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Summary of responses to the consultation entitled ‘Improving the energy performance of street lighting and traffic signals’

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1 Introduction

1. On 5 December 2007, following the publication of the Energy White Paper, the Government launched a domestic lighting product consultation paper[1]. Interested parties were invited to provide comments by the end of February 2008. AEA Energy and Environment managed this consultation, as lead contractor of the Government's Market Transformation Programme (MTP).

2. The paper (chapter 10 of the consultation paper) set out the Government's current evidence, analysis, indicative targets and eco-design standards for street lighting and traffic signal products that are sold and brought into use in the UK. The consultation paper was directly circulated to over 350 organisations and individuals. In addition, it was published on the MTP website and open to all interested parties for comment. This consultation is part of a wider annual review and policy development process, supporting delivery of the Government's objectives for energy and for sustainable consumption and production.

3. The responses have been reviewed and are reported in the following sections:

- Section 2 summarises the quantity and nature of responses received.
- Section 3 gives a summary of the responses by consultation question and the Government's response.
- Section 4 details the next steps in the process.

4. Appendix 1 lists the stakeholders who provided a response (excluding those who wished to remain anonymous).

2 Overview of responses

5. A total of nine responses were received. Seven of the responses represented submissions from the lighting and engineering industry, the remaining two responses were received from individuals with expertise in the lighting sector. A number of those stakeholders who responded attended a lighting products consultation meeting, which took place on the 9 January 2008. It should be noted that some organisations chose to have their opinions put forward via trade bodies.

6. Five of the participants provided extensive comments relating to most or all of the nine questions provided in the consultation document (of which three also provided general comments); the remaining four participants chose to provide only general comments.

[1] The original domestic lighting products consultation document (Sustainable Products Policy Brief, Energy in use: Domestic Lighting Products. Evidence, analysis, targets and indicative standards) can be downloaded at www.mtprog.com/cms/whitepaper/.

7. A common concern expressed by the majority of stakeholders in response to the performance targets as well as the overall policy framework concerned the existing focus on products; it was generally felt that this was an overly simplistic approach and that a more holistic approach was required that considered whole lighting installations and applications. A range of alternative methodologies were discussed. On a similar theme, a number of participants expressed concerns that the overall approach of the policies and measures outlined in the consultation document was insufficiently output-driven and focused on the manufacturer rather than the user (e.g. the local authorities and highway agencies).

8. Several participants agreed that the main barrier to improving energy performance was the low rate of renewal of the existing street lighting stock and in particular the inadequate budgets available to local authorities. A range of potential problems concerned with changes in street lighting were considered including e.g. user and hazard issues associated with reduced lighting levels and retrofitting. Although there was general agreement that many of the impacts outlined in the consultation documents had been correctly identified, including those relating to high capital costs and waste impacts, participants identified several additional factors including product-specific waste impacts, the potential for additional crime and safety considerations and impacts upon animals and ecosystems.

3 Summary of topics raised and the Government's response

Question 1: Are there any other market or technological trends or factors that should be taken into account in this market overview?

Summary table for Question 1

Key topics raised	Number of comments
Use of Central Management Systems	2
Availability of LED systems, dimming and other control technologies	3
Potential user and hazard problems associated with dimming and retrofit	3
Potential for energy efficient high pressure sodium lamps	1
Key role of local authorities in investing in new street lighting	3
Other	7

9. Six participants responded to this question. A range of additional trends and factors relevant to the market overview were described, including the following:

- the use of Central Management Systems (especially where these contain metering units allowing for installation control and energy consumption measurement);
- the fact that dimming ballasts and other control technologies are currently available and will develop quickly;
- the maintenance performance of luminaires related to IP ratings (≥ IPX5) and cleaning frequency;

- more rapid and effective response from Elexon through UMSUG to support innovation; and
- the dimming at start of lamp life, gradually increasing through life to more closely match light output to design criteria

10. Several respondents highlighted the important role of local authorities in driving the level of and speed of investment in renewal of street lighting stock, both in terms of their spending budgets and investment project priorities. The significant and long term effects of PFI contracts were also noted in this context. There was much agreement that consideration needs to be given to how to encourage the responsible organisations, both public and private, to invest in upgrading their current lighting installations more quickly in order to unlock the significant energy savings possible, using products that are available today.

11. One response stressed that much of the efficiency gain associated with low pressure sodium is lost due to poor optical design of the luminaire. It was noted that modern fully sealed high performance optics fitted with HID lamps can perform better and match the electrical consumption of low pressure sodium lamps in comparable situations and lighting classes. It was therefore observed that if careful consideration were given to the choice of lighting class as well as to the design and maintenance of the installation it is possible to design a replacement high pressure sodium lighting system with similar energy consumption.

12. Another stakeholder noted that in addition to products and systems, design of street lighting schemes to maximise factors such as spacing and use of controls can have a significant impact on energy-efficiency.

