



Better Lighting in Sustainable Streets

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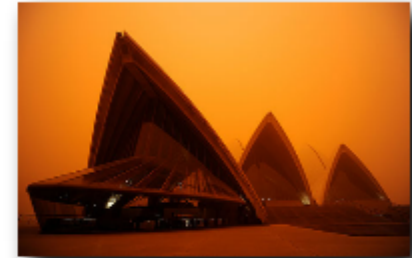
APSE Presentation – Tuesday 7 June 2011

ST. HELENS ★ EINDHOVEN ★ INTERLEUVEN ★ KAISERSLAUTERN



What is BLISS ?

BLISS is a European project to research & test methods to reduce street lighting energy consumption in different real life situations without detriment to crime, anti-social behaviour & road accidents



Why ?

Rising Energy Costs

St. Helens energy consumption
2002 - 548,251 euros
2009 - 1,550,000 euros



Global Climate Change

The need to reduce cost & contribute to European targets of 20% reduction by 2020

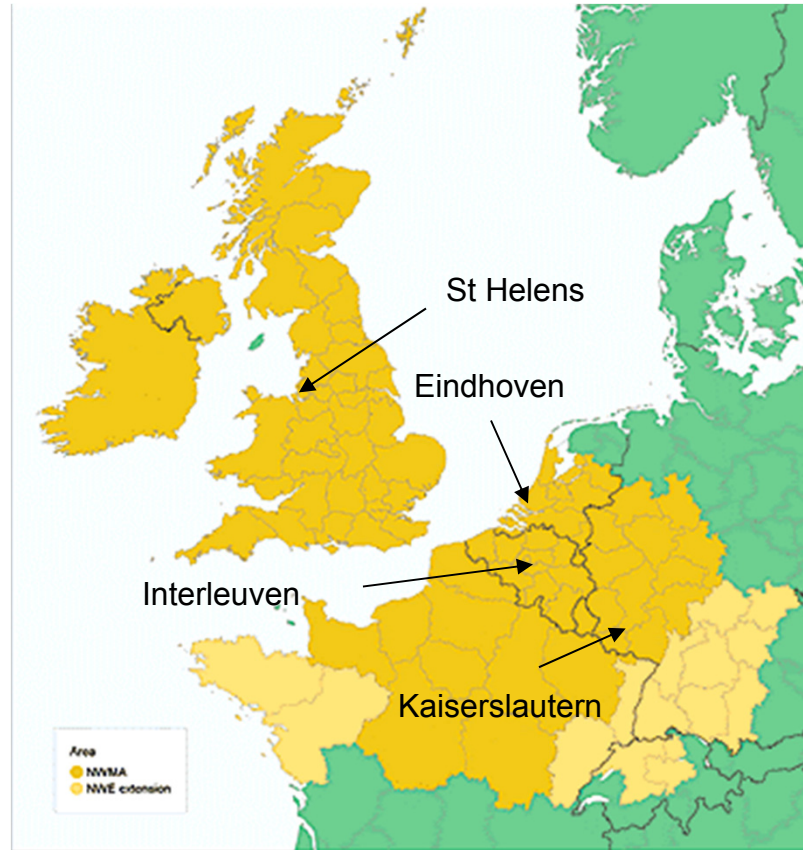


The need to reduce the consumption of unsustainable resources



“Ofgem warned that the UK could start to see a shortage of power plants and gas supplies by 2015 unless the way energy companies operate is overhauled. Huge investment is needed to replace old coal and nuclear plants that will be closing soon, and to meet a target of generating a third of the country's electricity from renewables by 2020. North Sea gas reserves are also dwindling, making the UK more dependent on unreliable imports.”

Guardian 4th February 2010



The BLISS Project

The project is part funded by the European Regional Development Fund through the North West Europe INTERREG IVB Investment Programme.

