

Customer  
Information  
Session

# OPEN HOUSE



May 15 & 16, 2017 | Presented by Niagara-on-the-Lake Hydro

# Agenda

1. Background on NOTL Hydro
2. Review of your electricity bill
3. Brief History of Ontario Electricity Industry
4. What is driving the high price of electricity
5. Recommendations and NOTL Hydro advocacy activity
6. Look into the future



# Niagara On-The-Lake HYDRO



- Over 100 years of distributing electricity in Niagara-on-the-Lake
- **NOTL Hydro is one of the smaller LDC's in Ontario**
  - 9,000 Customers
  - 133km<sup>2</sup> operating territory
  - Over 400km underground and overhead distribution lines
- Summer peak is 50MW
- 200 GWh delivered over the year
- 16 full time employees
- Lowest Delivery Charge in the Niagara Region

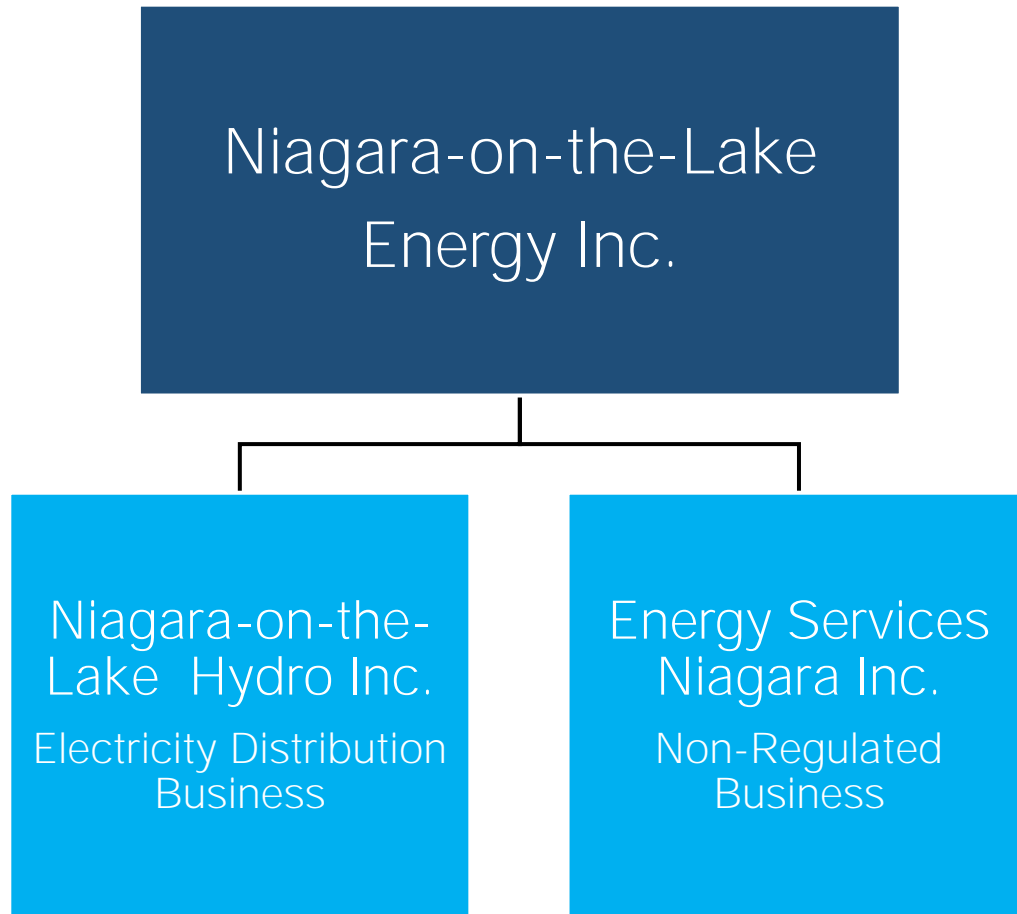
[www.notlhydro.com](http://www.notlhydro.com)

# Commitment to Safety

- Electricity can kill
- Safety is always first priority
- Achieved Zero Quest Bronze Award in 2005 and the 5<sup>th</sup> and final Platinum Award in 2012
- Part-time safety position created in 2015



# Corporate Structure



## Energy Services Niagara Inc.

- Any other business venture is kept separate from Hydro
- Owns 25% of NRBN
- Will own solar panels which will be built on roof of Hydro building later this year

# Board of Directors

## Independent

- Jim Ryan (Chair)
- Bob Cheriton (Vice Chair)
- Jim Huntingdon
- Nick Miller
- Philip Wormwell

## Town

- Lord Mayor Pat Darte
- Councillor Jamie King
- CAO Holly Dowd

# Strategic Goals

1. Safe Operations
2. Maintain a well run utility
  - Manage service and cost (rates) trade-off
3. Provide a fair return to the owner (Town of NOTL)
4. Enhance service to customers beyond basic operations
  - Investments in utility
  - Investments for profit and regional development
  - Advocacy efforts



# Customer Focus

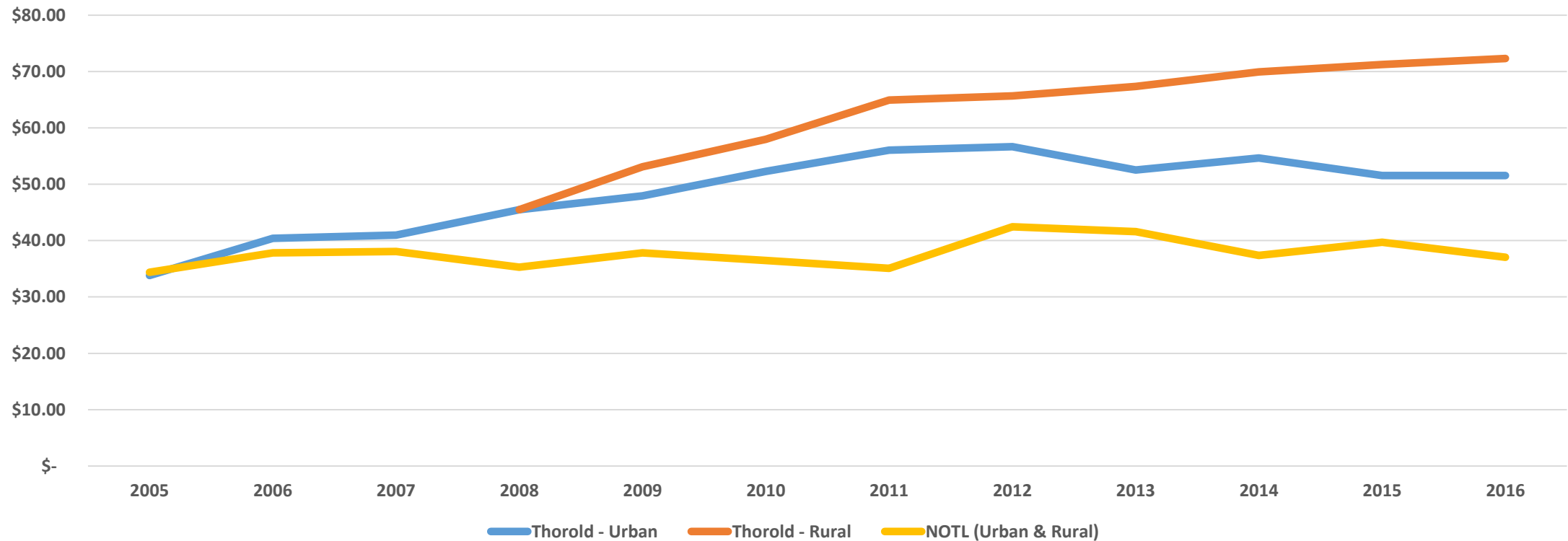


- Lowest delivery charge in the Niagara Region
- 24-hour on-call service for outages
- Front counter service maintained
- Combined electricity/water bills
- Investments determined for overall customer impact
- Local presence and knowledge



# Manage Rates

Monthly Delivery Charge - 800 kWh Residential Customer  
Hydro One (Thorold) and NOTL

