

‘Keeping the lights on...’

Investment options in LED Street Lighting

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Background

- 60,000 street lights – 20.5 GWh of electricity pa, cost £2m
- 53% of CO₂ footprint (excl schools)
- Electricity costs rising sharply, 57% of service spend and requiring annual growth bids (£307k for energy 2013/14)
- Energy efficiency projects to date funded using GCC's Salix Fund (dimming all main roads, rural part-night 70% parishes, limited LED)
- Further energy reduction requires significant investment
- GCC carbon reduction target, 60% by 2020/21 – cannot reach without significant reductions from street lighting



LED Technology

- Mainstream solution
- Up to 50% energy saving, can then be dimmed
- 70% reduction in maintenance cost, fewer faults
- Better light quality – whiter so easier to see
- Less light pollution – better focussed
- Lighting for residential areas relatively mature
- Traffic routes need brighter lighting – more expensive but also more energy efficient, cost still likely to fall as matures

Example of LED Scheme



Before



After



Dimming technology - *CMS or not CMS?*

- Pre-programmed - change by revisiting the street light; inflexible
- Central Management System (CMS), via website
 - ✓ Remote multi-stage dimming or switch-off, gives flexible approach to dimming to achieve the most savings;
 - ✓ Informed faults – replaces inspections and reliance on public reporting failures; and
 - ✓ Consumption monitoring and potential for metering – less risk and better energy rates.
 - ✗ More expensive, with ongoing revenue costs of £50k per year;
 - ✗ Different communications platforms, although a common ‘TALQ’ platform is being developed, which industry expects to be in place in 18-24 months.

Implications of not proceeding

Financially unsustainable Street Lighting service:

- Exposed to rising energy costs
- Budget increase or reduced lighting hours/ decommissioning

Potential negative impacts:

- Declining service
- Visibility, road/ community safety, fear of crime, night time economy
- Protected groups – young, elderly, disability, women
- Reputation – tourism, inward investment, etc
- Litigation risk
- Fail to meet CO₂ target with increased liability under CRC

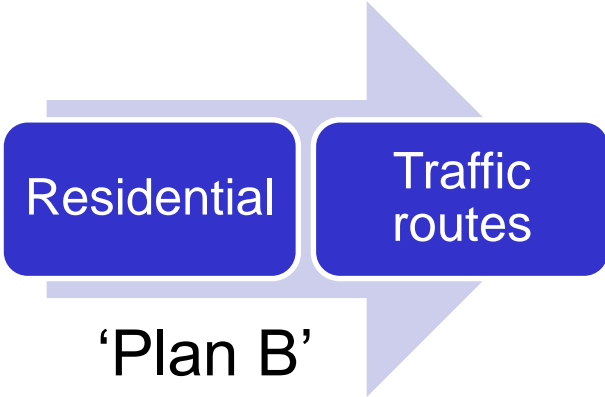
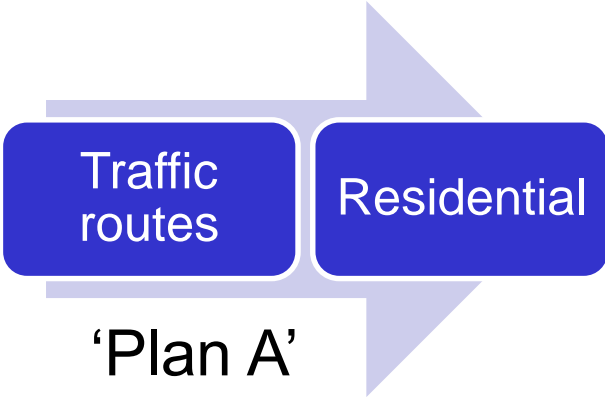
Implementation Options

- FBC modelled over 4 years to accelerate savings
 - Industry confirmed is realistic, similar scale done elsewhere



LED Technology

- 2 approaches modelled over 4 years:





Dimming technology - *CMS or not CMS?*

- Already dim traffic routes by 50%, scope to do more in residential areas
- 3 scenarios modelled to illustrate financial implications, with and without additional dimming in residential areas

No CMS

- Gloucestershire-wide
- All lights dimmed 50% midnight to 5.30am

50% CMS

- Gloucester & Cheltenham
- Traffic routes dimmed 50%, Residential 50% & 70%

75% CMS

- Gloucester, Cheltenham & Market Towns
- Traffic routes dimmed 50%, Residential 50% & 70%

Funding Options

Worst ?

- GCC only, modelled opportunity cost at PWLB rates

Likely ✓

- 40% Salix interest free loans, 60% GCC
- Salix Finance earmarked required funds

Best ?

