

Auditor General's December Report

Ministry of Energy Follow-Up on Key Figures

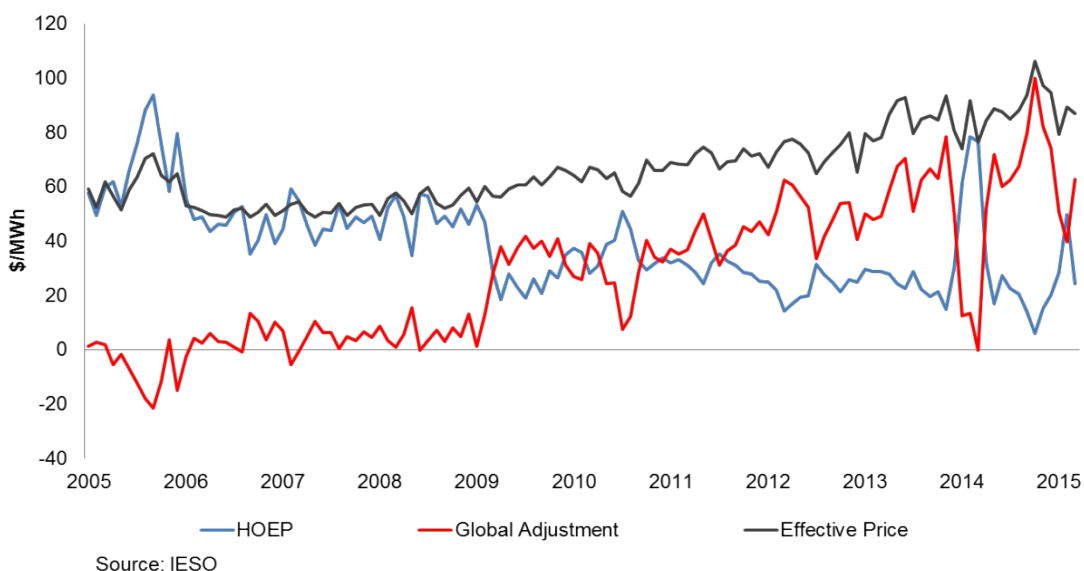
Global Adjustment

The 2015 Auditor General's Annual Report made a point of separating out and highlighting "global adjustment fees" as a particular cost to electricity consumers. For example, on pg 220-222, the report states: "In particular, Global Adjustment fees have increased significantly, from \$650 million in 2006 to \$7.03 billion in 2014. From 2006 to 2014, electricity consumers have already paid a total of \$37 billion, and they are expected to pay another \$133 billion in Global Adjustment fees from 2015 to 2032."

