

CLEAN ENERGY FOR EVERYONE



COLLECTIVE PROBLEMS CREATIVE SOLUTIONS

The challenges facing the energy sector are real. They are also shared.

Located in the heart of Toronto, the Centre for Urban Energy (CUE) at Ryerson University is an academic-industry partnership that produces tangible, novel and future-oriented solutions to pressing energy problems.

CUE generates creative solutions that work for everyone.



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Transforming the future of energy

SOLUTIONS FOR PARTNERS

Our industry partners define a problem and we then generate novel solutions with tangible outcomes.

This is where we are now:



Centralized grid



Climate crisis



Aging infrastructure and rising costs



Air pollution in major urban areas

TACKLING THE BIG QUESTIONS

We need new thinking and real-world research to build the zero-carbon energy system our planet requires.

This is where we are going:



Distributed energy



Thriving cities



Low or zero carbon sources such as wind and solar



Affordable and accessible energy for all

HOW CUE WILL GET US THERE



Education and professional development



Implementation of new technologies



Consultation



Creation of new policies



Research and testing



Innovation and incubation

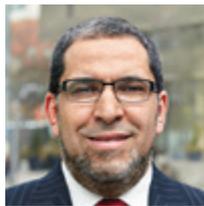
A shared message

Since its founding in 2010, the Centre for Urban Energy (CUE) has illustrated the enormous potential of interdisciplinary collaborations between industry partners and university researchers. In 2018, CUE researchers continued to generate novel solutions to the pressing problems our utility, industry and government partners asked us to investigate.

The past year was also a time of transition. CUE moved to a new home: Ryerson's state-of-the-art Centre for Urban Innovation (CUI) at 44 Gerrard Street East. The new space provides additional R&D capacity, the latest in electrical infrastructure and new opportunities for collaboration with researchers in areas that intersect with energy, such as big data, transportation and water. This investment illustrates Ryerson's commitment to CUE after eight years of solid results.

On behalf of Ryerson University, the Faculty of Engineering and Architectural Science and CUE, we invite you to join us in the year ahead. Working together, we can ensure an affordable, accessible, reliable and sustainable energy future for everyone.

Sincerely,



Mohamed Lachemi
President and
Vice-Chancellor



Tom Duever
Dean, Faculty
of Engineering
and Architectural
Science



Bala Venkatesh
Academic Director,
Centre for
Urban Energy

What we do

CUE is unique because it offers research expertise grounded in the reality of what does and doesn't work in the energy sector. We have spent years working closely with leading utilities and energy companies. Our models of the future are informed by what is actually possible.

OUR EXPERTISE

- World-class urban energy researchers and technologies
- Multidisciplinary collaborations under one roof
- Integration of research, testing and commercialization
- Nonpartisan, objective, academically driven research
- An evidence-based approach to big picture issues

JOIN US IF YOU

- Have a pressing energy problem you need to solve
- Are looking for ways to innovate within your organization
- Want access to world-leading research and development capacity
- Are looking for customized professional development programs for your team
- Want to be a part of the next generation of energy solutions

How to engage:

To explore a project, problem or possibility — in your organization or in the sector at large — contact our Academic Director, Bala Venkatesh:
bala@ryerson.ca



