system. For more than a century, that system has been dominated by large-scale, hydrocarbon-driven generation technologies and the transmission of energy in only one direction. Small-scale renewable energy technologies, energy storage and flexible smart grids can diversify this system, enabling our transition to a low-carbon economy and shaping our energy future.

Future Energy Systems funds researchers working in multidisciplinary teams to develop new energy technologies and facilitate their introduction into our current energy system. It supports researchers seeking to mitigate the environmental impacts of current and future energy systems, and those seeking to understand the influence of energy transition on our environment, economy and society.

FOUR RESEARCH AREAS

Developing Hydrocarbons Responsibly

Fossil fuels have guaranteed energy on demand for more than a century. These fuels continue to be vital to our energy future, so researchers in this area study ways to improve efficiency and reduce their environmental impacts.

Improving Environmental Performance

Existing and new energy systems can have significant impacts on the environment. By studying the capture, utilization and storage of carbon dioxide, researchers are investigating ways to limit the impact of our current multibillion dollar energy infrastructure. Reclamation researchers are identifying useful new metrics for restoration success, and developing groundbreaking, affordable new techniques for mitigating the impact of current and future energy technologies on land and water.

Enabling Sustainability

New energy sources like solar, wind, geothermal and biofuels will power our low-carbon future. Researchers are developing new technologies such as flexible solar cells that can be printed like newsprint and geothermal engines that can generate electricity from heat equivalent to your cup of coffee. Smart grid researchers are developing control systems that can safely integrate intermittent renewable electricity into existing

infrastructure. Storage researchers are developing technologies like flywheels and solar fuels to ensure that renewable energy can be available on demand.

System-Wide Enablers

Energy transitions affect our everyday lives. Researchers are exploring the long-term impacts of new energy technologies on the environment, job markets, government policy and the growth of rural and urban communities. In partnership with Aboriginal communities, researchers are broadening their understanding of the value of renewable energy technologies, while transferring knowledge and developing frameworks for co-designing projects.

Photos:

Water reclamation researchers Dr. Muhammad Arshad and Irum Zahara; Biofuels researchers Dr. Dominic Sauvageau and Dr. Lisa Stein; Heavy oil researcher Dr. Hongbo Zeng; Solar researchers Dr. Steve Bergens and Dr. Mona Amiri.



V. 2021.09.29



UNIVERSITY OF ALBERTA
FUTURE ENERGY SYSTEMS

www.futureenergysystems.ca



UNIVERSITY OF ALBERTA FUTURE ENERGY SYSTEMS

1000+ students & post-doctoral fellows by 2023

67% of total budget allocated to trainee salaries

10+ active research partnerships

2000+ publications, presentations & awards

STUDENT FOCUS

Training a new generation of researchers to address future energy questions is our top priority. Thanks to the University of Alberta's existing infrastructure, Future Energy Systems has been able to dedicate 67% of its total Canada First Research Excellence Fund (CFREF) grant to trainee salaries. Our target is to have more than 1,000 students participate in Future Energy Systems research by the program's conclusion in 2023. If each of those students spent 40 years working in their field, that could yield a legacy of 40,000 years of energy research.

Future Energy Systems provides its trainees with salaries, laboratory and field experience, and exposure to administrative, government, and public outreach initiatives not typically included in a graduate education. A Student Opportunities Fund will support students who wish to enroll in professional development courses outside the scope of their project, while centrally-developed training modules in subjects such as communications will provide enhanced skills training.

Centrally-organized interdisciplinary lunch-and-learns have successfully introduced researchers from different faculties to work taking place in other parts of the Future Energy Systems program, leading to independently-organized joint workshops. A new job-shadowing program is currently being developed to enable students and post-doctoral fellows to learn from their counterparts working in different research areas.

PARTNERSHIPS

Future Energy Systems collaborates with the University of Calgary's CFREF-funded Global Research Initiative in Sustainable Low Carbon Unconventional Resources, and is a partner in NAIT's Distributed Energy Management Initiative. We work collaboratively with the Government of Alberta's Department of Economic Development and Trade on a variety of projects and initiatives, and regularly support our researchers in applications for government research grant funding and industrial partnerships.

International partners include Germany's Fraunhofer Society, RWTH Aachen University and China's Tsinghua University. Numerous Future Energy Systems researchers have long-standing collaborative relationships with industry.

HOW TO HELP

Future Energy Systems is committed to sharing stories about the work being accomplished by our talented researchers. You can regularly find our content online at [Folio](#). All of our stories can be found in the news section of our website, and are shared via our monthly newsletter, which you can receive by going to futureenergysystems.ca/subscribe.

We regularly host laboratory tours for researchers, stakeholder groups, and students, and a wide variety of content is available on our YouTube channel, [Future Energy Systems](#). Our researchers and administrative staff are also available to speak on a variety of topics related to energy and the environment.

Please contact fes@ualberta.ca with any requests.

Photos:

Director Dr. M. Anne Naeth speaking at NAIT announcement; Solar researchers Dr. Arthur Mar and Dr. Jillian Buriak; Biofuels student David Gordon on exchange at Germany's RWTH Aachen University; Biofuels research engineer Alex Hunt, prior to his departure for the private sector.



V. 2020.09.21