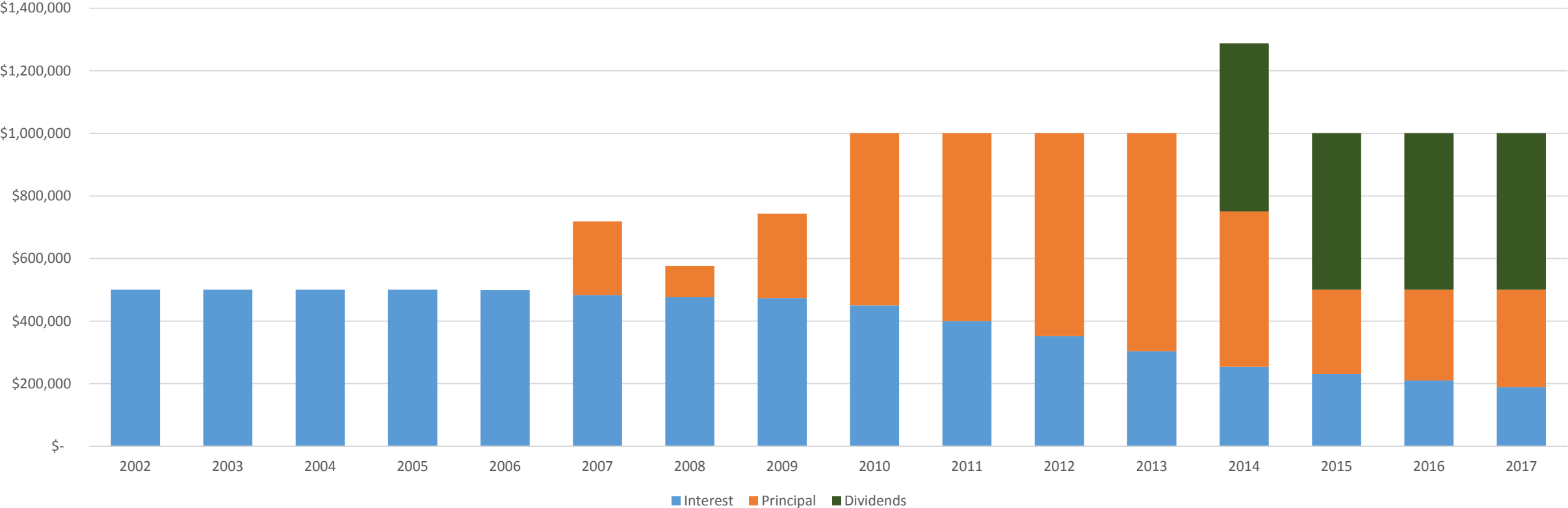




# Annual Payment to Town

Annual Payments to Town of \$1 million helps lower property tax rates

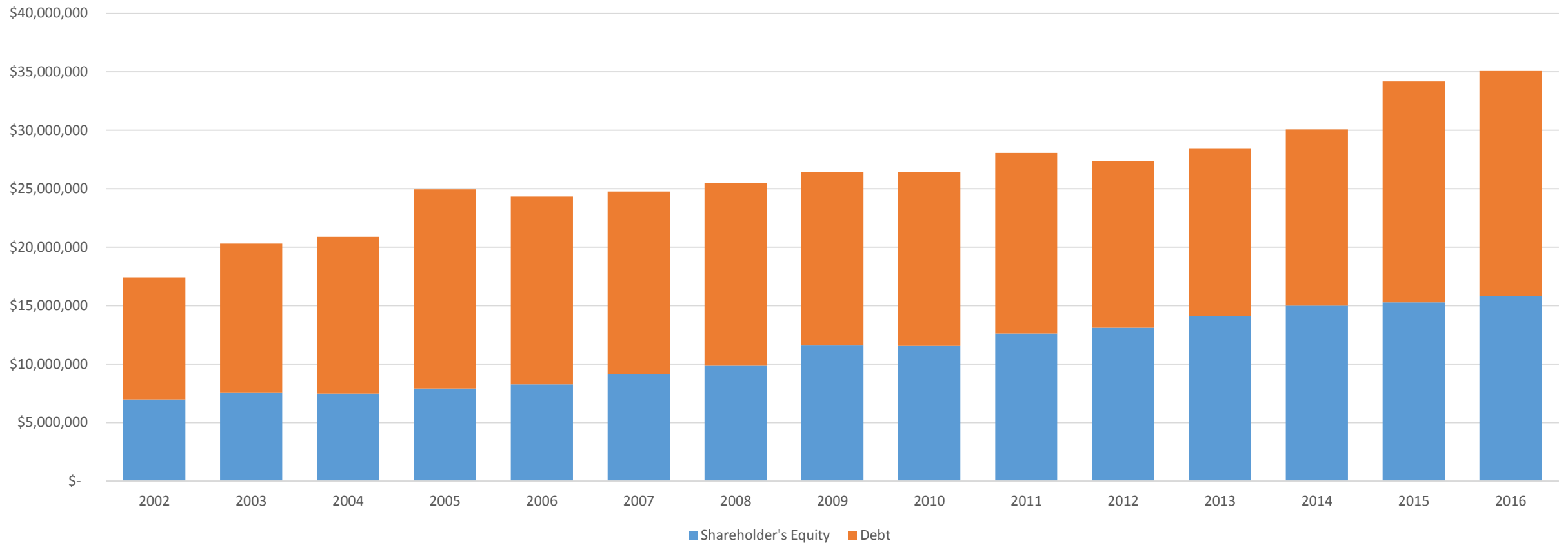
Annual Payments to Town



# Book Value of NOTL Hydro



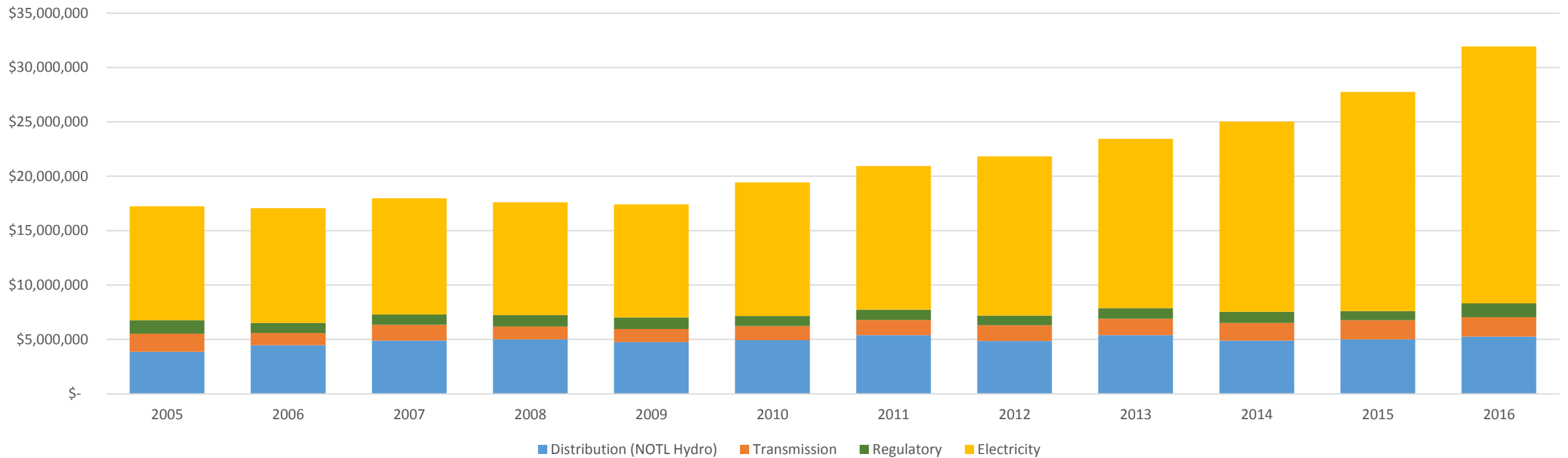
NOTL Hydro - Total Assets



# NOTL Hydro Revenue

- 17% of hydro bill kept by NOTL Hydro
- 83% for generation, transmission and regulation

NOTL Hydro Revenue



# Annual Investments

- Average \$1.3 million per year in regular capital investments
- Continued investment in both physical plant (poles, wires, transformers) and systems required to:
  - Meeting growing demand for electricity
  - Improve reliability
  - Reduce system losses
- Current investments include:
  - New 50MW transformer (enough to provide power to all of NOTL)
  - 40-year program to replace old lines in Old Town with new underground lines
  - 30-year program to replace old rural 4kV lines with new 27.6kV lines
  - Automated switches to reduce outage times



# Conservation

LDCs are required to participate in province-wide Conservation and Demand Management (CDM) programs designed to reduce the demand for electricity.

- NOTL Hydro achieved over 100% of its 2011-2014 target
- 1 GWh of savings to be achieved in each year (1GWh = 1,000,000 kWh)
- Target for 2015-2020 is 11.7 GWh. 45% of target met by end of 2016
- CDM Programs assist NOTL residents and businesses to reduce their electricity costs and make them more efficient
  - Outlet Mall developer >\$200,000
  - Town Street lighting >\$200,000
- NOTL Hydro has received a CDM award from Natural Resources Canada for **it's efforts, the smallest utility** to win this award.



# Local (Distributed) Generation



- 142 Generators in NOTL (141 solar and 1 hydro)
- Provides 7.5% of total energy consumed in NOTL
- NOTL Hydro pays each generator monthly
- Most local Generation helps reduce transmission costs
- Not currently possible to add large generation in NOTL due to capacity constraints on transmission system
- Some of the NOTL Hydro feeder lines are at capacity

# Your Hydro Bill



**MESSAGES:**

The Ontario Government is providing a rebate on your electricity costs equal to the provincial portion of HST.

~

The Debt Retirement Charge was removed for certain residential consumption after December 31, 2015.

Learn more at [Ontario.ca/DRC](http://Ontario.ca/DRC).

E-Billing: Customer Connect – it’s quick and simple.

Visit: [www.NOTLHydro.com](http://www.NOTLHydro.com) to sign up today.

