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**AITPM Victorian Branch Technical Forum**  
**Lighting up the road ahead ...**

Wednesday 20<sup>th</sup> February 2008, 5.15pm – 7.00pm  
VicRoads Theatre, 60 Denmark Street, Kew



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**Our speakers tonight are...**

Paul Storey: VicRoads  
David Raven: Odyssey Energy, New Zealand  
Ian Mackintosh: Mackintosh Consulting




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**AITPM Victorian Branch 2008 Technical Forum program**

Tues 8 April	Safety – Crash investigation
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Tues 10 June	Public Transport Priorities
Wed 9 July	Transport Legislation Review (DOI)
Tues 5 August	Activity Centres – Transit Oriented Development
Wed 17 September	Eastlink
Tues 7 October	Congestion Management
Wed 12 November	Sustainable Transport (DOI)

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## Street Lighting Assets

- new cost sharing arrangements

AITPM Technical Forum – Lighting the road ahead....  
20 February 2008

**Paul Storey**  
Network & Asset Planning



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## Presentation Outline

- Introduction
  - Who's involved / pays for / owns the assets
  - Metered schemes
- New Legislative amendment to the Road Management Act
- Future responsibilities

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## Players

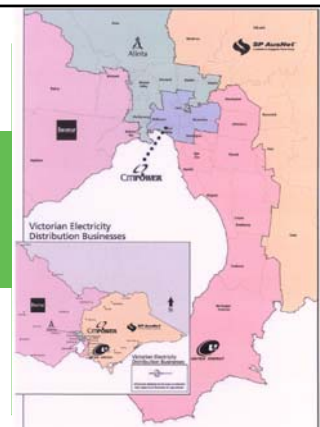
The three players in street lighting assets are:

- VicRoads
- Municipal Councils
- The electricity Distribution Businesses (DB):
  - Powercor
  - Citipower
  - SP AusNet
  - United Energy
  - Alinta
- (not the retailers: AGL, Origin, Tru)

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## Which area?



Electricity Distribution Businesses

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## Ownership

- All lights are owned by the relevant Distribution Business, unless they are separately metered
- Lights which are separately metered (eg on freeways) are owned by VicRoads
- Lights on declared arterial roads maybe be cost shared (currently 2/3 VicRoads and 1/3 Council)

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## Who Pays for Installation?

- VicRoads fully funds all lights on freeways
- VicRoads and Council may jointly fund schemes on arterial roads where there is a cost-sharing agreement
- VicRoads funds new lighting installations on declared arterial roads at "safety locations"
- Council funds all other lights:
  - On municipal roads; and
  - On arterial roads (footways, service roads etc)
- Developer installations

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## Current Maintenance Funding

**Distribution Business Asset**

- VicRoads 100% - arterial roads (few)
- Cost-shared – arterial roads
- Council 100% - arterial roads (inc footways & service rds)

**VicRoads Asset**

- VicRoads 100% funded – freeways and arterial roads
- Cost shared – arterial roads (rare)

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## Metered Schemes

- A separately metered scheme must:
  - Be on dedicated street lighting poles; not on electricity distribution poles
  - Be wired to AS 3000 (rather than VESI standard)
  - Have a meter box to record electricity consumption
- These assets are owned and maintained by VicRoads, not the DB's.

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## Outreaches

**VicRoads – straight outreach**



Photo Electric cell at distribution cabinet – no power to poles during day light

**Distribution Company – curved outreach**



PE cell with lantern

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## Street Lighting Poles

- Frangible
  - Slip based poles *- high speed; low pedestrian use; clear of overhead power lines*
  - Impact absorbing *- higher pedestrian & activity use; narrow medians*
- Hinged Poles *- high mast, helps maintenance access problems*
- Plate fix poles *- concrete barriers on structures*
- Rigid poles *- move away from use, but maybe appropriate in some locations*

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## Road Management Act Legislation

- Review by VicRoads/MAV following the deferral of Street Lighting responsibilities from the RMA 2004
- All arterial road lighting Energy and Operation, Maintenance & Replacement (OMR) cost shared at:
 

**60 / 40**

VicRoads / Councils
- Will involve a significant increase in cost for VicRoads. Overall Councils funding will reduce
- Commences 1<sup>st</sup> July 2008 with a 6 year transition

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## Transitional Arrangements

Timescale	VicRoads share		
	100% Council	Cost Shared	100% VicRoads
<b>Current</b>	0%	67%	100%
<b>Year 1</b> (July 2008)	10%	67%	100%
<b>Year 2</b> (July 2009)	20%	67%	100%
<b>Year 3</b> (July 2010)	30%	60%	60%
<b>Year 4</b> (July 2011)	40%	60%	60%
<b>Year 5</b> (July 2012)	50%	60%	60%
<b>Year 6</b> (July 2013)	60%	60%	60%