Ministry Comments

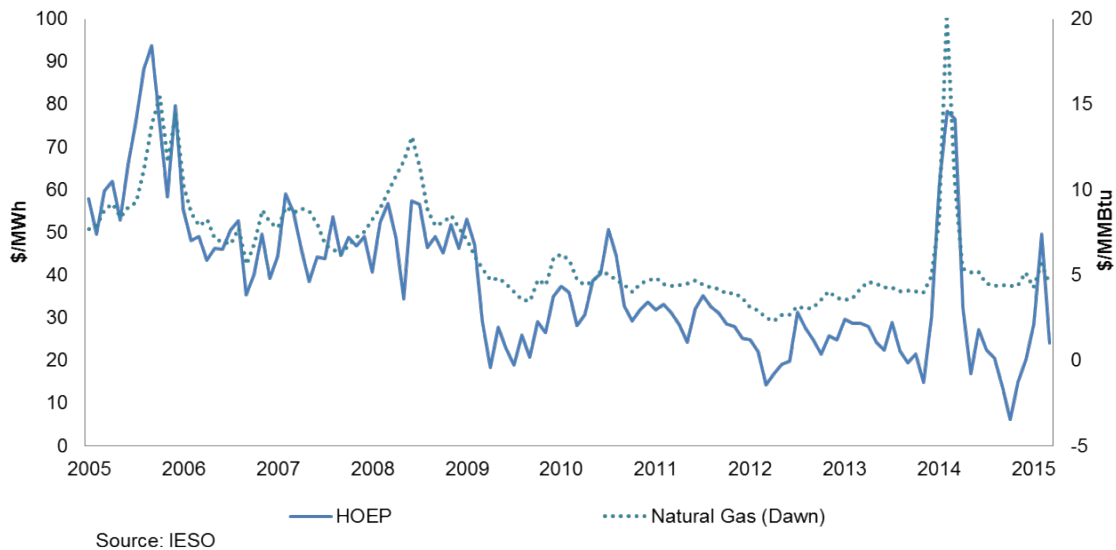
- The \$37 billion figure referred to in the AG's report, as quoted above, is the sum of Global Adjustment from 2006 to 2014 in nominal dollars from the IESO website. (See Appendix or <http://www.ieso.ca/Pages/Participate/Settlements/Global-Adjustment-Archive.aspx>)
- The \$133 billion figure reflecting 2015 to 2032 referred to in the AG's report, as quoted above, is taken from the modules that the then Ontario Power Authority (now IESO) released to accompany the launch of the Long-Term Energy Plan (LTEP) in 2013 (the sum of the Global Adjustment forecasts as set out on pg. 55 of the "[Cost](#)" module). The \$133 billion is in real 2012\$.
- Separating out the Global Adjustment (GA) from the spot market price (the Hourly Ontario Energy Price, or HOEP) is not an accurate or reasonable characterisation of the cost of electricity as a commodity.
- Quite simply, generators of electricity need to be paid for their product, and in Ontario's system, payments to generators are made up of two components, HOEP and the GA:
 - All generators receive HOEP for the electricity they supply. HOEP is determined by supply and demand conditions in the wholesale market, and generally reflects the marginal cost of electricity generation in the province.
 - Contracted/regulated generators receive additional payments to make up the difference between the revenue generated through the wholesale market and their expected contracted/regulated revenue. This difference is recovered from/returned to the GA.
 - Virtually all generators in Ontario receive a contracted or regulated rate.
 - Conservation costs and funds such as the Aboriginal, Municipal and Community Fund, are also paid for from GA.
- HOEP and GA are inversely related; as the market price increases, the GA payments decrease.

Commodity Cost of Electricity



- HOEP is determined by the hourly marginal cost of generation, and largely tracks the price of natural gas, as natural gas generators are often the marginal generators.

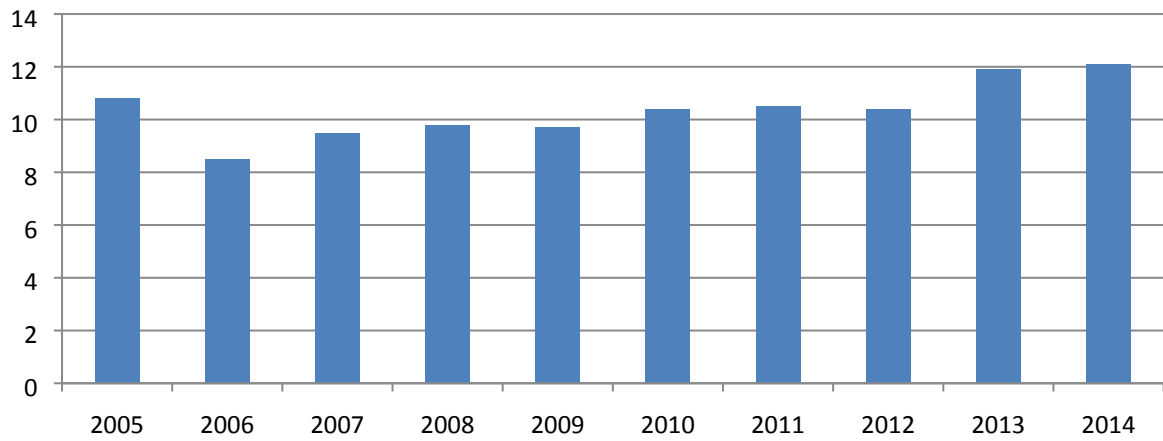
HOEP and Natural Gas Prices



- Accordingly, comparing Global Adjustment costs in 2006 (when natural gas prices, and HOEP, were much higher) and 2014, as per the AG's report, is not an appropriate comparison.
- It is much more appropriate, and much simpler, to review the total commodity cost. Over the period from 2005-2014, in real terms, the total cost of electricity as a commodity was relatively stable:

Total Commodity Cost

2014\$, Billions



Cost of Renewables

The report presents a figure that it claims is the additional “cost” for Feed-In Tariff projects over and above a notional alternative competitive procurement approach. As stated on pg. 227, “In our 2011 audit of renewable energy initiatives, we calculated that expensive guaranteed-price renewable contracts would cost Ontario electricity consumers about \$4.4 billion more over the 20-year contract term than they would have under the former program’s guaranteed prices. Taking into consideration new contracts signed since our 2011 report, **we estimate this cost has increased to \$9.2 billion (the IESO calculates this amount to be closer to \$5.3 billion, in order to reflect the time value of money)** [emphasis added].”

Ministry Comments

- According to staff at the Independent Electricity System Operator (IESO), who have discussed this figure with the Auditor General’s Office, in order to determine the “premium paid under FIT and microFIT”, the OAG compared the contract prices to a proxy of a competitive price for each renewable fuel type. The OAG then calculated the annual savings as:
 - $\text{Annual Savings} = \text{Contract Capacity} * \text{Capacity Factor} * 365 \text{ days/year} * (\text{FIT/microFIT Contract Price} - \text{proxy competitive price})$
- For the “proxy competitive price”, the OAG used the price for the Renewable Energy Standard Offer Program (RESOP), a program that ran prior to the introduction of the FIT program:

Technology	“Proxy Competitive Price” (¢/kWh)	FIT/microFIT Price* (¢/kWh)
Wind (on-shore)	11	11.5 - 13.5
Wind (off-shore)	11	19
Biomass	11	13 - 15.6
Landfill Gas	11	11.1
Biogas	11	14.7 - 16
On-Farm Biogas	11	16 - 21
Waterpower	11	13.1 - 14.8
Solar (groundmount)	42	27.5 - 80.2
Solar (roof-top)	42	31.6 - 80.2

*Note: FIT/microFIT prices vary due to different prices for different sized projects, and adjustments made to the price schedule as a result of regular reviews of the program.

- To determine the quantum of the savings, the OAG added up the savings for all the years of the contract term for each contract to yield a total savings in nominal dollars. This nominal figure was around \$9.2 billion.
- The IESO raised with the OAG that this calculation should take into account the time-value of money. The IESO calculated an alternative figure, using a 3.5 % real social discount rate with 2 % inflation to yield approximately a 5.5 % nominal social discount rate. The analysis was done with nominal cash flows. That discounted figure was \$5.1 billion (Note: this is different from the \$5.3 billion cited in the AG’s report. The IESO is unsure of how the \$5.3 billion figure came about.)
- The IESO also recommended to the OAG that they change the proxy price, namely that large scale wind should be 12 ¢/kWh (rather than 11). The OAG did not adopt any of the “competitive” price changes recommended by the IESO.

- During 2015, the IESO further reviewed the numbers and calculation. In October 2015, the IESO provided a more detailed calculation to the OAG, the summary of which is below:

Cost Metric	FIT Savings (\$)	microFIT Savings (\$)	Total Savings (\$)
Nominal Sum	\$8,090,616,612	\$1,315,511,300	\$9,406,127,913
NPV	\$3,831,403,764	\$916,975,976	\$4,748,379,740