**CONSUMPTION COMPARISON (Usage Per Day)**

	This Bill	Last Bill	Last Year
Electric (kWh)	45.17	39.50	41.17
Water (m3)	0.54	0.35	0.66

**YOUR ELECTRICITY CHARGES**

	RATE (\$)	USAGE	CHARGES
OFF PEAK WINTER*	0.087000	885.85	\$77.07
MID PEAK WINTER*	0.132000	141.45	\$18.67
ON PEAK WINTER*	0.180000	191.35	\$34.44
DELIVERY*			\$43.10
REGULATORY CHARGES*			\$8.84
DEBT RETIREMENT CHARGE*			\$0.00
<b>TOTAL ELECTRICITY CHARGES</b>			<b>\$182.12</b>

**YOUR WATER AND SEWER CHARGES**

METERED WATER CHARGE	1.347100	15.00	\$20.21
WATER SUPPLY CHARGE			\$21.27
<b>TOTAL WATER AND SEWER CHARGES</b>			<b>\$41.48</b>
<b>OTHER CHARGES AND ADJUSTMENTS</b>			
<b>TOTAL *HST (863605929)</b>			<b>\$23.68</b>

8% PROVINCIAL REBATE -\$14.57

CURRENT CHARGES From 2017-02-01 to 2017-03-01 \$232.71

TOTAL AMOUNT DUE \$232.71

Debt Retirement Charge exemption saved you \$8.53



# Electricity Commodity Charge

## Residential and Small Business Customers:

- Regulated Price Plan – set every six months by the OEB

Time of Day	Winter price	Potential price	Current price
On-peak (Summer Weekdays 11:00 am – 5:00 pm) (Winter weekdays 7:00 – 11:00 am; 5:00 – 7:00 pm)	18.0¢/kWh	18.5¢/kWh	15.7¢/kWh
Mid-peak (Winter Weekdays 11:00 am – 5:00 pm) (Summer weekdays 7:00 – 11:00 am; 5:00 – 7:00 pm)	13.2¢/kWh	13.3¢/kWh	11.3¢/kWh
Off-peak (Weekends and holidays – all day) (Weekdays 7:00 pm – 7:00 am)	8.7¢/kWh	9.1¢/kWh	7.7¢/kWh

## Larger Businesses:

- HOEP (Hourly Ontario Electricity Price) + Global Adjustment

# HOEP & GA



HOEP = Hourly Ontario Electricity Price

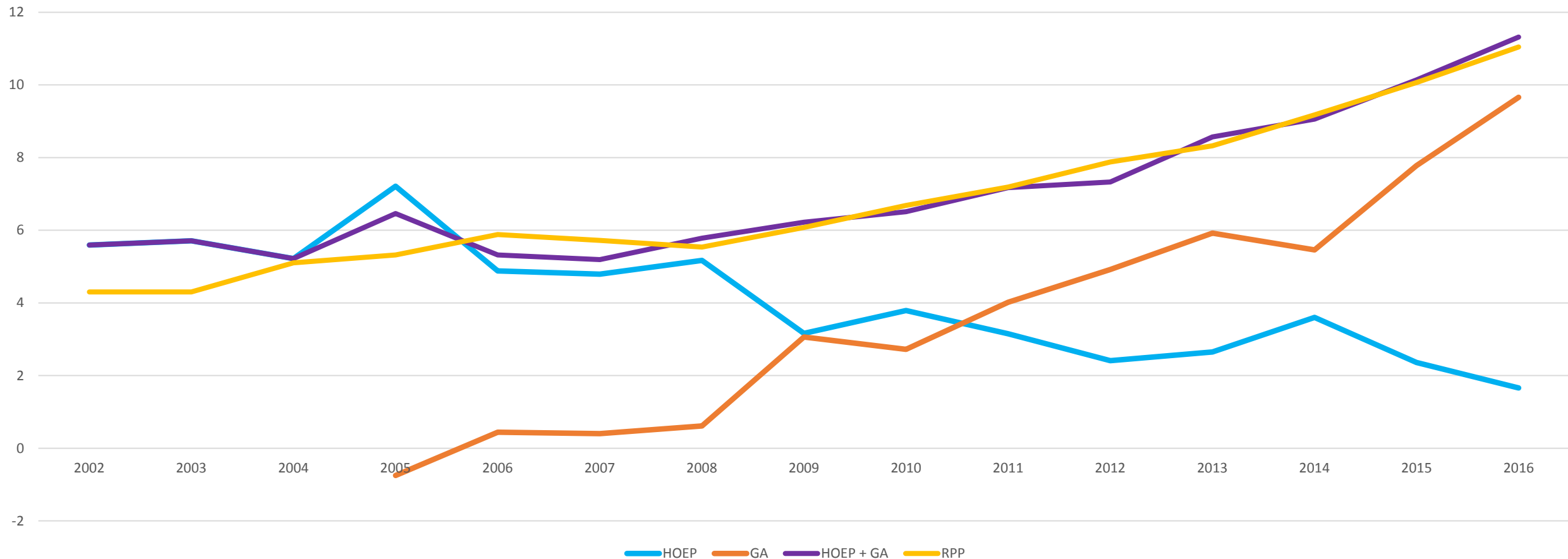
The wholesale price of electricity determined in the real-time market administered by the IESO.

Global Adjustment

1. Contracted price for purchased electricity less HOEP
2. Regulated price for OPG electricity less HOEP
3. Conservation programs
4. Savings provided to industrial customers under ICI

# Average Price of Electricity

Average Price of Electricity (cents/kWh)



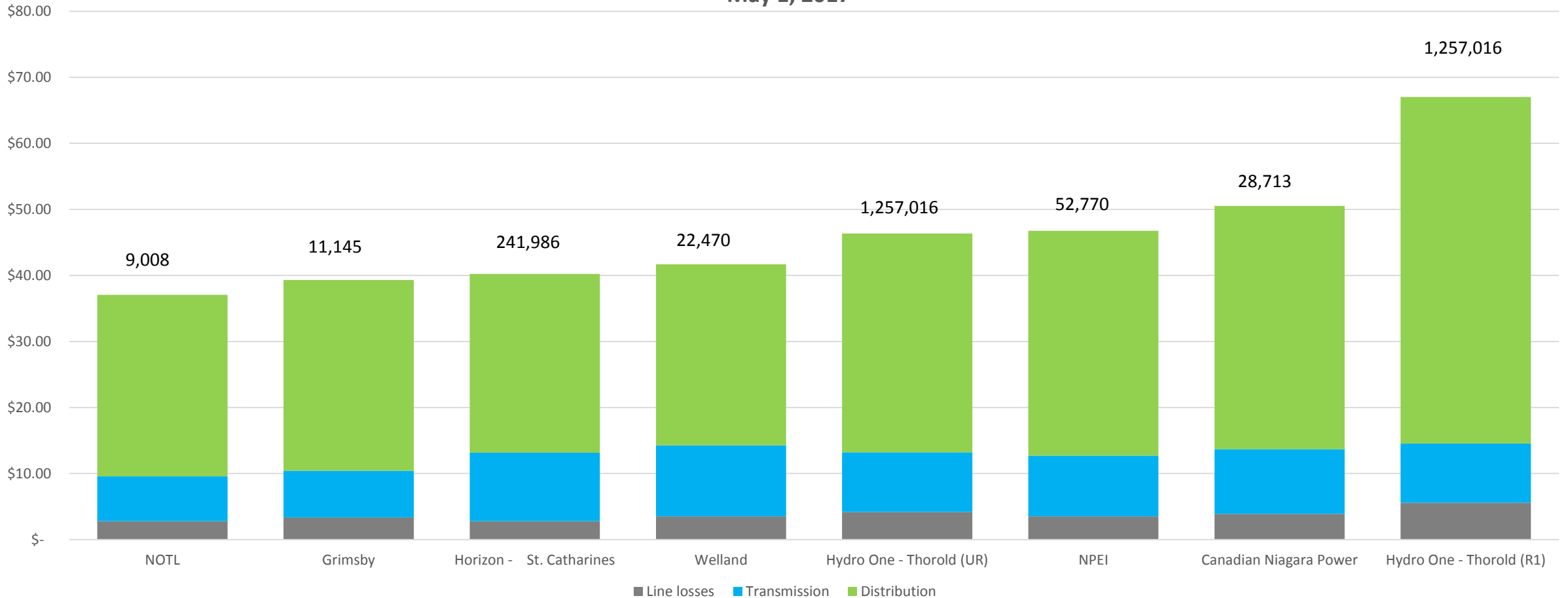
# Delivery Charge

1. Distribution Charges – <i>kept by NOTL Hydro</i>	
Fixed monthly charge - \$21.70/month	\$20.36
Variable rate - \$0.0059/kWh	\$ 6.80
2. Transmission Charges – <i>Hydro One</i>	\$11.00
3. System loss – <i>electricity lost during distribution</i>	<u>\$ 4.94</u>
Total	\$43.10

