Attachment 8.09

Public lighting investment plan - active reactors

May 2014

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Contents

Document and Amendment History

Issue No.	Date	Approved By	Summary of Changes
1.0	April 2014	Reg Team	Final

INVESTMENT PLAN – Active Reactors (Main Roads)

About this document

This document is a supporting document to Ausgrid's 2014-19 substantive proposal to the Australian Energy Regulator. It provides justification and explanation of a specific capital expenditure program as well as summarising the key financial information of the program.

This document should be read in conjunction with all submission documents, particularly those relevant to public lighting.

Investment Trigger

The investment trigger to remove and replace mercury vapour (MV) luminaires is due to:

- Improvement in spot outage rates when compared to mercury vapour.
- Potential to increase the Bulk Lamp Replacement (BLR) period from 2.5 years to 4 years.
- The use of MV luminaires for new installations is now banned by AS1158, and compliance with AS1158 is a requirement of the NSW Public Lighting Code.

1.0 UNDERSTANDING THE NEED FOR INVESTMENT

1.1 Identifying the need

Ausgrid has experienced much higher failure rates for the MV luminaries than the expected failure rates used in the 2009-14 revenue calculation. This resulted in Ausgrid maintaining a 2.5 year (BLR) period to ensure compliance with the Australian Standard. To continue using MVs as is and adhering to the Australian Standard, a significant increase in OPEX is required – above the 2009-14 regulated revenue.

The main focus of this particular investment decision is the proposed change to the lighting technology used on main roads, also known as category V lighting. Ausgrid have focused their strategy to achieve operating cost savings by moving all high wattage bulk replacements cycles from 2.5 years to a 4 year cycle by replacing them with longer life and more energy efficient luminaires. The underlying reason for this is that the majority of these high wattage luminaires are located on our main roads.

1.2 Impact of issue

The latest AER determination recommends that a 4 year cycle is required for high pressure sodium (HPS) lamps on traffic routes and 3 year cycle for all other lamp types. Due to the current use of the MV lamps which only have a 2.5 year BLR cycle and the mixture of HPS and MV on main roads Ausgrid chose to continue with a 2.5 year BLR cycle. It should be noted that operational expenditure would increase if Ausgrid moved to a 4 year cycle as spot outage rates would increase for MV luminaires. Further, the use of MV luminaires for new installations is now banned by AS1158. Compliance with the public lighting code, AER and Australian Standards are all part of Ausgrid's strategic objectives.

Another objective is to minimise the spot maintenance associated with streetlighting which in turn reduces the overall lifetime costs of streetlighting for Ausgrid and its customers. Refer to Appendix B which shows a comparison between the survival rate curves of MV lamps and the survival rate curve of a newer technology i.e. HPS lamps are used in this example. The curves demonstrate that the MV lamps mortality rates are closer to 30% at 16000hrs, however other emerging technologies such as the HPS lamps have a mortality rate of approximately 5% at 16000hrs. This represents a significant improvement when comparing the two technologies which further supports the reason to move away from MV lamps to more efficient lamps with longer life cycles. It should be noted that these curves are based on data gained in laboratory experiments and may vary significantly in practice.

The category V mercury vapour population in Ausgrid's network represented approximately 10% of the total street lighting population at the time of Ausgrid's investigations. The split by lamp type is shown in the table below:

Table 1: MV population for 400W and 250W as at January 2013

Current High Wattage Luminaire	Total Population
400W Mercury	7,142
250W Mercury	18,373
Total	25,515

1.2.1 NSW Government Energy Saving Certificates Scheme (ESC)

As a means to assist the streetlighting improvement programs aim towards reducing electricity consumption and electricity costs, the Australian Government offered the Energy Savings Certificates Scheme to encourage investment in emerging lighting technologies to achieve this.

Under the Energy Saving Certificates Scheme, the use of emerging lighting technologies in energy savings activities must achieve a reduction in energy consumption without reducing the level of service or output service provided by the original lighting equipment. The Energy Savings Scheme reduces electricity consumption in NSW by creating financial incentives for organisations to invest in energy savings projects. Energy savings are achieved by installing, improving or replacing energy savings equipment.

1.2.2 Impact of the ESC Scheme on Ausgrid and Councils

As with any luminaire replacement before the end of its financial life, the residual values must be paid for by councils. Under the new arrangement Councils:

- will be required to pay all residual costs;
- may be eligible for NSW Energy Savings Scheme Credits.

For the scheme to take place Ausgrid will be providing:

- the capital funding for the new technology;
- any appropriate documentation to assist and enable councils to claim the credits.

The councils have requested that Ausgrid considers an accelerated program to replace all 250W and 400W luminaires. However approval of an accelerated replacement program is subject to approval by Ausgrid's board for capital funding.

2.0 How we assessed the options

Ausgrid's approach to assessing all possible options was quite extensive when deciding on the most appropriate technology for Category V lighting.

The first stage in the assessment process was identifying the technology options through market research including policy analysis and future technology trends. The technologies investigated included cosmopolis, metal halide, induction lighting, light emitting plasma, LED and the Active Reactor.

The second stage was to compare the various suitable and compliant technology against a number of performance criteria such as energy efficiency and maintenance requirements.

The final stage was a financial analysis to understand the various costs of the remaining options.