By the numbers

FUNDING

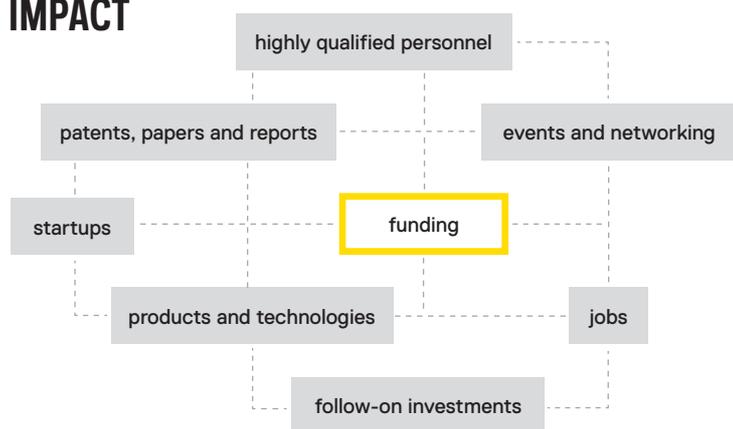
\$29.4 million

total funding

\$1.1 million

funding in 2018

IMPACT

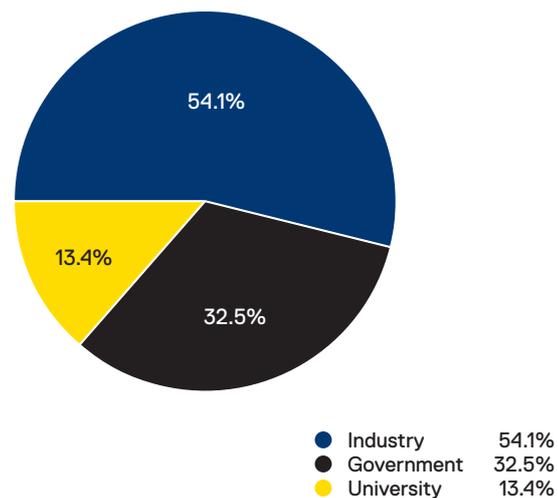


HIGHLY QUALIFIED PERSONNEL

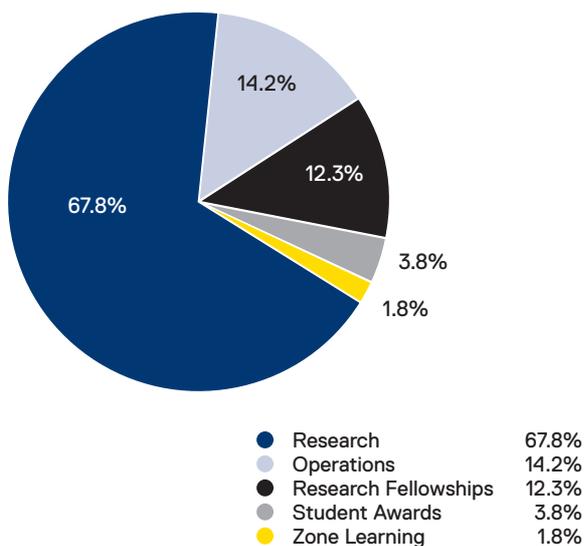
500+

energy sector researchers and entrepreneurs trained and developed through our various programs

FUNDING BREAKDOWN



FUNDING DISTRIBUTION



PROJECTS

71

total



PEOPLE

47

total



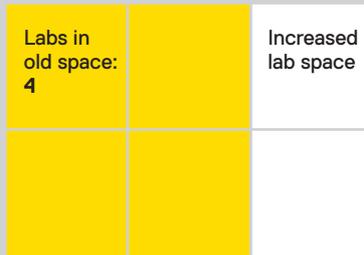
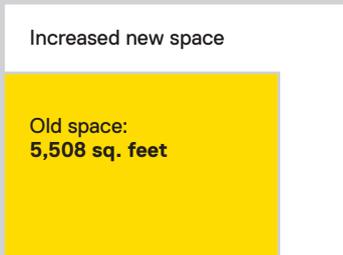
INCREASED SPACE IN CUI BUILDING

7,922

total sq. feet

6

brand new state-of-the-art labs



EVENTS

14

hosted

14

tours

19

speaking engagements and events participated in



Left to right: Bala Venkatesh, Academic Director, Centre for Urban Energy; Mohamed Lachemi, President and Vice-Chancellor, Ryerson University; Rod Phillips, Ontario Minister of the Environment, Conservation and Parks; David Piccini, Parliamentary Assistant to the Ontario Minister of Training, Colleges and Universities; Andrea Khanjin, Parliamentary Assistant to the Ontario Minister of the Environment, Conservation and Parks.

Featured research projects

Visit ryerson.ca/cuereport2018 for extended stories about these projects and partners.



MAKING TRACKS TOWARD A CLEANER COMMUTE

Feasibility study with North American transit company

If you operated a large public railway system fueled mainly by diesel and wanted to make the switch to a clean, sustainable energy source, would you want your trains to run on electrified tracks or burn hydrogen as a fuel? CUE investigates and discovers that one option emerges as the winner in a projected cost-benefit model.



