



Regional/Global Comparison of Retail Electricity Tariffs

Executive Summary

May, 2018

International Energy Consultants

www.energyconsultants.com.au

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- **Meralco has commissioned International Energy Consultants (IEC) to prepare an independent report comparing Meralco's retail electricity tariffs with those in selected markets from the Asia-Pacific region and worldwide**
- **This Report:**
 - **Provides a detailed snapshot of tariffs at various consumption levels in 18 selected markets in the Asia-Pacific region (including Meralco) as well as lower resolution data for a further 28 European and US markets, at the beginning of 2018**
 - **Updates a previous report that was prepared by IEC in 2016 for the same markets and examines the change in tariffs over the intervening 2 year period**
 - **Investigates the reasonableness of Meralco's tariffs**
- **Note that this Executive Summary is only a partial version of the Main Report & Appendices. Persons wishing to view the full report should make inquiries directly to Meralco.**

- For this Report, IEC has conducted a detailed survey and analysis of retail electricity tariffs and costs in 17 Core markets (15 countries and 2 US states) in the Indo-Pacific region plus Meralco, as well as a supplementary, less comprehensive “meta-analysis” of 27 countries in the Euro area and the 48 remaining US states
- The 17 Core markets in the survey include the following:
 - Subsidized markets: Australia (WA), Indonesia, Malaysia, Thailand, South Korea, South Africa, Sri Lanka, Taiwan, Vietnam
 - Unsubsidized markets: Japan (Kansai), Hong Kong, Singapore, NZ, California (PG&E), Hawaii, Canada (Ontario), PNG
- These markets were selected based on availability and quality of data with a focus on those which would provide a representative range of costs and tariffs. These are the same markets (plus Vietnam & PNG) reviewed in a similar report prepared in 2016
- At the time of preparation, only four (NZ, Singapore, Japan and Meralco) of the core markets are deregulated. 17 US states are deregulated (not including Hawaii or California)
- For each of the 17 Core markets (& Meralco), retail tariffs were calculated for Residential customers @ 100, 200, 400, 800 & 1500kWh per month as well as Commercial (40kW) and Industrial customers (2MW) each operating at @ 40% and 80% load factors. This data was calculated using published tariff schedules for each market’s respective utility/supplier and cross-checked with actual customers bills (where available)
- The detailed analysis and source information for the 17 Core markets are contained in Part II of this Report
- Tariffs for each of the supplementary 27 countries in Europe and 50 US states were sourced from data published by Government energy agencies and were not all verified separately by IEC. Tariff data for these supplementary markets is presented for customer categories which may vary in size from those presented for the Core markets
- Wherever possible, tariffs were unbundled into constituent components, for ease of comparison with Meralco’s unbundled rates (eg. Generation, Transmission, Distribution, Other, VAT)
- Tariffs for each of the 17 Core markets (and Meralco) were calculated for January 2018 in US\$/kWh, using the average exchange rate for that month. Tariff data for European markets and the 48 US states are reported for mid-2017 and December 2017 (respectively) which was the most recently available data
- The generation component of Meralco’s tariff was assumed to be equal to the regulated charge for all customers. Contestable customers, which already comprise c.30% by volume in the Meralco franchise area, pay an unpublished negotiated rate which could be higher or lower than the regulated charge

- **IEC is a Perth-based consulting firm which specializes in providing power market advisory services to companies operating in and associated with the IPP sector within the Asia-Pacific region**
- **IEC has been operating for over 17 years and has a major client list which includes: BHP Billiton, Shell, CLP Power, InterGen, Itochu, JPower, OneEnergy, PTT, EGCO, Arcapita, Woodside Energy, BG, Sithe, Blackstone, Origin Energy, Standard Chartered Bank, GNPowder, Meralco, Macquarie Bank, San Miguel & YTL**
- **Since inception, we have undertaken multiple engagements acting as both Sponsor's and Lender's Market Consultant for both acquisitions and greenfield IPP developments throughout Asia**
- **IEC specializes in modeling most of the major power markets in the Asia-Pacific region including: Philippines, Singapore, Indonesia, Vietnam, NZ, Taiwan, Japan & Korea. For each of these markets we have a detailed customized dispatch model and database and a deep understanding of the market mechanics and regulatory framework.**
- **We also provide a range of general IPP development services including: acquisition due diligence, greenfield project development, fuel demand forecasting, carbon analysis, strategic/business planning, in-house training courses and temporary secondment of personnel.**
- **IEC's Managing Director and lead consultant Dr John Morris is recognized as a leading authority in deregulated power markets in the Asia region. Dr Morris was formerly Country Manager for InterGen in Indonesia and Managing Director of InterGen in Singapore. He also holds a PhD in Geology and has worked extensively throughout Asia and globally in the oil/gas exploration industry**

Key Questions

The key questions addressed in this report are the following:

- **Tariff Composition:** *What is the composition of Meralco's retail tariffs?*
- **Tariff Comparison:** *How do Meralco's rates compare with other countries?*
- **Tariff Changes:** *How have Meralco's tariffs changed since the last survey 2 years ago and how do these changes compare with other markets?*
- **Tariff Reasonableness:** *Are Meralco's tariffs fair and reasonable?*

Summary of Answers: Tariff Composition?

What is the composition of Meralco's retail tariffs?



- The main component of Meralco's regulated retail tariff is the Generation Charge (60% of the average retail tariff) which includes:

• Legacy IPP's (QPL, FirstGen)	47%
• PSA's	35%
• WESM charges	11%
• Renewables	0.01%
• Ancillary services ¹	7%
- The Transmission Charge (excl Ancillary Services¹) comprises 8% of the average tariff
- The Distribution Charge comprises 16% of the average tariff. *(This is the only component of the tariff that accrues to Meralco. All other charges are collected by Meralco on behalf of third parties).*
- VAT and other taxes and statutory charges comprise 16% of the average tariff
- Retail competition commenced in July 2013 and, in Jan 2018, accounted for c.30% of kWh sold in Meralco's network area. Retail contestability is currently limited to only those customers with a monthly average peak demand >750kW
- Contestable customers have a tariff that includes a generation charge that is likely to differ (higher or lower) from the regulated Meralco charge