2.1 Compliance with technical requirements

The findings from the research are summarised in the table below:

Table 2: Technology compliance with technical requirements

Technology	Pass/Fail
Cosmopolis	Fail
Induction lighting	Fail
Light Emitting Plasma	Fail
Light Emitting Diode (LED)	Fail(however likely to pass when AS1158 is amended to include LED)
Standard HPS	Pass
Active Reactor	Pass

- The lighting technologies that failed to meet technical requirements:
  - The C*osmopolis* and the metal halide did not meet the 4 year target BLR;
  - *Induction lighting* didn't have good efficiency at the required category V level of lighting;
  - The *Light Emitting Plasma* technology only catered for much higher lighting levels than required.
  - LED at the time could not meet the photometric requirements and were not accepted as permissible lamp type in AS1158. LED in higher wattages was also prohibitively expensive.

- The lighting technologies that passed the technical requirements:

  - Standard HPS meets Ausgrid's technical requirements, is cost effective and can reduce energy consumption up to 41% when compared to the equivalent MV luminaires.
  - The Active Reactor meets Ausgrid's technical requirements, is cost effective and can reduce energy consumption up to 56% when compared to the equivalent MV luminaires.
  - Cost benefit analysis is neutral when comparing Active Reactor technology to standard technology
  - Ausgrid consulted with all 41 councils in Ausgrid's distribution area (November 2011), and they have accepted the additional costs of installing the active reactor as they see a significant cost saving over the life of the luminaire. (Letters attached) Refer to appendix A for more information about active reactor technology.

2.2 Testing of the AR HPS

Ausgrid has ensured substantial testing had been performed on the active reactor HPS luminaires before adopting them as the new category V default luminaire. Testing carried out to date:

- Supplier testing of the luminaire to AS1158.6 requirements
- Additional Electromagnetic Compatibility (EMC) testing to IEC61547
- To be prudent Ausgrid also consulted with Ironbark Sustainability who are consultants in sustainable strategy assessment and asset management to provide some analysis on active reactor technology. Their report looked at several trials in Victoria and the ACT that were completed for the supplier. All trial results were assessed against the Australian Standards AS1158. Conclusions from the analysis are:
    - The Sylvania Roadstar luminaires that are fitted with active reactors are compliant within AS1158;
    - The use of active reactors will have up to a 56% reduction in energy consumption when compared to the equivalent MV luminaires and up to 27% reduction when compared to standard HPS technology. Energy savings of The Active Reactor are captured in the AEMO load tables.

2.3 Comparison of Compliant technology

For further assurance Ausgrid assessed the Active Reactor HPS, Standard HPS and LED technologies against each other. The results can be seen in the sections below:

2.3.1 Active Reactor HPS vs Standard HPS luminaire

Table 3 below shows comparisons between the standard HPS and the active reactor HPS. It is clear from the table that the HPS Active Reactor results far exceed that of the standard HPS.

Table 3: Comparison of Standard HPS with HPS Active Reactor

	Standard HPS	HPS with Active Reactor
Bulk Lamp Replacement	3-4 years	Theoretically 10 years though Ausgrid would not be confident in this until it is tested in practice
Spot Outages	3.65*% pa (current AER assumption)	< 2.5% pa expected
Energy Consumption Savings	173W 273W 440W	130W (25% saving vs standard HPS) 199W (27% saving vs standard HPS) 326W (26% saving vs standard HPS)

*3.65% for 250W Std HPS and 3.18% for 150W Std HPS

2.3.2 Active Reactor HPS vs Standard HPS vs Mercury vapour luminaire

Table 4 represents the approach Ausgrid initially took where standard HPS luminaires replacing mercury vapour luminaires. From the table there are energy savings of 36-41% when compared to the mercury vapour.

Table 4: Comparison of the mercury vapour luminaire with the equivalent STANDARD HPS luminaire

Current Luminaire	Current Power Consumption	Equivalent STANDARD HPS Power Consumption	Energy Saving (%)
700W Mercury vapour	740W	440W (400W Std HPS)	41%
400W Mercury vapour	430W	273W (250W Std HPS)	37%
250W Mercury vapour	270W	173W (150W Std HPS)	36%

Table 5 below demonstrates the proposed approach which is now part implemented where active reactors are replacing the mercury vapour luminaires. Ausgrid is planning to replace the majority of the 700W Mercury vapour luminaires during 2013/14. Ausgrid are awaiting council's approval to go to the next step and apply to the Ausgrid board for approval for capital and commence the accelerated replacement program of all the 400W and 250W mercury luminaires. From the table below energy savings are as high as 52-56% when compared to the equivalent MV luminaires.

Table 5: Comparison of the mercury vapour luminaire with the equivalent ACTIVE REACTOR HPS luminaire

Current Luminaire	Current Power Consumption	Equivalent ACTIVE REACTOR HPS Power Consumption	Energy Saving (%)
700W Mercury vapour	740W	326W (400W AR HPS)	56%
400W Mercury vapour	430W	199W (250W AR HPS)	54%
250W Mercury vapour	270W	130W (150W AR HPS)	52%

3.0 Outcomes

3.1 Conclusion: AR HPS is the most suitable

Based on the options assessment undertaken the AR HPS is the most suitable. To further highlight the points from the comparison tables in section 2.0 the key benefits of moving to high pressure sodium active reactor technology are:

- Improved reliability with reduced spot outages allowing longer bulk lamp replacement cycles;
- NPV analysis indicated that the Active Reactor was more favorable when compared to Standard HPS;

- Significant mitigation of risk for Councils against future increases in energy and labour costs due to the greatly reduced energy consumption and maintenance burden; and
- There is no change to the appearance of the HPS lighting that already accounts for some 60% of main road lights on Ausgrid's network. Nor does it reduce the compliance distances achieved by the lights under the Australian Standard for roadway lighting AS1158.
- Lower costs for Councils compared to mercury vapour lighting and standard high pressure sodium lighting that currently exist on Ausgrid's main road lighting network;
- Reduced energy consumption. The use of active reactors will have up to a 56% reduction in energy consumption when compared to the equivalent MV luminaires and up to 27% reduction when compared to standard HPS technology.

