

Background Note:

Net Metering Uptake Modelling and Incentive Analysis

1) Net Metering Uptake and Incentive Levels

- Tables 1 and 2 below provide ENERGY's forecast of net metering uptake levels and project financial impacts for residential and commercial scale projects at differing levels of incentives. Project financials (ROI, payback period and NPV) are estimated for projects installed in 2018. Total uptake is estimated over 10 years (2018 – 2027).
- Table 3 provides the aggregate uptake of both residential and commercial scale projects at differing levels of incentives.

Table 1: Residential (4 kW) – Uptake and Financial Impacts of Incentives

	0%	10%	20%	30%	40%	50%
ROI (%)	2.1	2.4	2.7	3.0	3.6	4.3
Payback Period (Years)	22.4	20.2	18.1	16.1	14.2	12.3
NPV (to 2017)	(3,889)	(2,929)	(1,969)	(1,008)	(48)	913
Total incentive (\$)	0	1,008	2,016	3,024	4,032	5,040
\$/W Incentive	0	0.25	0.50	0.77	1.01	1.26
Total Uptake 2018 – 2027 (MW)	135.2	151.5	172.1	198.4	231.8	275.7

Table 2: Commercial (100 kW) – Uptake and Financial Impact of Incentives

	0%	10%	20%	30%	40%	50%
ROI (%)	2.1	2.3	2.6	3.0	3.5	4.2
Payback Period (Years)	22.5	20.3	18.1	16.1	14.2	12.3
NPV (to 2017)	(89,836)	(67,836)	(45,836)	(23,836)	(1,836)	20,164
Cost of incentive (\$)	0	23,100	46,200	69,300	92,400	115,500
\$/W Incentive	0	0.23	0.46	0.69	0.92	1.16
Total Uptake 2018 – 2027 (MW)	320.4	359.8	409.6	472.9	552.9	657.9

Table 3: Aggregate Uptake of Residential and Commercial Projects

	0%	10%	20%	30%	40%	50%
Residential + Commercial Uptake (MW)	455.6	511.3	581.7	671.3	784.7	933.6

- For projects installed in 2018, an incentive between 40% and 50% is estimated to be required to achieve positive NPVs and shorter payback periods. Past experience with price digressions under FIT and microFIT, however, suggest that industry may be able to find creative solutions to achieve deployment under depressed prices (i.e. compensation at retail rates without additional incentives).
- It is important to note that the Ontario Fair Hydro Plan (OFHP) may impact uptake due to the perception of low returns during the first 4 years, while rates are depressed and rate increases are held to the rate of inflation. However, since savings are realized over the 25-year life of the project, the relative increase in rates in the later years of the OFHP balance out the 4 years when rates are low.
- The introduction Third Party Ownership (TPO) is not expected to significantly impact ENERGY's estimates of net metering uptake over 10 years. While TPO is expected to decrease installed costs, developers must also provide savings to customers in order to encourage sales of systems. Offering savings to a customer on their electricity bill means the customer must pay less than the retail rate of electricity to the developer for any electricity provided. This reduces the amount of revenue the developer can expect from customers to a value below the retail rate of electricity.
 - ENERGY's analysis therefore assumes that the reduced installation costs brought by TPO will be balanced out by the reduced revenue developers would receive by having to offer savings to customers.
- Table 4 provides estimated annual net metering uptake between 2018 and 2027 with no incentive. Uptake under this scenario would be significantly less than uptake under recent FIT and microFIT procurements (which were roughly 200 MW per year).

Table 4: Estimated Annual Uptake with No Incentive, 2018-2027

Year	Residential (MW)	Commercial (MW)	Total (MW)
2018	9.5	22.3	31.8
2019	10.6	24.9	35.5
2020	11.8	27.9	39.7
2021	12.7	30.0	42.7
2022	13.5	31.9	45.4
2023	14.2	33.8	48.0
2024	14.9	35.4	50.3
2025	15.5	36.9	52.4
2026	16.0	38.1	54.1
2027	16.4	39.2	55.6
Total	135.2	320.4	455.6

- Table 5 below provides estimated annual net metering uptake between 2018 and 2027 with a 50% incentive. Uptake under this scenario would continue to be significantly less than uptake under recent FIT and microFIT procurements, however, larger than with no incentive provided.

Table 5: Estimated Annual Uptake with 50% Incentive, 2018-2027

Year	Residential (MW)	Commercial (MW)	Total (MW)
2018	17.3	40.7	58
2019	19.5	46.1	65.6
2020	22.2	52.6	74.8
2021	24.6	58.4	83
2022	27.0	64.2	91.2
2023	29.3	69.9	99.2
2024	31.4	75.1	106.5
2025	33.4	79.9	113.3
2026	34.9	83.8	118.7
2027	36.2	87.1	123.3
Total	275.8	657.8	933.6

2) Impact to Solar Businesses and Employment

- It is difficult to determine the impact that not providing an incentive would have on solar businesses and employment. It can be assumed qualitatively, however, that, levels of deployment of systems below that which exists today will have negative impacts and potentially cause contraction in the industry. ENERGY's estimates of net metering uptake even at 50% incentive levels remains below current levels of procurement under the FIT and microFIT Programs; this likely means that some level of industry impact/contraction will be unavoidable.
- Compass Renewable Energy Consulting conducted a solar company survey as part of the analysis to deliver the *Market Analysis of Ontario's Renewable Energy Sector* report to the Ministry of Energy. Results of the survey suggested that the sector could expect to see up to 160 MW of net metered solar capacity deployed between 2018 and 2021 with no capital cost incentive. The Compass sector survey was conducted before OFHP was announced.
- Regardless of net metering uptake levels, activity will continue in the solar sector out to 2021 in order to bring on remaining FIT and microFIT projects in the pipeline and LRP 1 contracted projects.