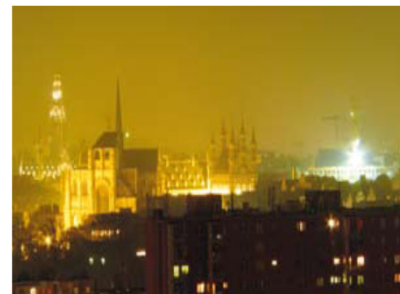
This supports organisations who wish to work with other regions to find solutions to problems that they share, developing North West Europe's knowledge-based economy by capitalising on our capacity for innovation



The Project Partners

The project participants are St Helens in the UK, Eindhoven in the Netherlands, Interleuven in Belgium and Kaiserslautern in Germany.

Together, these four European Authorities intend to reduce street lighting costs and carbon emissions by using existing and emerging cutting edge technologies without compromising on crime, accident or socio-economic factors





Better Lighting in Sustainable Streets

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The Key Aims of the BLISS Project

- To look at ways to reduce energy consumption and reduce CO₂ emissions
- To evaluate the impact on crime, accident and socio economic acceptability
- To produce a Design Guide and Specification of Best Practice



What Are the Project Requirements

- Monitoring existing street lighting installations
- Researching best practice and evaluating new and emerging products within the global market place
- Trialling innovative design solutions & products
- Undertaking pre and post evaluations of lighting levels, crime and accident data
- Monitoring public acceptability to changes in street lighting.
- Raising public awareness of the impacts of climate change.
- Setting a good example of the need to reduce energy and carbon emissions



What We Are Doing

- Installing more energy efficient lanterns and control gear
- Remote monitoring and controls
- Dimming lights at selected times
- Trimming lights – on later, off earlier
- Passive infra-red movement detection to control lights
- Review design standards – to ensure roads are not over-lit
- Analysing road accident and crime data

Assessing Acceptability

- Selected public consultations undertaken by Ipsos MORI through focus groups, interview and canvas



Innovation in Exterior Lighting

New light sources technology:

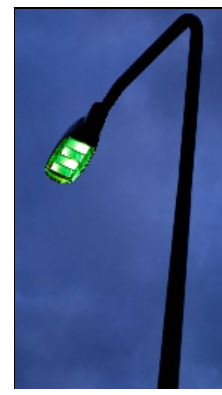
White Light, CPO (Cosmo lamps), LED (Light Emitting Diodes), OLED (Organic Light Emitting Diodes – next generation technology) , Electro-Luminance

Central Management Systems:

Dynamic Lighting Control, Variable lighting levels, Fault logging and pro-active management

Reduction in energy consumed:

Smart Ballast, Energy efficient lamps, Trimming / dimming techniques
Re-evaluation of lighting levels & illuminated signage requirements




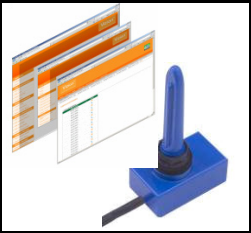





Better Lighting in Sustainable Streets

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Innovation: Control of Street Lighting Systems

	Photocells			Central Management System	Ballasts
	Standard	Part-Night	Dimming		
					
	Trimming & Consumption	Part-Night Operation (to Off)	Part-Night Dimming Operation	Advanced Control Regimes	High Efficiency Ballasts
Savings =	2%	>40%	>20%	40%	13%

Source: Zodion Ltd



2009 Programme

- May 2009 Carried out street lighting scheme in Gaskell Park – Public Open Space
 - Existing 24 No. 70 watt SON-T lanterns, with electro magnetic control gear consumed 90 watts.

Replaced with:-

- 24 No. WRTL Stela luminaires incorporating 36 LEDs. Luminaires rated at 52 watts.
- New luminaires consume 38 watts less energy, i.e. saving over 40%.