13. Two comments received noted potential problems associated with the discussion of the potential for dimming outlined in the consultation document. One stakeholder expressed the concern that reducing lighting levels outside peak traffic flow hours may not be appropriate, particularly late at night, given the potential hazards to pedestrians (noting also the fact that at these times drivers may be more tired, driving faster, and maybe with impaired ability). Another response commented that whilst light output from 'white lights' can be dimmed the design must comply with required road lighting classes as given within BS5489-1:2003. A further concern was noted by one participant with regards to changing just the light source (via retrofit) of an existing lamp installation. It was stressed that this would affect the optical performance of the luminaire, which would in turn change the arc tube length and position with the reflector thereby affecting the road lighting levels, potentially to the detriment of the users.

14. Regarding traffic signals, the potential role of LED units to improve energy performance was highlighted by more than one participant. One stakeholder commented that as LED technology is improved the adoption of these units will increase; it was further noted that because many traffic signal installations have a relatively short life span, the phasing out of tungsten halogen light sources and their replacement by LED's will be relatively short. A second participant noted that suitable LED products are readily available for use at present. One participant stressed that in other countries across Europe, Asia and in the US LEDs have been successfully implemented and that there were important lessons to be learnt here.

15. One participant stressed that traffic sign technology has also improved the energy performance by replacing miniature fluorescent lamps with compact fluorescents in many cases making providing an overall energy reduction down to 25% of the original when replacing 2no. 8w MCF/U lamps by a single 11w PLL and switching the lamp so it only operates during the dark rather than 24 hours a day. It was observed that the UK is alone in Europe in lighting many of its traffic signs (whereas other European countries rely upon the illumination from vehicular headlights and the fitting of retro reflective signs); in this context it was noted that whilst some relaxation of the Traffic Sign Regulations has recently taken place, further relaxation of the regulations bringing the UK more in line with other European countries would be beneficial in helping to reduce energy consumption.

16. In relation to the price barriers outlined in the consultation document, one participant stressed the important role to be played by competent lighting designers, and local authorities through implementation of full asset management plans and programmed proactive maintenance, thereby reducing the component failure rates and hence reactive maintenance. Another stakeholder commented that changing existing column spacing is generally expensive.

Government response

17. The use of Central Management Systems and the extra uses for dimming and controls have been noted and future versions of this paper will point out that replacement of low pressure sodium with high-pressure sodium lamps need not have an energy penalty.

18. Several respondents to the 2007/08 consultation exercise suggested that the MTP assumption regarding the adoption of LED traffic signals was too conservative. This assumption will be revisited in discussion with stakeholders, including trade bodies and the assumption will be updated as appropriate.

19. The role of the local authority in approving scheme designs will be added to future versions of this paper, as will The Highways Agency strategy of reviewing all its installations.

20. The other comments on renewal and investment will be addressed later in the document.

Question 2: Do the performance values shown in the tables in the Appendix cover the right products and are they set at the right levels?

Summary table for Question 2

Key topics raised	Number of comments
Performance standards and metrics should be based on lighting installations rather than lamp products	5
Other	3

21. This question refers to the graphs describing the indicative performance targets and policy options (see pages 10 and 24 in the original consultation document). Five participants responded in relation to the set of figures proposed, four of which expressed reservations concerning the overall approach taken. There was a general agreement that the values should be based upon luminaires/lighting installations (or the whole lighting solution) rather than lamps as these are the more relevant to the overall energy efficiency.

22. One stakeholder suggested that an alternative approach would be to consider kWh per km based upon the road lighting class (or something relating to the installation as a whole and the class of lighting used). It was observed that lessons to be learnt here from the Building Regulations Approved Part L where the mean lamp circuit luminous efficacy for a whole building is scored against target values, with use of modification factors for luminaire light output ratio and controls (these factors can easily be assessed by third parties without need for deep technical insight).

23. Another participant suggested that an appropriate alternative performance parameter should take account of the actual area requiring lighting (not the area actually lit), the period of lighting and the class of lighting. This could then lead to a series of parameter such as "kWh per annum / (lux or Cd/m2) / 100m2" being developed for each lighting class, the choice of lux or Cd/m2 being chosen to suit the lighting class used in the design. It was commented that the use of kWh per annum would encourage the use of variable light classes and that such an approach would help reduce energy consumption by making designers and specifiers more aware of the problem by having to consider it as one of the design criteria.

24. A further concern expressed by three participants was the poor quality of data available in the development of the targets. It was suggested, for example, that local authority and Highways Agency inventories should be able to provide more recent data and also that the Department for Transport has more current data collected in 2007 (although this has not been released in to the public domain). It was noted that regular collection of data is necessary to develop monitor market progress and develop appropriate targets.

25. Specific comments were made relating to the figures, including the following:

- the average lm/W values are high and need to be adjusted to include lm/W of the lower wattage lamps which will be less than 100 lm/W
- the P1 targets do not include changes in lighting application practice which could be a valuable contributor to energy saving

- the curve in the graph (Figure 3.1) suggests that although in many cases low-pressure sodium lighting is being replaced with high-pressure sodium or compact metal halide lighting of a lower lamp efficacy, the overall luminous efficacy of the lighting scheme should be able to be maintained through using best practice products and good lighting design.

