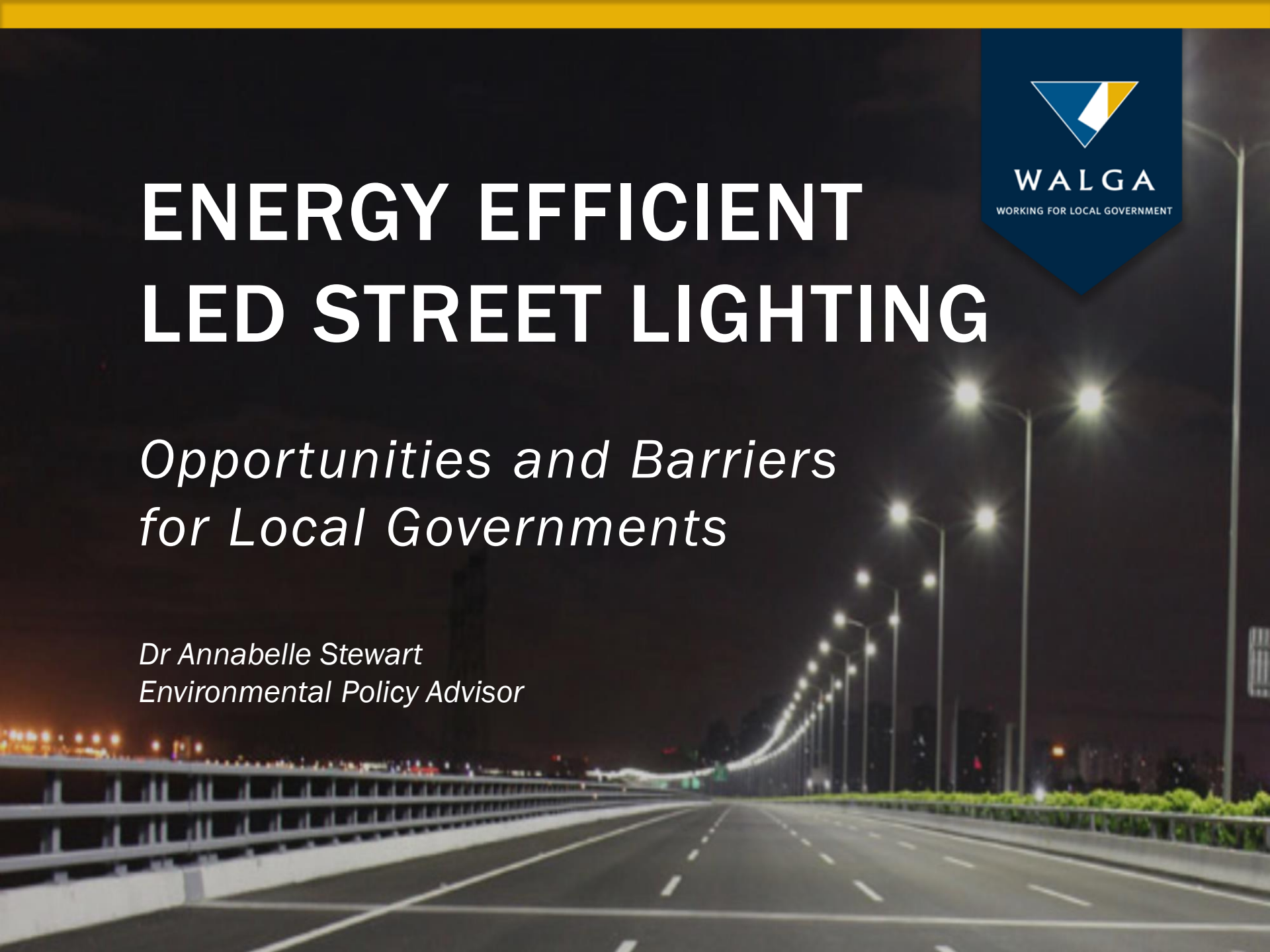


ENERGY EFFICIENT LED STREET LIGHTING

Opportunities and Barriers for Local Governments

Dr Annabelle Stewart
Environmental Policy Advisor

WALGA
WORKING FOR LOCAL GOVERNMENT

OVERVIEW

- Street lighting technologies
- Why switch to LEDs?
- Where has it successfully occurred elsewhere?
- Barriers to implementation
- Addressing barriers
- Funding opportunities
- WALGA actions
- Next steps