Typical Trial Schemes

A pilot installation in a park in St. Helens using LED technology



70w SON installation - 22 lamps
8158kwh consumption = 3508kg Co₂



LED installation - 22 lamps
4643kwh consumption = 1996kg Co₂

40% Saving in energy and Co₂ emissions

Typical Trial Schemes

A pilot installation in a park in St. Helens using LED technology



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LED installation - 22 lamps
4643kwh consumption = 1996kg Co₂

40% Saving in energy and Co₂ emissions



Outcome – Gaskell Park

- LED lighting gives sharper “white” light
- True colours of objects
- Light spillage reduced
- Survey of residents, “Friends” of the park, police, indicates high satisfaction with scheme.
- Original energy consumption 4200 hours x 90 watts ↷ 378 kW hrs.
- Now energy consumption 4200 x 52 watts ↷ 218 kW hrs.
- Saving 40% of energy -160 kW Hrs per column



2009 Residential Pilot Scheme: Mowbray Avenue, Blackbrook



Before

5 No. 80w MBFU (94w) / 70w SON-T (90w) Luminaires

Estimated Annual Energy Consumption – 2,333 KWh

Estimated Annual CO₂ Emissions – 1,260 Kgs



After

6 No. 45w Cosmopolis (51w) Luminaires

Estimated Annual Energy Consumption – 1,260 KWh

Estimated Annual CO₂ Emissions – 680 Kgs

Estimated Annual Energy / CO₂ Saving – 46%



2009 Pilot Scheme: Lenfield Drive, Blackbrook



Before

6 No. 35w SOX (58w) / 70w SON-T (90w) Luminaires

Estimated Annual Energy Consumption – 1,802 KWh

Estimated Annual CO₂ Emissions – 973 Kgs



After

6 No. 18w LED (27w) Luminaires

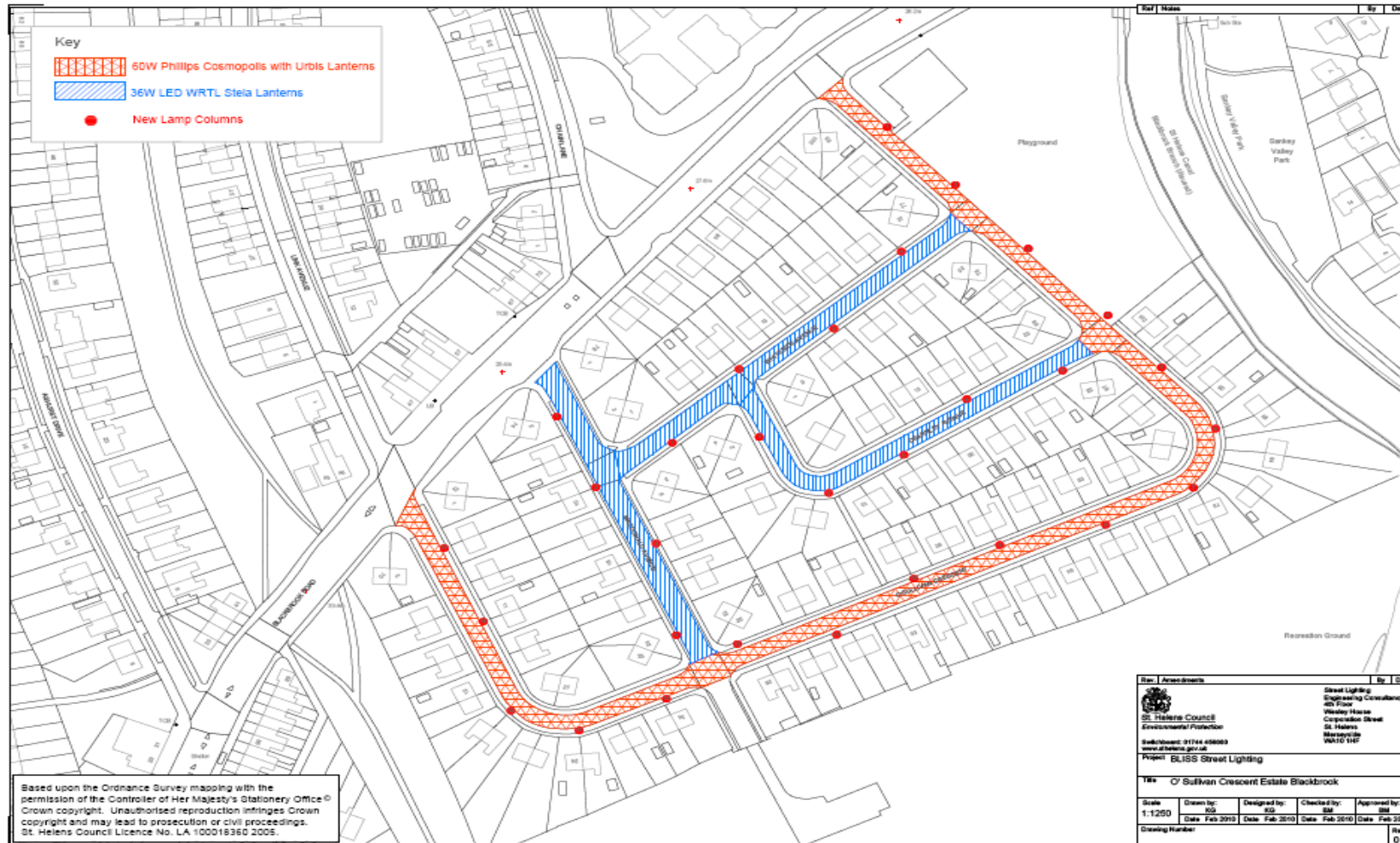
Estimated Annual Energy Consumption – 670 KWh

