

**Behind-the-Meter Solar:
Key Considerations for Ontario's Electricity Distribution Sector**



June 26th, 2015

Canadian Solar Industries Association

www.cansia.ca



Electricity Distributors Association
Operations Forum

Presentation Outline

- Introduction and About CanSIA:
 - Roadmap 2020: Powering Canada's Future with Solar Electricity
- Three key behind-the-meter trends in Electricity:
 - Solar, the Internet of Things & Storage
- CanSIA's Ontario Distributed Generation Task Force
 - Context, Scope & Deliverables
- Q&A:
 - What key considerations are needed to lessen potential negative impacts on LDCs?
 - On what issues can the solar industry and electricity distributors collaborate?

About CanSIA

- Who we are:
 - National trade association representing the solar energy industry throughout Canada
 - Since 1992, worked to develop markets and create opportunities for our Members
- Why we are:
 - Solar energy technology adds value to the world in many ways
 - Thus the solar industry is making the world a better place
 - Trade associations exist to represent the interests of their Members
 - CanSIA exists to maximize the benefit of the solar industry to Canada
- Where we will be in 2020:
 - Solar as mainstream energy source, Integral part of Canada's diversified electricity-mix
 - Ensure solar industry will be sustainable with no direct subsidies

CanSIA's Board of Directors



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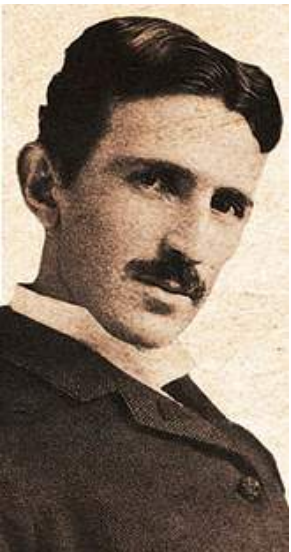
Greg Scallen,
SunEdison

Roadmap 2020: Powering Canada's Future with Solar Electricity

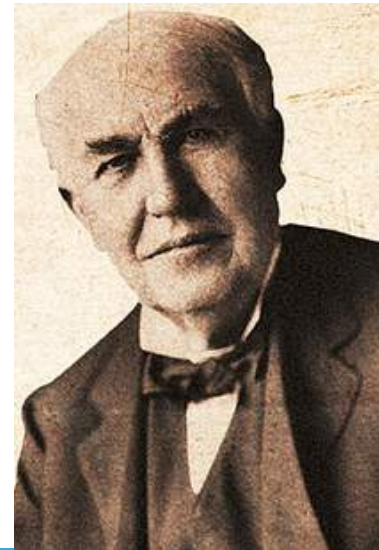
- CanSIA's plan is to ensure that solar electricity is cost competitive with other forms of electricity in Canada by 2020. The plan focuses on five key areas requiring strategic, coordinated and immediate action:
 - Develop a supportive and stable policy and regulatory environment that recognizes the total value of solar electricity, including externalities.
 - Simplify and streamline permitting and processes for grid interconnection and metering of solar electricity systems.
 - Reduce soft costs to levels consistent with global best practices.
 - Educate the Canadian population on the true benefits and costs of solar electricity, and empower them to take action to support and adopt solar.
 - Develop new and enhance existing relationships with technologies, applications and stakeholders to create synergies that enable greater solar electricity use in Canada.
- This vision for our future will require strong and confident leadership. It will also depend on the close collaboration of industry, government, stakeholders, and Canadians to make it work.

Distributed versus Centralized Electricity Systems

- Who would you have cheered for in the Current War – Edison or Tesla?
- In the late 1880's, the world was not ready for a distributed electricity system:
 - Coal was the prevailing Distributed Generation source.
 - Electricity distribution networks were in their infancy.
 - Grid-tied storage would be over a century way.
- Today, there is a fundamental paradigm shift afoot:



- Solar quickly becoming the dominant new electricity source. and at the least expense.
- “Internet of Things” is revolutionizing electricity distribution and enabling new products and services at the grid-edge.
- Grid-tied storage is about to experience similar deployment growth over the next decade that solar has during the last.