- £4.9m LTB Major Schemes bid – unsuccessful for now
- 40% Salix, GCC balance

Private ✕

- UK Green Investment Bank, Energy Performance Contracting, commercial finance
- Commercial rates, more expensive so not modelled

Investment, 'Likely Financial Case' No CMS

'Plan A' traffic routes first	Overall £m	2015/16 £m	2016/17 £m	2017/18 £m	2018/19 £m	...	2027/28 £m	2028/29 £m
40% Salix for implementation phase	-8.3	-3.6	-1.5	-1.7	-1.5	...	-	-
60% GCC Funded	-14.6	-5.4	-2.2	-2.0	-1.8	...	-1.6	-1.6
	-22.9	-9.1	-3.7	-3.7	-3.3	...	-1.6	-1.6

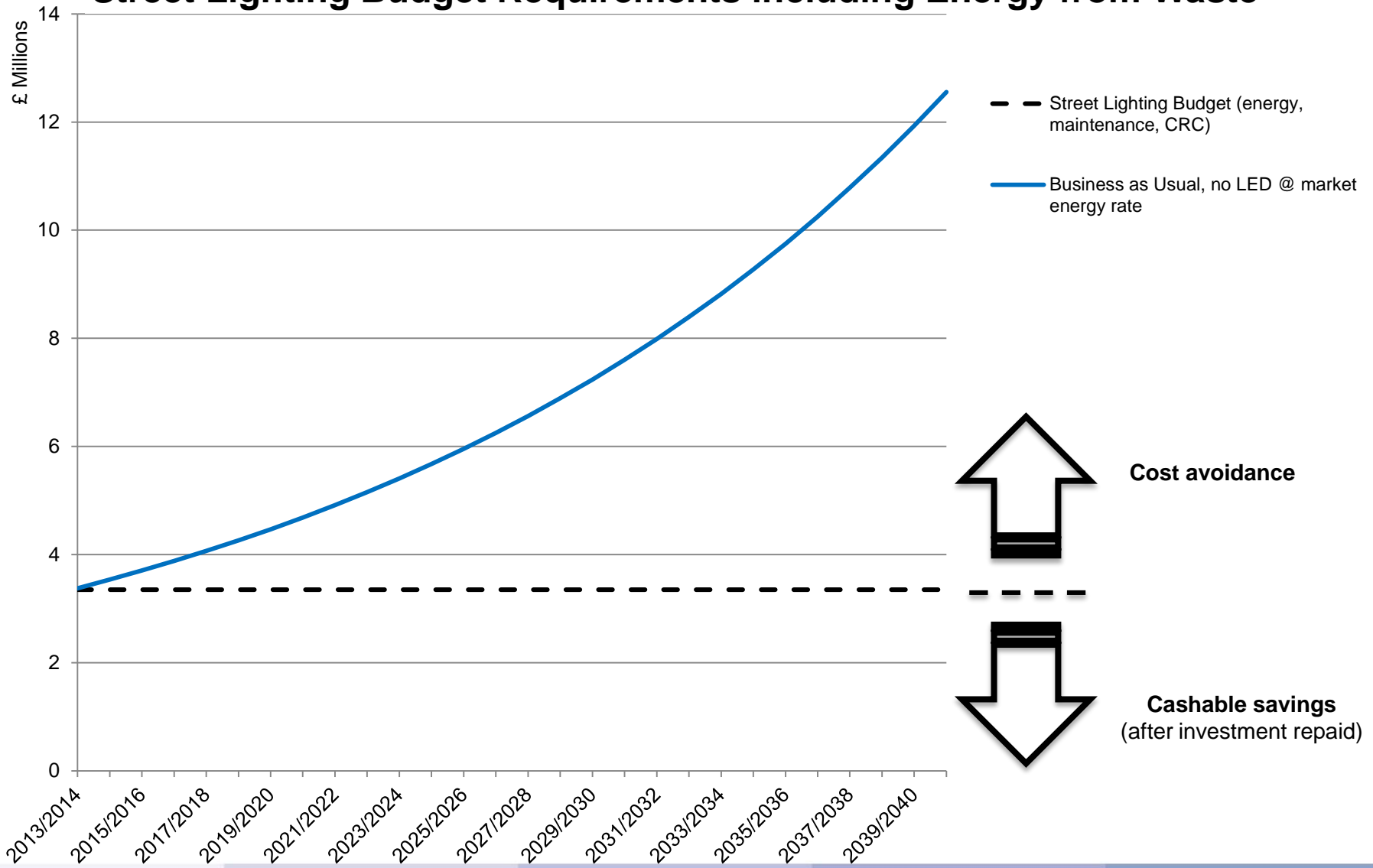
'Plan B' traffic routes last	Overall £m	2015/16 £m	2016/17 £m	2017/18 £m	2018/19 £m	...	2027/28 £m	2028/29 £m
40% Salix for implementation phase	-8.3	-1.5	-1.5	-1.3	-3.6	...	-	-
60% GCC Funded	-14.6	-2.2	-2.2	-2.0	-5.4	...	-1.6	-1.6
	-22.9	-3.7	-3.7	-3.3	-9.0	...	-1.6	-1.6