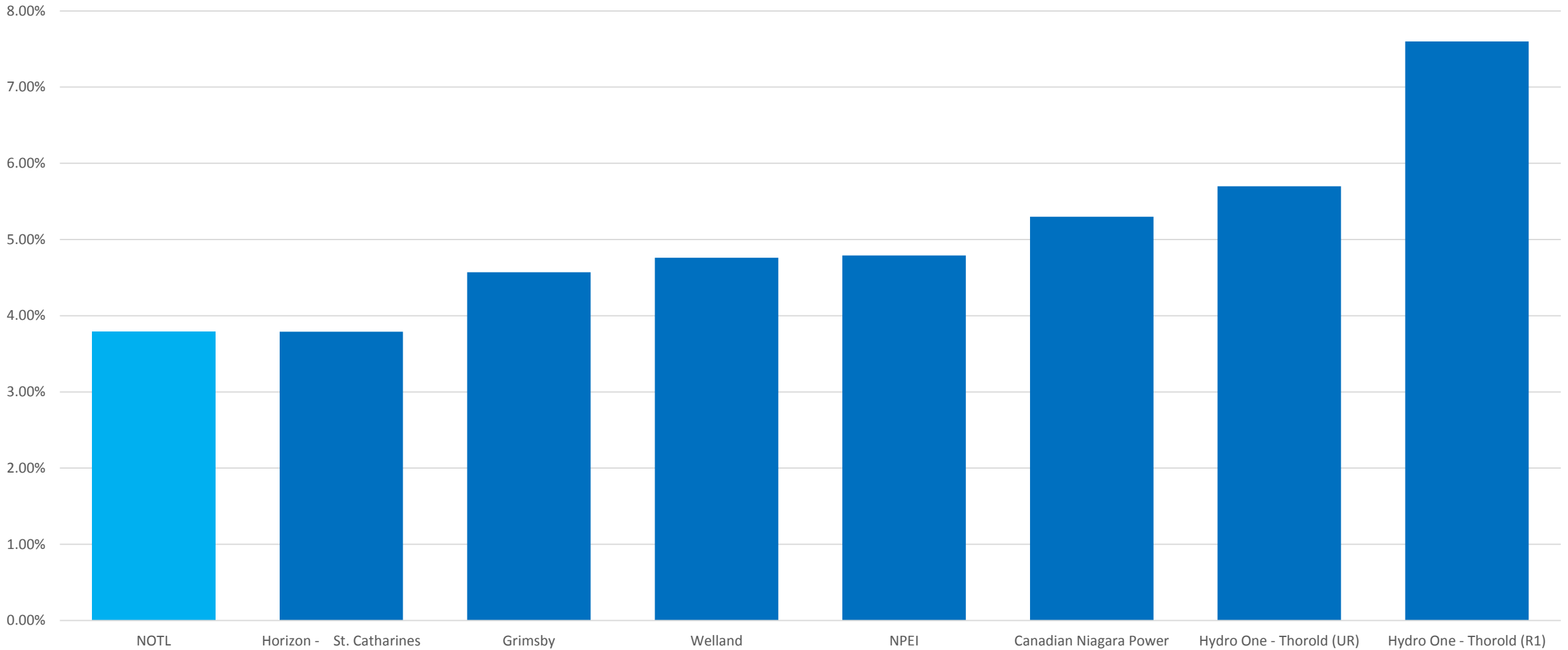
# Niagara Region Hydro's Delivery Charges



Niagara Region Residential Delivery Charge (with # customers)  
- May 1, 2017



# Niagara Region Hydro's Line Losses



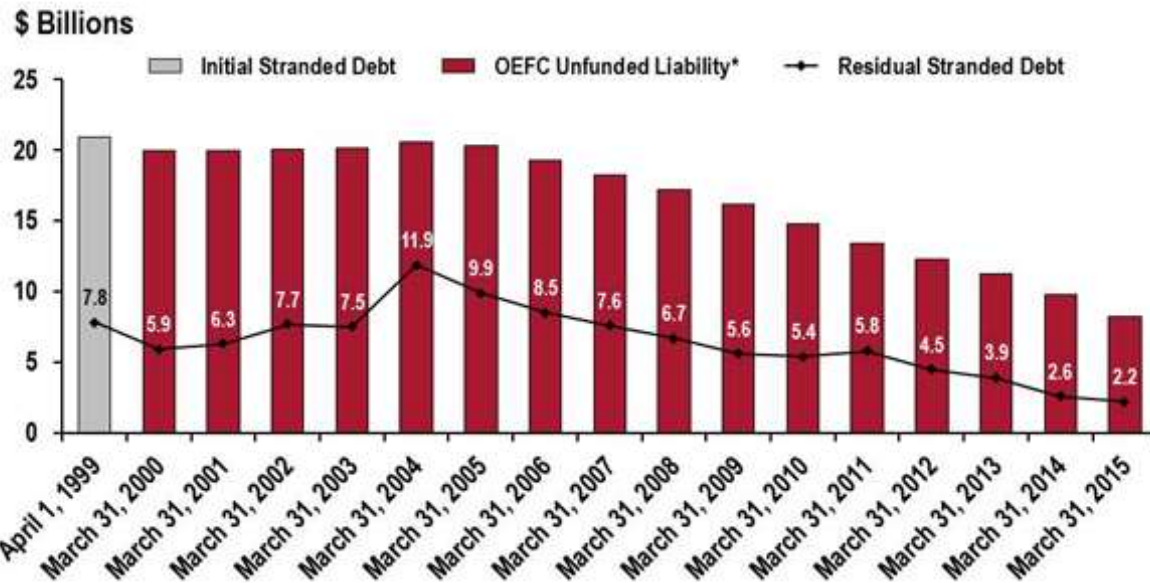
# Regulatory Charges



1	Administration Fee	<ul style="list-style-type: none"><li>kept by NOTL Hydro</li><li>\$0.25 / month (<i>pro-rated</i>)</li></ul>	\$0.23
2	Wholesale Market Service Charge	<ul style="list-style-type: none"><li>IESO</li><li>\$0.0036 / kWh</li></ul>	\$4.56
3	Rural and Remote Rate Protection	<ul style="list-style-type: none"><li>Hydro One remote customers</li><li>\$0.0021 / kWh</li></ul>	\$2.66
4	Ontario Electricity Support Program	<ul style="list-style-type: none"><li>low income customers</li><li>\$0.0011 / kWh</li></ul>	\$1.39
			<hr/>
		Total	\$8.84

# Debt Retirement Charge

CHART 3.8 Residual Stranded Debt since April 1, 1999



\* OEFC's unfunded liability as at April 1, 1999, was \$19.4 billion, which is the initial stranded debt of \$20.9 billion adjusted for \$1.5 billion of additional OEFC assets as of that date, including primarily an accounting asset for deferred debt charges.  
 Notes: Unfunded Liability amounts are from OEFC Annual Reports from 1999–2000 to 2014, and the Annual Financial Statements for 2015. Residual Stranded Debt value for April 1, 1999, as announced on April 1, 1999. Values for the period from March 31, 2000, to March 31, 2010, as estimated by the Ministry of Finance in the 2012 Budget and for March 31, 2011, to March 31, 2014, as determined by the Minister of Finance in accordance with a regulation made under the Electricity Act, 1998, and as estimated for March 31, 2015.

- Created to pay down the \$19.4 billion stranded debt from Ontario Hydro in 1999
- Residential customers stopped paying DRC in 2016
- Businesses will stop paying in April 2018
- Remaining debt was \$4.4 billion as of March 31, 2016



# Ontario Fair Hydro Plan

1. 8% rebate since January 1, 2017
2. 17% reduction in RPP effective May 1, 2017
3. OESP charge to be removed from bills May 1, 2017
4. RRRP to be removed from bills some future date
5. Future rate increases not higher than rate of inflation



# Ontario Electricity History - 1

- 1906 Hydro-electric Power Commission of Ontario (HEPCO) created  
Electricity has always been political in Ontario  
Municipal distribution systems created as municipalities took responsibility from HEPCO
- 1922 Sir Adam Beck plant on Niagara River first opens
- 1971 Pickering nuclear plant comes into service
- 1974 Ontario Hydro created; electricity at cost mandate
- 1980's** Bruce and Darlington nuclear plants open with significant cost over-runs and subsequent rate increases
- 1993** Rate freeze until 2002
- 1999 Over 300 Municipal Electric Utilities



# Ontario Electricity History - 2

- 1999 Ontario Hydro broken-up:
- a) Ontario Power Generation (OPG) - generation
  - b) Hydro One – transmission and distribution
  - c) Independent Electricity System Operator (IESO) – system operator
  - d) Electrical Safety Authority (ESA)
  - e) Ontario Electricity Finance Corporation (OEFC) - \$19.4 billion stranded debt
  - f) Ontario Energy Board – given rate setting authority
- 2002 Market opens – May 1;  
**Price freeze – November – this eventually becomes the RPP**
- 2003 Eastern seaboard black-out  
Coal phase-out announced – campaigned by all three parties
- 2005 Global Adjustment created (contracted energy and OPG regulated prices)
- 2009 Green Energy Act (FIT and MicroFIT contracts)