3.2 Project Plan

Ausgrid had approximately 25,500 category V mercury vapour luminaires as at January 2013. See table 1 section 1.2. At the completion of the project the following operational outcomes are expected to be achieved:

- Reduced spot replacements;
- A step closer to a 4 year BLR program;

3.2.1 Proposed Dates:

Commencement date: July 2014
Proposed Completion date: June 2016

3.3 Consultation process

Ausgrid's consultation process with councils has been regular and comprehensive. Ausgrid have kept councils informed through all stages of this project examples include:

- Meetings were held for all councils to review Ausgrid's current portfolio for Category V lighting. The aim of the meeting was to identify the lighting technologies that could improve reliability, energy efficiency and lower total costs for councils i.e. active reactors compared to the current lighting in place. The meeting was intended to give councils an update on technology changes under discussion and to discuss a proposed change to the lighting used on main roads;
- Follow up letters to councils presenting them with options on the way forward. Councils were provided with sufficient information in order to provide assistance to make well informed decisions regarding their region.

3.4 Financial Information

The replacement program costs of the Active Reactors are discussed in this subsection. Note that all costs are as at June 2013.

Real $FY14	FY15	FY16	FY17	FY18	FY19
	[redacted]	[redacted]			

3.4.1 Cost Estimation Process

The capital cost estimates are based on real material and labour costs. Ausgrid has now varied its existing public lighting materials contract (EA0097) to include the active reactor luminaire. These material costs are tabled below:

Description	Contract price
150w & 250W HPS Active Reactor Luminaire (inc lamp & PE Cell)	[redacted]
400W HPS Active Reactor Luminaire (inc lamp & PE Cell)	[redacted]

The above material costs to not include consumable items such as screws, connectors and cable.

The install costs are tendered amounts from a recent procurement process to obtain bulk lamp replacement contractors. These amounts are specific to this actual replacement program. The schedule of rates divided the Ausgrid network into regions (South, East, North and Central Coast) and the tendered rates varied between these regions.

The volume of work and the rate at which it will be performed is an estimate based on historical replacements of other fittings. The figure of 1021 per month is however slightly conservative as Ausgrid has not taken on a replacement program of this size before.

The material and labour rates were obtained using Ausgrid's procurement policy. The value of the material and labour rates was such that formal procurement plan, recommendation and board report were required to be signed off for approval. The labour rates included in these estimates are specific to the accelerated replacement of the high wattage mercury luminaires therefore there are no shared costs and overheads are included in the rates.

The labour costs are specific to a grid by grid accelerated replacement of the high wattage mercury luminaires. This was specifically detailed in the scope of the tender document to obtain these prices. Therefore this does consider the efficiencies that come with an accelerated replacement process compared to spot replacements of these fittings.

3.5 Cost Calculation

A summary of the cost calculation is provided below:

3.5.1 Unit Costs:

Install costs without bracket (South and East Region): [redacted]
Install costs without bracket (North Region): [redacted]
Materials excluding bracket: [redacted]

Lamp Type	Population as of Jan 13	Total Residual Cost
250W Mercury	18,373	$4,208,390
400W Mercury	7,142	$1,882,708

Replacement Planned	Planned Number of Replacements	Cost of Replacement	Total Cost
2014/15	12,247	[redacted]	[redacted]
2015/16	12,247	[redacted]	[redacted]

Note:

- Material costs do not include consumable items such as screws, connectors and cable
- The labour rates are recently tendered contractor rates and should be treated as confidential
- Some investigation needs to be undertaken to determine how many brackets need to be replaced

- 250W and 400W materials cost are the same
- Labour rates for the South and East regions are significantly different to the North (Contracted rates)

3.5.2 Cost benefit

Ausgrid has used its proposed FY15 – FY19 opex cost build up model and capex annuity model to calculate a cost benefit of The Active Reactor over the standard High Pressure Sodium luminaires. Ausgrid is confident that the cost build up method used in these models is reflective of the actual capital and maintenance costs for each lamp and luminaire. All pricing models can are attached at 8.13 – Public Lighting models

	Standard 150W HPS ($)	Active Reactor 150W HPS ($)
Yearly maintenance costs	84.19	62.85
Yearly annuity capital cost	49.09	71.69
Total	133.28	134.54

	Standard 250W HPS ($)	Active Reactor 250W HPS ($)
Yearly maintenance costs	86.20	63.86
Yearly annuity capital cost	49.09	71.69
Total	135.29	135.55

As shown above there is very little difference in the cost of ownership to Ausgrid for either technology choice. Ausgrid gave these options to customers and the majority response was to accept the Active Reactor due to the reduction in energy consumption.