Investment, 'Likely Financial Case' 75% CMS

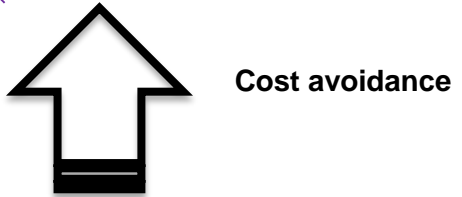
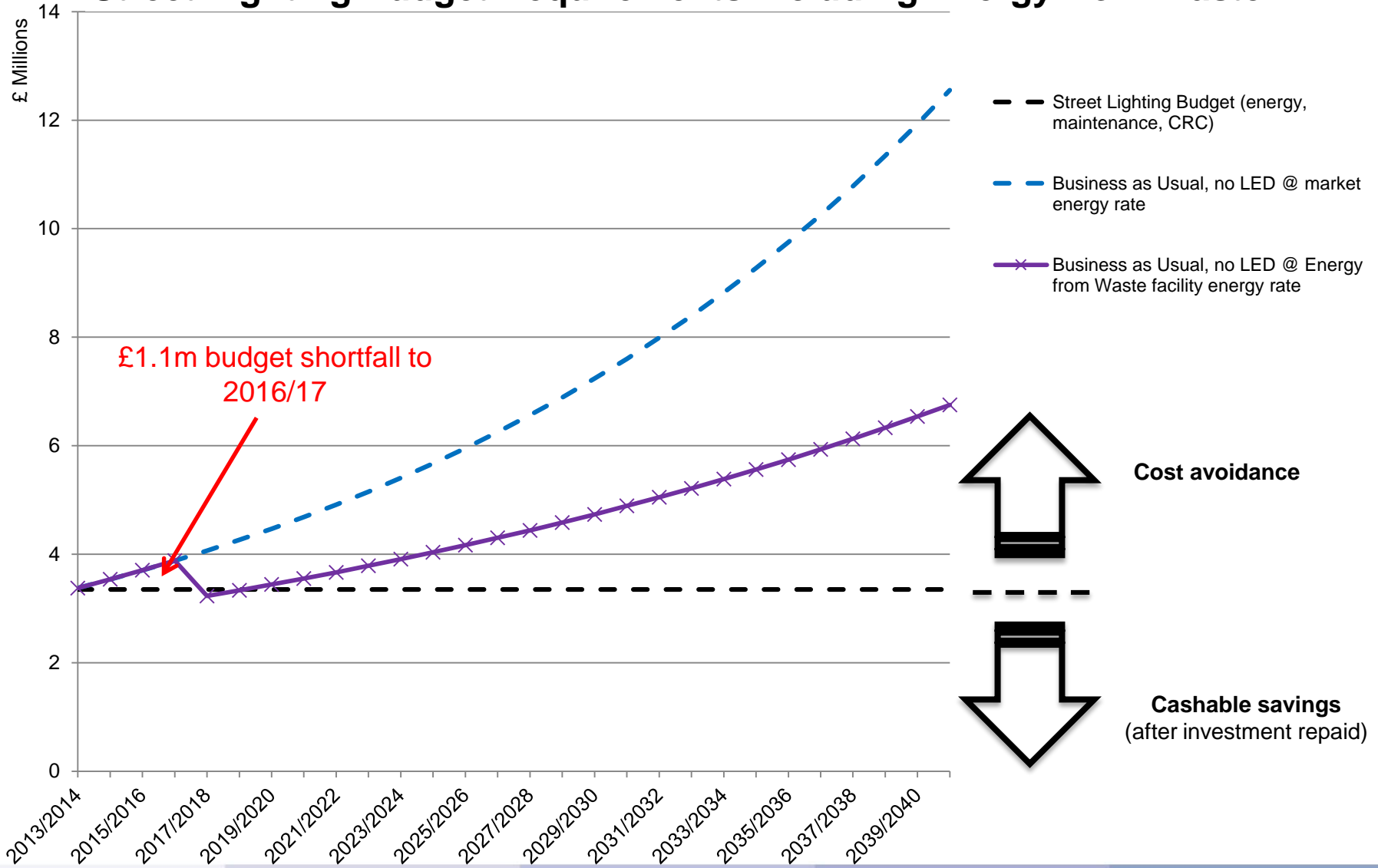
'Plan A' traffic routes first	Overall £m	2015/16 £m	2016/17 £m	2017/18 £m	2018/19 £m	...	2027/28 £m	2028/29 £m
40% Salix for implementation phase	-8.5	-3.7	-1.7	-1.7	-1.5	...	-	-
60% GCC Funded	-16.0	-5.5	-2.5	-2.5	-2.3	...	-1.6	-1.6
	-24.5	-9.1	-4.1	-4.2	-3.8	...	-1.6	-1.6