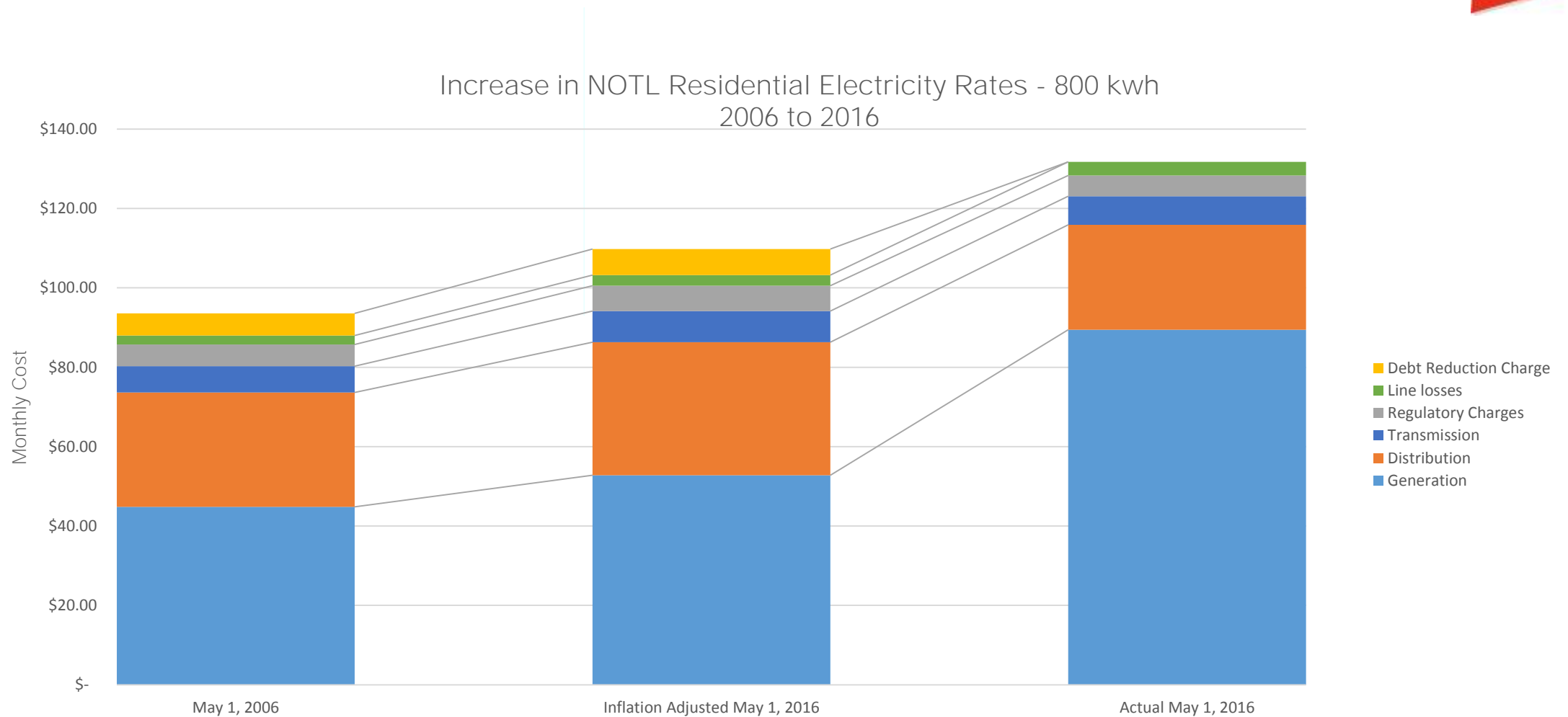


# Ontario Electricity History - 3

- 2010 Industrial Conservation Initiative (ICI) launched
- 2011 Conservation and Demand Management (CDM) program launched
- 2011 HST added to electricity bills
- 2011 **Ontario Clean Energy Benefit – 10% reduction until 2015**
- 2016 Debt Reduction Charge removed from residential bills
- 2017 OESP introduced
- 2017 Rural and remote protection plan increased
- 2017 **Ontario Fair Hydro Plan**
- 2018 Debt Reduction Charge to be removed from all bills



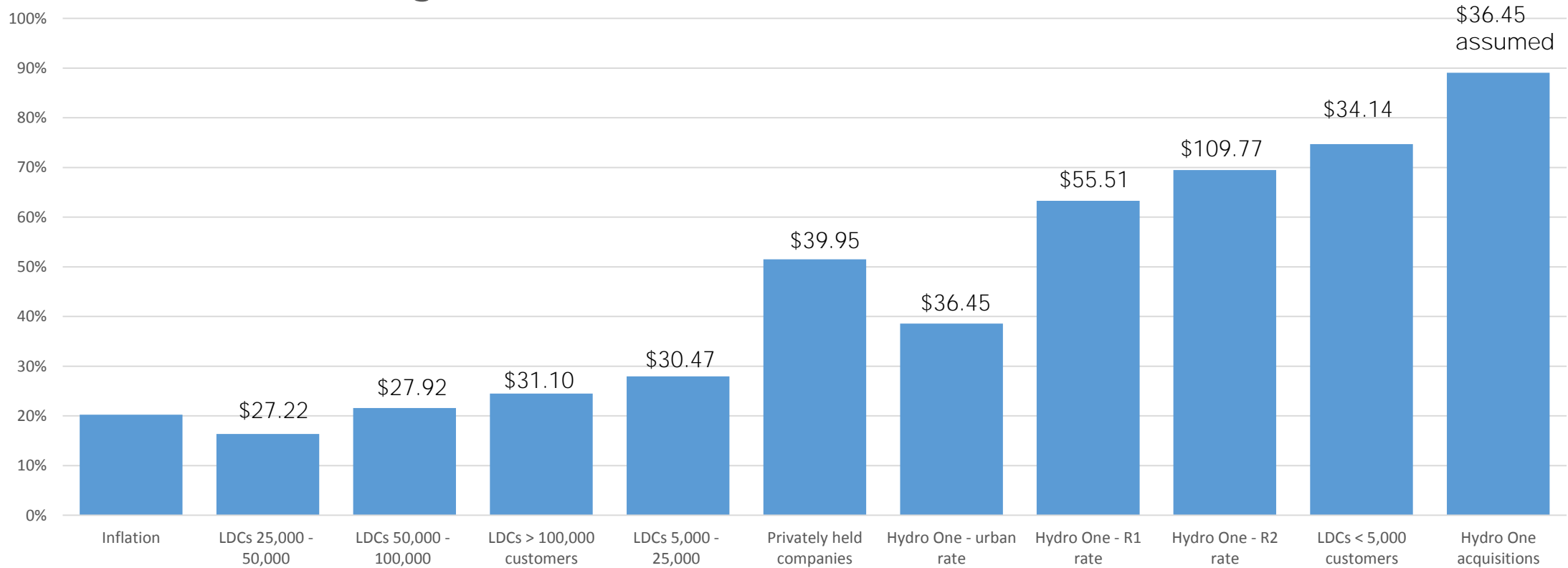
# Rising Electricity Costs



# Distribution Rates



## Average Distribution Rate Increase 2005-2016



NOTL Hydro rate increase from 2005-2016 was 17% and our distribution rate was \$26.42 in 2016.

# Cost of Electricity – 2015

Technology	Cost (\$MM)	Production (TWh)	Production (%)	Price (\$/MWh)
Nuclear	5,864	92.3	64%	\$63.6
Hydro	2,159	37.2	26%	\$58.1
Gas/Oil	2,183	15.5	11%	\$140.8
Wind	1,346	10.2	7%	\$132.5
Solar	1,386	3.0	2%	\$461.1
Bioenergy	194	0.6	0.4%	\$306.7
Coal	-	-	0%	\$-
Other	60	1.4	1%	\$43.8
Imports	169	5.8	4%	\$29.4
<b>Total</b>	<b>13,359</b>	<b>165.8</b>	<b>Average</b>	<b>\$80.6</b>
Exports	(606)	(22.6)	(16%)	\$26.8
<b>After exports</b>	<b>\$12,753</b>	<b>143.2</b>	<b>Average</b>	<b>\$89.1</b>

# Ontario Supply Mix 2007-2015

Technology	Production 2007 (TWh)	Production 2015 (TWh)	Change in Production (TWh)
Nuclear	80.8	92.3	11.5
Hydro	33.0	37.2	4.2
Gas/Oil	12.2	15.5	3.3
Wind / Solar	1.1	13.2	12.1
Coal	28.4	0.0	(28.4)
Other	1.9	2.0	0.1
Imports	7.2	5.8	(1.4)
<b>Total</b>	<b>164.5</b>	<b>165.8</b>	<b>1.3</b>
Exports	(12.3)	(22.6)	(10.3)
<b>Total</b>	<b>152.2</b>	<b>143.2</b>	<b>(9.0)</b>
<b>Total Cost (\$B)</b>	<b>\$8.2</b>	<b>\$12.8</b>	<b>+\$4.6</b>
<b>Cost per MWh</b>	<b>\$54.1</b>	<b>\$89.1</b>	<b>+\$35.0</b>

- 2014 was the last year of any electricity generation from coal in Ontario
- Demand for electricity has declined by 6%
- Cost of electricity has grown by 65% in eight years
- Inflation in this time period was 14%



# Cost of Electricity – Coal

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2007 Coal production (TWh)	28.4
2007 Avg. Generation Cost	\$54.1
2007 Coal Cost	\$53.1
Increase in Costs	\$1.0
Increased Costs by Removing Coal (millions)	\$28.4

*Coal was 19% of total supply in 2007*



# Cost of Electricity – Nuclear

Technology	Cost (\$MM)	Production (TWh)	Production (%)	Price (\$/MWh)
<b>Nuclear</b>	<b>5,864</b>	<b>92.3</b>	<b>64%</b>	<b>\$63.6</b>
Hydro	2,159	37.2	26%	\$58.1
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2015 Nuclear Production (TWh)	92.3
2015 Avg. Cost	\$63.6
2007 Avg Cost	\$50.4
Increase in Costs	\$13.2
<b>Increased Costs of nuclear (millions)</b>	<b>\$1,218</b>

*Nuclear production grew by 14% from 2007-2015*



# Cost of Electricity – Wind/Solar

2015 Wind/Solar Production (TWh)	13.2
2007 Avg. Cost	\$54.1
2015 Wind/Solar Cost	<u>\$2,732</u>
Value of Wind/Solar	\$714
Excess Costs (\$ millions)	<u>\$2,018</u>

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# Cost of Electricity – Capacity

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2015	
Cost of Gas/Oil	\$2,183
Value of Gas/Oil	\$476
Cost of Capacity Payments	\$1,707
2007	
Cost of Gas/Oil	\$1,147
Value of Gas/Oil	\$688
Cost of Capacity Payments	\$459
<i>Increase in Capacity Costs</i>	<u>\$1,248</u>