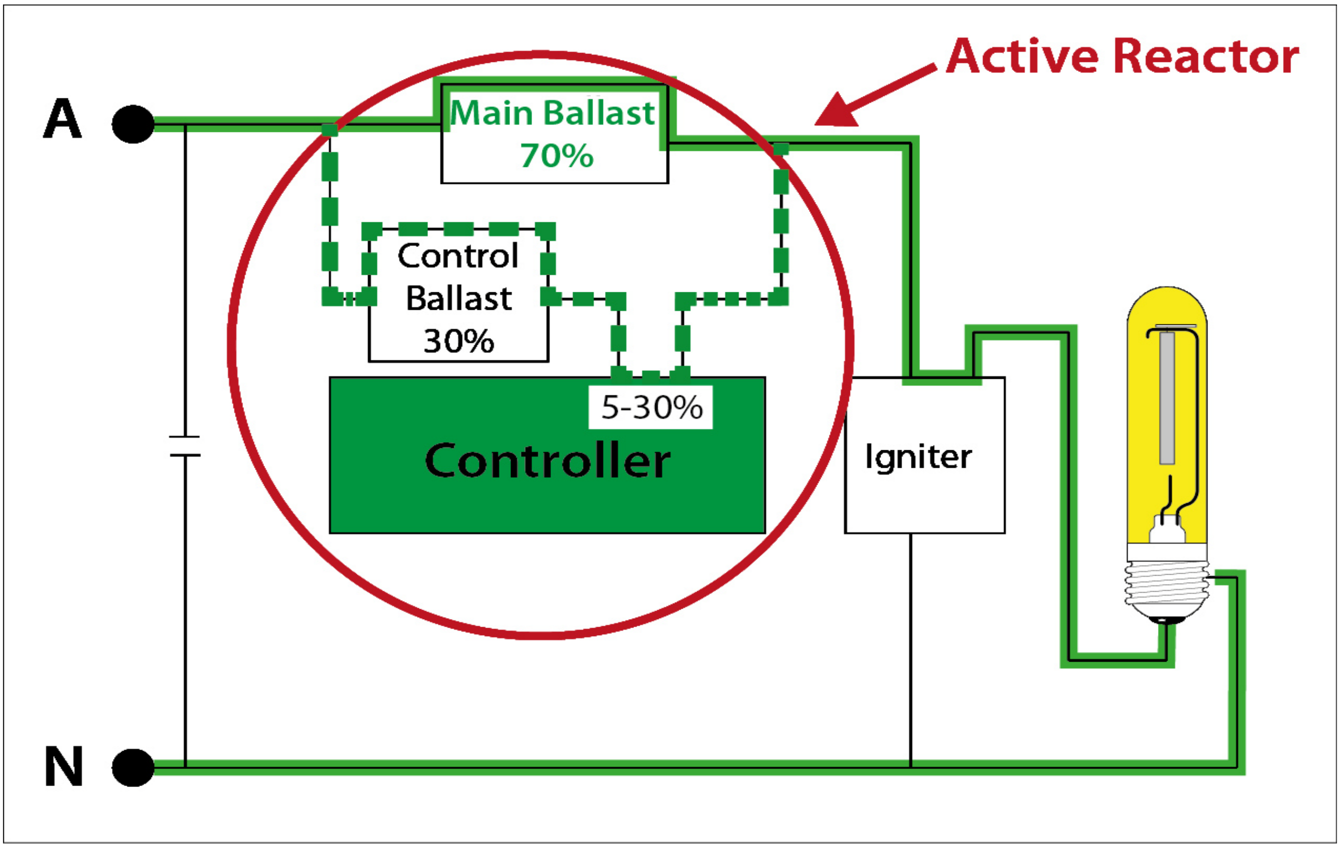
APPENDIX A – Active Reactor Technology and Cost Savings Curve

The Active Reactor device consists of an electronic control unit which controls a HID lamp in a pre programmed manner. The mode of operation of the device is variable power, constant light, as opposed to conventional ballasts which operate at constant power, variable light. These two different modes of operation greatly affect lamp energy consumption and lamp performance.

Because lamps controlled by the Active Reactor run all their life below their rated power, the mechanisms which reduce lamp life and lumen maintenance are reduced by a significant extent.

A schematic wiring diagram of the Active Reactor is shown below. The Active Reactor components are:

1. ***Active Reactor printed circuit board (Controller)*** - contains the electronics to control the lamp power and lamp starting.
2. ***Main Ballast*** - supplies approx 70% of the lamp power. For example, for a 400 watt HPS lamp this power is 280 watt.
3. ***Current Injector (Control Ballast)*** - supplies approx 30% of the lamp power. For example, for a 400 watt HPS lamp this power is 120 watt.



The Active Reactor (as shown in the circled area highlighted in the diagram above) uses the main ballast as the primary source of power for the lamp and injects additional current (and power) into the circuit via the control ballast to achieve the required lamp operating conditions.

The minimum power the lamp can run in this example is 70% rated power when the control ballast is turned off completely. The maximum power the lamp can run at is typically 100% rated power when the control ballast is turned on completely. The lamp can run at any instant, at any point in its life, between 70% and 100% power by appropriate current injection into the lamp.