Government response

26. The Government recognises that the indicative standards for street lighting are of limited value as they only address lamp efficacy. Although the Government and MTP would like to develop similar standards for luminaire efficiencies, the MTP models do not contain enough data on these for a metric to be developed.

27. The Government agrees that a more holistic approach to energy efficiency would be beneficial. It is feasible that an overall energy efficiency level might be pursued through the Energy Services Directive. The Government would be interested in seeing more details of the CELMA Total Lighting Solution mentioned in one of the responses. The Government also notes the suggestions for metrics mentioned in the responses and will work with trade bodies to develop these ideas.

28. The Market Transformation Programme notes the comment about more up-to-date information being available within the Department for Transport and has asked the DfT if they can make the data available.

29. The average lm/W figures are an output from the current MTP stock and sales model for street lighting. As such they attempt to cover all the lamp wattages in common use. The baseline survey data did not have enough information to disaggregate the data by lamp wattage so the original 'average wattage' of each lamp class has been used throughout. It should be noted that the 'standards' do refer to the efficiency of the 'average' wattage lamp. Obviously there will be some lower wattage lamps that are of lower efficacy but equally there should be some higher wattage lamps that are of higher efficacy. The indicative standard is the mean figure for the whole lamp population. The P1 scenario does assume that the best practice lamps are installed; this scenario will be revisited when the proposals under the EuP Directive are clarified.

Question 3: In the areas of market analysis, projections and targets, should consideration be given to any additional measures, risks or strengthening initiatives?

Summary table for Question 3

Key topics raised	Number of comments
More public investment in energy efficient street lighting required	3
Mandate lighting scheme quality to BSEN 13201 and apply energy efficiency limits	1
Pursue measures designed to further accelerate the use of innovative technologies	1
Risks from switching and low/zero lighting	1
Risk from development of inappropriate and unrealistic targets	1
Risk from poor knowledge of market	1
Other	3

30. Four participants provided comments in response to this question and outlined a range of measures, risks and strengthening initiatives.

31. With respect to measures, the following suggestions were made:

- Mandate lighting scheme quality to BSEN 13201 and apply energy efficiency limits
- More investment required, particularly by local authorities and the highways authorities in upgrading existing street lighting installations to current energy performance standards, incorporating controls where these add value.
- Pursue measures designed to further accelerate the use of innovative technologies (e.g. more rapid and effective response from Elexon through UMSUG; use of Controlled Management Systems)

32. One stakeholder noted a potential risk arising from the random switching of road lighting (to save energy) as this would destroy the principles of the road lighting design and increase the risk of accidents. The same stakeholder also suggested that there could be public resistance to reduced or zero lighting levels in public areas for certain times due to e.g. fear of increased crime and general amenity.

33. A key risk was highlighted by one respondent regarding the development of the performance targets. It was stressed that such targets should be realistic, take account of current and achievable future technology and be backed by the provisions of adequate funding to allow them to be achieved. Furthermore, any changes to targets should only be made after extensive discussion with manufacturers and organisations responsible for the installation, maintenance, and operation of lighting systems. In this context, the view was given that the existing consultation has been limited mainly to manufacturers and suppliers although local authorities are responsible for the specification and choice of road lighting apparatus and standards.

34. A further risk identified was the weaknesses in knowledge concerning market and technology trends, and the relationship between the performance of products measured under test conditions and what is achieved in real life. It was perceived that these factors could lead to the reduced effectiveness of the policy.

35. The following suggestions were made in respect to strengthening initiatives:

- Require private roads, car parks and other public spaces to adopt public standards
- Improving public understanding of the suitable lighting alternatives and their features and benefits
- Stronger policy to speed up investment in refurbishment of the existing stock to more energy-efficient standards

Government response

36. As noted above, the Highways Agency has produced an action plan to review and update its lighting installations. Local authorities are required to produce sustainable energy action plans that could include street lighting renewal. The ILE has produced some guidance on possible 'Invest to Save' strategies.

37. The EC may be able to include mandatory use of BS EN 13201 and energy efficiency minimum standards as part of the Energy Services Directive work due to commence this year. This legislation may also be able to include private roads, car parks etc.

38. The Government acknowledges the concern that reduction in (or switching off) road lighting outside peak hours is not a suitable strategy for all roads, particularly in urban centres. Each installation should be reviewed on its own merits and trial periods of change can be instigated to gauge public opinion.

39. The current indicative targets are based on the MTP stock and sales model. Any further information on the make-up of the UK installed base will be welcomed by MTP. MTP is constantly seeking to increase its understanding of the lighting market.

Question 4: In the area of engaging the supply chain, should consideration be given to any additional measures, risks or strengthening initiatives?

Summary table for Question 4

Key topics raised	Number of comments
Local authorities and highways agencies rather than Government will be responsible for ensuring standards	2
Need to encourage all street lighting schemes to be designed by appropriately qualified engineers/designers	1
Insufficient funding leading to pressure to reduce product/system specifications	1
Technical complexity could deter the adoption of standards	1
Role of MTP and Red-Green calculator	1
Lamps should be marked as lumens per watt	1

40. Comments were received from five stakeholders, noting their concerns with aspects of the consultation document relating to supply chain issues, and suggesting for consideration a range of measures, risks and initiatives which could be strengthened.