*Gas production increased 27% from 12.2 TWh to 15.5 TWh*

# Increase in Cost of Electricity 2007-2015

Breakdown of the increase in the cost of electricity from 2007-2015:

Nuclear	\$1.2	- <i>cost per unit increase of 26%</i>
Wind/solar contracts	2.0	- <i>combined avg. price over 20¢ per kWh</i>
Capacity Costs	1.2	- <i>driven by intermittent wind/solar</i>
Other	<u>0.2</u>	
<b>Total</b>	<b>\$4.6</b>	

# Cost of Electricity – Exports

Technology	Cost (\$MM)	Production (TWh)	Production (%)	Price (\$/MWh)
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<b>Total</b>	<b>\$12,753</b>	<b>143.2</b>	<b>Average</b>	<b>\$89.1</b>

2015	
Proceeds from Exports	\$606
Exports (TWh)	22.6
Average price (excl. exports)	\$80.6
Cost of Exports	\$1,821
<i>Loss on Exports</i>	<i>\$1,215</i>

2007	
Proceeds from Exports	\$594
Exports (TWh)	12.3
Average price (excl. exports)	\$53.7
Cost of Exports	\$660
<i>Loss on Exports</i>	<i>\$66</i>

*Increase in Loss on Exports*      *\$1,149*

# Cost of Electricity - Recommendations

Recommendation	Status
1. Stop signing high priced green energy contracts	Largely done other than FIT 5 What contracts can be reasonably cancelled?
2. Write-off excess cost of green energy contracts	Effectively been done under Fair Hydro Plan Expect this cost to move to debt eventually.
3. Remove costs from system where possible	Nothing has been done
4. Independent regulator	OEB has been made less independent IESO needs mandate improved
5. Break-up Hydro One	50% sold, break-up highly unlikely
6. Prepare for future	Good work in Province High price is an impediment

# NOTL Hydro Activity - Press Releases



Date	Press Release Subject
December 9, 2015	NOTL Hydro Board challenges Minister of Energy to debate – <i>11 recommendations</i>
September 13, 2016	Open letter to Premier Wynne on the Cost of Electricity – <i>11 recommendations</i>
February 1, 2017	Electricity Costs rose again on January 1, 2017
March 1, 2017	NOTL Hydro board urges Minister of Energy to cancel FIT 5
April 3, 2017	Board urges Reduction in Electricity Costs for all Businesses
May 1, 2017	NOTL Hydro Board urges cancellation of \$2 billion Electricity Conservation Programs



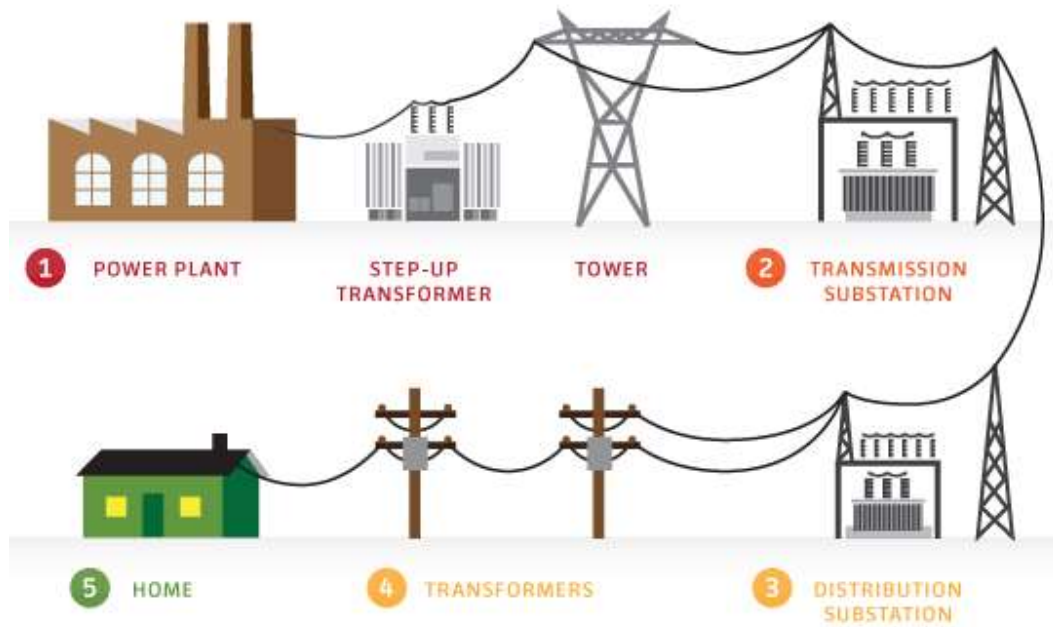
# NOTL Hydro Activity - Meetings



The logo for the Liberal Party of Ontario, featuring a large red letter 'L' followed by the words "LIBERAL" and "ONTARIO" in red, stacked vertically.	Minister of Energy or Representative	Twice (15 minutes each)
A logo consisting of a stylized 'C' shape in blue and red, with a green circle inside the 'C'.	Energy Critic	3 times
The logo for the Ontario New Democratic Party, with "ONTARIO" in orange above "NDP" and "NPD" in orange, with a stylized orange arrow pointing right.	Energy Critic	Twice (including at our Board meeting)
The logo for the Ontario Premier's Office, featuring a stylized white flower or leaf icon to the left of the word "Ontario" in a black serif font.	Ministry of Energy <b>Premier's Office</b>	Multiple times

