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Essential Services Commission

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RE: Victorian Default Offer (VDO)

GloBird Energy welcomes the opportunity to provide feedback on the method being used to calculate the Victorian Default Offer (VDO).

When working on the VDO, one of the major factors to consider is the newly introduced Best Offer Notice rules obliging retailers to inform customers of the best offer every 3 months. The best offer includes the VDO price. This has effectively made VDO a price cap for all customers, even those on market offers. We understand that a low VDO is desirable, however, it must still be attainable and reflect actual underlying costs, and not create a falsely low price.

The Wholesale Energy Cost (WEC) is the single largest **variable** cost component in the energy bill which accounts for about 40% of the total bill. The Wholesale Energy Cost has more than doubled over the last 3 years and is the largest contributor to retail price increases over the last few years.

GloBird appreciate the effort and professionalism demonstrated in developing a model to estimate the Wholesale Energy Cost for setting the VDO price. This is an exceptionally complex and difficult task to get right. Overlooking the smallest detail can warp the result dramatically and dangerously underestimate the WEC.

We are surprised to see that the load premium (calculated as the load-weighted price divided by the time-weighted price) in the WEC is at 125 % in average across all distributors. This result is below what the industry has observed and experienced in the past. The nature of the WEC is similar to a commonly used financial instrument called Load Following Swaps, which offers a fixed dollar per MWH rate to the buyer (usually a retailer) on all future energy consumptions, regardless of the load shape and spot price.

In today's market, a Load Following Swap contract for residential customers generally requires about a 140% load premium, which is 15% above the load premium achieved by the STRIKE model, this difference is too big to ignore even if we factor in the additional premium the seller usually charges. In GloBird's view, the estimated WEC is about 10% below actual cost (approximately $12/MWh for residential customers) for a prudent and efficient retailer, based on the same futures contract price.

As a prudent retailer, we need to deliver a real price, to real customers in the real world, using liquid and tradable contracts with sound risk management practise. Otherwise we are chasing an

unattainable theoretical outcome. The consequences of such are catastrophic for the industry and more importantly for consumers. The Essential Services Commission Act 2001 requires the Essential Services Commission to have regard to the long-term interests of consumers. Setting the VDO based on some unrealistically lower WECs is not in the long-term interest of consumers.

With a close look into the model and the report published by Frontier Economics, we believe the underestimated WEC is caused by several issues in the current STRIKE model. In summary:

- **Volatility Allowance should consider the cost of One in Ten-year market event:**

  In the ESC's "Advice to Victorian Government" document published 3rd May 2019, it says "to address the SMALL risk associated with an unpredictable, very high-priced event, Frontier recommended including a volatility allowance to account for the residual risk not accounted for in the contract position". The phrase SMALL risk does not seem to be clearly defined.

  The risk of a high-priced market event is real, and the cost of such events are not in fact small, more importantly these risks needs to be quantified by a retailer. We could not see any particular analysis Frontier have done to determine this risk component accurately, only that it acknowledges the risks exist and the need for allowance. In the STRIKE Model, the WECs are only estimated for the median simulated years, and it is possible a retailer may be better off in some years, and worse off in other years compared to the WEC, therefore, Frontier has included a small Volatility Allowance to compensate retailers for "the residual risk to which they are expected".

  GloBird believes that the median result and the current form of Volatility Allowance does not fully address the extreme losses retailer's face over numerous years. With the way energy wholesale market is designed, the wholesale price can go up to $14,700 /MWh while the average cost in the WEC is less than $150/MWh in today's market, the total loss to retailers when the market price (and demand) is at its extreme can be as high as 100 times compared to normal fluctuations in the market, such risk cannot be ignored by a prudent retailer.

  Therefore, the Volatility Allowance should consider the real cost of extreme wholesale market events and the losses they will cause retailers. A very common approach used by industry to quantify and manage this, is the use of "stress tests" to look at the impact of a credible stress test event, for example a "One in Ten-year" wholesale event, like the one that happened in Q1 2019 in Victoria. The logic being that these events are not a question of IF but WHEN, therefore, the impact must be built into the Volatility Allowance.

  In detail, the model should work out the total loss a retailer will face on a market event like this based on the actual demand and proposed median contract positions, then spread the total loss over a 10 year period as part of the Volatility Allowance, so that over any 10 year period, the actual Wholesale Energy Cost matches up with the model.

