

Post 2025 Market Design Paper.

Intelligent Automations Response

Client	
Document Status	Final
Document Revision	V1.0
Date	26 th October 2020

Table of Contents

1	Introduction	2
1	AGING THERMAL GENERATION	2
2	DER INTEGRATION	4
2.1	NETWORKS	5
2.2	DEMAND RESPONSE	6
2.3	2 WAY MARKETS.....	8
3	CONCLUSION	9

1 INTRODUCTION

Intelligent Automation Pty Ltd was established in 2010 on the Sunshine Coast in response to a market gap in automation solutions, answering the increasing need for better control of low-medium load appliances. This set Intelligent Automation on the path to manufacture a Home Energy Management System (HEMS). With the slow release to the market, the Gswitch has caught the attention of Energex, AEMO and numerous other companies responding to the need for network control of loads.

The Gswitch team was invited to take part in the steering committee for the Australian standard, 4755.2 and the current AEMO VPP trial as well as advising on the code of practice for DERs? Intelligent Automation's product the Gswitch is also one of the suppliers for the current HEMS pilot program with Energex (IPDRS).

1 AGING THERMAL GENERATION

Intelligent Automation perceives the necessity to move to an IoT approach for load control. We predict a future requirement for an entry level product for the control of appliances as the first line of defence in transitioning to renewables.

In order to capture the mindshare of consumers, the product needs to have the following features:

- Set 'n' Forget
 - It must be easy and automatic, unlike current systems the product needs to react automatically to conditions according to customer pre-sets and market conditions.
- Access to all markets
 - Be able to work with current retailer mechanisms and wholesale markets
- Network control
 - Be able to react to various network control signals to protect the integrity of the grid
- Emergency signals
 - React to high priority emergency signals, able to override any other directive currently being executed
- Remote agents
 - Work with remote agents and provide a mechanism to allow the consumer to prioritise and select multiple agents to handle multiple market offerings.

Currently the majority of load control remains with the DNSP. This limits consumers access to other ancillary markets. Load control should be an open market where the consumer is compensated for any disruption to supply and be paid market price, for the operation of their appliances; this will also hold to account suppliers for reliability.

LOADS	MARKETS					
APPLIANCE TYPE	SPOT PRICE TRIGGERS	FCAS	WHOLESALE DR	NETWORK DEMAND RESPONSE	RRO	RERT
HOT WATER	Y	Y	Y	Y	Y	Y
POOL PUMP	Y	Y	Y	Y	Y	Y
ELECTRIC VEHICLE	Y	Y	Y	Y	Y	Y
AIR CONDITIONER	R	N	Y	Y	Y	Y
OTHER APPLIANCES	Y	N	Y	Y	Y	Y
R RESTRICTED						
Y SUITABLE						
N NOT SUITABLE						

Market Suitability for Load Type

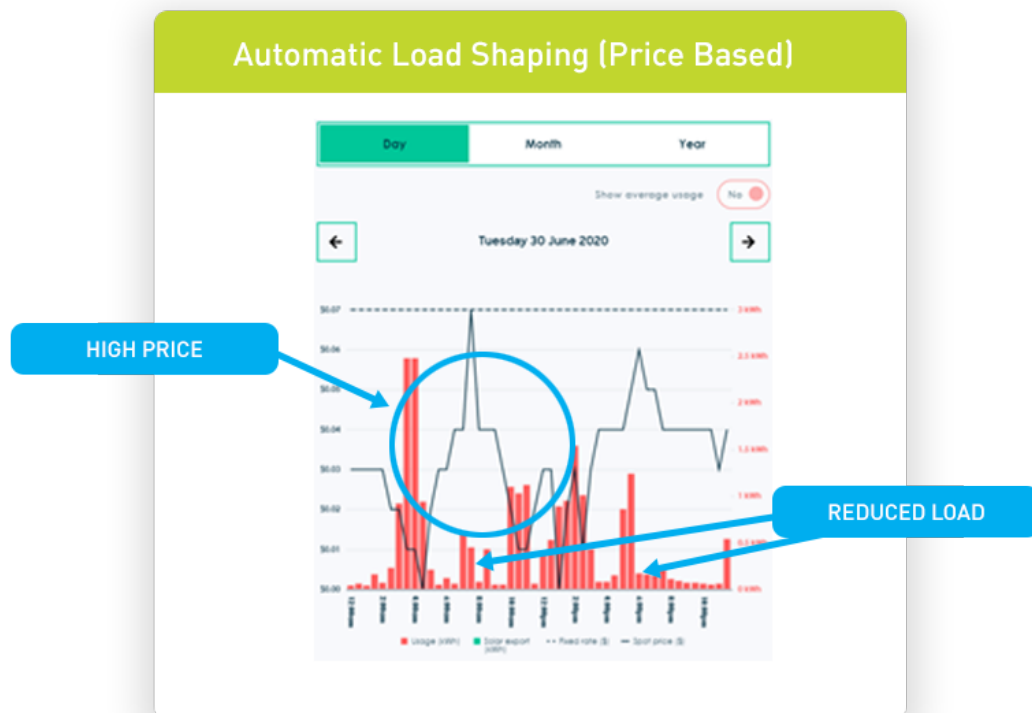
We feel the need becomes greater for more granular load control. Consideration should be made for legislation that deems all house-hold appliances have an open protocol for the ease of communication to the market or to offer incentives much like Energex' peak smart program to purchase such products.