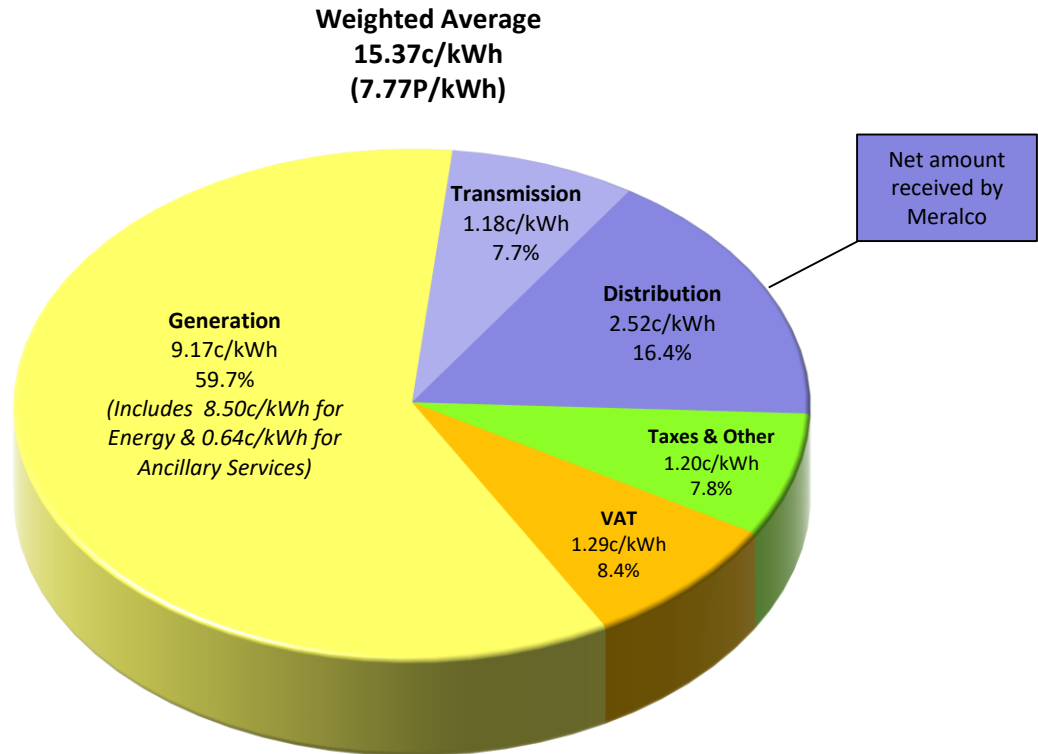
Note

1. Ancillary services are included in the Transmission component of the published tariff but are ultimately paid to generators

Meralco Tariff Composition (Jan 2018)



The average tariff (in USc/kWh) has declined by 4%, over the past two years while the Distribution Charge (which is the only part of the tariff claimed by Meralco) has decreased by 9%



Notes

1. US\$1 = 50.56P
2. Data for Jan 2018. Weighted average based on customer splits (31% Residential; 40% Commercial; 29% Industrial)
3. Generation charge assumes all customers paying the regulated price
4. Transmission & Generation charges grossed up for Distribution Losses (ie. Charges for losses are added back to generation and transmission)
5. Ancillary services component of Transmission charge allocated back to Generation charge
6. Excludes special rate discounts

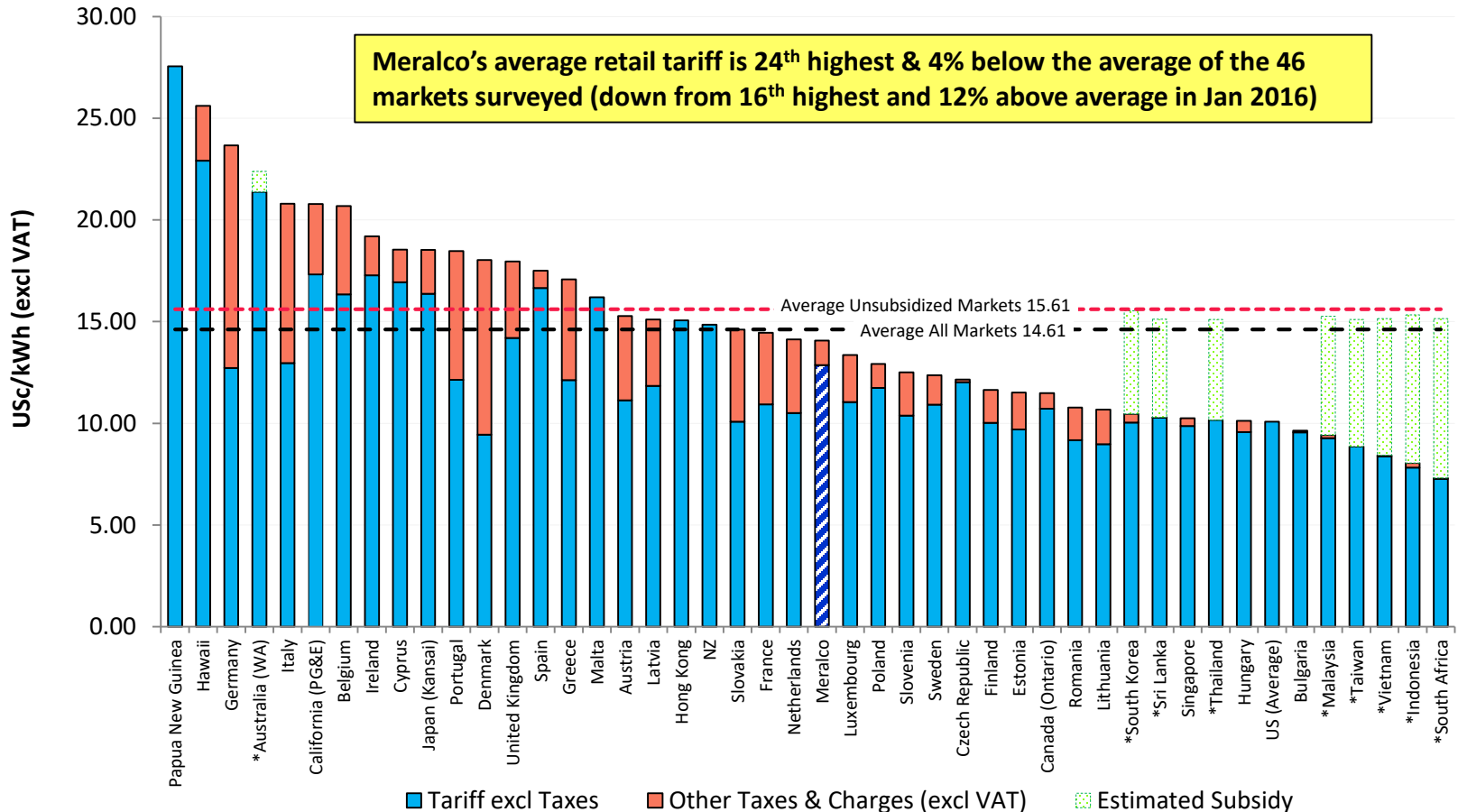
Summary of Answers: Tariff Comparison

How do Meralco's rates compare with other countries?



- Meralco's weighted average retail tariff (14.07c/kWh excluding VAT but including all other statutory charges) ranks 24th and 4% below the average (vs. 16th highest & 12% above the average in 2016) among the 46 markets surveyed
- If subsidized markets are excluded, then Meralco's tariff is 10% below the average (15.61c/kWh)
- Meralco's Residential retail tariff (17.72c/kWh incl. VAT) ranks 26th highest and is 8% below the average (vs. 21st highest & 2% above the average in 2016)
- Meralco's Commercial retail tariff (13.93c/kWh excl. VAT) ranks 24th highest and 7% below the average (vs. 19th highest & 6% above the average in 2016)
- Meralco's Industrial retail tariff (12.01c/kWh excl. VAT) ranks 17th highest and only 6% above the average (vs. 10th highest & 19% above the average in 2016)
- Note that the actual commercial & industrial tariffs may be lower than indicated because contestable generation charges (which are unpublished) may not be the same as the regulated rate
- Meralco's Residential customers have moved from 16th to 26th highest since 2012 and are now paying 8% below the global average rate (vs. 15% above the average in 2012)
- This is an excellent outcome for consumers, considering that the Luzon power market is unsubsidized and the majority of electricity is produced using imported fuel (or gas at partial import parity prices)

Average Electricity Tariffs¹ excl. VAT (46 Markets)



Notes

1. All data for Jan 2018 except EU countries which are 2017 and US (average) which is Dec 2017
 2. All figures are actual weighted averages except EU countries which are weighted Res 40% : Com 30% : Ind 30%
- * Indicates subsidized (or under-priced) markets. Subsidies calculated as estimated cost of supply minus actual tariff. Australia (WA) is actual subsidy.

