## Welcome

Ryerson University and the Natural Sciences and Engineering Research Council of Canada (NSERC) are proud to lead a five-year, \$5 million pan-Canadian network of 15 universities and 26 industry and government partners focused on the future of energy storage — an essential technology in the global transition to clean energy.

The NSERC Energy Storage Technology Network (NESTNet) collaboratively explores many different types of energy storage, including flywheels, lithium-ion batteries and compressed air, while determining how best to integrate these technologies into electricity grids. In addition, researchers consider the implications arising from the increasing adoption of energy storage and how consumers will perceive, adopt and interact with these technologies. By partnering with the private sector, NESTNet enables directed progress — without duplication of efforts — towards a strong domestic Canadian energy storage industry that is also competitive in the global marketplace.

As our energy systems transform to integrate clean technologies, cooperation from all sections of society is required. With that in mind, we welcome you to the third annual Leading the Charge conference. This event provides a platform for stakeholders – including technology providers, local distribution companies, government and academia - to come together and share their perspectives on the promise and progress of energy storage.

We would like to offer our sincere thanks for joining us today and gratefully acknowledge the support from our sponsors and partners, without whom this event would not have been possible.

#### rverson.ca/nestnet

The Centre for Urban Energy at Ryerson University is an academic-industry partnership that explores and develops sustainable solutions to urban energy challenges such as the advancement of smart grid technologies, energy storage, electric vehicles, net-zero buildings and renewables.

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## Speakers



Jessie Ma is a senior research fellow at Ryerson University's Centre for Urban Energy







Sean Conway is an honorary fellow at Ryerson University's Centre for Urban Energy and a public policy adviser at Gowling WLG



**Eric Gebhardt** is vice president and strategic technology officer at GE Power, based in Atlanta. Georgia



**Jill Powers** is an infrastructure and regulatory policy manager at the California Independent System Operator, based in Folsom, California



Michael Maiello is vice president of energy storage systems at Schneider Electric, based in Foxborough, Massachusetts



Bala Venkatesh is the academic director of Ryerson's Centre for Urban Energy and director of the NSERC Energy Storage Technology Network



Leonard Kula is the chief operating officer and vice president of planning, acquisition and operations at the Independent Electricity System Operator (IESO)



Jane Kearns is a senior advisor with MaRS Cleantech



**Daniel McCormick** is the vice president of sales at Constant Power Inc.



Matthew Sachs is the chief operating officer at Peak Power



Hari Suthan is the chief strategic growth and policy officer at Opus One Solutions



lan Rowlands is a professor and the associate vice president of international at the University of Waterloo and internationalization leader of the NSERC Energy Storage Technology Network



Claudio Cañizares is a professor of electrical and computer engineering and Hydro One endowed chair at the University of Waterloo and theme three leader of the NSERC Energy Storage Technology Network



Liuchen Chang is a professor of electrical and computer engineering at the University of New Brunswick and theme two leader of the NSERC Energy Storage Technology Network



F. Handan Tezel is a professor of chemical and biological engineering at the University of Ottawa and theme one leader of the NSERC Energy Storage Technology Network

Speakers are listed in order of appearance. To view their complete bios, please visit www.ryerson.ca/leading-the-charge.

# **NSERC** Energy Storage **Technology Network**

# Leading the Charge

**Conference program** 

Thursday, June 21, 2018 Mattamy Athletic Centre

🕑 #LeadingTheCharge



Centre for **Urban Energy** 





## **Schedule**

#### 8:30 AM ET

Breakfast and registration

#### 9:00

Welcome and opening remarks Jessie Ma

#### 9:10

Welcome from NESTNet's board chair Neetika Sathe

#### 9:20

Introduction of morning session Sean Conway

#### 9:30

**Keynote: Energy system transformation** Eric Gebhardt

The electric power industry is undergoing a transformation. The growth of distributed energy resources such as rooftop PV, battery energy storage and electric vehicles, coupled with advances in information technology, is changing the way the distribution system is being operated. At the same time, new business models are changing the way electricity is sold and purchased by retail customers. As a result, the grid and utility of the future will be different from what we know today.

#### 10:00

Break and networking

#### 10:15

Presentation: Energy storage at the transmission and distribution level — A California ISO perspective Jill Powers

Energy storage connected directly to the California Independent System Operator grid and resources connected directly to the distribution grid are growing and will represent an increasingly important part of California's future resource mix. Integrating these resources will help lower carbon emissions and can offer operational benefits including provision of flexibility in balancing the grid. Discover how the California ISO is undertaking a variety of efforts to facilitate market participation of storage and aggregated distributed energy resources and how those efforts have revealed remaining challenges to overcome for them to realize their full economic value to the California electricity system.

#### 10:30

Presentation: Trends in energy storage technology and prosumer use cases Michael Maiello

The old world of energy is moving from a unidirectional flow of energy from a central source to distributed consumption. Today's new energy world is a more complex and bidirectional flow of energy, where consumers are now also producers. Energy storage becomes a key asset in this and other use cases behind the meter.

#### 10:45

# Panel discussion: Lessons on energy storage from south of the border

Eric Gebhardt, Michael Maiello and Jill Powers (moderated by Sean Conway)

The three presenters from our morning session convene to discuss the impacts to date of energy storage in the United States. They will consider a range of challenges — practical, technological, political and geographical — to the wider adoption of these transformative technologies, both in front and behind the meter.

#### 11:10

#### Break and networking

#### 11:25

Keynote: The IESO — Embracing and encouraging disruption Leonard Kula (introduced by Bala Venkatesh)

Innovation is driving the need for significant change in the electricity sector. Mr. Kula will talk about how the IESO is managing this change and integrating new and innovative technology — including grid-scale energy storage — into its plans for the renewal of Ontario's electricity market.

## <u>Notes</u>

#### 2:00 PM

Lunch (served on West Concourse)

#### :00

#### Panel discussion: Commercializing energy storage — The road to success Daniel McCormick, Matthew Sachs and Hari Suthan

(moderated by Jane Kearns)

Energy storage has arrived. Storage is now the fastest growing segment of the solar market, utilities are actively including energy storage in their long-term planning, and property owners are installing storage to manage onsite solar and take advantage of time-of-use pricing. As companies navigate this expanding market, what are the potential pitfalls and opportunities, and what needs to be considered as they build their businesses?

#### 2:00

**Break and networking** 

#### 2:15

# Panel discussion: NESTNet outcomes and impact — The story so far

Claudio Cañizares, Liuchen Chang and F. Handan Tezel (moderated by Ian Rowlands)

The NSERC Energy Storage Technology Network's mission is to bring together leading academic, industry, utility and government stakeholders to develop, test, demonstrate and ultimately commercialize innovative energy storage technologies. Three years into the network's five-year mandate, our panelists — representing the network's four research themes: storage technologies, power converters, systems integration, and economics and policy — will discuss the impact of the network so far and highlight some of its key success stories.

#### 2:55

**Closing remarks** Bala Venkatesh

3:00-4:00 Reception