- Applies to all arterial roads (except service roads) regardless of standard and purpose
- VicRoads/MAV/DB's have agreed to review lighting records for the new cost sharing arrangements

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### Identifying cost shared street lights

- Maps supplied by Distribution companies showing existing street light responsibilities
- VicRoads coordinate with Councils to review maps and agree arterial road lights to be cost shared under the new arrangements
- As a general guide road reserve limits define arterial road limits through intersections (RMA principles)
- Electronic CSV files updated to reflect the agreed changes
- Exercise to be completed by July 2008 when funding changes commence

### Road Management Act changes

- Initiating party should fund 100% of the capital cost of new or modified lighting. Ongoing operation and maintenance costs will be shared.
- For new installations, fund as existing 100% or 2/3-1/3 until the appropriate transition date
- Council or VicRoads not to withhold agreement to pay ongoing operation and maintenance
- Generally Council pays replacement cost for decorative equipment

### In Summary

- New Legislation will introduce new cost sharing arrangements agreed with MAV
- 6 year transition arrangement
- Process to agree arterial road lights prior to July 2008 commencement of cost sharing arrangements

## Illuminating the way ahead

### Understanding New Lighting Technology

AITPM Tech Forum Feb 2008



### New Technology:

A host of new lighting technologies has recently become available, which is most suitable for you?

Which offer better road safety & efficiency

- Metal Halide?
- Induction lamps?
- LED lighting?
- Cosmo Polis lamps?
- Compact fluorescents?

Test these new lamps, obtain accurate data, then decide

### Electrical Load & Carbon Emissions:

- Street lights in Australia consume around 1,100GWh (1,100,000,000kwh) of electricity per year.
- This power produces around 880,000 tonnes of CO<sub>2</sub> per year (78% of power is produced from coal).

In Melbourne Metropolitan area, the lights would have an ODV asset value in the region of A\$200m.

Lights are a Councils' most visible user of power.

### What good lighting should achieve:

- Light output is maximised and broadcast where required
- Light pollution and sky glow are minimised
- Electrical load and CO<sub>2</sub> emissions are minimised
- The required level of service (LOS) is provided
- Maintenance costs are kept to reasonable levels

Councils and lighting providers, need to determine, with the local community, the level of lighting that is required.

This LOS should be provided as efficiently as possible.

### Proof of LOS Delivery

- Don't assume: - **measure it.**
- It is **economically possible.**
- Measurement is required to demonstrate satisfactory asset management (PAS 55).
- Road lighting must be treated like other roading assets

### Maintenance Costs

Q. How many psychiatrists does it take to change a bulb?

A. 1 but the bulb must be willing to change.

### Maintenance Costs

Q. How many maintenance contractors does it take to change a light bulb on a State Highway?

A. 6

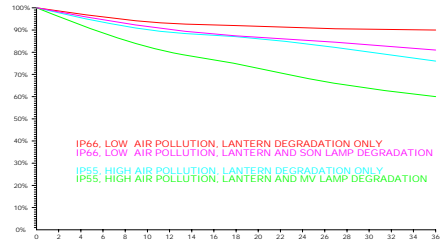
1 to change the bulb, 1 safety observer, 2 crash truck drivers, 1 flagman plus 1 administrator to update the records.

Plus

1 bucket truck, 2 attenuated trucks and a ute.

(\$500/hr in plant and personnel)

### Effects of Degradation on Lumen Output

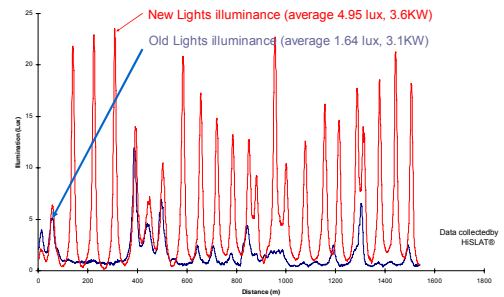


### Luminaire Comparison

Comparison Between New & Old Lights installed in the same location (both fitted with new 80W MV lamps)



### Road Safety improvements following upgrade



### Effects of Proactive Maintenance

	2002	2004	2006	2012 (existing tech)	2012 (BAT)	2012 (BAT & Controlled switching)
Total load (KW)	246	268	274	267	241	241
Lumen output (Klux)	9,292	13,423	15,322	17,534	17,820	17,820
Cost per lumen (power + lamp change)	\$15.52	\$10.11	\$9.04	\$7.69	\$6.83	\$5.72
Lumens per watt	37.8	50.0	55.9	65.7	73.9	73.9
CO <sub>2</sub> emissions (tonnes)	166	181	185	180	163	136
CO <sub>2</sub> emissions per lumen (kg)	4.39	3.63	3.31	2.75	2.20	
Annual maintenance	\$128,812	\$194,303	\$78,601			



Concrete pavement reflects up to 27% of light. Black asphalt pavement reflects only 5% of light.