STREET LIGHTING TECHNOLOGIES

Lighting Type	Description	Status in Australia	
Mercury Vapour	Low efficacy and environmental toxicity concerns. Banned from the US in 2008 and from the EU in 2015	Greater than a million lights still on residential roads. Smaller numbers on main roads	
High Pressure Sodium	Yellow light - negative effect on vision at very low light levels. High efficacy but with low colour rendering.	Dominant lighting type on main roads for the past two decades. Still widely deployed.	
Compact Fluorescent Light	Medium to high efficacy and high colour rendering. CFL has greatly reduced mercury levels.	Used for residential street lighting from 2008 onwards.	
Light Emitting Diode (LED)	White light with high efficacy. Instant starting, medium-high colour rendering and long life of potentially 15-20 years. Low maintenance. Small size and point source nature facilitates precision optics.	First deployed for street lighting in City of Sydney. Widely used in Victoria. Horizon Energy has deployed LEDS in remote regions in WA.	

WHY SWITCH?

Economic benefits

- Increased energy efficiency
- Decreased power bills
- Reduction in operation and maintenance costs
  - Current replacement 3-4 years
  - LED life span of 15-20 years
  - LA study: spot failures of 0.3%
- Total long term costs could be reduced by more than 50%

- LED lighting is a risk mitigation against rising energy and street lighting maintenance costs

WHY SWITCH?

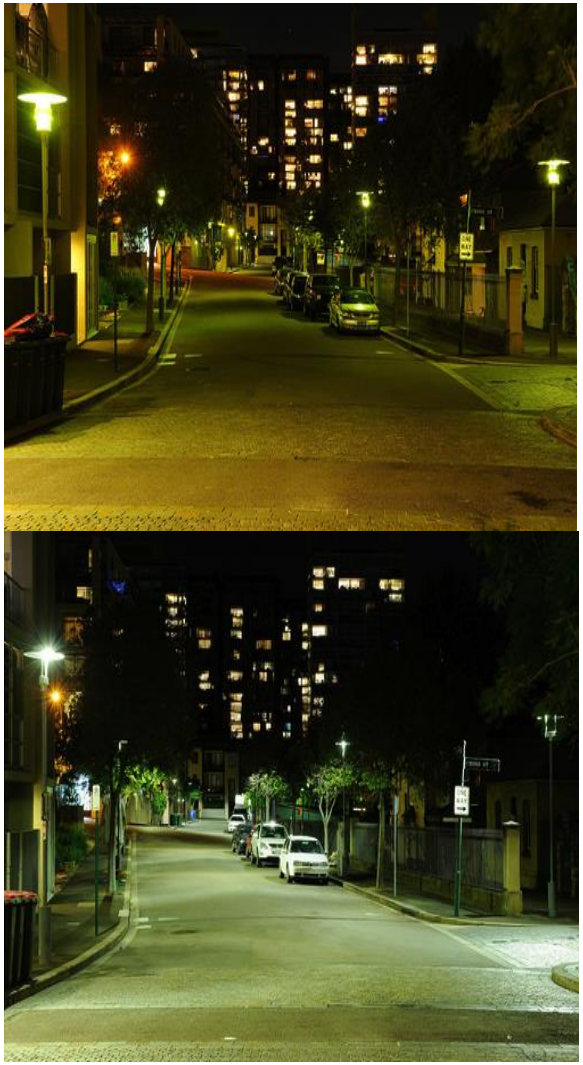
Environmental benefits

- Reduction in energy use and carbon emissions
  - If widely deployed in Australia, could reduce carbon emissions by 47%
- Reduction in mercury pollution
  - Traditional gas discharge lamps contain mercury
  - Hazardous substance
  - LED luminaires contain no mercury
- Reduction in light pollution
  - Well designed LED application can address light trespass, glare and skyglow

WHY SWITCH?

Safety benefits

- Improved road safety
  - LEDs improve driver reaction times to hazards, thereby avoiding accidents.
- Personal safety
  - City of LA reported a 10.5% reduction in street crime and vandalism concurrent with the conversion to LEDs



WHY SWITCH?

Community social benefits

- Opportunity to lead by example by installing sustainable technology
- Enhance image of Councils as environmentally friendly
- More liveable City
- Increased urban desirability
- Enhanced civic pride

WHO HAS SWITCHED?