- **Flaws and mistakes in the simulation do not fully match up with real world:**

  In estimating the WEC, Frontier has developed a STRIKE model that generates 500 simulations then uses the results to derive a lowest possible Wholesale Energy Cost for a median simulated year with some small residual risks to retailers. While the approach sounds reasonable, the result is only accurate if each of the 500 simulations are a reasonable representation of actual market characteristics and behaviours. Otherwise, we are simply drawing conclusions from unreliable data, resulting is inaccuracies.

  A few key aspects & characteristics exist in the wholesale energy market are, firstly, it is highly seasonal with a strong correlation to the weather, that is: the average demand, maximum demand and spot market price varies significantly between seasons, particularly for residential customers. Secondly, the wholesale spot price is highly volatile where prices can go as high as $14,700/MWh, and the high price is usually accompanied by high demand, the more extreme the temperature is, the higher the demand, the higher the price. Thirdly, the average temperature trends smoothly from month to month. For example; the Mar average and maximum temperature is generally lower than Jan, and Dec is generally higher than Oct. Therefore, the average and maximum demand in Jan should be higher than those in March, and similar patterns in demand can be expected from quarter to quarter.

  When simulating the load and price, the STRIKE model draws a number of random days from historical days of the same quarter, but gives no consideration to the distribution and correlation to the weather / temperature, therefore, the simulated Q1 demand and price could be mathematically (theoretically) correct but not possible in real-life. For example, the simulation could create a Q1 simulation with only a mild temperature of 20 degrees every day, or the max demand in Q1 which is lower than the max demand in Q2, while in real-life, this doesn't happen. Such a simulation will lead to the incorrect estimation of future demand & price, and ultimately, the wrong estimation of the WEC.

  GloBird has identified areas of concerns caused by the theoretical nature of the simulation not compatible with the real-life market reality, which has led to inappropriate contract positions, resulting in inaccurate WEC estimations and under-estimated risk to retailers. The key issues are listed below, which will be discussed in detail further in this submission:

  - Total hedged summer contract position is up to 7% below the maximum demand
  - Simulated demand in Q1 is sometimes under-estimated by up to 28% for the TOP 15 Half Hourly Period when the price is high
  - The relevance of using FY16/17 market data is questionable

  In addition, there are also mistakes made in the simulation:
  - Incorrect maximum spot price being used in the simulation ($16921.47 VS $14700)
  - Not treating 2020 as a leap year

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Detailed Analysis of the flaws and mistakes in the simulation

Earlier in this submission, we touched on some flaws in the simulation compared to actual market behaviour, we would like to discuss it in detail here. To keep our focus on this topic, we choose to examine the contract position and the WEC for "AusNet" distribution area for residential customers only. The data is published on the ESC website on the 20th of September 2019, under the title of " Frontier Economics - Wholesale electricity settling contract positions AusNet Services zone".

Based on Frontier's declared approach on Page 29 of the Consultant Report by Frontier Economics, which says:

- *purchasing swaps to cover (approximately) average demand*
- *purchasing caps, on top of that, to cover (approximately) to peak demand*
- *in some cases, incurring a small amount of pool exposure at absolute peak demand times.*

We can infer that the total portfolio size is approximately the expected maximum demand from retail customers, let's call it "Implied Maximum Demand", which is calculated like this:

Implied Maximum Demand = "Base Swap Position Size" + "Peak Swap Position Size" + "Base Cap Position Size"

To confirm if this "Implied Maximum Demand" matches up with the actual maximum demand in the real world, let's compare this to the VIC MIRM data.

The below table shows the WEC contract positions for residential customers. We have added a new column to show the total hedge contract positions, which is the "Implied Maximum Demand", being the sum of "Base Swap Position", "Peak Swap Position" and "Base Cap Position":

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AusNet

Based on 12 month average contract prices

Quarter	position base future	price base future	position peak future	price peak future	position base cap	price base cap	Total Portfolio Size / Implied Max. Demand
	Base swap position	**Base swap price**	**Peak swap position**	**Peak swap price**	**Base cap position**	**Base cap price**	(MW)
1	0.132	$122.84	0.009	$186.73	0.232	$34.98	0.374
2	0.153	$81.97	0.000	$100.03	0.136	$3.35	0.290
3	0.153	$74.15	0.004	$88.90	0.116	$3.83	0.274
4	0.099	$72.11	0.024	$83.80	0.196	$6.06	0.320

On the other hand, below is the Average Load and Max Load analysis for AusNet residential customers based on the historical half hourly load data from July 2016 to June 2019.