PLUGGING INTO A NEW MARKET FOR ELECTRICITY

IESO Research Fellowship renewed

Energy storage is on the rise in Ontario, but if you operate an electric car or use solar panels, you can't sell what you have — or any surplus beyond your needs — back to the grid during peak times. CUE reviews how the integration of a transactional energy system for distribution may solve this challenge.

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A changing world can present challenges, but the IESO's partnership with CUE is an example of addressing change in a proactive and positive way. Together, we are exploring innovative solutions that will help Ontario's electricity system be reliable and cost-efficient in the years to come."

– PETER GREGG, PRESIDENT AND CEO, IESO



POWERING THROUGH MINOR DISRUPTIONS

Partnership with Toronto Hydro pushes the limits of power quality

For some customers, the smallest disruption in power delivery — even as brief as 10 milliseconds — can interrupt critical processes and cost millions. CUE works with Toronto Hydro to find an energy solution to protect our most sensitive industries from adverse effects of these minor stoppages.



A SURGE IN CANADA'S ENERGY STORAGE RESEARCH

NSERC investment supports national project

Canada's electrical system is aging and requires significant investment — of at least \$350 billion by 2030. How can energy storage help reduce or eliminate these costs and can it also improve grid resilience? CUE leads NSERC's nationwide Energy Storage Technology Network (NESTNet) to position Canada as a world leader in energy storage.



PARTNERSHIP WITH INDIA SPARKS INNOVATION IN CANADA

A new future for Tata Power-Delhi Distribution Limited

Energy demand in Delhi is growing, as is the use of energy storage systems. Tata Power-DDL needs to update its system to manage a changing load profile. CUE takes one section of the Delhi network and models how the whole grid can be transformed to accommodate solar energy, energy storage and electric vehicles.

The next generation of energy leaders

PROFESSIONAL DEVELOPMENT PROGRAMS AND EXECUTIVE EDUCATION

Between now and 2030, the Conference Board of Canada estimates that there will be a need for more than 150,000 workers per year to carry out the renewal and modernization of Canada's electricity system. These roles will require advanced technical and analytical skill sets. CUE's professional development programs, seminars and student award programs ensure a steady stream of top talent ready to thrive in a rapidly evolving sector.

Below:

Ryerson students receive their energy research awards, generously sponsored by Enwave, the IESO and Toronto Hydro, in April 2018.



What I learned is directly applicable to what I do at the City now."

– CATHERINE COOK, RESEARCH ANALYST,
CITY OF TORONTO, ENVIRONMENT AND
ENERGY DIVISION AND PMDIP GRADUATE

Electrical Engineering 101

This seminar series introduces the fundamental concepts of electrical engineering to those without an engineering background looking to break into or advance their career in the energy sector.

Postgraduate Certificate in Energy Management and Innovation

In cooperation with the G. Raymond Chang School of Continuing Education at Ryerson University, this certificate program enables adult learners to contribute effectively to energy management, conservation, sustainability, entrepreneurship and public policy.

Professional Master's Diploma in Energy and Innovation (PMDip)

The PMDip addresses the pressing need for qualified personnel in the energy sector by immersing participants in the relevant knowledge and skills required to excel as corporate officers, administrators, technicians and other leadership roles.

ACKNOWLEDGEMENTS

Founding sponsors



Sponsors and collaborators

Alectra Utilities
eCAMION
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Jacobs
Mitacs
NSERC
Ontario Ministry of Energy
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Schneider Electric
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Susan Uthayakumar, Country President, Schneider Electric Canada
Bala Venkatesh, Academic Director, Centre for Urban Energy

CUE is committed to a smaller carbon footprint

Learn more about our impact in the extended online version of this report at ryerson.ca/cuereport2018

Location:
44 Gerrard Street East
Toronto, ON M5B 1G3

Mailing Address:
350 Victoria Street
Toronto, ON M5B 2K3

416-979-5000, ext. 552974
cueinfo@ryerson.ca
ryerson.ca/cue

 /RyersonCUE
 @RyersonCUE