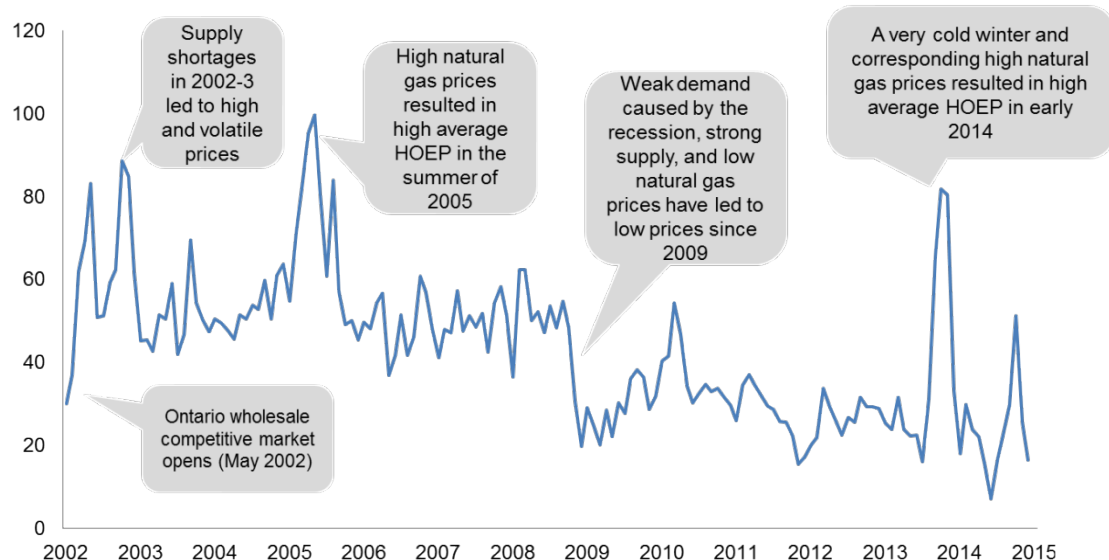
- As part of this calculation, the IESO incorporated its recommended revision of the “competitive” prices.
- The IESO also points out that the FIT program was also designed to procure renewables on a much greater scale than the previous programs. It is unknown whether the uptake would have been the same had the previous program been maintained and, as such, it is uninformative to assume an equal uptake and compare spending based on those assumptions.

Appendix

Background on Components of the Cost of Electricity

Historical Market Prices

Weighted Monthly Average Hourly Ontario Energy Price (\$/MWh)



Source: IESO
Note: Each year starts in May

Calculation of GA by the Auditor General

- The \$37 billion figure referred to in the AG's report, as quoted above, is the sum of Global Adjustment from 2006 to 2014 in nominal dollars from the IESO website. (See Appendix or <http://www.ieso.ca/Pages/Participate/Settlements/Global-Adjustment-Archive.aspx>)
- Accompanying the launch of the Long-Term Energy Plan (LTEP) in 2013, the then Ontario Power Authority (now IESO) released a number of "modules" to provide a detailed breakdown of the facts and figures underpinning the report. The modules were developed in conjunction with a summary of the assumptions used in the development of the LTEP. They are posted on the IESO's website.
- The \$133 billion figure reflecting 2015 to 2032 referred to in the AG's report, as quoted above, is taken from the 2013 LTEP modules (the sum of the Global Adjustment forecasts as set out on pg. 55 of the "[Cost](#)" module).
 - The \$133 billion is in real 2012\$. The Ministry has therefore also escalated the \$37 billion figure to be in real 2012\$ for the purposes of comparison (totals lines in the table below).

	Historical GA (IESO)		Forecast GA (2013 LTEP)
	Nominal\$	2012\$	2012\$
2006	0.65	0.74	-
2007	0.60	0.66	-
2008	0.90	0.97	-
2009	4.22	4.48	-
2010	3.85	4.00	-
2011	5.31	5.42	-
2012	6.46	6.46	-
2013	7.73	7.58	-
2014	7.03	6.76	-
Total	36.75	37.06	-
2015	-	-	9.37
2016	-	-	9.31
2017	-	-	8.35
2018	-	-	8.53
2019	-	-	8.43
2020	-	-	8.61
2021	-	-	7.88
2022	-	-	8.03
2023	-	-	6.84
2024	-	-	6.86
2025	-	-	6.69
2026	-	-	7.11
2027	-	-	6.69
2028	-	-	6.60
2029	-	-	6.15
2030	-	-	5.82
2031	-	-	5.57
2032	-	-	5.72
Total 2015-2032 (\$2012)			132.56