'Plan B' traffic routes last	Overall £m	2015/16 £m	2016/17 £m	2017/18 £m	2018/19 £m	...	2027/28 £m	2028/29 £m
40% Salix for implementation phase	-8.5	-1.7	-1.7	-1.5	-3.6	...	-	-
60% GCC Funded	-16.0	-2.6	-2.5	-2.3	-5.4	...	-1.6	-1.6
	-24.5	-4.3	-4.2	-3.8	-9.0	...	-1.6	-1.6

Street Lighting Budget Requirements including Energy from Waste

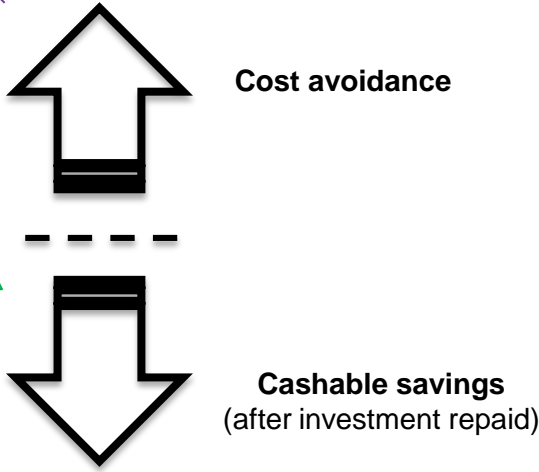
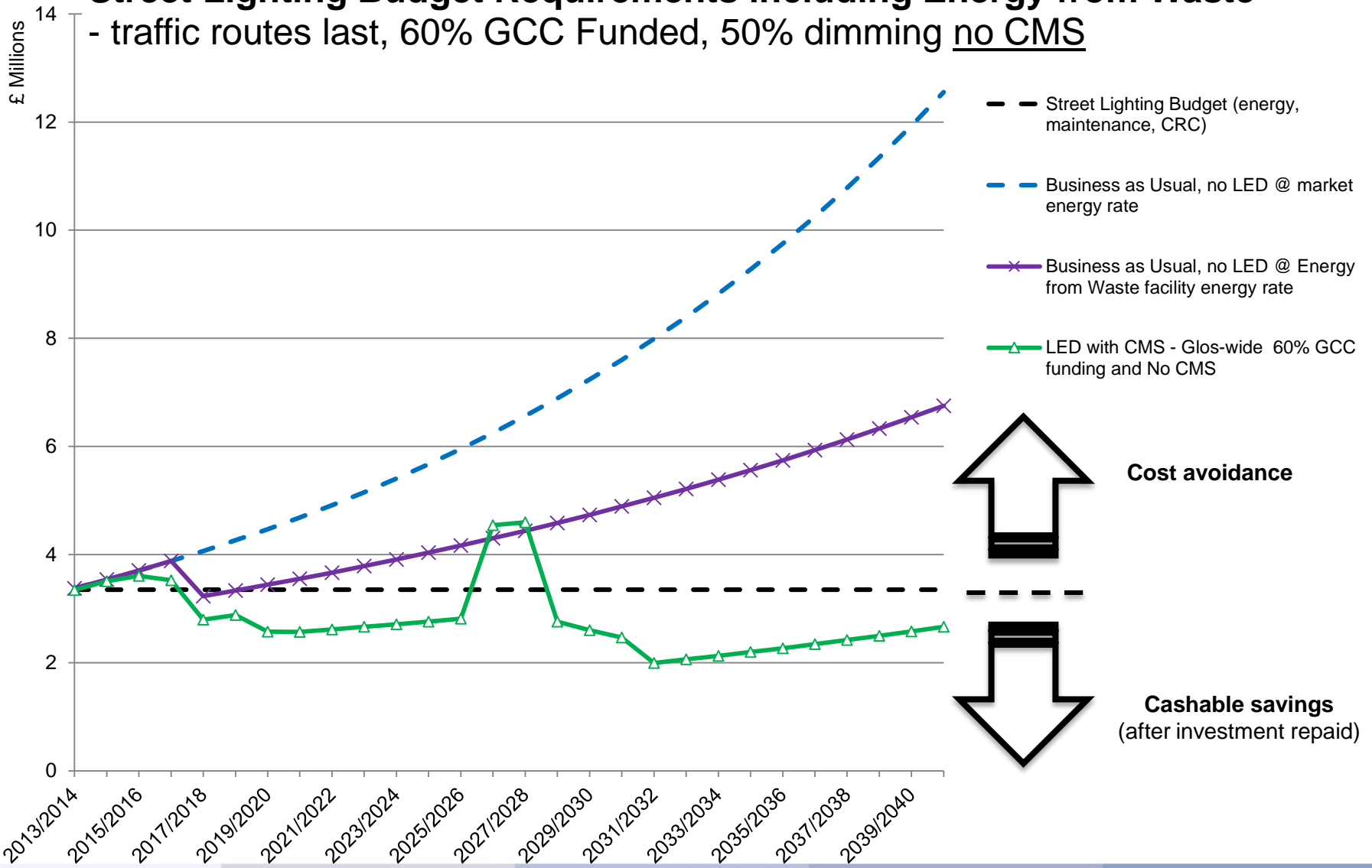