The more appliances that can be controlled online will increase the amount of dispatchable load that can match available generation.

2 DER INTEGRATION

Intelligent Automation are currently running trials for load control activation triggered by spot pricing. Working with the retailer PowerClub - their business model enables the consumer to access the wholesale market. Combined with the Gswitch (HEMS) product, automatic switching of loads based on market spot price has seen appreciable returns to the end users and achieving a 70% reduction in generation costs in some months.

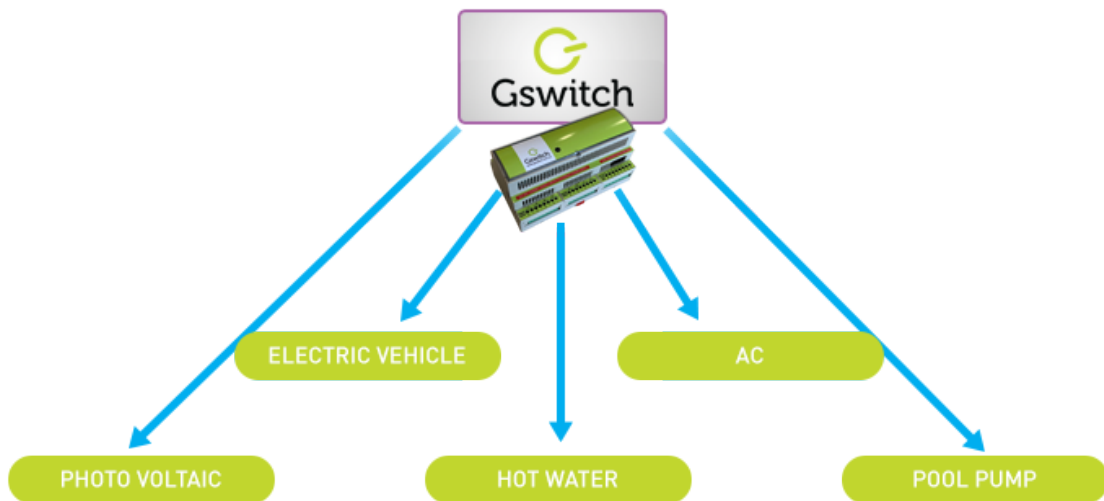
Responding to spot pricing is conducive to overall consumer satisfaction; when the price is high the HEMS throttles back consumption. Alternatively, when the price is low it turns on the appropriate appliances. The HEMS also gives the consumer the ability to set a price that suits their own comfort levels whilst working within the constraints of their budget.



2.1 NETWORKS

Network cost is the largest contributor to most power bills. We have seen reductions of hot waters and pool pumps connected to tariffs as consumers opt for solar soaking, thereby reducing the effectiveness of ripple control.

With the installation of HEMS, DNSP can have access to a greater diversity of loads, including pool pumps, hot water, air conditioner, electric vehicles, general appliances and generation from PV solar systems. This will increase the demand response portfolio (allowing for more granular load control mechanisms).



In addition, such HEMS devices can also provide voltage control and network stability as well as increase the ROI for appliances such as PV units.

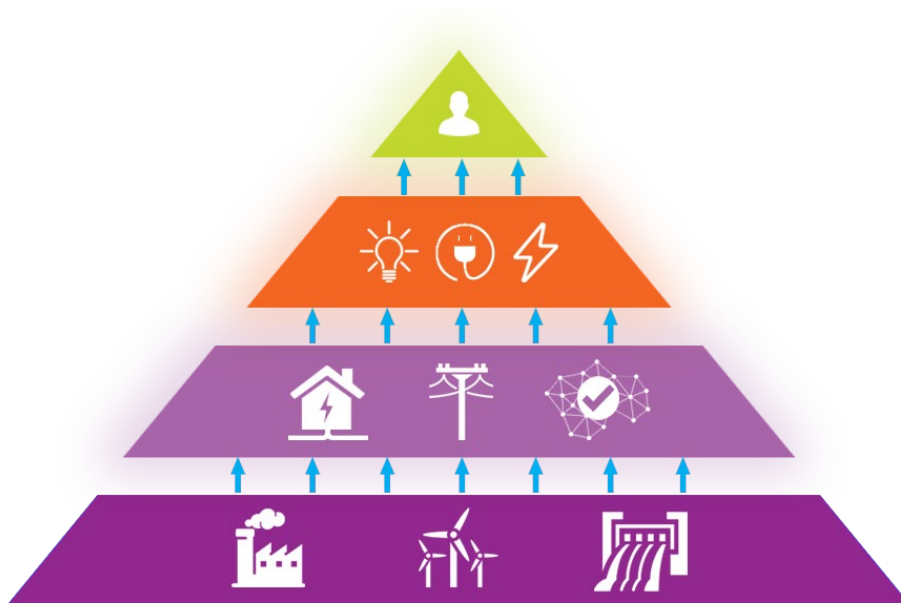
A larger demand response portfolio will reduce investment in poles and wires. HEMS will also give the ability for DNSP to localise and target problem areas.