	Q1		Q2		Q3		Q4	
Financial Year	Average Load	Max Load	Average Load	Max Load	Average Load	Max Load	Average Load	Max Load
2016/17	142,202	439,579	177,828	361,047	156,622	300,424	133,685	388,772
2017/18	143,211	560,067	175,634	366,854	198,827	382,843	137,218	422,940
2018/19	148,115	521,259	173,640	404,348	194,151	376,850	130,043	448,321
Average	144,509	506,968	175,701	377,416	183,200	353,372	133,649	420,011

If we compare each quarter's own result against the Q3 numbers, we have the difference in percentage in other quarters compared to Q3. The reason for choosing Q3 is because Q3 has the lowest max demand across the year, the table below shows the result:

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	STRIKE MODEL		Historical Load Data		% Difference between VIC MRIM data and the Implied Maximum Demand by the STRIKE Model (VS Q2)
Quarter	Implied Max. Demand	Implied Quarterly Max. Demand VS the Implied Q3 Max. Demand (%)	Average Max Load	Average Max Load Compare to Q2 in percentage (%)	
1	0.374	136%	506,968	143%	-7%
2	0.290	106%	377,416	107%	-1%
3	0.274	100%	353,372	100%	0%
4	0.320	117%	420,011	119%	-2%

From the result above, we can see that based on historical data, the average maximum demand in Q1 between Jan 2017 and March 2019 is about **143%** of the Q3 maximum demand, however, in the STRIKE model, the implied max demand is only **136%** of the Q2 maximum demand, the difference is 7%.

This shows that compared to the real-world average, the STRIKE model has under-hedged against the maximum demand in Q1 by up to 7%, which happens to be the riskiest parts of the year, and the CAP contract price is also the highest. Such a portfolio, while it may save some dollars for some years, it would leave the retailer exposed to any future market event that might happen (like the one we have experienced in summer 2019), this is not a position a prudent retailer could possibly take. It is also against Frontier's own declared approach on Page 29 of the report.

In addition, some spot prices generated in the simulation are incorrectly higher than the Market Price Cap defined by AEMO, which is $14,700/MWH. For example, in the excel file for AusNet, we see prices spot price on 26/03/2017 16:30 is $16,912.47/MWh, and the spot price on 26/03/2017 17:00 is 15,642.66/MWh, this again, has resulted in a higher payout from the hedge contract and overall lower Wholesale Energy Cost.

Assume the time-weighted average spot price is the same as the Base Swap contract price in the portfolio, which is calculated to be $87.59/MWh for the whole year, with the load weighted average price is only $108.95/MWh for AusNet residential customers, meaning the load premium in the WEC is at 124%. With all the issues mentioned above, it is no surprise to see such a low load premium. This is unrealistic and against industry reality.

Based on the issues discussed above, we suggest the model and the WEC can be tweaked to better reflect the actual market and underlying cost a retailer usually incurs in the wholesale market:

1) **Use a stress test (One in Ten Event) to calculate Volatility Allowance**

   The biggest risk a retailer faces is a high price with high demand at the same time, therefore, stress test simulating the One in Ten event (exactly like the ones that just happened this summer) against the actual demand and the actual contract position, assume the loss can be

recovered in the other nine years where no extreme event is expected, 10% of the calculated total loss from the event should be included in the calculation the Volatility Allowance.

2) **Compulsory Inclusion of some extreme demand days for each month in the simulation**

The simulation draws a random day with its price & demand from a pool of historical dates from the same quarter in earlier years. It is possible to create a simulation consisting of only the mild temperature days in the past, which is not a true representation of the market, and the result could be skewed by such a simulation.

Considering the demand is highly correlated to the weather, and the weather trends month to month with steady direction. To ensure the simulation fully reflects this, we suggest two improvements with the simulation.

Firstly, the simulations could be developed on the month by month basis using the monthly data, instead of quarterly data, and it should only draw the random days from the same month of the same type (weekdays, weekends and public holidays) in history for each month.

Secondly, group the days of the same month into three categories to create three separated pools, being the pool with TOP N demand days, the pool with Bottom N demand days, and the pool for all remaining days. When simulating the monthly load and price, it should draw a fixed number of days from each pool so that the data distribution is better matched with a real-life scenario.