### Performance Measurement in Action

- HiSLAT (**H**igh **S**peed **L**ighting **A**ssessment **T**echnology) is a vehicle based "real time" surveying system that collects the lighting data at actual road speed.
- This data is collected and processed during the survey and clearly shows how the asset is performing.
- Post processing can detail the costs required to bring the asset up to Standards and produces a strategic upgrade plan based on a "worst first" philosophy

A full HiSLAT service is available from Austraffic  
Austraffic are the sole supplier of HiSLAT in Australia

### To Conclude

Performance measurement of lights:  
Shows where any problems areas are and provides accurate data on how your asset is performing (can also be used to trial new light technologies)



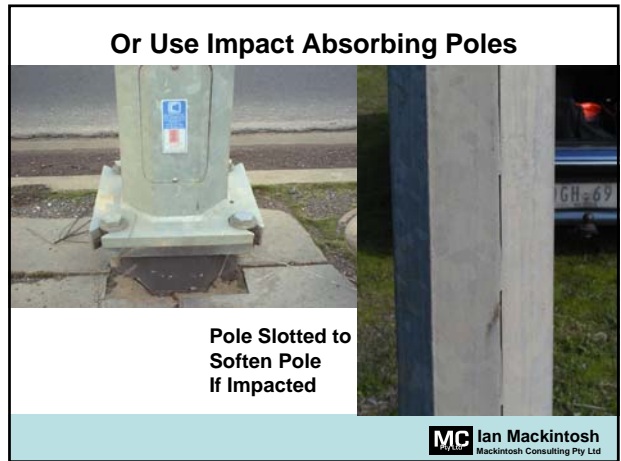
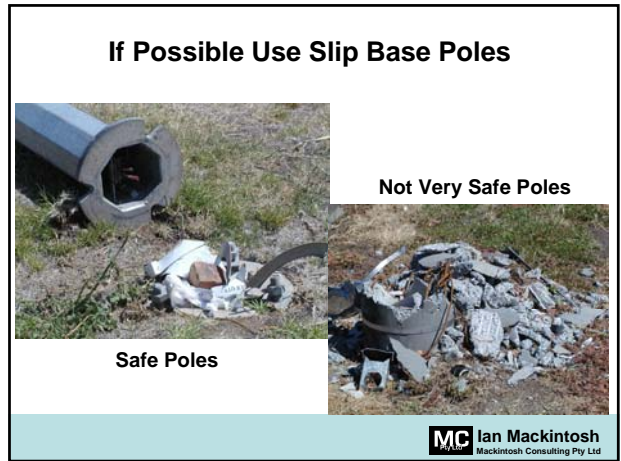
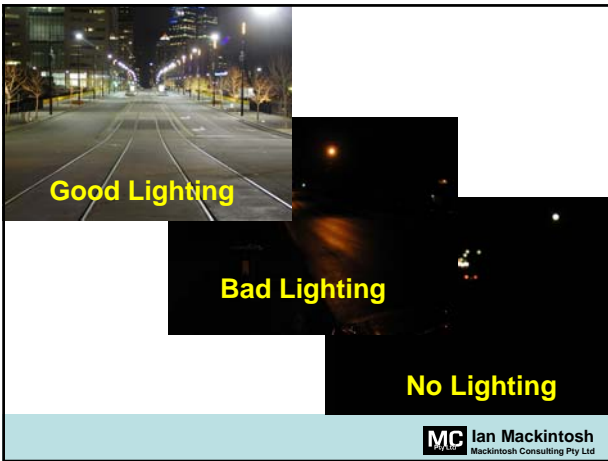
This data allows strategic planning to be introduced



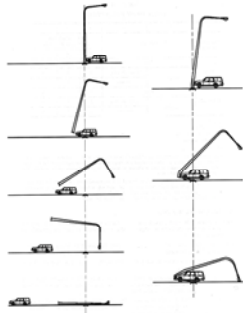
Which can be used to proactively manage your asset



A managed asset can provide better lighting for less \$

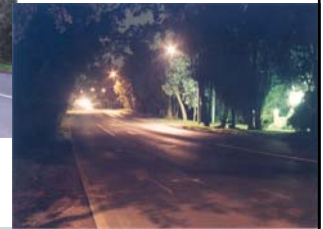


### Frangible Poles



**MC** Ian Mackintosh  
Mackintosh Consulting Pty Ltd

### Even With heavy Tree Growth Good Lighting Can be Achieved With Careful Design



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### This is One Type of Situation That is Difficult



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### Pedestrian Crossings



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### Poor Lighting and Joint Use Poles



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### No(?) Lighting and Joint Use Poles



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A Recently Remodelled Intersection Where  
Lighting Has Not Yet Been Installed



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