Street Lighting Budget Requirements including Energy from Waste



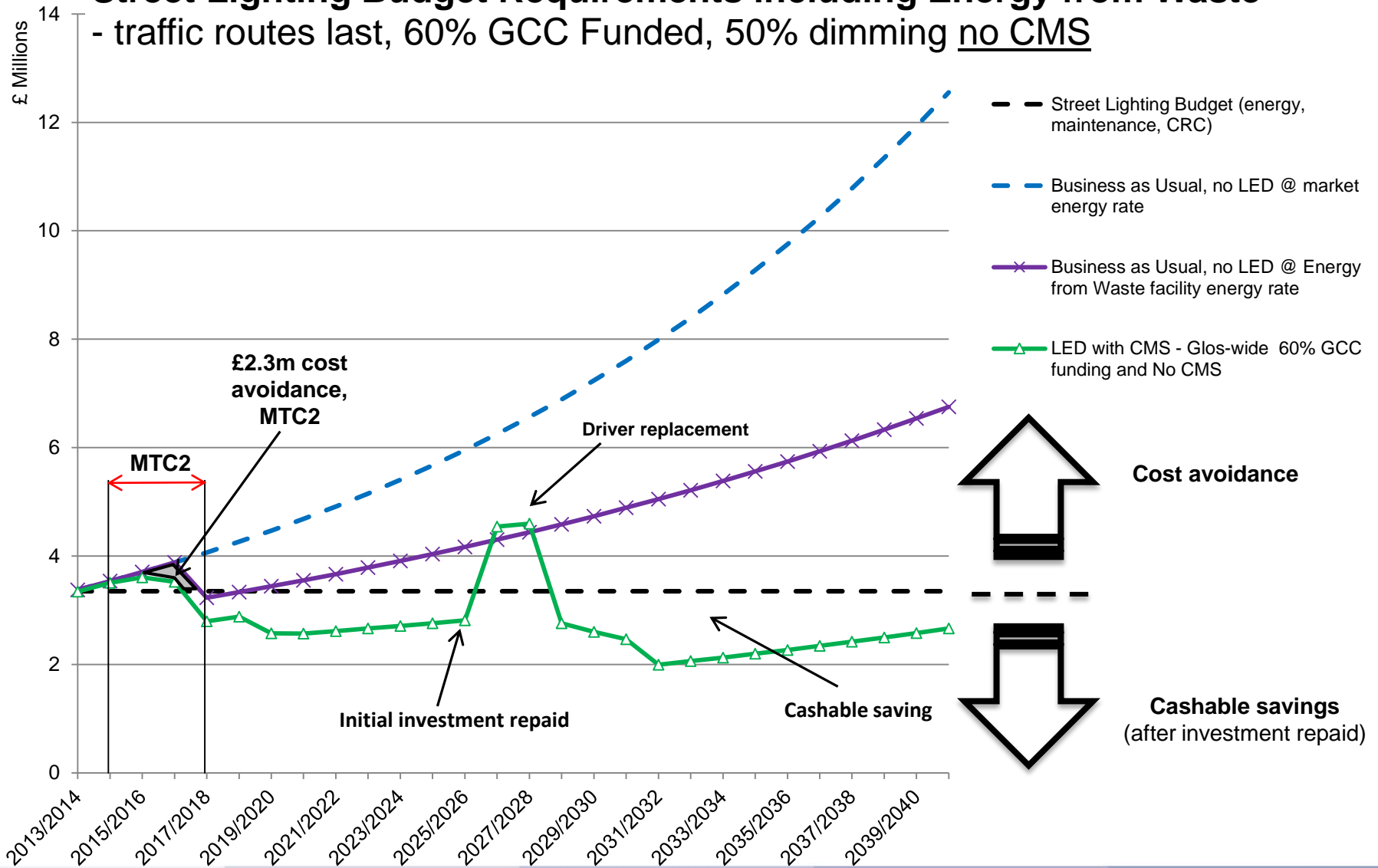
Street Lighting Budget Requirements including Energy from Waste