This operation is summarised below:

Main ballast	Control ballast	Lamp power
ON	Completely OFF	70%
ON	Completely ON	100%
ON	Partially ON/OFF	70%-100%

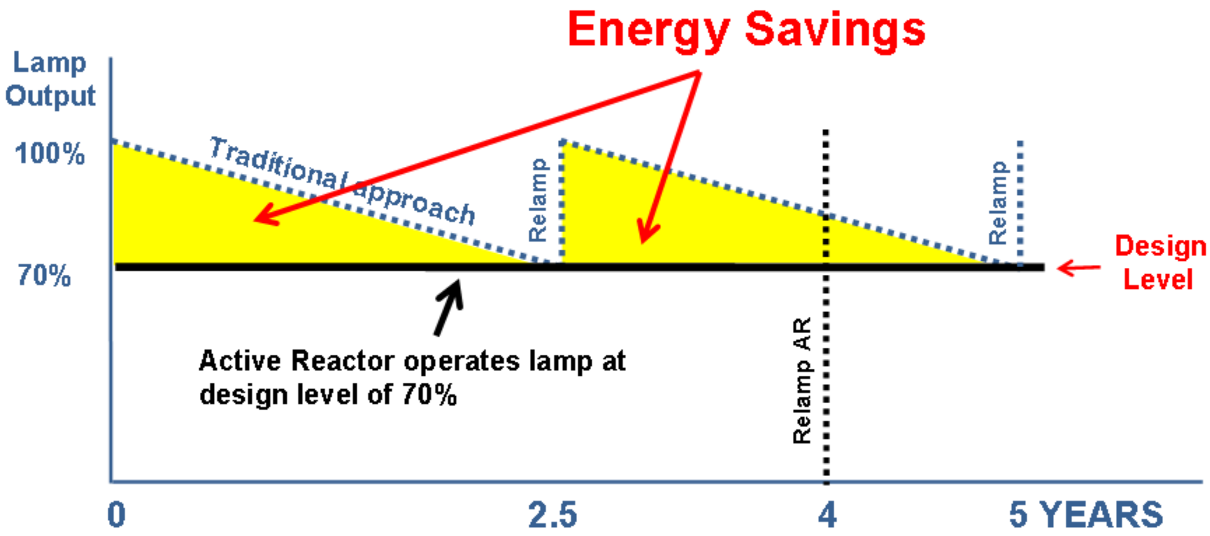
The 30% variable power which can be delivered to the lamp is just enough to offset the 30% flux depreciation during the life of a lamp.

The power savings between our current technology and new Active Reactor technology is greater than 50% as demonstrated in the table below.

Mercury Vapor (Traditional Technology)		Active Reactor (New Technology)		Power Saving %
Nominal Lamp Rating (W)	Power Consumption (W)	Nominal Lamp Rating (W)	Power Consumption (W)	
250	270	150	130	52%
400	430	250	199	54%
700	740	400	326	56%

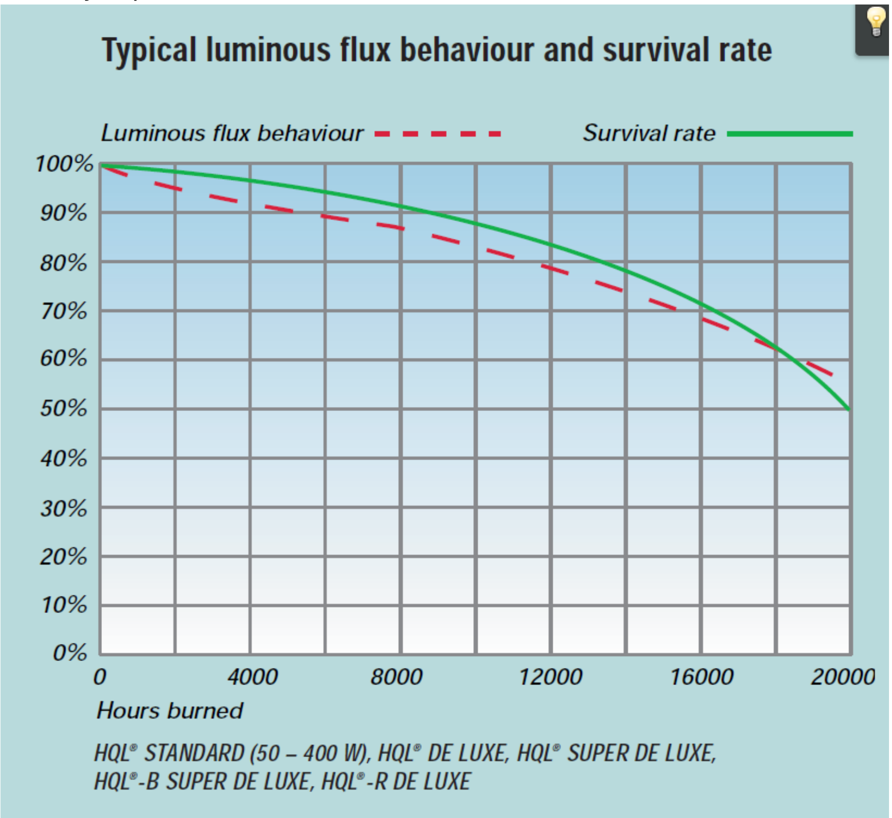
To further illustrate the savings, the chart below has been prepared. The traditional and new AR technology is represented on the chart. Important points to note:

- The current technology (i.e. the traditional approach dotted line) will start its life at 100% power output. The power output gradually declines as the lamp depreciates over time. To ensure the lamp remains at the appropriate lighting levels as required by AS/NZS 1158 series, Ausgrid implements a 30 month (2.5years) BLR cycle to ensure compliance is achieved.
- The new AR technology (i.e. the solid black line) shows the lamp starting at 70% output and maintains this level over the duration of its life. As a result this leads to an extension in the AR BLR cycle as the lamps life deteriorates at a slower rate than the older technologies meaning that it does not need to be changed as frequent. Furthermore, this brings Ausgrid in line with the AER's recommendation to move from a 2.5 year to a 4 year cycle.
- When the two lamp life cycle charts are overlaid you can clearly appreciate the savings achieved by the active reactor which are highlighted in yellow.

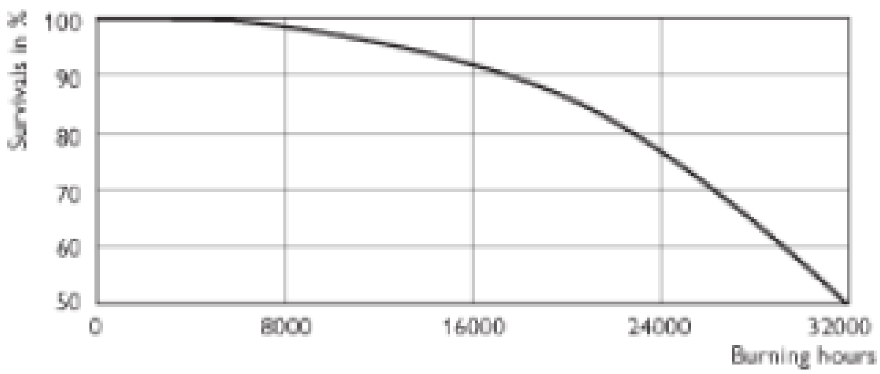

Energy Savings
Lamp Output
100%
70%
Traditional approach
Relamp
Relamp
Design Level
Active Reactor operates lamp at design level of 70%
Relamp AR
0
2.5
4
5 YEARS

APPENDIX B - Survival Rate Curves

Mercury vapour survival rate curve. From the chart 16000 hours the mortality rate is approx 30%.



The chart below shows the High Pressure Sodium survival rate curve. When comparing like for like with the Mercury vapour, at 16000 hours of operation the mortality rate is approximately 8%. Active Reactors are designed to have a lower mortality rate due to their design and concept.



MST SON-T PIA HgFr 100W/150W/250W/400W

APPENDIX C - Correspondence with customers

28 November 2011

570 George Street
Sydney NSW 2000
All mail to GPO Box 4009
Sydney NSW 2001
T +61 2 131 525
F +61 2 9269 2830
www.ausgrid.com.au

Mr John Burgess
General Manager
Auburn Council
PO Box 118
Auburn NSW NSW

Dear John Burgess,

Proposed Improvement to Main Road Lighting Power Supply

Following discussions with Councils, Ausgrid is proposing to adopt lighting with an intelligent power supply in all new and replacement main road lighting. The proposed power supply, called an Active Reactor, substantially improves energy efficiency and reliability, and lowers lighting costs for Councils. A joint meeting with Councils was held on 12 August 2011 to discuss the proposed approach. Ausgrid's Board formally approved Capital Funding for an accelerated program to replace existing main road mercury vapour lights where residual costs are covered by external funding sources on the 22nd November 2011.

The purpose of this letter is to seek Council agreement to the proposed change in technology and agreement to the proposed charges. Prior to Ausgrid introducing a new public lighting asset to its customers, the capital and maintenance charges for the asset must be approved by the Australian Energy Regulator (AER). We hope that the AER will expedite its approval process and accept a streamlined submission if Councils in our franchise area support our proposed customer charges for the 150W, 250W and 400W high pressure sodium luminaires with Active Reactor power supplies.

The key benefits of the proposal for Councils are:

- **LOWER COSTS** – Lower costs for Councils compared to the older mercury vapour lighting that is the key legacy technology being replaced on main roads and lower costs for Councils compared to the standard high pressure sodium lighting that is the current default main road lighting type across Ausgrid's network;
- **REDUCED ENERGY & GHG** - Reduced energy consumption & GHG emissions 25-27% lower than standard high pressure sodium lighting (the current default across Ausgrid's network) and 52-56% lower than the legacy mercury vapour lighting that is the type most frequently being replaced on main roads;
- **IMPROVED RELIABILITY** - Improved reliability with reduced spot outages allowing longer bulk lamp replacement cycles; and
- **RISK MITIGATION** – Because of the greatly reduced energy consumption and reduced maintenance burden, the new lighting offers significant mitigation of risk for Councils against future increases in energy and labour costs.