Victoria

- MAV Street Lighting Program & regional partnership Watts Working Better
- 64 of the state's 79 councils have been involved in a bulk changeover project
- Reduction in emissions of 1.21 million tonnes CO_2e
- Council and ratepayers save $340 million in electricity and maintenance costs

City of Sydney

- First city to initiate switch over in 2012
- Replaced more than 6604 lights
- Reduced energy use by 48% since March 2012 with savings of up to $800,000/year in electricity costs

Town of Port Hedland and Karratha

- Horizon Power installed 674 LEDs as part of the Pilbara Underground Power Project

BARRIERS TO IMPLEMENTATION

WA Regulatory Environment

- Non-contestability
  - No ability to choose energy provider
  - Lack of competition
- Distribution Network Service Providers
  - South West Interconnected System
    - Western Power – energy distributor: builds, maintains and operates the electricity network
    - Synergy – energy generator and retailer
  - Regional and remote WA
    - Horizon Power – generates, procures, distributes and retails electricity
- No access to WP/HP poles for third party lighting infrastructure
- Lack of transparent tariffs
- Until July 2016, no LED tariff
- No regulatory incentive to install LED lights

BARRIERS TO IMPLEMENTATION

Institutional

- Up until Oct 2015, LED luminaires were not included in the Australian Road Lighting Standard AS/NZ 1158.6

Funding

- High upfront and capital costs – greatest barrier to LED uptake by LG
- Business case uncertain due to lack of transparent tariff
- Tax recovery on gifted assets (13.9%)
  - WP & HP recover tax liability from assets by charging companies that gifted the asset.
- No incentive

BARRIERS TO IMPLEMENTATION

Access to LED Technology

- Retrofit of LED technology not part of WP/HP plans
- Only available to new developments

Lack of expertise in Local Government

- Complex subject
- Multiple parties involved

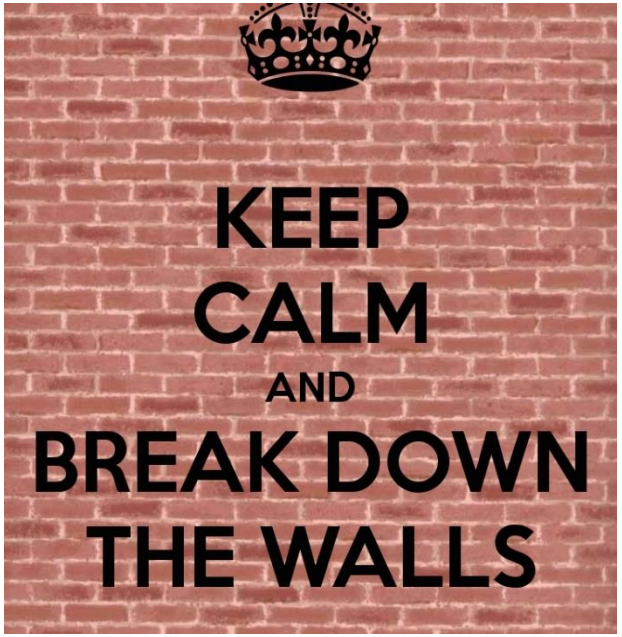
Sale of Western Power??

- Sold in parts or as a whole?
- Impact on street lighting?

ADDRESSING BARRIERS

Electricity Market Reform launched in 2014

- WA currently regulated by the State Economic Regulation Authority
- Regulation moving to the Australian Energy Regulator (AER)
  - AER benchmarks and compares prices
    - Costs significantly lower
    - Tariffs currently broken down into components
      - Energy fee + Operation, Maintenance and Repair fee
  - Likely to introduce transparency, which is lacking in WA
  - May introduce contestability
  - Removal of tax on gifted assets



ADDRESSING BARRIERS

- Australian standard AS/NZS 1158.6:2010 revised
  - SA/SNZ TS 1158.6: *Lighting for roads and public spaces – Luminaires – Performance*
  - AS/NZS 60598.2.3: *Particular requirements – Luminaires for road and street lighting*
    - Includes the use of solid state light (LEDs)
- New LED streetlight tariff introduced
  - Released 1st July 2016, will come into force in September 2016
  - Available for greenfields (new) developments only
  - No plans to introduce as an option for retrofitting as of yet

Streetlight	Tariff (c/day)
42W CFL SE	39.74
42W CFL BH	41.51
42W CFL KN	45.31
80W MV	45.99
150W HPS	59.49
250W HPS	89.40
22W LED	31.65

FUNDING OPPORTUNITIES

Emissions Reduction Fund

- Approved ERF Method: Commercial and public lighting method
- Potential to combine efforts with other WA councils
- Payment in the last auction (April 2016) was $10.23 per tonne of carbon
- Any payment unlikely to be sufficient to fund project in itself