- traffic routes last, 60% GCC Funded, 50% dimming no CMS



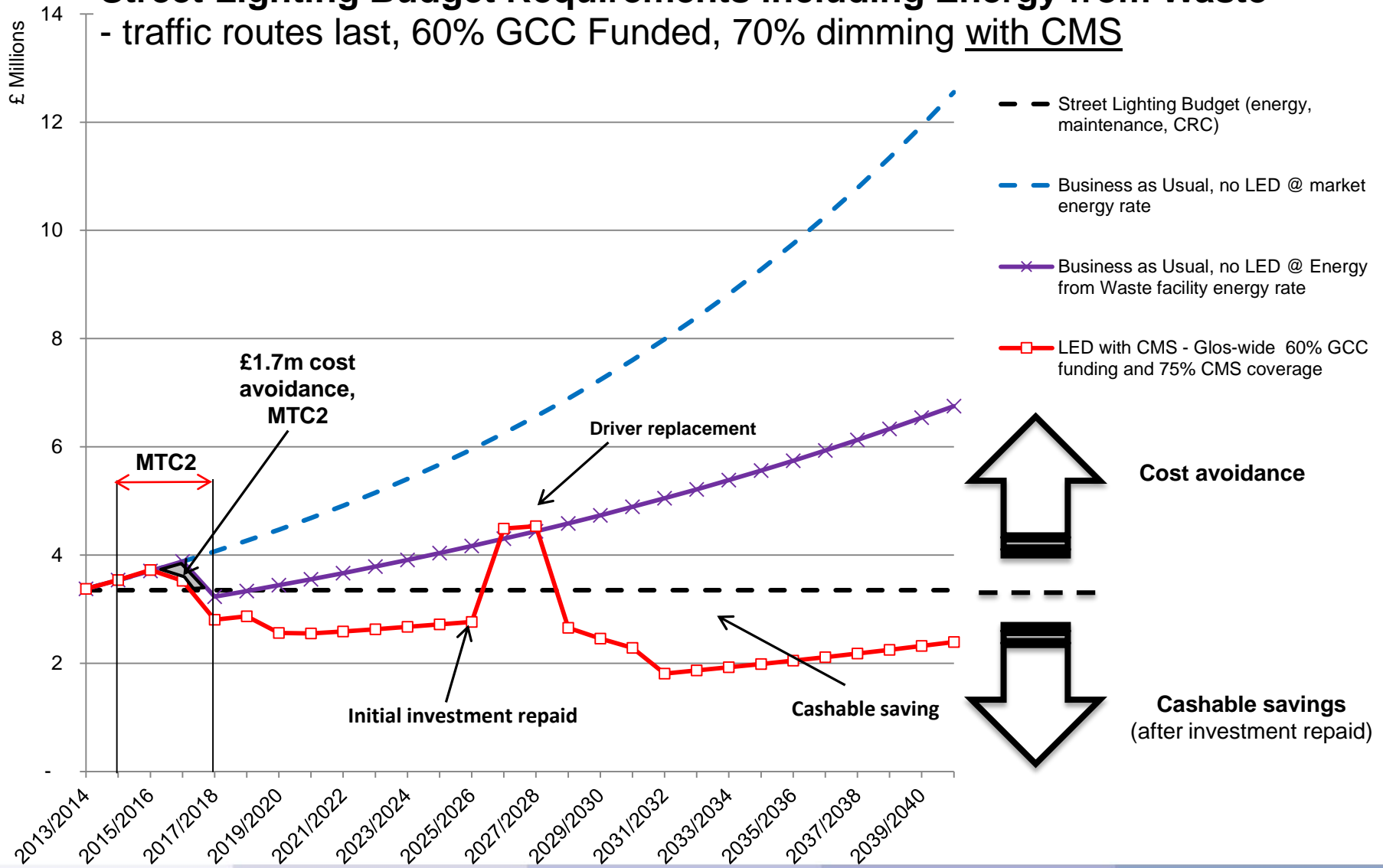
Street Lighting Budget Requirements including Energy from Waste