# Electricity in the Future

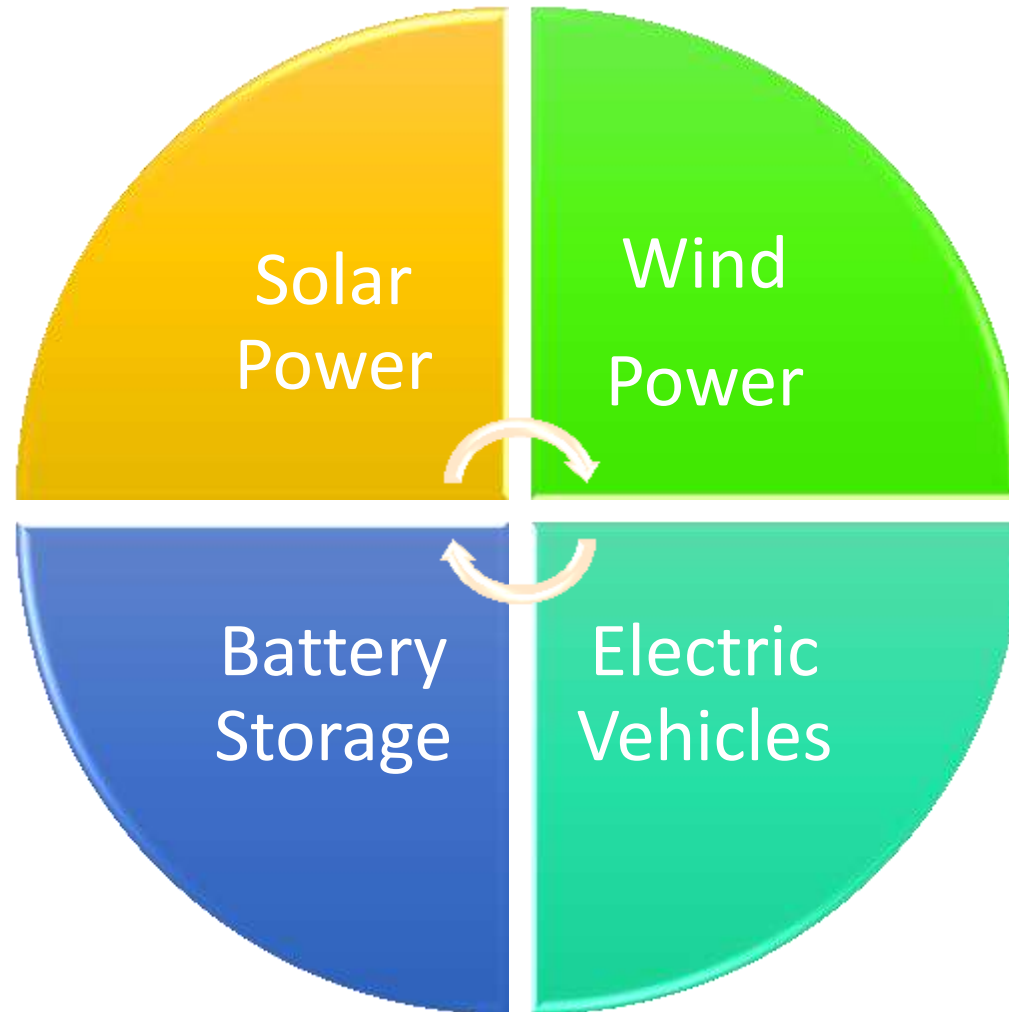
## Past Electricity System



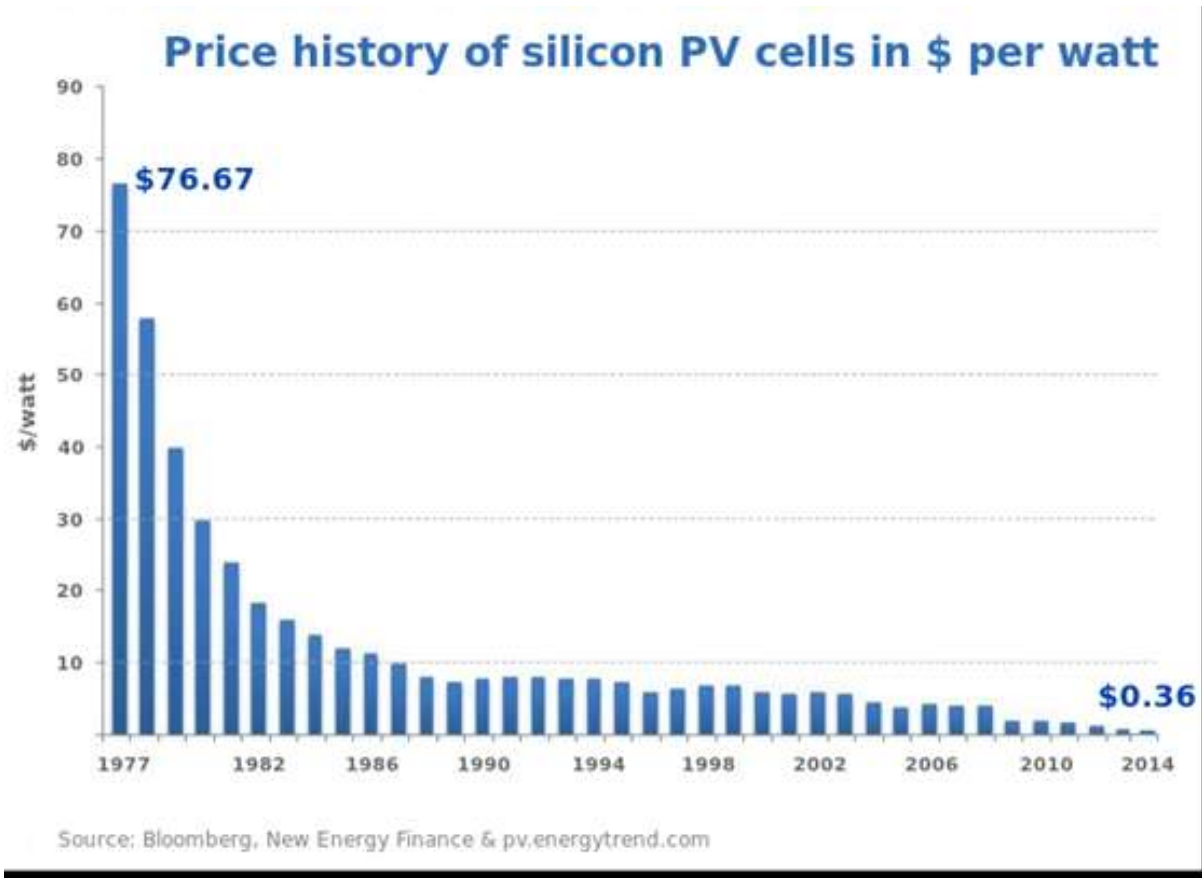
## Future Electricity System



# Electricity in the Future



# Solar Power Cost Curve



- Solar power gets cheaper every year
- Large solar sites in favourable climates have costs as low as \$0.04/kWh
- Prices expected to continue to fall with improvements in technology
- No reason solar power cannot become ubiquitous

# Solar Power



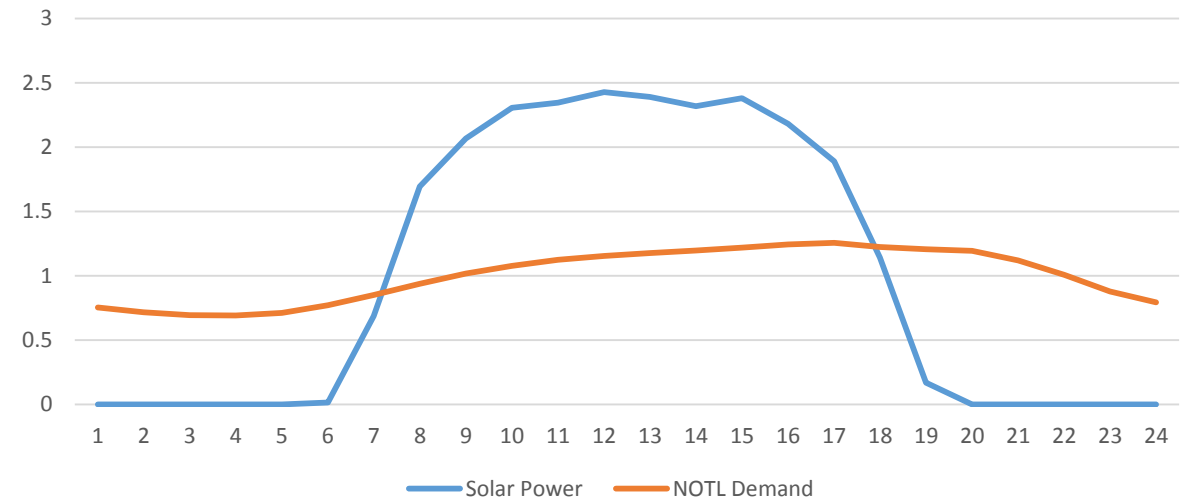
# Solar Power - Daily



- Solar power generates no electricity at night
- Generation still needed at night to meet demand
- Storage is a solution but at what cost



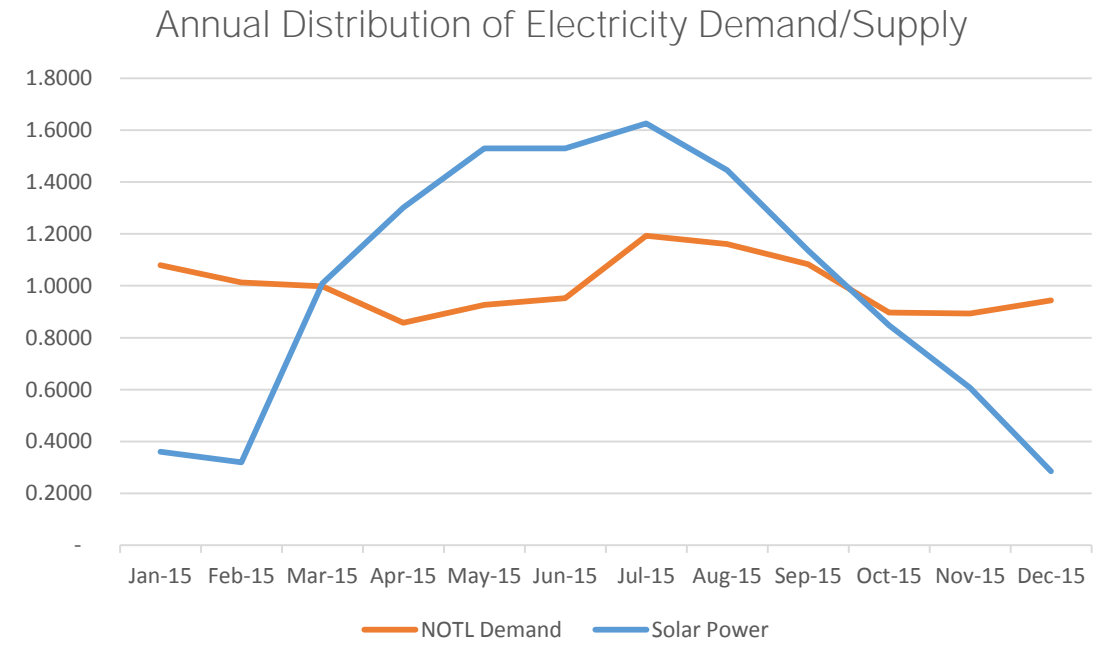
Daily Distribution of NOTL Demand vs Solar Supply - Sept 2015



# Solar Power - Annually



- Solar power generates little electricity in winter, even in NOTL
- Generation still needed in winter to meet demand
- Storage not a solution over time line and with this volume



# Solar Power - Net Metering

Net metering is a contract between the LDC and the customer with solar generation:

- Customer uses electricity generated and gives the excess to LDC for a credit
- Credit calculated based on prevailing costs
- When customer uses electricity from LDC (at night or winter) the credit is applied
- Credits not used for 12 months disappear
- No cash payments for electricity ever made to customer



# Solar Power – Distribution Lines

Distribution lines can only handle a finite amount of solar power

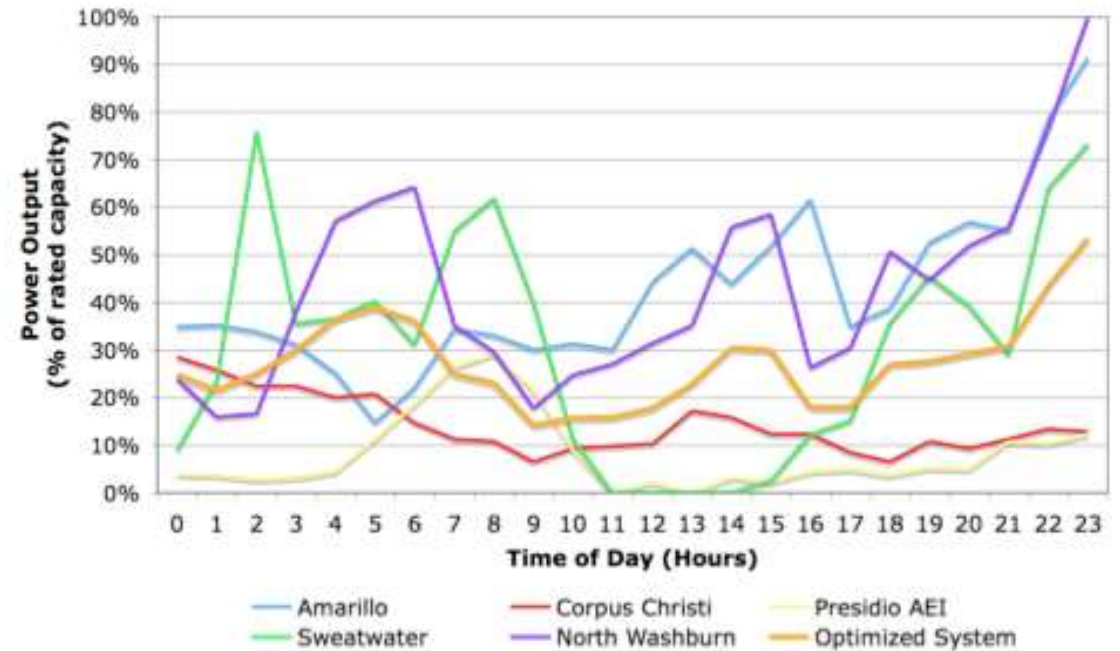
- Exceeding these limits can create problems with voltage control and power quality
- We are already at these limits in parts of NOTL
- Unaddressed issue of who should pay for any system modifications which would allow for increased solar power