Importantly, the proposed change does NOT alter the appearance of the high pressure sodium lighting that already accounts for some 60% of main road lights on Ausgrid's network. Nor does it reduce the compliance distances achieved by the lights under the Australian Standard for roadway lighting (AS/NZS 1158). Ausgrid's proposed prices for the 150W, 250W and 400W high pressure sodium luminaires with Active Reactor power supplies for the current year are:

Luminaire	Proposed 2011/12 Capital Yearly Charge # (excl GST)	Proposed 2011/12 Maintenance Yearly Charge # (excl GST)	Estimated Energy* & Network Yearly Charges (excl GST)	TOTAL Estimated 2011-12 Yearly Charges (excl GST)
150 HPS Active Reactor	$56.66	$40.18	$64.90	$161.74
250 HPS Active Reactor	$56.66	$40.18	$99.35	$196.19
400 HPS Active Reactor	$69.29	$65.85	$162.76	$297.90

* Estimated charges vary slightly with Council's energy contract but not sufficiently to alter overall conclusions.
# These charges would typically increase in line with CPI over the life of the investment subject to AER approval.

The above charges are on average 17- 35% lower in total than the charges for comparable mercury vapour lights that are the type most frequently being replaced on main roads. The above charges are also some 2-8% lower than the current charges for the current replacement lighting type, standard high pressure sodium lighting. In all cases, Councils are expected to be cash positive from the first year (subject to AER approval of the above Ausgrid pricing proposals).

Ausgrid seeks your agreement to the adoption of the Active Reactor power supply in 150W, 250W and 400W high pressure sodium luminaires as the standard default for all main road lighting in your Council and to the proposed pricing of the luminaires. Ausgrid is also seeking your support to accelerate the removal of the old poorly performing lighting using available external sources of environmental funding.

If you agree with the adoption of this technology and the above proposed prices, please complete the attached form and return by **Thursday 15 December 2011.**

If you have any other questions or concerns with our proposal, please do not hesitate to contact me directly on (02) 8001 3339.

Yours sincerely,

Phil McKee

Phil McKee
Manager - Street Lighting

Please return this page to Ausgrid by Thursday 15th December 2011

Pricing proposal for 150W, 250W and 400W high pressure sodium luminaires with Active Reactor power supplies

AGREEMENT TO ADOPT AS STANDARD DEFAULT & PRICING

Auburn Council **agrees / disagrees** (cross out one) with the adoption of the 150W, 250W and 400W high pressure sodium luminaires with Active Reactor power supplies as the Standard Defaults for lighting on main roads and agrees to the proposed 2011-12 pricing as detailed below:

Luminaire	Proposed Capital Yearly Charge (excl GST) #	Proposed Maintenance Yearly Charge (excl GST) #
150 HPS Active Reactor	$56.66	$40.18
250 HPS Active Reactor	$56.66	$40.18
400 HPS Active Reactor	$69.29	$65.85

These charges would typically increase in line with CPI over the life of the investment subject to AER approval.

PARTICIPATION IN ACCELERATED REPLACEMENT OPPORTUNITIES

Auburn Council **agrees / disagrees** (cross out one) to participate in opportunities to accelerate the replacement of old mercury vapour lighting on main roads and replacement with high pressure sodium with Active Reactor power supplies where residual costs of existing lighting are covered by external funding sources including:

1. A funding source under joint investigation with Councils is the NSW Energy Savings Scheme (ESS). This allows Energy Savings Certificates (ESC) to be created up-front when more efficient street lights are used to replace inefficient ones. It is expected that available ESS funding would be directed to pay off the residual asset charges associated with the old mercury vapour lights. Ausgrid will shortly be seeking an accreditation from ESS regulator for this project and will then follow-up with Councils with further details.

2. Other funding opportunities may emerge (eg from the Commonwealth Government under the Community Energy Efficiency Program).

Please turn over/

Please return this page to Ausgrid by Thursday 15th December 2011

Councils participating in any accelerated replacement opportunities will be given an opportunity to exclude any areas, such as commercial hubs or entertainment precincts from accelerated replacement programs, should they wish to await the possible emergence of a bright white lighting alternative (eg LEDs) over the next couple of years. It should be noted that this is likely to come at a higher cost.

Approved By:

________________ ________________ ________________

Signature Title Date

Please return by Thursday 15 December 2011.

Return via Mail

Phil McKee
Manager Street Lighting
Ausgrid
GPO Box 4009
Sydney NSW 2001

OR

Return via e-mail

Attention: Phil McKee
publiclighting@ausgrid.com.au

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F +61 2 9269 2830
www.ausgrid.com.au

6 February 2013

Ms Vanessa Chan
General Manager
Ashfield Council
PO Box 1145
Ashfield NSW 1800

Dear Ms Chan,

New Energy Efficient Main Road Lighting Adopted

Further to my letter dated 28 November 2011, I am pleased to advise that Ausgrid will now adopt the following energy efficient luminaires as its default for main roads:

- Active Reactor 400W High Pressure Sodium (HPS) luminaires. (In Stock)
- Active Reactor 250W High Pressure Sodium (HPS) luminaires. (On order)
- Active Reactor 150W High Pressure Sodium (HPS) luminaires. (On order)

Once available, equivalent Active Reactor luminaires will be used to replace failed Mercury Vapour (MV) or HPS luminaires and for all new installations.