41. The view was expressed by two participants that the statement in the consultation document that "Government will ask major UK manufacturers and contractors to compete to supply street lighting in line with the indicative standards set out in the Appendix" indicated a lack of understanding of how road lighting is provided and maintained in the UK. It was commented that 'users' such as local authorities and the highways agencies should rather be those requiring street lighting to be supplied to appropriate standards, since they are responsible for setting the design criteria, procurement, and operation of road lighting in the UK.

42. Similar concerns were expressed relating to the statement made in concerning how new lighting is specified for housing sites; it was commented that in most local

authorities the developer has to obtain approval not only to the design of the proposed street lighting but also to the specification as part of the Section 38 Agreement, and that many local authorities actually provide the design and specification to the developer as well as installing the street lighting on a rechargeable basis. While it was agreed that a number of local authorities do employ consultants to manage their street lighting systems (often as part of an overall highway management contract), the local authority generally has an overseeing role and would be responsible for approving any policy decisions.

43. Regarding specific measures, one participant suggested the need to encourage all street lighting schemes to be designed by appropriately qualified engineers/designers, working to and complying with agreed standards in terms of energy efficient products, systems and scheme designs.

44. Two specific risks were noted:

- Insufficient funding leading to pressure to reduce product/system specifications, with the result that energy-efficiency standards are not achieved.
- The technical complexity in this area could deter the adoption of standards across the supply chain.

45. One participant noted that Government, through its Market Transformation Programme, could work with the ASLEC/HEMSA Environmental Forum to supply information on best practice performance standards for street lighting. The important roles to be played by the Red-Green calculator for products and the final lighting solution / project were also highlighted. Finally, it was noted that lamps should be to be marked not as wattage but as lumens per watt with a similar Red-Green identifier.

Government response

46. The role of the local authority in approving scheme designs is acknowledged. The Government notes the concern that technical complexity could deter the adoption of standards whilst recognising that a holistic approach to lighting design may necessarily involve some complexity.

47. The Government notes the suggestion that lamps should be marked with Lumen/watt values and will bear the suggestion in mind during future discussions about the EuP Directive standards.

48. The Government welcomes any inputs to standards development and will try to ensure that joined-up thinking is applied in future standards development

Question 5: In the area of EU and international policy actions, programmes and initiatives, should consideration be given to any additional measures, risks or strengthening initiatives?

Summary table for Question 5

Key topics raised	Number of comments
EuP should address lighting installations/applications rather than products	2
Product based standards may prove difficult in relation to international products	1
Adoption of CELMA Total Lighting Solution	1
Speed up investment in upgrading (e.g. support for "invest to save")	1
Need to support market surveillance processes	1
Main risk to policy achieving significant energy savings is the low rate of renewal of street lighting	3
Speed up the process of developing standards for electronic ballast for HID lamps and LED street lamps	2
Use of KPIs, additional funding streams and greater transparency on the labelling of products	1

49. This question was answered by five participants. While many of the measures, risks and strengthened initiatives described in the consultation document were welcomed by stakeholders, most suggested limitations with existing measures, highlighted additional areas of risk and suggested a range of required actions.

50. Several participants commented on the role of the EuP proposals in relation to street lighting. Two respondents commented that, in relation to the question of whether a product standards approach was the best course of action for street lighting, a serious flaw in the EuP proposals is that they only consider the equipment rather than its application in a lighting installation, competently designed, that will yield energy savings. It was also commented in relation to the preparatory product study recently completed for street lighting, that the option also exists to replace energy-inefficient old stock of luminaires given that there are already a host of high quality performance luminaires available on the market.

51. One respondent questioned the value of encouraging EuP to include product requirements for low-pressure sodium systems as well as HID systems. Another stakeholder commented that the introduction of a system based performance standard may also be easier to implement than a product based standard as there are no legislative based requirements internationally for the specification, design, installation, and maintenance of road lighting systems; only European and British Standards. Another response suggested that harmonised standards relating to in-use performance would be essential for ongoing investment (particularly with LED's and specifically with red-lamp monitoring in traffic signals).

52. Several participants made suggestions in relation to measures, including the following:

- adoption of CELMA Total Lighting Solution i.e. Lighting Design Directive proposal
- consider effective ways in which investment in upgrading can be speeded up e.g. via Regulatory or financial incentives (e.g. support for the "invest to save" campaign)

53. It was also noted that whilst the lighting Industry strongly supports the continuation of the existing CE marking process in which manufacturers back up their marks with detailed technical files, improvement is needed in the supporting

market surveillance processes in order to minimise products that do not meet agreed energy efficiency standards entering the UK market.

54. There was general agreement that the largest risk to policy achieving significant energy savings is the low rate of renewal of street lighting, in particular caused by insufficient local authority budgets to finance the investment needed to upgrade existing, energy inefficient, installations. There was also concern that a lack of consistent standards and specifications is hampering the development and the market for LED road lighting units.