Solar becoming dominant electricity source at least expense

- This week, Bloomberg NEF issued forecasts for a massive shift in power sector:
 - *Solar Prices Keep Crashing*: “...it will outcompete new fossil-fuel plants”, “...potentially stranding billions in fossil-fuel infrastructure”.
 - *Solar Billions Become Solar Trillions*: “expect \$3.7 trillion in solar investments between now and 2040”, “will account for more than a third of new power capacity worldwide”.
 - *The Revolution will be Decentralized*: “By 2040, rooftop solar will be cheaper than electricity from the grid in every major economy”, “13% of electricity worldwide will be generated from small-scale solar systems”.
- This report assumes no further policies supporting renewables from 2018 or any unforeseen climate agreements. BNEF are not alone in their predictions:
 - Deutsche Bank:
 - 30% global electricity market, generate \$5 trillion by 2030.
 - International Energy Agency:
 - Sun could be world’s largest source of electricity by 2050.



The “Internet of Things” enabling new products and services

- By 2020, there will be tens of billions of data-spouting devices connected to the Internet. And they're already changing how we live and work.
- Interconnection of electricity distribution to “internet of things” enabling more complex interactions to take place at the grid-edge.
 - Utility-business model becoming consumer service not point-of-load administration.
 - Consumers becoming active market participants as micro-generators & soon storage.
- Fundamental shift in electricity sector business model paradigm underway being driven by:
 - The need to put consumers and their actions first; and
 - Embracing new Technology and Business Models:
- More Ontarians favour the use of solar energy over other generation types to power the electricity needs of the province with overall favourability now at 86%.

*This survey of Ontarians about solar energy, technology and policies was fielded: between May 1 and May 8th, 2015, with 837 adult Ontarians. Using a randomly-recruited, non-opt-in online panel, the margin of error would be +/- 3.39%, 19/20.

The dawn of behind-the-meter solar plus storage is upon us

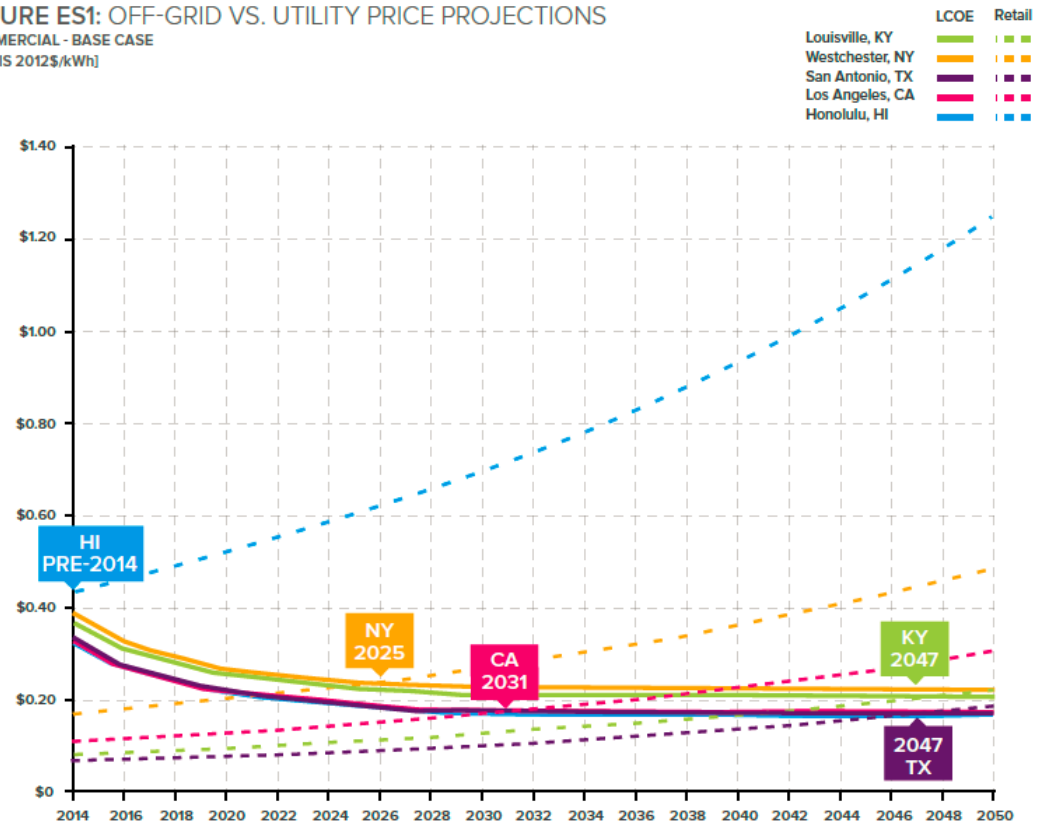
- Traditionally Storage only economic for off-grid or remote applications:
 - Pricing reaching new lows, drivers include manufacturing scale (e.g. giga-factories).
- Utilities and Regulators are now looking to Storage for solutions on aging grids:
 - Reliability, flexibility, reduced complexity and network congestion.
 - Conservation, demand-side management and load-shifting.
 - Integration of renewables and losses of generation sources (nuclear, coal).
- New revenue streams from selling services to consumers, or possibly bidding power and energy into frequency regulation, contingency reserves and wholesale markets.
- Soon storage will have mass consumer appeal:
 - Ugly old technology being replaced with beautiful consumer products.
 - Poster-children like Elon Musk of Tesla will boost *cachet*.