- traffic routes last, 60% GCC Funded, 50% dimming no CMS



Street Lighting Budget Requirements including Energy from Waste

- traffic routes last, 60% GCC Funded, 70% dimming with CMS



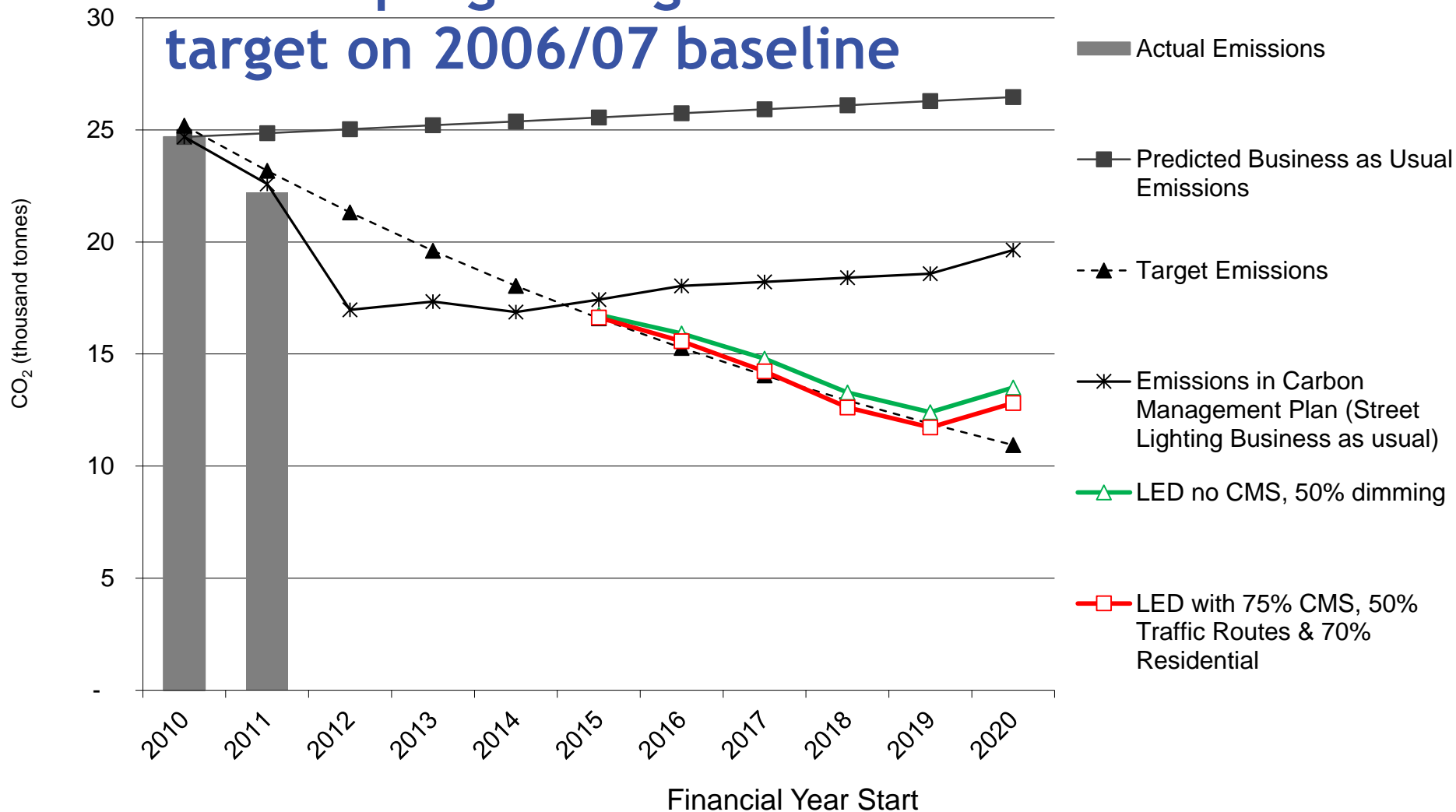
Finance Model Assumptions

- Actual asset and how used (part-night, dimming, early LED)
- LED accepted lifetime 25 years, model run to 2040/41;
- Investment and installation phased from 2015/16;
- Forecast market energy rates using information from DECC;
- Energy from Waste facility comes online 2017/18, giving reduced energy costs and suppressed inflation rate
- Energy use increase of 1.1% pa, adopted new development;
- 5% discount from bulk buying
- 10% cost reduction from market efficiencies (5% energy efficiency, technology cost)
- 10% cost for risk
- LED driver replacement after 12 years

Finance Model Limitations

- Dimming with CMS in residential areas
 - Scope for increased dimming beyond 50%
 - Level not determined and won't be suitable for all areas
 - Reduced dimming will extend the payback of CMS
 - Trial in early work
- Estimated implementation plan and provisional specification
 - Won't know until procurement what will be replaced, with what and in what order

Carbon progress against 60% reduction target on 2006/07 baseline



Resource Implications, 25 years 'Likely financial case'

