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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 Technical Forum
Lighting up the road ahead ...

Wednesday 20th February 2008, 5.15pm – 7.00pm
VicRoads Theatrette, 60 Denmark Street, Kew

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AITPM Victorian Branch 2008 Technical Forum program

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tr>
<td>Tues 8 April</td>
<td>Safety – Crash investigation</td>
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<td>Wed 7 May</td>
<td>Monash – City Link – Westgate Upgrade Project</td>
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<td>Tues 10 June</td>
<td>Public Transport Priorities</td>
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<tr>
<td>Wed 9 July</td>
<td>Transport Legislation Review (DOI)</td>
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<td>Tues 5 August</td>
<td>Activity Centres – Transit Oriented Development</td>
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<td>Wed 17 September</td>
<td>EastLink</td>
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<td>Tues 7 October</td>
<td>Congestion Management</td>
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<td>Wed 12 November</td>
<td>Sustainable Transport (DOI)</td>
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www.aitpm.com/main/n_activities_VIC.html
Street Lighting Assets - new cost sharing arrangements

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

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)

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

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
**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)

**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.

**Outreaches**

**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

**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:
  
<table>
<thead>
<tr>
<th>Year 1 (July 2008)</th>
<th>VicRoads share</th>
<th>OMR Cost Share</th>
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</thead>
<tbody>
<tr>
<td>10%</td>
<td>60%</td>
<td>60%</td>
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<tr>
<td>20%</td>
<td>40%</td>
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<td>60%</td>
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<td>60%</td>
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**Transitional Arrangements**
- 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
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$_2$ 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$_2$ 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

![Graph showing the effects of degradation on lumen output](image)

### Luminaire Comparison

<table>
<thead>
<tr>
<th>Luminaire Comparison</th>
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<tbody>
<tr>
<td><strong>Comparison Between New &amp; Old Lights installed in the same location</strong></td>
<td></td>
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<tr>
<td>(both fitted with new 80W MV lamps)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Luminaire Type</th>
<th>New luminaire (96w)</th>
<th>Old luminaire (96w)</th>
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</thead>
<tbody>
<tr>
<td><strong>Road Safety improvements following upgrade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- New Lights illuminance (average 4.95 lux, 3.8kW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Old Lights illuminance (average 1.64 lux, 3.1kW)</td>
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## Road Safety improvements following upgrade

![Graph showing road safety improvements](image)

## Effects of Proactive Maintenance

![Table showing effects of proactive maintenance](image)

**Concrete pavement reflects up to 27% of light. Black asphalt pavement reflects only 5% of light.**
HiSLAT (High Speed Lighting Assessment Technology) 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

Performance Measurement in Action

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 $
Good Lighting

Bad Lighting

No Lighting

If Possible Use Slip Base Poles

Not Very Safe Poles

Safe Poles

But Make sure They are Installed Properly

Bolts on Slip Base Poles Should be Torqued to 80 Newton-Meters

Or Use Impact Absorbing Poles

Pole Slotted to Soften Pole If Impacted

Impact Absorbing Poles Also Have To Be Correctly Installed

Base Plate of Frangible Poles Should be From 75mm and Not More Than 100mm Above Ground

This is How They Should Fall
Even With heavy Tree Growth Good Lighting Can be Achieved With Careful Design

This is One Type of Situation That is Difficult

Pedestrian Crossings

Poor Lighting and Joint Use Poles

No(?) Lighting and Joint Use Poles
A Recently Remodelled Intersection Where Lighting Has Not Yet Been Installed