55. One respondent commented that, in respect of the risk identified in the consultation document that lamp replacements will not result in energy savings but only in more light output, this would not occur where the entire lighting solution is re-designed, except where current levels fall below the current accepted standard.

56. Regarding the strengthening of initiatives, one participant suggested the need to speed up the process of developing standards for electronic ballast for HID lamps and LED street lamps and that more funding and public awareness activities were needed to overcome the risks identified. Commenting on the fact that only around 3% of lighting is renewed each year, leading to lifetimes of installations of 30 years or more, one respondent noted that this could be measured and accelerated through the use of key performance indicators (KPIs) and additional funding streams, as well as transparency on the labelling of products (noting e.g. power factor effects with CFL lamps).

Government response

57. The Government welcomes any inputs to standards development and will try to ensure that joined-up thinking is applied in future standards development.

58. The need for increased market surveillance has been brought up on a number of occasions within the lighting consultation. The lighting industry has been self-policing until now and organisations such as the Lighting Association have done significant amounts of work on testing the safety of CE marked products. The Government would be willing to discuss with the industry whether additional policing measures would be appropriate; these could be introduced as part of the EuP discussions. Such measures would need to be agreed on a Europe-wide basis.

59. The low rate of renewal is recognised and the use of KPIs to improve this situation will be added as a strengthening measure.

60. The need to speed up the development of HID ballast and LED standards is noted.

Question 6: In the area of UK policy actions, programmes and initiatives, should consideration be given to any additional measures, risks or strengthening initiatives?

Summary table for Question 6

Key topics raised	Number of comments
The lighting scheme / installation should be considered rather than simply the product	1
Public procurement has key role in setting a leading example	2
Initiatives should be output driven	2
Little benefit associated with energy labelling road lighting products	1
Local authority budgets limiting upgrading of lighting stock	2
Risk of public concern regarding low lighting levels	1
Other	5

61. Comments were received from five stakeholders. One participant simply repeated the widely shared view that it is the lighting scheme / installation that should be considered by policymakers and not simply the product. Two stakeholders expressed their support for the various comments made in the consultation document concerning public procurement and its role in setting a leading example in the area of energy-efficiency. It was noted in this context however that the issuing of Government guidance relating to public sector procurement of energy using products should take account of the individual needs of local authorities as well as the limited budgets available to them. Furthermore, the point was made that such initiatives should be output driven (i.e. specifying the standards to be achieved as against input driven such as specific technology) in order to allow specifiers and operators to determine the products that offer them the best whole life cost while meeting the requirements of the service and energy conservation.

62. One stakeholder expressed the view that there would be little benefit from the proposed suggestion of an energy labelling scheme for road lighting products as the majority of these products are specified or purchased by engineers who already understand the use of energy and its cost. It was felt that in most cases the energy efficiency label would only be seen by the operatives installing or maintaining the product; and they generally have little influence on the specification and purchase of such products.

63. Stakeholders suggested a range of additional measures at the UK level including the following:

- Strengthen focus on use of more electronic ballasts and lighting controls to bring about higher levels of energy efficiency e.g. via more controlled use of lighting.
- Rather than introduce new or additional energy labelling requirements for professional lighting products (e.g. street lighting luminaires, lamps, ballasts) focus on the existing CE mark, backed up by manufacturers technical files and enhanced market surveillance
- Requirement for all local authorities to have regularly reviewed lighting policies addressing energy performance as well as other issues (e.g. light pollution and economic enhancement)
- Development and monitoring of appropriate and effective KPI's
- Use of education programmes for manufacturers, contractors, consultants and local authority and central government lighting engineers, together with information for councillors and the public.

64. Key risks identified included local authority budget restrictions limiting the scope for either the investment to speed up upgrades and public concerns about potentially low lighting levels. Regarding the strengthening of initiatives, the view was repeated by one participant that more effective incentives of both regulatory and financial nature were needed to speed up investment via public procurement programmes in upgrading street lighting installations to meet agreed energy efficiency standards.

Government response

65. The Government agrees that a more holistic approach to energy efficiency would be beneficial. It is feasible that an overall energy efficiency level might be pursued through the Energy Services Directive. The Government would be interested in seeing more details of the CELMA Total Lighting Solution mentioned in one of the responses. The Government also notes the suggestions for metrics mentioned in the responses and will work with trade bodies to develop these ideas. The Government agrees that such as scheme should be output driven i.e. to produce the right amount of light in the right place with minimum energy use. The Government has no intention of imposing prescriptive solutions onto Local Authorities.

66. There was a difference of opinion within the respondents over the benefits of lamp labelling. One respondent suggested labelling lamps with lumen/watt values whilst another said that such labelling was not required. The Government does not hold a strong view on this subject but considers that such labelling may be of use to less experienced specifiers.

67. The suggestions about education programmes and that local authorities should have regularly reviewed lighting policies are noted.

68. As part of the UK Energy Efficiency Action Plan[1] the Government have announced that 'revolving loan funds' have been made available for energy efficiency work in the public sector; such loans may be available for street lighting renewal.