As previously advised, these luminaires will improve energy efficiency by up to 56% compared to the old mercury vapour lights they replace and by up to 27% compared to standard HPS luminaires which were the previous default lighting type for main roads. The lights are also expected to be substantially more reliable and will have lower overall lighting costs for Councils. Pricing as approved by the AER for 2012/13 is as follows:

Luminaire	**Approved 2012/13 Yearly Capital Charge (excl GST)**	**Approved 2012/13 Yearly Maintenance Charge (excl GST)**	**Estimated Energy* & Network Yearly Charges (excl GST)**	**TOTAL Estimated 2012/13 Yearly Charges (excl GST)**
150W HPS Active Reactor	$58.58	$41.54	$87.48	$187.60
250W HPS Active Reactor	$58.58	$41.54	$133.91	$196.19
400W HPS Active Reactor	$71.64	$68.08	$219.37	$359.09

** Estimated charge will vary slightly with Council's energy contract*

Now that this technology is available, Councils have requested that Ausgrid considers an accelerated program to replace all existing 250W, 400W and 700W MV luminaires. Ausgrid would like to gauge Councils' preference with regards to the technology they would prefer to have installed.

It should be noted that an accelerated replacement program would be subject to approval by Ausgrid's Board for capital funding. Ausgrid Board approval will be sought if deemed appropriate following the response from all Councils.

As with any luminaire replacement before the end of its financial life, Councils will be required to pay all residual costs. Ausgrid understands that Councils are planning to use the Energy Saving Credits Scheme to help pay residual amounts owing. Ausgrid will assist Councils by providing the appropriate documentation to enable Councils to claim the credits.

Ashfield Council's Mercury Vapour Luminaire count and corresponding residual amount is detailed below (count correct as of 1 February 2013, residual shown in 2012/13 terms):

Mercury Luminaire Type (W)	Count	Residual value per Luminaire	Total
250	544	$ 89.79	$48,845.76
400	152	$310.87	$47,252.24
700	4	$416.57	$1,666.28

Ausgrid is recommending the accelerated replacement of all 700W MV luminaires with active reactor 400W High Pressure Sodium (HPS) luminaires takes place as soon as possible. Presently, LED technology is prohibitively expensive at this high wattage level and is not considered viable now or in the foreseeable future. However, LED technology to replace 250W and 400W MV luminaires may become financially attractive within 1 to 5 years.

It is neither practical nor cost effective to run replacement programs with different technologies at the same time. Ausgrid is therefore asking Councils whether they wish Active Reactor HPS lighting to be deployed in an accelerated replacement program now or whether they want Active Reactor HPS lighting be used solely for replacement of failed luminaires (and hence wait some years to replace the bulk of main road lighting with LEDs). Ausgrid will use the information we receive from Councils to decide which approach will be used across Ausgrid's Network.

There are some significant differences between the two technologies. The information detailed below will enable Council to make an informed decision on their preferred technology.

Active Reactor 150W and 250W High Pressure Sodium (HPS) Luminaires	Equivalent LED Technology
Colour – Yellow light identical to current standard HPS	**Colour** – White light with improved colour rendition
Energy - Uses 25-27% less energy than the existing standard HPS technology. Uses approximately 52-56% less energy than the equivalent MV lamps.	**Energy** - Estimated to use 25 – 30% less energy than the existing standard HPS technology in replacement situations. Estimated to use 60% less energy than the equivalent MV lamps

Maintenance - Increased bulk lamp replacement cycles (initially a 4 year cycle) Potentially lower maintenance costs than standard HPS technology.	**Maintenance** – No bulk lamp replacement, only a visor clean (initially a 4 year cycle). The power supply and or LED module may need to be replaced during the life cycle. Potentially lower maintenance costs than HPS Active reactor but with higher technical risk and no trials to date.
Availability – Available now, approved by Ausgrid, pricing approved by the AER and listed on the AEMO load table	**Availability** – May become viable in 1-5 years. Would require pricing approval by the AER and listing on the AEMO load table
Life Cycle – 20 years	**Life Cycle** – 20 years

Please complete the attached form and return by **Thursday 28 February 2013.**

Please do not hesitate to contact me directly if you require any further information on (02) 8001 3339.

Yours sincerely,

Phil McKee

Phil McKee
Manager - Street Lighting

Ausgrid

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Please return this page to Ausgrid by Thursday 28 February 2013

1. Ashfield Council **agrees / disagrees** (cross out one) to replace all of its 700W MV luminaires (4 only) with Active Reactor 400W High Pressure Sodium (HPS) luminaires and pay the residual amount of $1,666.28 which will be invoiced at the end of the financial year.

2. Please tick below your preference for main road accelerated replacement of 250W and 400W MV luminaires:

Tick one box only

ACCELERATED DEPLOYMENT OF ACTIVE REACTOR HPS Ashfield Council would like to use the HPS Active Reactor technology for a main road accelerated replacement program. Council understands that, the main road accelerated replacement program is subject to Ausgrid Board approval for capital funding. If this project proceeds, Ashfield Council agrees to pay any residual amount owing on the 250W and 400W MV luminaires. (Current amount owing $96,098.00). Council understands that it may eligible for NSW Energy Saving Scheme credits to help pay for any residual amount owing. Under this option, Councils could quarantine some lights from this program (eg CBDs and in entertainment precincts) to await white light in areas where such lighting may have high socio-economic value.	☐
WAIT FOR LEDs Ashfield Council would like to wait until LED products become financially attractive and are approved for main road accelerated replacement.	☐

Approved By:

________________ ________________ ________________

Signature Title Date

Please return by Thursday 28 February 2013

Return via Mail

Phil McKee
Manager Street Lighting
Ausgrid
GPO Box 4009
Sydney NSW 2001

OR

Return via e-mail

Attention: Phil McKee
publiclighting@ausgrid.com.au