'Plan A' – traffic routes first	Project Cost £m	50% dimming, No CMS			70% dimming residential, using CMS		
		Simple Payback Yrs	NPV £m	Cost Avoidance MTC2 £m	Simple Payback Yrs	NPV £m	Cost Avoidance MTC2 £m
75% CMS	24.5	10 to 11	17.2	1.6	10 to 11	19.2	1.7
50% CMS	23.9	10 to 11	17.4	1.6	10	18.8	1.7
No CMS	22.9	10 to 11	17.9	1.8	-	-	-

'Plan B' - traffic routes last	Project Cost £m	50% dimming, No CMS			70% dimming residential, using CMS		
		Simple Payback Yrs	NPV £m	Cost Avoidance MTC2 £m	Simple Payback Yrs	NPV £m	Cost Avoidance MTC2 £m
75% CMS	24.5	11	17.0	1.5	11	19.2	1.7
50% CMS	23.9	10 to 11	17.4	2.2	10 to 11	18.8	2.3
No CMS	22.9	10	18.3	2.3	-	-	-

Salix funding

- Provided retrospectively in c. 9 month tranches; existing DECC funding
- Increases in LED energy efficiency would increase the proportion funded by Salix for each mini project, reducing GCC funding requirement
- The council's local Salix Fund could provide c. £1.3m towards the cost of implementation from 2013/14 to 2017/18
 - Requires c. £2.2m GCC funding to meet Salix compliance criteria.
 - Would reduce GCC funding requirement down to £14.7m

Interdependencies

- **Street Lighting concrete column replacement programme**
 - Would need to be prioritised to ensure the savings can be realised within the planned timescale
- Street Lighting maintenance contract
- Accurate information on the lighting stock
 - Vital to accurate financial modelling for the Business Case and procurement, and for billing by the energy provider
- Energy contract – this will determine costs until the Energy from Waste facility comes online (12 month delay, £0.8m)

This project is part of the Carbon Management Programme, under the MTC Renewable Energy Programme

Procurement

- Seek to tie in with procurement of new Maintenance contract for street lighting, signs and bollards
 - Still on track for
- SW Highways Alliance and other LAs keen to develop a joint approach, led by us, and lobby DfT for funding
- GPS still want to work with us to develop a procurement

Equalities

- Dimming/ part-night no apparent impact on crime or road safety
- No complaints on existing LED (Cheltenham, Dursley, Park & Rides sites)
- Significant positive impacts on visibility, road safety, and fear of crime
- CMS enables lighting increase if any significant impact protected groups
- Not yet known if LED lighting might impact the visually impaired.

Proposed mitigating actions:

- Ongoing review for cabinet report, procurement and implementation stages
- Engage stakeholders, learning from early work and other good practice
- Monitor road safety/ crime to see if any negative change could be linked
- Monitor feedback/ complaints by protected groups.

Conclusions

- Street Lighting revenue budget can be fixed - 100% cost avoidance
- Opportunity for significant cashable savings in the long-term, inc avoiding costs under MTC2
- Repaid by savings so need not take resources from other services
- CMS saves more but costs more – use pre-programmed dimming and retrofit CMS if needed
 - Comparison study in residential areas to determine maximum acceptable dimming, use for pre-programmed dimming

Conclusions

- 'Plan B' provides the most savings, with residential areas converted before traffic routes
 - Keep under review with ongoing engagement with industry
- Better quality street light and place to live – social & economic benefit
- Significant contribution to meeting CO₂ target
- The maintenance contract for street lighting, signs and bollards should seek to include the supply, fit and maintenance of LED street lighting with option for CMS

Timeline

2013/14 Cabinet – approval as part of MTFS

2013 to 2015 – procurement phase

2015 to 2018 – implementation phase

- Installation is planned to coincide with the final year of the current street lighting maintenance contract, which is being extended to 2015/16

Proposed Approach

1. Investment in Gloucestershire-wide LED street lighting, implemented over 4 years – residential routes followed by traffic routes
2. Procurement option to include for investment in Central Management System (CMS) coverage for Gloucester, Cheltenham and Market Towns (c.75% coverage)
3. Utilise the interest free loans earmarked by Salix Finance Ltd's SEELS programme, to meet c. 40% of the project cost
4. Continue early investment, where funds permit, to maximise benefits, trialling additional dimming in residential areas

Proposed Approach

5. Begin procurement preparation phase, to ensure the required elements are in place – draft specification, Framework, communications plan, etc
6. Seek to tie in with the procurement of the maintenance contract for street lighting, signs and bollards
7. Seek to develop a procurement with GPS, on behalf of the SW Highways Alliance and other interested highway authorities