Global Adjustment Values - 2005-2014, from IESO Website

2014	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	87.8	41.7	34.6	62.4	62.3	54.3	58.5	66.2	53.7	79.1	80.1	83.1
GA-OPG (M\$)	-66.3	-138.1	-152.6	88.7	173.2	137	178.2	177.7	216.3	271	208.8	298.3
GA-OPA (M\$)	139.2	245.9	116.1	369.6	467.9	435.6	435.6	473.7	514.5	637.4	581.3	462.1
Total GA (M\$)	160.7	149.5	-1.9	520.7	703.4	626.9	672.3	717.6	784.5	987.5	870.2	843.5
GA (\$/MWh)	12.61	13.3	-0.27	51.98	71.96	60.25	62.56	67.61	79.63	100.14	82.32	74.44
Class A Total (M\$)	16.7	15.5	-0.2	54.2	73.1	65.1	64.8	68.8	75.2	94.7	83.4	80.9
Class B Total (M\$)	144	134	-1.7	466.5	630.3	561.8	607.5	648.8	709.3	892.8	786.8	762.6

2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	100.6	93.2	112.7	90.1	90.7	90.5	79.4	89.2	86.1	99.1	112.1	88.9
GA-OPG (M\$)	127.7	106.4	111.8	136.3	155.1	161.1	139.1	180.1	163.2	157.0	197.2	117.9
GA-OPA (M\$)	380.2	328.1	330.3	388.4	411.4	473.0	391.1	430.5	408.1	378.1	537.7	384.9
Total GA (M\$)	608.5	527.7	554.8	614.8	657.2	724.6	609.6	699.8	657.4	634.2	847.0	591.7
GA (\$/MWh)	49.99	48.14	49.26	58.59	67.59	70.43	50.89	62.45	66.55	63.12	78.55	50.68
Class A Total (M\$)	62.8	54.5	57.3	63.6	67.9	74.9	63.4	72.8	68.4	66.0	88.1	61.6
Class B Total (M\$)	545.7	473.2	497.5	551.2	589.3	649.7	546.1	627.0	589.0	568.2	758.9	530.1

2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	105.9	103.4	119.4	91.3	92.3	82	61.9	73.1	78	78	108.9	96.9
GA-OPG (M\$)	152	160.2	202.4	167.5	170.9	176.1	114.1	142.2	131.5	152.5	132.6	146.3
GA-OPA (M\$)	254.4	286.4	344.7	335.9	315	326.7	245.7	269.5	269.4	315.1	333.7	219.8
Total GA (M\$)	512.3	550	666.5	594.7	578.2	584.8	421.7	484.8	478.9	545.6	575.2	463
GA (\$/MWh)	42.46	50.62	62.34	60.72	56.5	52.55	33.59	41.78	47.62	53.81	54.26	40.64
Class A Total (M\$)	51	54.8	66.4	59.2	57.6	58.2	42.4	49	48.4	55.3	59.2	47.8
Class B Total (M\$)	461.3	495.2	600.1	535.5	520.6	526.6	379.2	435.9	430.5	490.3	516	415.2

2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	110.1	94.2	101.2	82.2	82.1	102	87	64.5	50.5	88.9	103.6	116.6
GA-OPG (M\$)	118.6	94.3	96.7	114.9	147	92.6	80.4	112	105	118.9	119.5	147
GA-OPA (M\$)	240.4	205	229.8	243.3	269.1	228.5	224.3	249.6	235.9	249.1	227.9	276.9
Total GA (M\$)	469.1	393.5	427.7	440.4	498.2	423.1	391.7	426.1	391.4	456.9	451	540.5
GA (\$/MWh)	37.01	35.18	36.83	43.89	50.05	40.48	31.3	36.57	38.49	45.4	43.46	47.15
Class A Total (M\$)	51.1	42.9	46.6	47.9	54.2	46	39	42.4	38.9	45.5	44.9	53.8
Class B Total (M\$)	418	350.6	381.1	392.5	444	377.1	352.7	383.7	352.5	411.4	406.1	486.7