Average Retail Electricity Tariff Summary – All Customers (USc/kWh ex VAT)



- Meralco's average retail tariff is 24th highest & 4% below the average among the 46 markets surveyed (*down from 16th highest and 12% above average in Jan 2016*); it was one of only 5 markets with a tariff that declined since 2016

2016 Rank	2018 Rank	Country ²	2018 Tariff ¹	2016 Tariff ¹	Change in Tariff
<i>n.a.</i>	1	Papua New Guinea	27.56	<i>n.a.</i>	<i>n.a.</i>
1	2	Hawaii	25.61	22.70	12.8%
3	3	Germany	23.67	19.78	19.7%
8	4	Australia (WA)	21.38	16.14	32.5%
2	5	Italy	20.79	20.14	3.2%
4	6	California (PG&E)	20.78	19.54	6.3%
10	7	Belgium	20.68	15.91	30.0%
6	8	Ireland	19.19	17.56	9.3%
9	9	Cyprus	18.54	15.91	16.5%
7	10	Japan (Kansai)	18.52	16.18	14.5%
		Average (All Markets)	14.61	13.08	11.7%
16	24	Meralco	14.07	14.65	-4.0%
25	32	Canada (Ontario)	11.49	11.36	1.2%
38	35	*South Korea	10.47	9.47	10.5%
27	36	*Sri Lanka	10.29	11.13	-7.5%
29	37	Singapore	10.25	10.89	-5.8%
34	38	*Thailand	10.17	9.93	2.4%
35	39	Hungary	10.12	9.92	2.0%
39	40	US (Average)	10.09	9.31	8.4%
40	41	Bulgaria	9.64	9.12	5.7%
41	42	*Malaysia	9.43	8.83	6.8%
42	43	*Taiwan	8.86	8.73	1.5%
<i>n.a.</i>	44	*Vietnam	8.43	<i>n.a.</i>	<i>n.a.</i>
43	45	*Indonesia	8.06	7.03	14.7%
44	46	*South Africa	7.31	6.36	14.9%

* Indicates subsidized market

1. Weighted average of all customers. USc/kWh excluding VAT but including all other non-recoverable taxes and charges.

2. All data for Jan 2018 except EU countries which are H2 2017 and US (average) which is Dec 2017

Summary of Answers: Tariff Differential

What is the main factor driving differences between Meralco's tariffs and those in other countries?



- **Subsidies**

- Relative to most of the world, Meralco's rates are below both the average and the median
- Many of the "cheaper" neighbouring countries (eg. Thailand, Indonesia, Malaysia, Korea, Taiwan) have average tariffs that benefit from effective subsidies of up to 50%
- Although tariffs have generally been rising in all these markets, in order to reduce the subsidy burden (eg. 2018 vs 2016: Indonesia up 15%, South Korea up 11%, Malaysia up 7%), the increases are insufficient to match demand growth and fuel price rises ie. the total annual subsidy is actually growing rapidly
- In comparison, Meralco's c/kWh tariff – which is not subsidized – has actually decreased by 4%, over the same period
- IEC believes that providing subsidies via lower tariffs is bad economic policy and ultimately unsustainable – eventually the cost will be unaffordable and the inevitable price shock will cause major socio-economic dislocations
- When subsidies are added back to retail tariffs, the true cost of electricity in these countries rises to a level that is higher than Meralco's rate. If subsidies were removed, Meralco's rates would be the 15th cheapest in the survey

- **Cost of Supply**

- In a high growth, deregulated market such as the Philippines, wholesale prices should be close to the long-run marginal cost (LRMC), in order to encourage new investment eg. Any lower and new capacity will not be built
- The estimated LRMC of supplying reliable electricity in Luzon (equal to the replacement cost of new generation capacity plus fuel and network charges)
- Meralco's regulated tariff excluding taxes (12.88c/kWh) is currently well below both the estimated LRMC (15.10c/kWh) of supply in Luzon and the average worldwide cost of supply (13.61c/kWh)

Regional Electricity Subsidies

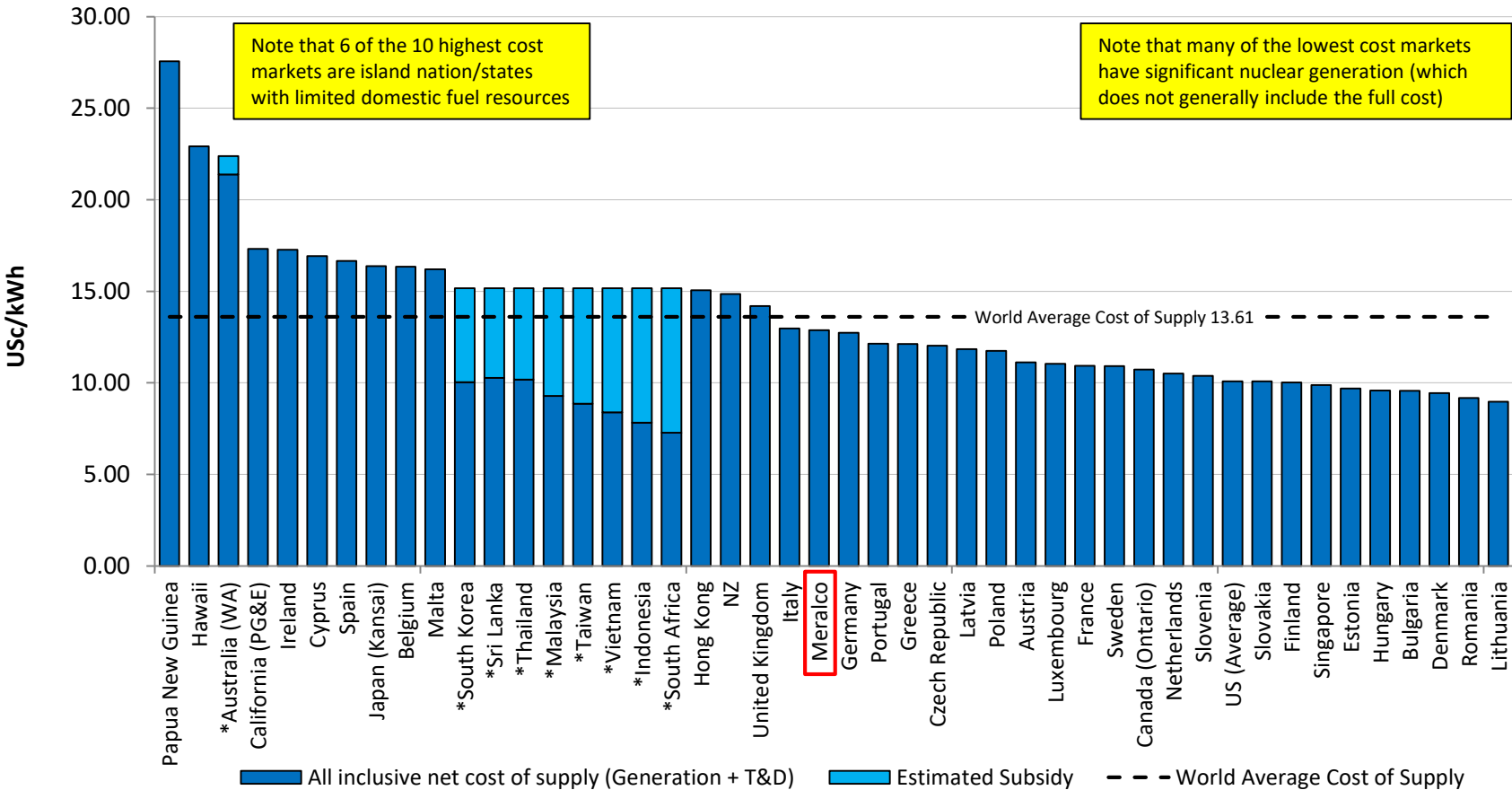
- In 2018, the five countries listed in the table below are projected to subsidize their tariffs by an estimated¹ 33-48% (average of 41%) for a combined implied subsidy >\$80 billion ie. Consumers in these countries are only paying 59% of the actual cost of supply
- These subsidies were in in the form of cash grants, subsidized fuel or deferred expenditure
- The implied subsidy is calculated by subtracting the actual tariff from the LRMC plus network charges and multiplying the result by the annual sales volume
- An equivalent subsidy applied to Meralco’s average tariff would require an estimated US\$2.4 billion or P119 billion in 2018