Why the hype about Behind-The-Meter Solar plus Storage?

- Combining solar with storage enables greater control of when electricity produced can be consumed thus enabling further optimization of solar system performance:
 - Solar-plus-battery grid parity is fast approaching.
 - “Load Defection” and “Grid Defection” could be disruptive to traditional utility business models.
 - As this disruption is so close, and well within the 30-year economic life of typical utility assets, how should long term decision-making in the electricity distribution sector adapt to this disruption?

FIGURE ES1: OFF-GRID VS. UTILITY PRICE PROJECTIONS
COMMERCIAL - BASE CASE
[Y-AXIS 2012\$/kWh]



Source: Rocky Mountain Institute

Context for CanSIA's Ontario DG PV Task Force

- CanSIA's Roadmap 2020 envisions the Canadian solar electricity industry as sustainable, with no direct subsidies
- Global trends for distributed generation of solar electricity are now moving away from direct standard offer programs such as feed-in tariffs
- Ontario's solar FIT is expected to end in 2017
- Natural next step for Ontario's solar industry is to partner directly with electricity consumers through net-metering and other customer-based generation models
- CanSIA has established an Ontario Solar Electricity Distributed Generation Task Force specifically to develop a post-FIT solution and strategy

The Role of the Task Force

1. To foster an enabling regulatory environment for customer based solar electricity within the Ontario electricity markets
2. To develop a roadmap for transitioning from the current FIT program to a customer-based generation model (e.g., net-metering)

Deliverables and Scope of the Task Force

- Jurisdictional scan of:
 - International best practices for customer-based generation models
 - Ontario barriers and opportunities for implementing customer-based generation model
- Concept paper of a customer-based generation model for Ontario market
- FIT Program transition plan toward new mode for Ontario
- Policy recommendations position paper for key identified stakeholders

Issues to be examined by the Task Force

- Net metering, incentive and procurement mechanism best practices
- Options for the evolution of FIT towards these best practices
- Identifying barriers to solar in Ontario and strategies to mitigate them
- Fixed charges, rate change and other regulatory developments
- Can solar in Ontario fit within the current CDM construct?
- Faster and more efficient grid access while responding to system needs

Thank You and Questions

- Do you have any questions for us?
- We also have some questions for you:
 - What key considerations are needed to lessen potential negative impacts on LDCs?
 - LDC Business Model?
 - Corporate Governance?
 - Engineering and System Management?
 - Customer Relations?
 - What new approaches could improve LDC's interactions with solar technology?
 - Policy & Programs?
 - Technical?
 - Regulatory?
 - On what issues can the solar industry and electricity distributors collaborate?

Contact

- **John Gorman, CanSIA President & CEO**
- Over 20 years of professional involvement in the sustainable infrastructure sector.
- Canadian Designate on the International Energy Agency's Executive Committee (PVPS).
- Served as a director on the boards of numerous community and corporate organizations including one of the nations largest electric utilities.
- Family and Ottawa-based home are proud participants in Ontario's microFIT solar program.
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 - LinkedIn: ca.linkedin.com/in/johnarthurgorman
 - YouTube: Search "gorman solar TedX" to watch TedTalk.



I hope to see you at one of CanSIA's upcoming events

CanSIA

Coming up in 2015

GAME CHANGER AWARDS 2015
March 26, 2015
Delta Toronto
TORONTO, ON
gamechangerawards.ca

SOLAR ONTARIO 2015
May 25– 27, 2015
Fallsview Casino Resort/Hilton
NIAGARA FALLS, ON

June 17, 2015
Jazz Bistro
TORONTO, ON
Summer SOLSTICE 2015

SOLAR WEST 2015
October 2015
in ALBERTA

SOLAR CANADA 2015
December 7 – 8, 2015
Metro Toronto Convention Centre
TORONTO, ON

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