3) **Further Sanity Check on the generated data for each simulation**

The energy market is quite seasonal, and its demand does follow some observable patterns between the different months of the year, additional sanity checks can be added to ensure the generated sample data for each simulation are not completely at odds with real-life situations, any simulations that is outside of the standard norm should be discarded.

4) **Cap the maximum price using on the actual Market Price Cap defined by AEMO**

When scaling the future spot price based on the futures market price, the result must be capped at the Maximum Price Cap (MPC) defined by AEMO, which is $14700/MWh for 2020, any residual value can be added to the remaining price intervals.

5) **Exclude FY 2016/17 data from the simulation**

The meaningfulness of using FY16/17 data in the simulation is questionable. The shutdown of Hazelwood power station in March 2017 marked the start of a new era, which is the country is on an irreversible fast track towards a lower carbon economy, the wholesale cost has more than doubled since and importantly the volatility has also increased significantly. The market price data, and its relationship to demand in FY16/17 is no longer representative in today's market, therefore, it should be excluded from the simulation. The move to include this year skews the results with data that is no longer relevant.

6) **Room for forecast deviation or execution errors**

There is no allocation or budget for on demand forecast variance, trading cost or trading price deviation. As they are all legitimate costs incurred by any efficient retailer, they have tangible impacts to the actual wholesale energy cost.

Take the demand forecast variance for example; simply ask if anyone can accurately predict the actual amount of energy their own household will consume in the next 12 months? Or if anyone can trade the financial market with 100% success rate? Yet in the model, retailers are expected to do both. A retailer is somehow expected to be able to accurately forecast all customers demand up to 12 months in advance and execute each trade without deviation compared to the theorical average price in the 12 months period. There needs to be some budget allocations for the imperfections that come from a human being trading in the financial markets as they attempt to manage the compelling wholesale risks without the benefit of hindsight.

7) **Back test with real-life data to validate that the STRIKE model works**
We suggest Frontier Economics to conduct a series back tests with real life price and load data for the previous years to prove that the STRIKE model works, and that it will produce a WEC that is balanced between cost & risk.

For example, run the STRIKE model and the same judgement process using futures & customer demand data up to May 2018 for the Wholesale Energy Cost forecast calculation for the financial year 2019, then apply the actual FY2019 wholesale spot price and customer load data, to calculate the actual WEC a retailer would be facing under the model, and publish the actual WEC result, together with the forecasted WEC before the year starts. This back testing should be conducted for several historical years. The result will help the industry further understand the STRIKE model and provide some confidence in the model.

Without doing so, combined with the concerns we have raised earlier in this submission, the model has nothing of substance that can be relied on to back it up. We are left with the horror scenario that nether Frontier Economics, nor the State Government seems prepared to underwrite it, and there are no offers from any other party to retailers on a Load Following Swap contract that are even close to the WEC cost derived in the STRIKE model.

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Finally, industry has raised concerns on the model's transparency, Frontier has released a report and some detailed data to improve on the transparency level, although this is welcome, it doesn't go far enough, we suggest more disclosure is needed to further improve the model's transparency:

- **More disclosure to improve transparency:**

  On the 16th of September 2019, Frontier has released a report named "Wholesale Electricity Costs for 2020" that was made available to public. We appreciate the detailed explanation on the model and the rules used behind the STRIKE model. The report has helped us to understand the STRIKE model better, however, we believe more can be done to further improve the transparency level.

  While we do not think it is necessary to release its source code for the STRIKE Model, however we do believe all input source data, all assumptions, rules made in generating the simulations, and the optimizations, any parameters used, as well as the whole 500 simulation results should be made generally available, so that the industry can independently check or replicate the model in its own way to further verify the results at a detailed level.

  Additionally, in calculating the median contract position, the STRIKE assumes "*a given level of risk*", we would like to know how STRIKE defines the risk, the assumptions and rules behind it. It is also important for the industry to understand the reason to use the Median result from the simulations, rather than the Mean result.

  And further, Frontier has mentioned the WEC is calculated *"based on the most conservative contracting position on the efficient frontier"*, we would like to see more evidence to back up this statement, as the actual contract position shows differently.

  And finally, it is important to publish and make clear **the start and end date** of the futures price to be used in calculating the final WEC, so that industry can know when the futures market movement would stop to have any impact on the VDO for 2020.