Annual Subsidy (US\$ billion)	Oil Price ²	Coal Price ³	Indonesia ⁴	Malaysia ⁵	Taiwan	Korea	Thailand	TOTAL	Average subsidy
2018	\$69	\$107	18.1	7.3	14.5	31.0	10.1	\$81.0B	41%
2016	\$31	\$50	12.8	4.3	8.5	18.4	5.1	\$49.1B	32%
2012	\$116	\$111	13.2	5.3	17.1	40.5	8.3	\$84.4B	46%

Notes
 1. Assumes flat oil/coal prices and tariffs in each year
 2. Brent Crude for month of January (US\$/bbl)
 3. Newcastle coal (FOB) for month of January (US\$/tonne)
 4. Cash subsidy to PLN in 2012, 2016 & 2018 (proposed) was \$10B, \$4.6B & \$3.6B respectively
 5. Estimated implied subsidy for Malaysia is for Peninsula only

Estimated Cost of Supply (46 Markets)

The cost of supplying electricity in Luzon is 5% below the world average; Meralco's electricity price is 4% below the world average



Notes
 1. Net cost of supply calculated by removing all taxes from tariffs and adding back subsidies

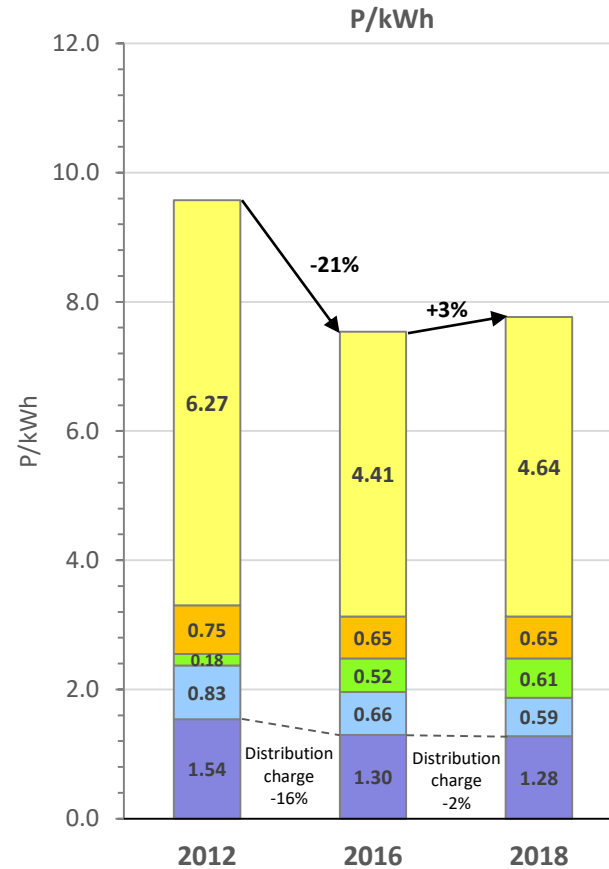
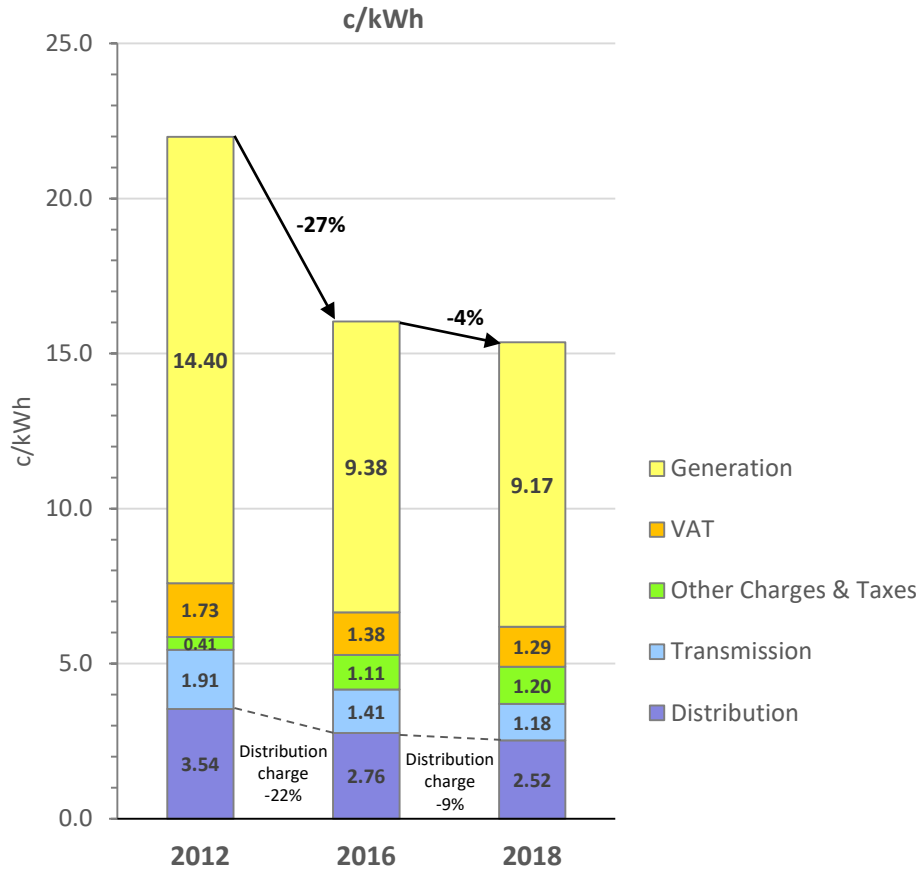
Summary of Answers: Tariff Changes

How have Meralco's tariffs changed since the last survey 2 years ago and how do these changes compare with other markets?