2.2 DEMAND RESPONSE

DR is being trialled in the residential market with automatic triggers for the Energex IPDRS pilot program. Consumers in this trial will be paid \$15-20 for each the DR event. They are able to opt out of any DR events that are scheduled to take place.

Markets for wholesale DR could be set up much like the FCAS market. When a distribution company needs network reduction they could activate the bid with the required MW and length of time. This market can also be used for RRO, RERT, and DR. This would take advantage of already established mechanisms and would make it easier for OEMs to manufacture such conforming devices.

There is inherent risk in explaining complicated contracts to the consumer. Education is key with aggregators and retailers taking most of the revenue and passing on smaller portions to the consumer. The effect are even more pronounced when also considering generation and distribution companies into the equation.



To further develop confidence with the consumer, transparency is needed in price triggers so consumers can see how much the aggregator is paid for the event. Forcing such transparency will help to open up the market for greater competition.

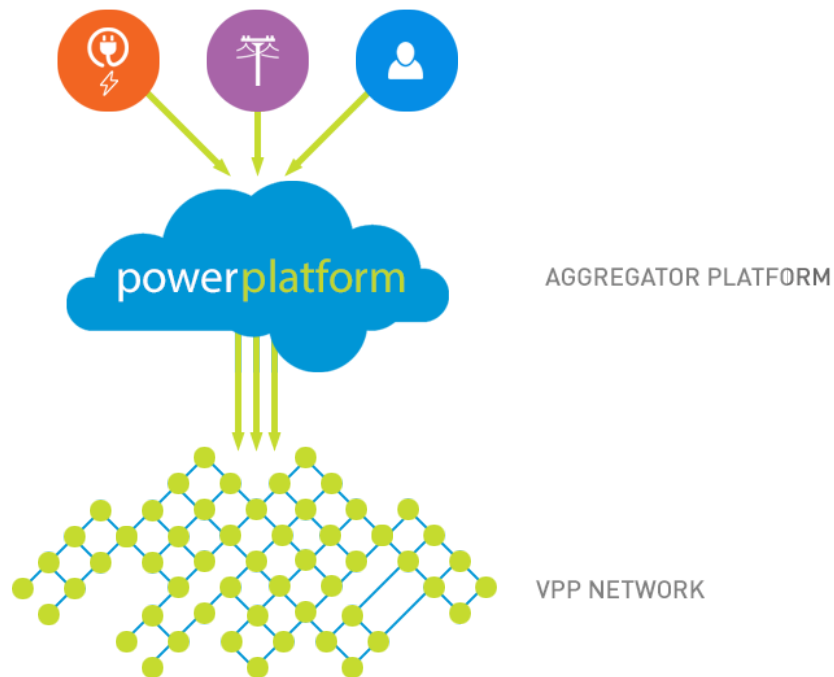
In addition to this, education must play a major role in offsetting the “Big brother effect”. The consumer will be handing over the control of their household appliances and this could be quite daunting.

Although Distribution companies have been doing this for years using tariffs. Clear transparency with the length of time the load will be controlled for and the market revenue that will be available for compensation could alleviate any concerns. Considering that some appliances can be under control indefinitely, these factors will have to be spelt out clearly and precisely in a contract.

Generally the market price signals would be high during a demand response event, the consumer setting a load reduction due to high pricing will reduce DR costs to the DNSP as both signals may coincide.

2.3 2 WAY MARKETS

Large scale VPP fleets (2 way markets) can be enabled via HEMS devices and aggregator platforms. This creates opportunities for various entities to establish VPP fleets that can become involved in the market.



Activation of large loads may cause strain on generation and networks. Forecasting and ramping is an important part of a successful dispatch. Devising a market where a generator would bid for an order of dispatchable load, this can be achievable on a large VPP fleet. Loads can then be dispatched during times of excess generation where price is considerably lower. These loads can be localised to reduce distribution line losses, also working within the constraints of the network limits.

Contracts between renewable generation, aggregators and consumers could then be achieved with a more reliable outcome. With the ability for large VPP to dispatch loads when power is abundant, stabilises the price and reduces curtailment. This in turn gives higher prices for generation and more output for renewables as well as a larger income stream to pay for load control.

3 CONCLUSION

Intelligent Automation welcomes the transition to renewables. We do feel however that the simplest remedy has been over looked. Operating within the real time market and signalling loads to operate on pricing will help alleviate many of the existing problems. This will also keep prices low while still allowing other emergency control measures that can be prioritised.

With rise of EV ownership, 60- 70% of house-hold loads and all Solar PV generation can be dispatchable or controlled, this makes sense for the future of renewable energy as both EV and PV installations become more prevalent.