Question 7: Are there any other policies likely to impact on street lighting and traffic signal products that should be taken into account?

Summary table for Question 7

Key topics raised	Number of comments
Cost of energy impacting local authority budgets	1
Government policy to reduce road traffic accidents and crime	1
24 hour culture and CCTV will require greater lighting levels	1
Plans to increase home building will drive energy use in road lighting	1

69. Three stakeholders responded to this question. Factors identified included the following:

[1] http://www.defra.gov.uk/environment/climatechange/uk/energy/pdf/action-plan-2007.pdf

- The high cost of energy having a significant negative impact on local authority budgets and the implementation of improvements.
- Government's commitment to reduce road traffic accidents and crime may have an effect on the provision of road lighting
- Growth in the 24 hour culture and the provision of CCTV surveillance will require higher levels of, and better quality, illumination than currently installed, increasing rather than reducing energy consumption.

70. One participant also commented that Government's policy to increase the number of homes being built in the UK will similarly increase the use of energy for road lighting purposes. It was observed that although this new lighting can be provided by the best suited products at the time of specification and installation, with the fact that the average local authority experiences a 1-2% growth in road lighting numbers per year must be taken in to account when setting targets.

Government response

71. The three risk factors mentioned above are noted and will be included in further versions of this paper.

72. The plans to increase house building are already taken into account in the MTP projections.

Question 8: What additional measures would you suggest developing to drive forward sustainability in street lighting and traffic signals?

Summary table for Question 8

Key topics raised	Number of comments
Identify and replace existing inefficient luminaires	2
Encourage further development of (non-LED) lighting products	1
Address existing barriers within the PFI process	1
Acceleration of R&D efforts	
Other	5

73. Comments from five stakeholders were received in response to this question. Two participants agreed that more needed to be done in identifying and replacing existing inefficient luminaires with one suggesting that there should be funding for regular auditing of existing installations. One participant noted that while LEDs would play an important role in efficient street lighting, the further development of other light sources such as long life compact fluorescent lamps and other HID light sources should not be ignored. In this context, it was stressed that road lighting has many requirements (e.g. from providing relatively high levels of high quality illumination for our town and city centres to providing low levels of acceptable illumination for footpaths and residential roads) and that different requirements have different solutions.

74. The important role of the PFI process was highlighted by one respondent, who suggested that a root and branch review of the process was required to encourage innovation and best practice technological solutions. A range of existing barriers were noted here including the alleged flaws in the procurement process, the cost of

bidding, alleged restrictive contract documents (not apparently linked to standard conditions of contract), excessive risk to the contractor through contract conditions and excessive non-critical non-performance reductions in the payment mechanism.

75. Other additional measures noted by stakeholders included:

- The need to focus on good quality designs of schemes which make optimum use of energy efficient products, including controls, in order to ensure best use of energy whilst in use
- Increasing public awareness of the need for energy saving and therefore the why changes to public lighting would take place, whilst noting public concerns (e.g. fear of crime, risk of accidents etc)
- Use of Central Management Systems including variable lighting levels
- Development and monitoring of effective lighting policies
- Visible and practical Government support for competition in connections for un-metered supplies (which could reduce the total cost of replacement and speed up the process)
- Use of funding sources for resources to accelerate R+D and routes to market for energy efficient, intelligent lighting solutions (including active control of LED based street lighting and battery technology)

Government response

76. Funding for audits would need to come from the normal local authority budgets. Effective audits would identify useful savings.

77. The Government believes that good (non-LED) lighting products will be developed if a well-defined market is available. All Applied Research and Technology Transfer projects are eligible for consideration for funding under existing Carbon Trust funding routes.

78. The Government thanks the respondent for comments on the effectiveness of the PFI process. PFI schemes are considered on their own merits. A business case has to be prepared before a street lighting PFI scheme is approved. That business case is required to show that the PFI approach is value for money over conventional funding over the 25 years of a PFI contract and that the PFI option demonstrates a positive benefit cost ratio.

Question 9: Are there any other potential impacts resulting from these proposals that should be taken into account?

Summary table for Question 9

Key topics raised	Number of comments
Potential for effective lamp replacement for existing luminaires	1
Documentary evidence exists of a large back-log of street lighting	2
Limitations of PFI contracts and need for additional funding	2
Product specific waste considerations	2
Potential impacts upon animals and ecosystems	1
Importance of recycling, treatment and disposal of street lighting products	2
Other impacts identified	5

79. Comments from five participants were received in relation to this question, commenting mainly in relation to issues considered in the consumer cost/benefit analysis, business impacts and waste impacts.