- The major contributors to the Meralco tariff reduction (in c/kWh) over the past two years have been Distribution (36% of decrease), Transmission (34%) & Generation (31%) charges
 - The declines in the network charges are mainly due to Peso depreciation; but these charges were almost unchanged in Peso terms
 - Generation charges have contributed almost 1/3 to the decline, despite fuel prices rising between 30-90% which should have caused them to increase. The decline is mainly attributable to Meralco's efforts to competitively source PSA's at low rates
- Tariffs in many of the markets in the survey have moved significantly in both \$ and local currency terms and between customer categories, since the last survey in 2016
- 39 of the markets increased their rates by an average of 12.5% (eg. Australia +33%). Just 5 markets managed to increase their tariffs over the same period (including Meralco -4%)
- The reasons for the changes include one or more of the following factors (sometimes moving in opposite directions):
 - *Currency movement.* A depreciation will make the local currency component of the tariff appear cheaper in US\$ terms eg. Meralco down 4% in US\$ but up 3% in local currency due mainly to a 6% fall in the Peso vs the US\$
 - *Higher fuel costs.* Crude oil up 69% and coal up 94% which flows through to higher generation costs. Note that Meralco's generation charge actually declined by 3% despite rising fuel costs which was the major contributor to the final tariff decrease
 - *Change in regulated charges and tariff schedules.* Many of the markets are still fully regulated and tariff schedules are at the discretion of the Government and not necessarily linked to costs
 - *Change in the customer weightings.* Over time, the ratio of R:C:I changes which has an effect on the weighted average tariff

Change in Meralco Tariff

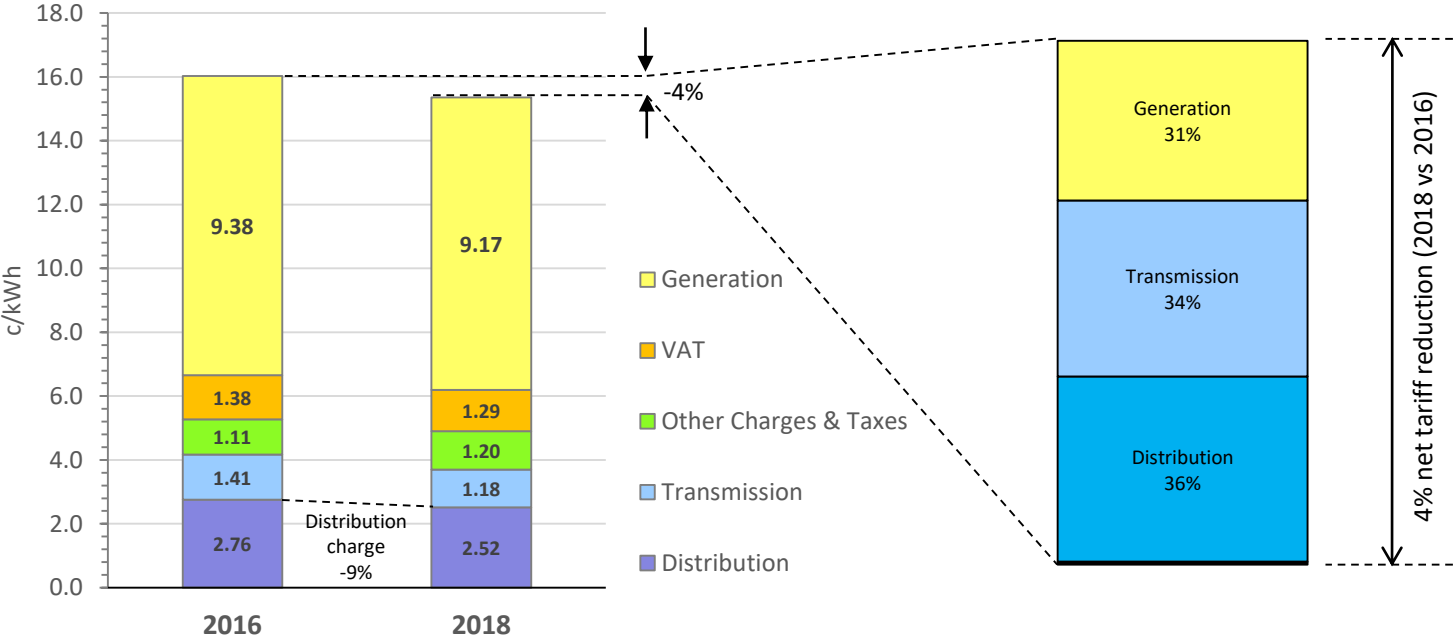


Notes

1. Data for Jan in each year. Weighted average based on customer splits
2. Generation charge assumes all customers paying regulated generation charge
3. Transmission & Generation charges grossed up for Distribution Losses
4. Ancillary services component of Transmission charge (assumed to be 33% of total) allocated back to Generation charge
5. Excludes special rate discounts

Contributions to Meralco's Tariff Reductions (2018 vs 2016)