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	96.8	108.9	111.2	97.7	77.1	49.7	47.4	31	43.4	99.2	92.4	104.8
GA-OPG (M\$)	77.5	71.6	124.1	89.4	41.4	50.8	-5.3	27.8	97.8	108.9	101.5	103.9
GA-OPA (M\$)	178	121.7	214.6	183.9	154.7	181.9	56.8	99	172.5	236.1	195.5	203.7
Total GA (M\$)	352.9	302.2	451.1	371.1	273.2	282.4	98.8	156.8	313.7	443.7	389.4	412.4
GA (\$/MWh)	27	25.91	39.07	35.6	24.34	24.66	7.5	12.25	28.42	40.34	34.14	32.27
Since Jan 1 GA (\$/MWh)	27	26.49	30.49	31.63	30.22	29.3	25.82	24.01	24.46	25.95	26.67	27.18

2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	41.9	40.3	64	69.9	76.7	91.9	89.8	106.7	72.4	106.6	106.3	95
GA-OPG (M\$)	0.1	28.4	136.9	167.3	99.7	167.3	202.3	168.3	189.9	133.5	148.6	109.1
GA-OPA (M\$)	-25.5	80.2	134.3	168.8	152	146.7	174.8	178.4	168.8	142.6	197.6	187
Total GA (M\$)	16.5	148.9	335.2	406.1	329.2	405.9	466.9	453.4	431.1	382.7	452.5	391.1
GA (\$/MWh)	1.21	12.83	27.79	37.96	31.42	37.74	41.72	37.5	39.8	34.49	40.79	31.05
Since Jan 1 GA (\$/MWh)	1.21	6.56	13.43	18.9	21.13	23.72	26.22	27.7	28.97	29.51	30.51	30.56

2008	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA-OEFC-NUG (M\$)	56.9	46.5	40.1	43.1	44.8	24.8	26.1	31.1	25	47.1	42.4	51.6
GA-OPG (M\$)	30.4	-36.5	-64.1	-21.1	45.8	-64.6	-63.7	-7.9	-20.3	1.7	-33.9	43.8
GA-OPA (M\$)	30.2	34.1	37.2	43.4	83.5	38.6	79.8	66.8	30.3	44.1	49.8	74
Total GA (M\$)	117.5	44.1	13.2	65.3	174.1	-1.2	42.2	90	34.9	92.9	58.4	169.3
GA (\$/MWh)	8.69	3.44	1.02	5.73	15.42	-0.1	3.26	7.26	2.99	8.04	4.98	13.08
Since Jan 1 GA (\$/MWh)	8.69	6.14	4.45	4.74	6.69	5.58	5.23	5.49	5.23	4.54	5.45	6.12

2007	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA (M\$)	93	-71	-5	56	123	78	81	4	56	41	80	61
GA (\$/MWh)	6.81	-5.5	-0.37	4.72	10.4	6.23	6.37	0.3	4.77	3.52	6.5	4.56
Since Jan 1 GA (\$/MWh)	6.81	0.81	0.42	1.41	3.08	3.6	4	3.52	3.65	3.63	3.89	3.95

2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA (M\$)	-32	53	31	70	37	35	14	-9	154	125	46	130
GA (\$/MWh)	-2.4	4.26	2.36	6.15	3.1	2.85	1.02	-0.66	13.46	10.55	3.79	10.14
Since Jan 1 GA (\$/MWh)	-2.4	0.8	1.32	2.41	2.54	2.6	2.35	1.96	3.12	3.83	3.82	4.36

2005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GA (M\$)	21	35	27	-63	-18	-94	-170	-244	-261	-140	-44	-202
GA (\$/MWh)	1.44	2.78	2.01	-5.4	-1.55	-7.06	-12.31	-17.82	-21.37	-11.66	-3.57	-14.82
Since Jan 1 GA (\$/MWh)	1.44	2.06	2.05	0.37	0.02	-1.2	-2.89	-4.84	-6.57	-7.05	-6.74	-7.45

Note: Positive amount denotes a charge as per IESO settlement.