Consumer cost/benefit analysis and business impacts

80. One stakeholder agreed with the stated payback period and noted that, based on work undertaken in relation to the "invest to save" campaign, payback periods can be in excess of 10 years even when accounting for taking other savings such as changes in maintenance regimes and equipment replacement programmes. It was also commented that while there is very little benefit that can be achieved by just using a different lamp in the same luminaire (as each luminaire is designed for a specific lamp type and wattage) if manufacturers were able to produce physically identical lamps producing the same light output with lower energy consumptions for a similar price to those currently paid then a cost effective replacement would be practicable. Although it was agreed that replacement of the total luminaire would not as cost effective, if careful consideration was given to all requirements it may be possible on many existing lighting columns in good condition to provide adequate systems of road lighting which almost meet current specifications. While such systems may not be more energy efficient, they could have a smaller energy footprint overall taking account of reduced maintenance requirements and visits. For this reason, it was suggested that there is a need for more research and the production of a cost benefit analysis of such solutions to give guidance and encouragement for their use.

81. Two participants disagreed that the evidence of a large back-log of street lighting in need of refurbishment on safety grounds was "anecdotal". One stakeholder noted relevant work undertaken by The Institution of Lighting Engineers, ALSEC & HEMSA which shows the problem and that the ILE document 'managing a vital asset' (this document can be down loaded from the ILE web site www.ile.org.uk) should be considered as this summarises the current position which has lead to the use of PFI contracts to address the issue. The second noted that The Department for Transport calculated and published details of this backlog a number of years ago and used the data as a reason for encouraging the uptake of PFI contracts. It was commented that whilst this initiative has been welcomed, there are still many authorities who require additional funding to help them replace their aging and often dangerous lighting stock and who may not be able to qualify for PFI funding.

82. One participant stressed that PFIs do not generally result in a reduction of energy consumption, owing to the increased levels of illumination and quality of lighting provided as well as a growth in the number of lighting points installed to meet the specified outputs. It was noted that there is a very small replacement budget that does not meet current requirements and that with further increases in electricity costs forecast, this may become even smaller. In this context the urgent requirement for additional funding to overcome this backlog and to help provide a more energy efficient solution was highlighted.

83. Another participant noted that local authorities can currently assess the most efficient street lighting solutions being installed through use of its developer's

specification, but that a good street lighting asset management plan and a knowledge of its complete stock are required to realise the benefits (which in most cases is currently not the case).

Waste impacts

84. Several participants commented upon waste impacts. One response noted that a very small quantity of mercury is required in high pressure sodium lamps to achieve the high lumen output, and that mercury-free alternatives are available but at a lower lighting output. A second response noted that whilst LED's are mercury free they contain other materials which need to be treated and safely disposed of in a similar manner to other electronic equipment. It was observed that as the use of LED's accelerates, the quantity and difficulties of disposing of them will become recognised, requiring consideration early in their product life cycle so that suitable disposal techniques can be developed.

85. One participant noted that while there is considerable waste produced from the disposal of road lighting lamps, this is very small (circa 3m units per annum) compared to the quantity of discharge lamps removed and replaced from office blocks, factories, shops etc. estimated at 80m per annum. Furthermore, it was observed that the size and volume of materials in a lamp used in road lighting are generally much less than those used in lamps for offices etc. However, it was agreed that the impact and treatment of this waste needed to be addressed and that local authorities have a good record for treating and disposing of waste from street lighting lamps. In this context another participant stressed the importance of recycling end-of-life lamps.

Other impacts

86. Responses received from two participants discussed additional impacts not directly identified in the consultation document.

- The use of dimming and possibly lower overall lighting levels will have an impact on many animals and ecosystems.
- Lower lighting levels and better controlled luminaries will help to reduce sky glow and light pollution issues from street lighting.
- Potential impacts from residential and motorway street lighting upon crime (and the fear of crime) and safety
- consumer/user resistance to new technologies due to comfort with the known and fear of the unknown.

87. In relation to the potential impacts upon animals, one participant suggested that the impacts of white light has still to be determined and in some cases may have more adverse effects than low pressure sodium lighting. For example, bats among other animals are very sensitive to light and its spectrum and may be adversely affected by the use of white light sources.

Government response

88. The Government agrees that appropriate lamp replacements for existing luminaires would be beneficial. MTP has already raised this point at the consultation forum associated with this current consultation. The manufacturers present claimed that such lamps are available. The Government suggests that if local authorities find that there is no suitable alternative for a particular application, then they apply to the Lighting Industry Federation (possibly via the ILE or CSS) with a request for the necessary lamp(s). If a large enough market is identified, the manufacturers will supply appropriate products.

89. The phrase 'anecdotal evidence' has been removed from the section on the back-log of maintenance.

90. The Government thanks respondents for their comments on waste issues and agrees that street lighting is well recycled in general, and is grateful for the comments made about LEDs.

91. The added risk of white light on animals, and the benefit of reduced sky-glow are recognised and will be addressed in future versions of this paper. The other impacts mentioned above are already included in the document.

General responses

Summary Table for General responses

Key topics raised	Number of comments
Policies should address lighting installations/applications in addition to products	4
Policies should be targeted at users rather than (or in addition to) manufacturers	3
Local authorities (and other users) are key to delivering change	3
Insufficient budget is the key barrier to required upgrading/investment	2
Policies and measures could be extended to include other products and applications	1
More consideration of on and off street light timing (e.g. solar timers) needed	1
Other comments	5

92. Six participants chose to submit general responses in the area of street lighting and traffic signal products in addition to, or as an alternative to, answering specific questions.