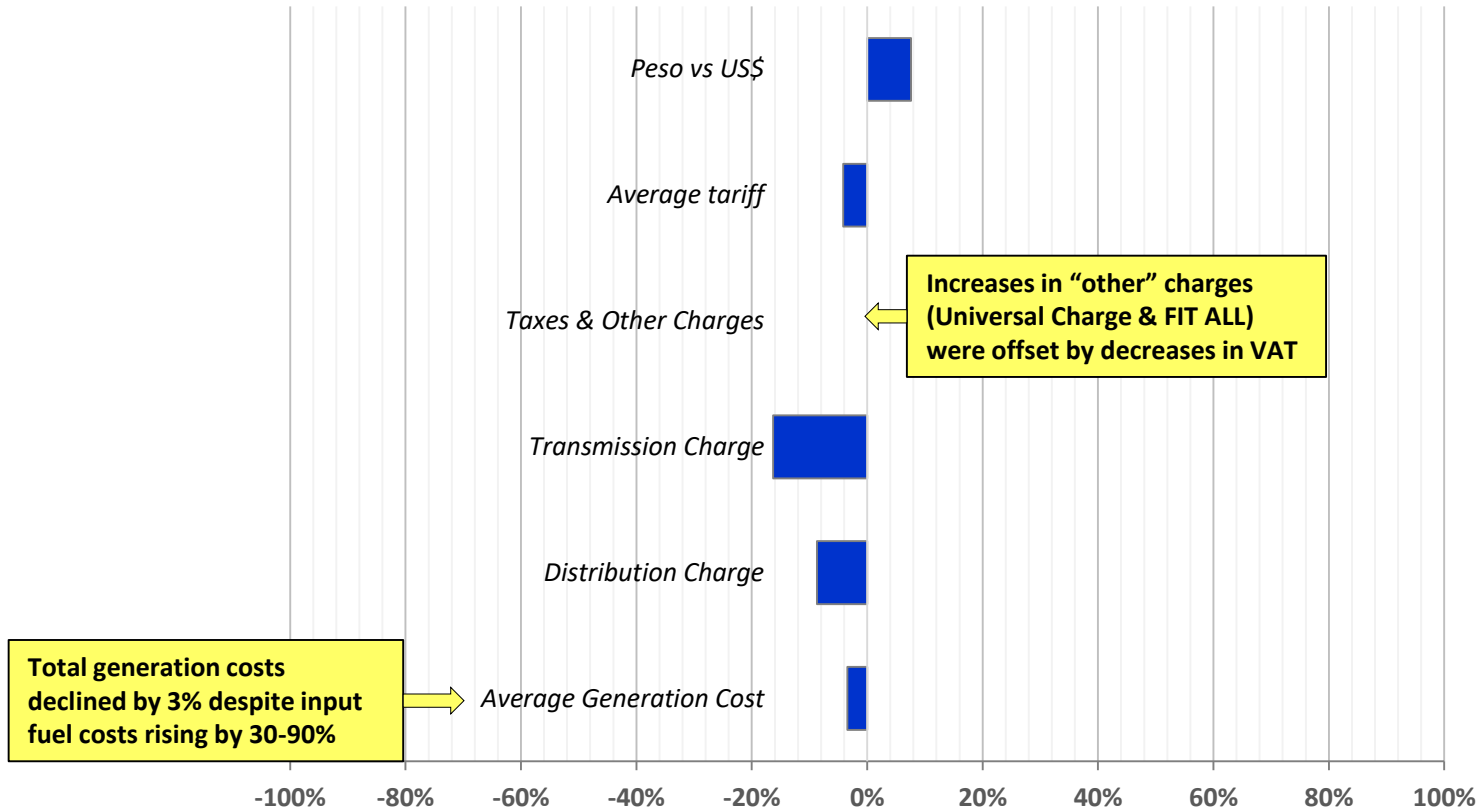
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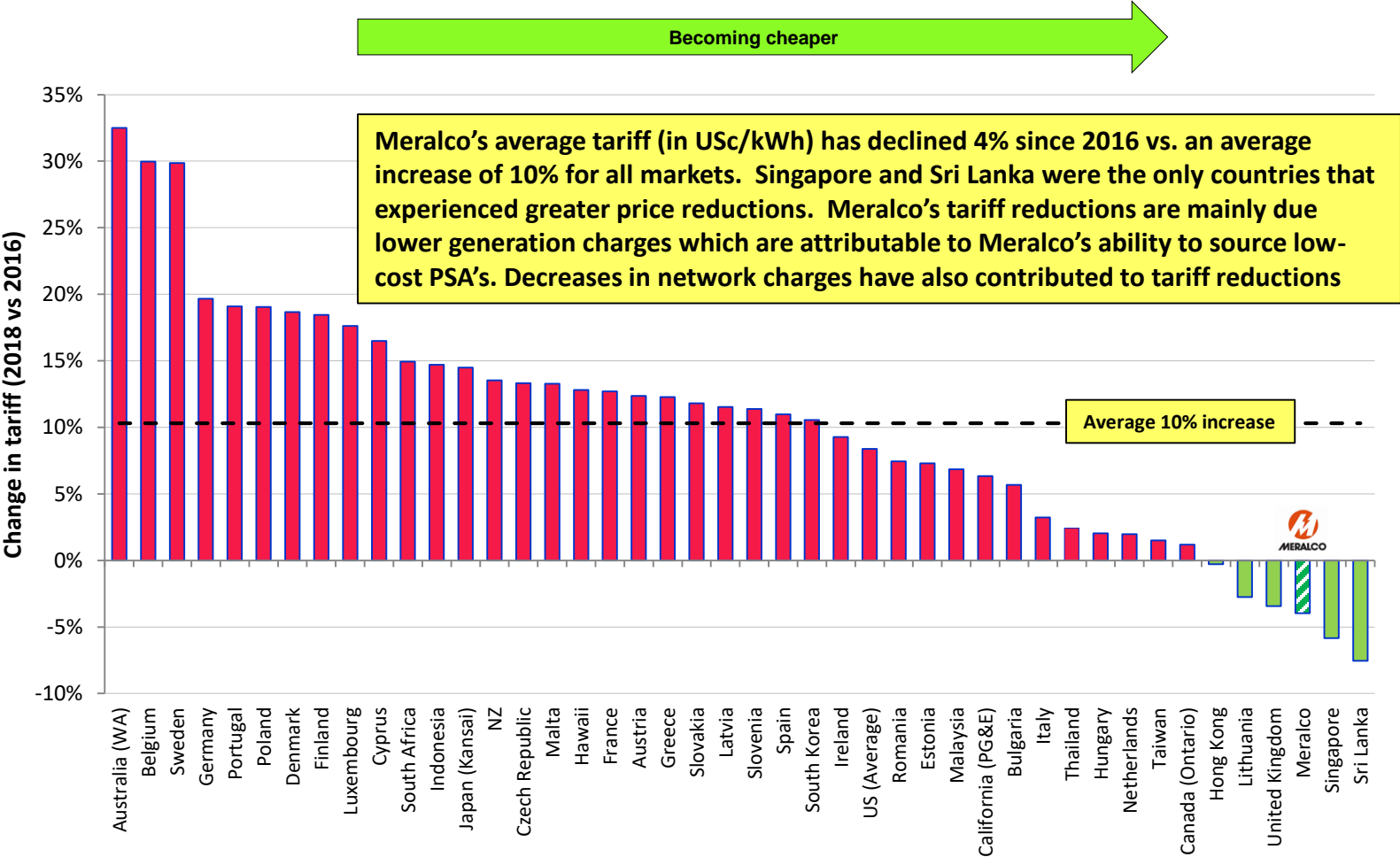
Change in Meralco Tariff Component Costs (2018 vs 2016) – US\$



% Change Meralco Tariff Components & Input Costs in US\$ (2018 vs 2016)



Change in Average Electricity Tariffs (2018 vs 2016) – c/kWh



NB. Excludes VAT but includes other non-recoverable charges and taxes. Assumes regulated generation charge for all Meralco customers

Summary of Answers: Tariff Reasonableness

Are Meralco's tariffs fair and reasonable?



- In order to judge whether the tariff is fair, it is necessary to assess the reasonableness of each component independently
- The Generation Charge (9.17c/kWh @ 60% of the total tariff) is significantly lower than IEC's estimate of the long-run marginal cost of producing reliable wholesale electricity in Luzon (11.40c/kWh¹). This large discount is mainly due to Meralco's ability to source low cost PSA's and represents a very good outcome for consumers who are getting their power at 20% below replacement cost
- The Distribution Charge (2.52c/kWh @ 16% of the total) is 37% lower than the average rate for the markets surveyed. On this basis, IEC judges that the charge is certainly fair and reasonable
- The Transmission Charge (1.18c/kWh @ 8% of the total) is 20% lower than the average of the markets surveyed (1.48c/kWh). Given the geography of the network area and the cross-subsidy for non-Meralco customers, this charge is probably fair and reasonable
- Taxes and Other Charges (2.49c/kWh @ 16% of the total) are much lower than the average 26% of the 46 markets. Other Charges (8% of the total) are lower than the average of 14% seen elsewhere and the VAT rate (9.2% effective) is much lower than the 15.1% average rate in markets that have a VAT
- Considering all of these factors, IEC believes that - on average - Meralco's regulated customers are currently paying a fair and reasonable price for electricity. This assessment is supported by the fact that Meralco's average tariff is now 4% lower than the average of 46 markets (and 10% lower than the average of unsubsidized markets), despite lack of subsidies and fundamentally high supply costs
- Furthermore, Meralco's rates were one of only five markets that experienced a decline over the past two years. This result is even more remarkable, given the twin headwinds of Peso depreciation and rising world fuel prices