- From now until 2021, over 700 MW of solar capacity that was contracted under FIT and microFIT is expected to reach commercial operation and an additional 140 MW of utility-scale solar capacity is expected to reach commercial operation under the LRP I procurement.
- Solar capacity additions between 2017 and 2021 will generate over \$2.1 billion of investment in the solar sector.
 - 63%, or \$1.4 billion, will be spent and invested in Ontario.
 - It is estimated that 17,000 jobs will be created from new build solar projects over this period.

3) Summary of CanSIA's DGTF Recommendations

- CanSIA, initially through their Distributed Generation Task Force (DGTF) and continuing to present, is recommending a declining incentive to be administered over 5 years.
- This incentive is intended to support 1,000 MW of solar PV net metering projects. Past anecdotal evidence from CanSIA suggests that this uptake level is based on annual procurement levels under the FIT (150 MW) and microFIT (50 MW) Programs. In other words, the market has shown there is an annual appetite or capacity for approximately 200 MW of distributed solar PV projects and CanSIA wishes to maintain industry size and activity.
- CanSIA recommends incentives decline in the following manner.
 - 50% rebate in year 1
 - 40% rebate in year 2
 - 30% rebate in year 3
 - 20% rebate in year 4
 - 10% rebate in year 5
- CanSIA has not provided data-based justification for the recommended incentive levels.

4) Appendices

QAs for Minister

Q1: Does the government plan to provide incentives for solar installations under the Green Ontario Fund?

A1: As identified in the 2017 LTEP, ENERGY continues to work with MOECC, IESO and Green Ontario Fund to explore how to further integrate conservation and low-carbon technology programs for both electricity and fuels.

Q2: When will decisions about solar incentives be made, and when would they

become available?

A2: I understand MOECC, the IESO and Green Ontario Fund representatives are continuing to develop the suite of low-carbon technology programs to be delivered through the Green Ontario Fund, which potentially includes solar and other renewable energy technologies. It is premature to speak about potential timelines or potential results of that ongoing work at this point.

Q3: CanSIA has said that future success of the solar industry under net metering is dependent on a solar incentive program, at least in the near term. With FIT and microFIT ending this month, and no solar incentive program in place to support solar net metering, there will be major impacts to industry in terms of lost jobs and investment. What are you doing to address this concern?

A3:

- My Ministry has worked to implement a number of regulatory enhancements to the net metering framework, such as removing the size limit for net metering generation and more recent proposed changes to introduce flexibility in ownership models for third-party ownership and virtual net metering demonstration projects, to provide greater opportunities for customers and businesses to continue to invest in solar generation.
- As these enhancements are brought into market, we also expect activity will continue in the sector out to 2021 to build solar projects that are still in the pipeline from FIT and microFIT, as well as from the LRP I procurement.
 - From now until 2021, we expect over 700 MW of solar capacity that was contracted under FIT and microFIT to reach commercial operation and an additional 140 MW of utility-scale solar capacity is expected to reach commercial operation under the LRP I procurement.
 - Solar capacity additions between 2017 and 2021 will generate over \$2.1 billion of investment in the province's solar sector, 63% of which will be invested locally. That's \$1.4 billion being spent and staying right here in Ontario.
 - It is estimated that 17,000 jobs will be created in Ontario from these new build solar projects.

Modelling Approach and Key Assumptions

- ENERGY staff conducted analysis to support the July 2016 Cabinet decision making process. This analysis estimates that net metering uptake could reach up to 500 MW over 10 years (2017 – 2026) with a 50% incentive (as reported in earlier cabinet documents).
 - This analysis did not incorporate the effects of the OFHP on expected net metering uptake, and did not directly link the business case for a net metered project to potential uptake.
- ENERGY staff have since updated our internal model, estimates are outlined in the tables below.
- The internal model was revised to:
 - capture the effects of the OFHP;
 - include revised assumptions for installation costs, available building stock, and connection capacity constraints; and
 - directly link the net metering business case to potential uptake following methodology developed by the National Renewable Energy Laboratory (NREL).
- Uptake is estimated as a function of the payback period of a net metering system, which is calculated using cash flow analysis. New and existing building stock was also a key input into the NREL model. The number of electricity accounts in Ontario used as a proxy for existing building stock.
- Key Assumptions:
 - Project size: Residential – 4 kW system; Small Business – 100 kW system
 - Applies IESO forecast for installed costs over the forecast horizon
 - Installed cost for 4kW system in 2018 - \$2.52/W
 - Installed cost for 100 kW system in 2018 - \$2.31/W
 - Electricity rates: Applies IESO forecast for electricity cost projections per OFHP and 2017 LTEP
 - Available connection capacity on the grid and the number of available “solar-ready” buildings are held constant as these variables have been determined not to be binding constraints on uptake.

Created by: Renewables Policy Unit, REFO

Date: December 1, 2017