93. Several participants stressed that while the policy proposals outlined focused on the product (and often just the lamp efficacy, as reflected in the Appendix performance figures) a better approach would be to consider the efficiency of the lighting installation (scheme) in meeting the required performance standard. Similarly, it was suggested that policies should be output driven and targeted at users rather than simply specifying product standards for manufacturers.

94. Although it was recognised that better products will assist in delivering greater energy performance, it was stressed that a more holistic approach was required

including for example, looking at standards of provision and the education of councillors and local authority engineers to make them aware of the problems and the possible solutions. In this context, the point was repeated by one participant that a major limitation on the potential to reduce energy consumption (and to meet the P1 targets) in road lighting is due to the limited funds available to local authorities.

95. It was noted that there is a considerable advantage in that street lighting is mainly controlled by a limited number of bodies, principally Local Authorities and the Highways Agency. Therefore, it was felt, they should be well placed to specify appropriate requirements that address energy performance, considering lamp life and depreciation, luminaire value, maintenance issues etc as well as lamp energy consumption. If this were done competently the offers received should then be capable of being vetted on a common basis for best value (and energy efficiency). Again, potential barriers such as inadequate funding for stock replacement were noted.

96. One respondent considered that there may be a need for stricter requirements concerning street lighting design and suggested that there could be the need for a scheme for assessing competence and demanding the use of properly qualified designers to sign off a proposal before it is acceptable for submission.

97. Several participants felt that the policies and measures outlined in the consultation document overlooked or omitted key areas. For example, one stakeholder suggested products such as city beautification luminaires and other uses of standard products such as the use of road lighting luminaires on private car parks, railway station platforms etc could be easily and simply incorporated into the programme. Another participant suggested that the consultation document made insufficient reference to the control of street lighting on and off times, and noted that without use of efficient control street lighting energy will continue to be wasted. In this context, attention was drawn to the potential value of solar timers which are now commercially available to the market.

98. The view was expressed by one participant that the document did not reflect that LED street lighting was already advanced in many places in other countries (e.g. Singapore, California) and that the UK was significantly behind; in this context, it was felt that more reference to existing practices worldwide would be of use.

99. Other issues that were considered to be inadequately addressed in the consultation document included:

- Re-assessing where lighting is necessary
- Considering alternative solutions to column lights – for example using low level or in-ground luminaires / LED markers at rural roundabouts or junctions.
- Whether lighting the footways and road margins only is adequate in some built-up areas instead of whole-road lighting (apart from junctions and other hazards)
- "Reverse dimming": under-running lamps initially to compensate for over-lighting to allow for lumen depreciation

Government response

100. The Government agrees that a more holistic approach to energy efficiency would be beneficial. It is feasible that an overall energy efficiency level might be pursued through the Energy Services Directive. The Government would be interested in seeing more details of the CELMA Total Lighting Solution mentioned in one of the responses. The Government also notes the suggestions for metrics mentioned in the responses and will work with trade bodies to develop these ideas. The Government agrees that such a scheme should be output driven i.e. to produce the right amount of light in the right place with minimum energy use. The Government has no intention of imposing prescriptive solutions onto Local Authorities.

101. The Government agrees that good training of street lighting specifiers is important and a number of opportunities are already provided through the ILE, CIBSE, and other bodies. The Government does not believe that it is the role of central Government to mandate such training or the level of formal qualifications that a designer must have; it is part of normal CPD for any professional. The government agrees that it is good and essential practice for a suitably experienced designer to approve any new lighting scheme.

102. A sentence has been added to section 4.1 on the UK lagging other countries in the use of LED street lighting.

103. The Government agrees that the local authorities and Highways Agency have a key role to play in improving the specification of street lighting. The Government is committed to more devolved power and the responsibility for street lighting specification lies at the local level. Defra and the Market Transformation Programme are endeavouring to ensure that local authorities understand the importance of good street lighting design and control and we rely on the valuable support provided by professional and trade bodies in getting these messages across to their members. A section on the use of solar timers and alternative methods of lighting roads has been added to section 4.

4 Next steps

104. The Market Transformation Programme has carefully reviewed the existing evidence and taken into account these stakeholder responses and any new information or data. The original projections for the future performance of street lighting products are being reviewed along with options for the ongoing improvement.

105. The outcome of this process is published in the separate document entitled 'Policy Brief for Street Lighting and Traffic Signals' which provides an update of the baseline information provided in the original Consultation Document. While the formal consultation process has closed, engagement on the standards will continue as part of an annual reviewing and updating process.

Appendix 1 - List of respondents

Malcolm Richards
Colin Humphries, Cambridge University
Eddie Taylor, Lighting Industry Federation (LIF)
Allan Howard, Mouchel
Gareth Pritchard, ASLEC
Dave Coatham, Institute of Lighting Engineers (ILE)
Peter Phillipson, Future Group Lighting Design
Dr Ric Allnott, UK Displays and Lighting KTN
Stephen Payne, Timeguard Ltd