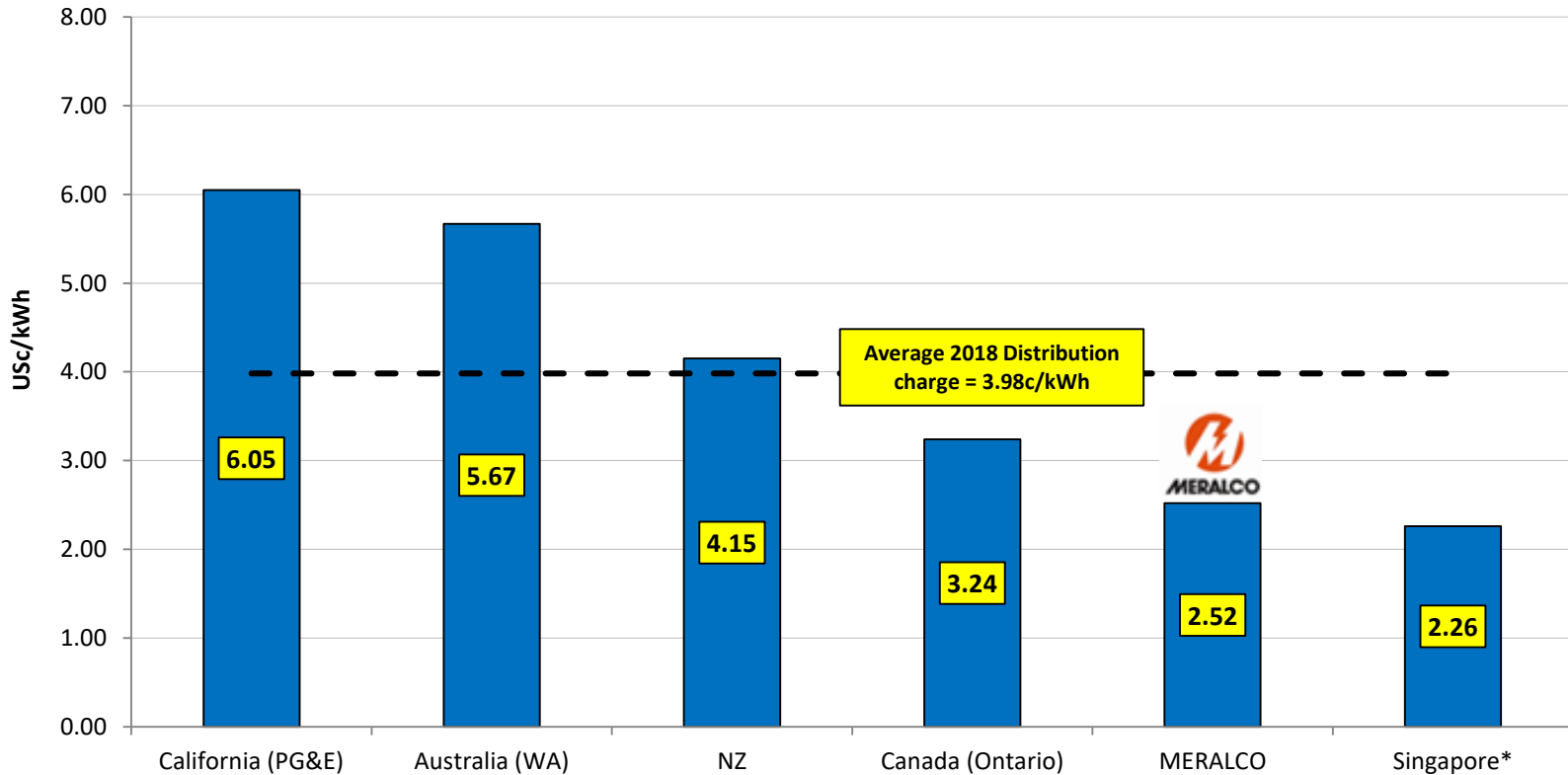
Notes

1. Assuming fuel prices @ Dec 2017

Comparison of Distribution Charges

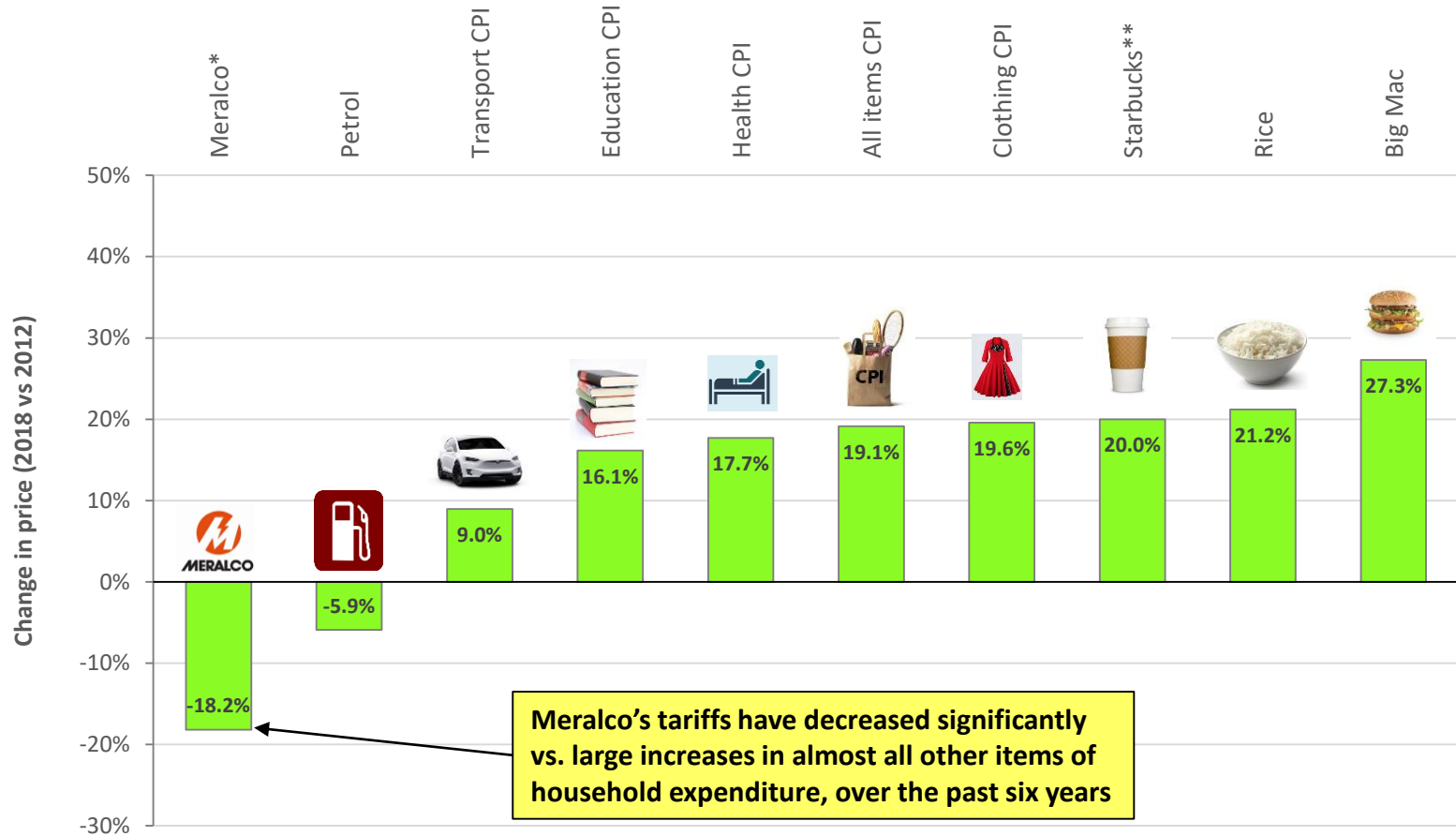


In comparison with the other markets in the survey, for which unbundled network costs were available, Meralco's Distribution Charge is 37% below the average



* Transmission and distribution combined

Price Change of Consumer Goods in Metro Manila (2018 vs 2012)

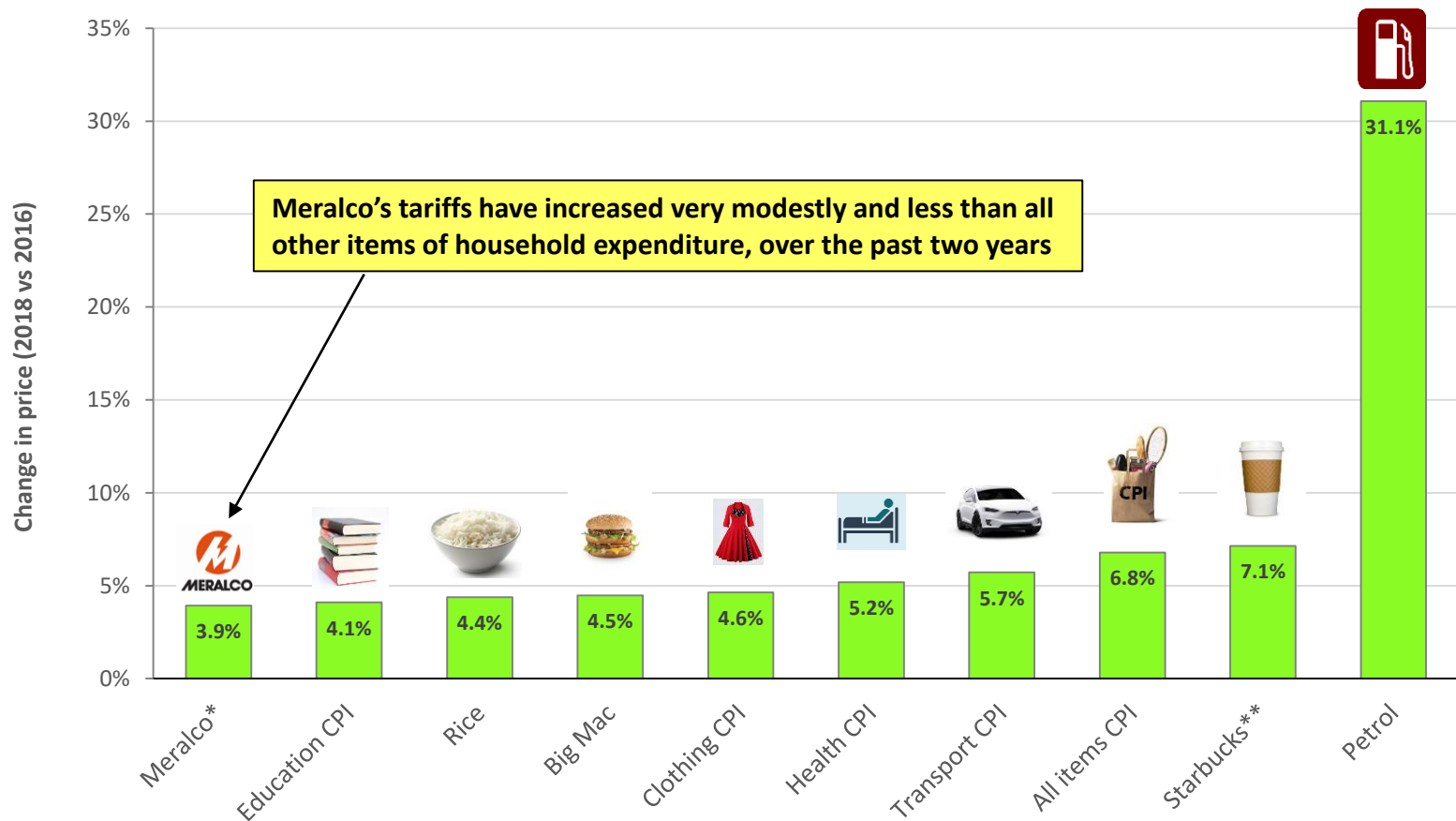


Meralco's tariffs have decreased significantly vs. large increases in almost all other items of household expenditure, over the past six years

Notes

- 1. All prices are in Pesos and include VAT
- 2. All data for Jan 2018 vs. Jan 2012
- 3. CPI data sourced from Philippines Statistics Authority
- * Monthly residential electricity bill in Pesos (200kWh consumer)
- ** Starbucks Americano (Venti)

Price Change of Consumer Goods in Metro Manila (2018 vs 2016)



Notes

- 1. All prices are in Pesos and include VAT
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Conclusions & Recommendations

- **Meralco's average tariff now ranks 24th out of 46 and 4% below the average of the survey. If subsidized markets are excluded, then Meralco's tariff is 10% lower than the average**
- **Over the past two years, Meralco's customers have been among the few in the world that have enjoyed rate decreases (vs. substantial increases in some of the neighbouring countries)**
- **Meralco's average tariff has decreased by 4% since Jan 2016 (vs. an average increase of 12% in the survey). In Peso terms, Meralco's tariff has increased by only 3% despite twin headwinds of significant fuel price increases and a depreciating local currency**
- **Meralco's residential customers have experienced a 4% increase in their monthly bills vs. a 7% increase in CPI, since 2016. Residential customers now pay 8% below the global average and now rank 26th out of 46**
- **All of the components of the regulated tariff are judged fair and reasonable, based on comparisons with other markets and versus the true cost of electricity**
- **This is an excellent outcome for consumers, considering that the Luzon power market is unsubsidized and the majority of electricity is produced using imported fuel**
- **Meralco's tariff reductions are mainly due to the addition of competitively-priced power supply contracts (PSA's) in the generation portfolio**
- **To ensure that Meralco holds or improves its position relative to tariffs in other markets, it is critical that regulators and legislators focus on facilitating investment in new generation to meet rapid demand growth and promote competition at a retail level so that wholesale electricity cost reductions are fully passed through to consumers**