# Wind Power

- Wind power can vary from minute to minute which means standby generation must always be available
- Timing of wind power also varies by site with some sites producing power at better times than others

**Figure 5: Optimized output (5 sites in Texas, January 1, 2004)**

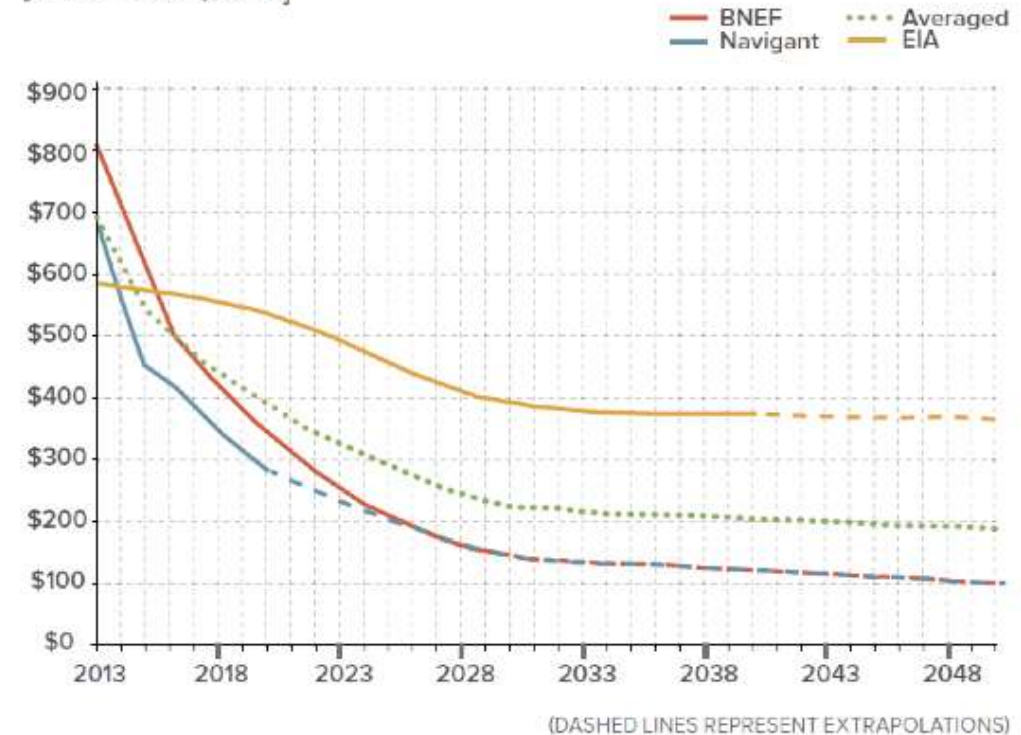


# Battery Storage

- If we can store energy then the intermittent supply from solar and wind becomes less of a problem
- Cost of battery storage expected to fall significantly over the next few years
- Use of batteries can also allow more generation on a distribution line

Figure 41: Blended Battery Price Projections

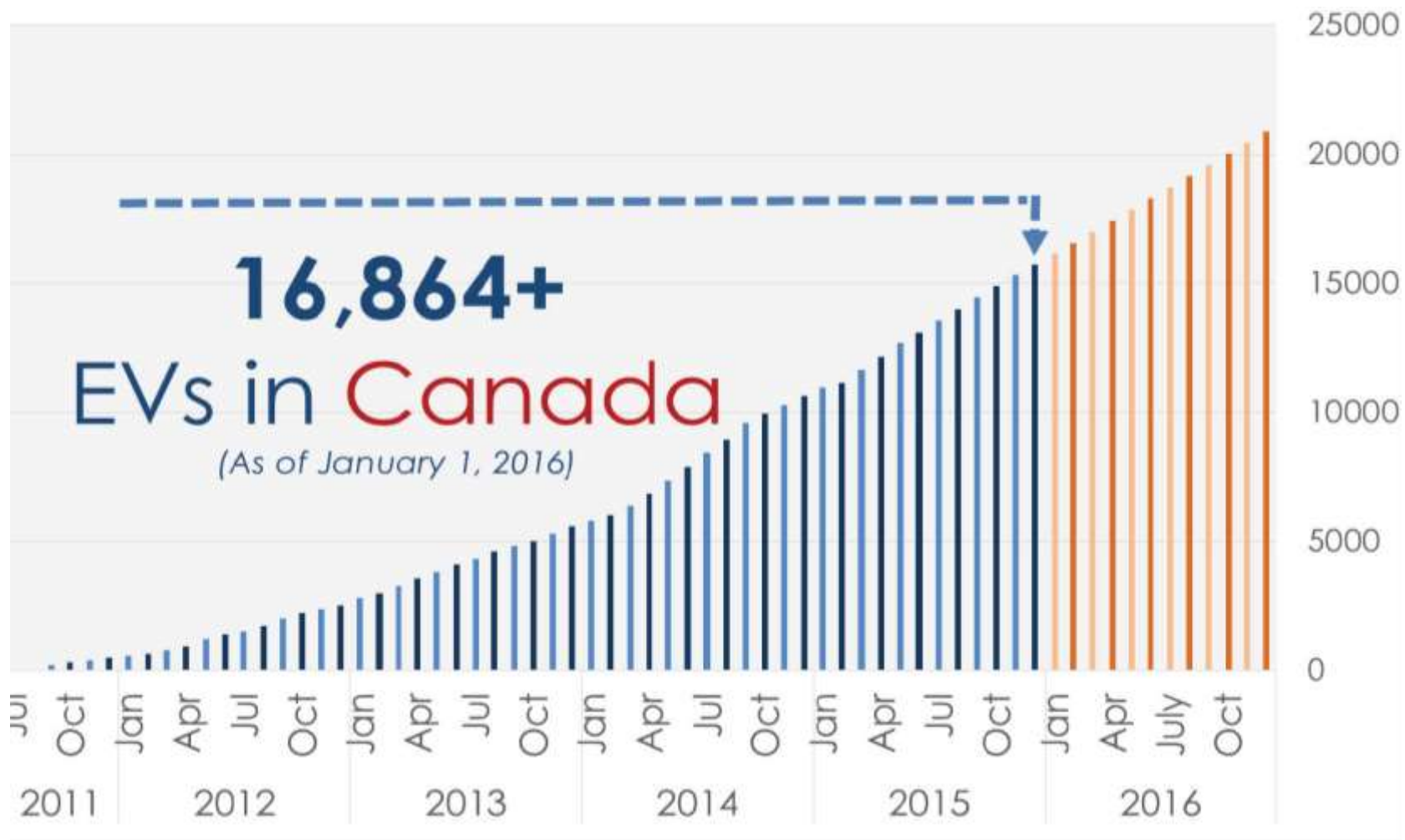
BATTERY PRICE PROJECTIONS  
[Y-AXIS 2012\$/kWh]



Source: Rocky Mountain Institute

# Growth of electric vehicles in Canada

Presented by  
**Niagara**  
**On-The-Lake**  
HYDRO



# Impact of 1 million EVs on Ontario Grid - Load

## Load

- Assume 5,000 kwh per annum per vehicle (GM est. 2,500 kwh)
- Total load 5 TWh for 1 million EVs
- Ontario load is 140 TWh so a 3.6% impact
- Ontario has sufficient electricity capacity to charge all electric vehicles



# Impact of 1 million EVs on Ontario Grid – Demand

## Demand

- Level 2 charger has 7.2 kw demand
- Total demand 7,200 MW for 1 million EVs if all charged at once
- 2015 peak is 22,500 MW (avg. 15,600 MW) while capacity is 39,000 MW
- Peak is usually around 5:30 PM. If all vehicles charged at that time (upon return from work) then could be an issue.
- Potential solution is to give utilities ability to curtail charging; cost and freedom issue



# Impact of 1 million EVs on Ontario Grid – Local Demand

## Demand

- Level 2 charger has 7.2 kw demand
- Typical transformer has 50 kw capacity and serves around 7-10 houses; houses average 3-4 kw demand
- In many neighbourhoods transformers are already at capacity with growth in pools, hot tubs, etc.
- It would not take many electric vehicles to overload the local transformer



Thank you