Clean Energy Finance Corporation

- Provide and develop financing solutions such as project finance, corporate loans and aggregation funding
- City of Warrnambool, City of Melbourne, City of Sydney

WALGA ACTIONS

CEEP Pilbara Project

- Community Energy Efficiency Programme
  - Announced in July 2011 as part the government's climate change strategy
- January 2012 Category Two Tropical Cyclone Heidi
- Horizon Power's Pilbara Underground Power Project (PUPP)
  - Replacing ageing overhead infrastructure with underground networks
- WALGA identified opportunity to advance uptake of energy efficient LED street lighting
- WALGA working with City of Karratha, the Town of Port Hedland and Horizon Power

Australian Government
Department of Industry

COMMUNITY ENERGY EFFICIENCY program

PILBARA UNDERGROUND POWER PROJECT

WALGA ACTIONS

CEEP Pilbara Project

Table 1: LED streetlights installed and estimated savings (data provided by Horizon Power)

	LEDs installed	Energy savings per annum	Estimated cost savings per annum
South Hedland	353	537,552 MJ	$27,151
Wedgefield	203	213,228MJ	$11,895
Roebourne	118	50,508MJ	$4,042

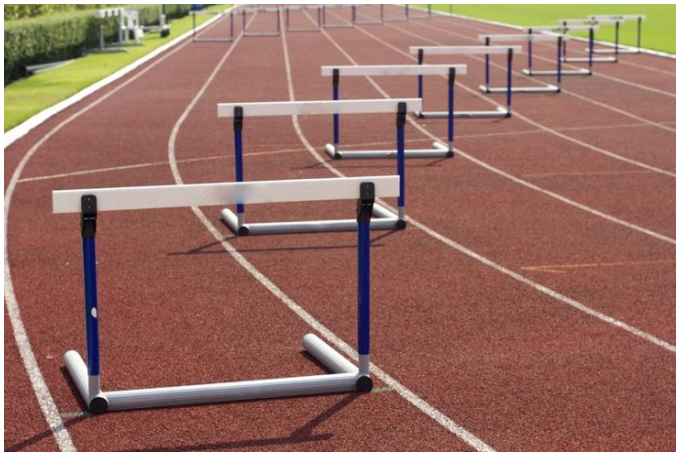
- Total LED lights installed: 674
- Energy savings: 801,290 MJ p.a.
- Cost savings: $42,400 p.a.
- Carbon abated: 233 Tonnes CO_2e

WALGA ACTIONS

- Internal street lighting working group
- Energy Efficient Street Lighting: Discussion Paper (Nov 2014)
  - Resulting actions directed advocacy/research/communication
- Regular liaison with:
  - ALGA and LG Associations in other states
  - DNSP - LED tariffs and progressing energy efficient street lighting projects
  - Standards Australia - requested update to standard
  - Public Utilities Office – advocating for retrofit with LEDs
  - Institute of Public Works Engineering Australia
  - Clean Energy Council

WALGA ACTIONS

- Submission to the development of ERF methodology for public lighting
- Currently involved in the Street Lighting & Smart Control Programme
  - Joint initiative with IPWEA, Main Roads WA, Western Power and the Cities of Mandurah, Stirling and Perth
- Preferred Supplier Panel now includes companies that can provide LED Luminaires
  - Mondoluce
  - Eco-FX Smarter Lighting Solutions
  - Going out to tender to include more companies soon



WALGA ACTIONS

Comparison – Electricity Costs and Maintenance

Example from Mondoluce for 1237 lamps

Year	1	2	3	4	5	6	7	8	9	10
Current	$536381	$563200	$591360	$620928	$651975	$684573	$718802	$754742	$792479	$832103
LED	$477000	$488565	$500411	$512547	$524979	$537713	$550758	$564122	$577813	$591835

- Current = Electricity + maintenance + admin
- LED 10 yr service plan = LED lighting upgrade + monitoring systems + electricity + maintenance
- Asset handed back to council at end of 10 yr plan

Note: figures are assumed and each case will need to be calculated on individual requirements

NEXT STEPS

- Ensure that transition to AER creates opportunities for improved street lighting outcomes for LG
- Audit and quantify potential savings from LED street lights using the new tariff
- Provide cost savings to feed into business case for retrofit
- Identify other councils that might be keen to join forces
  - Economies of scale and ERF funding
- Potential pilot project
- Develop a policy position on energy efficient public lighting
- Continue to advocate for clear and transparent tariffs
- Update the Climate Change Management Toolkit