Estimated Annual CO₂ Emissions – 362 Kgs

Estimated Annual Energy / CO₂ Saving – 63%



O'Sullivan Crescent Estate, Blackbrook





St. Helens Council

Street Lighting Survey



The information provided on this form will be processed in accordance with the requirements of the Data Protection Act 1998. It will be treated as confidential and used only for the purpose of investigating the effectiveness of the street lighting. Please answer this survey whilst outdoors in the street, or have a good look outside before answering.

Address:Postcode:

Date: Time:

Do you agree with these statements, please tick **Yes or No**.

- | | Yes | No |
|---|--------------------------|---|
| 1. It is safe to walk here, alone, during the day. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. It is safe to walk here, alone, at night. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The lighting is comfortable. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The lighting shows up the whole street well. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The lighting lets me see people at a distance clearly. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The lighting is too bright | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The lighting is too dark | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The lighting is uneven (patchy). | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. The lighting is glaring. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The lighting does not show colours properly. | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Using a scale of 1 to 10, please rate how bright the street lighting is (1 = very dark, 10 = very bright). | <input type="text"/> | |
| 12. Using a scale of 1 to 10, please rate how satisfied you are with the lighting (1 = very dissatisfied, 10 = very satisfied). | <input type="text"/> | |
| 13. How does the new street lighting compare with the previous street lighting? Please tick one of the boxes below. The new lighting is:- | | |
| Worse | <input type="checkbox"/> | Slightly worse <input type="checkbox"/> |
| Slightly better | <input type="checkbox"/> | Better <input type="checkbox"/> |
| | | About the same <input type="checkbox"/> |

Any other comments

Thank you for your help with this survey.

Please complete the questionnaire and post back to us (no stamp needed).

thedesignstudio@sthelens.gov.uk 0900984G

Street Lighting Survey Form A



**O' Sullivan Crescent Estate, Blackbrook
Results of Residents' Satisfaction Survey**

	New Lighting	No. of houses	No. of replies	Replied	Brightness Average of scores 1-10		Satisfaction Average of scores 1-10		How does the new street lighting compare with the previous street lighting? The new lighting is:-									
					Before	After	Before	After	Worse	Slightly worse	About the same	Slightly better	Better	Better or slightly better				
O' Sullivan Crescent Estate																		
O'Sullivan Crescent Previously 70W SON/T (15 No.)	60W Cosmopolis (17 No.)	93	23	25%	3.5	7	3	7	2 (9%)	0	3 (13%)	3 (13%)	15 (65%)	18 (78%)				
Dearnley Avenue Previously 70W SON/T (5 No.)	36W LED (5 No.)	28	6	21%	3	5	3	5	0	0	0	3 (50%)	3 (50%)	6 (100%)				
Whiteside Avenue Previously 70W SON/T (4 No.)	36W LED (4 No.)	24	5	21%	4	9	4	9	0	0	1 (20%)	0	4 (80%)	4 (80%)				
MacDonald Avenue Previously 70W SON/E(I) (4 No.)	36W LED (4 No.)	20	7	35%	4	7	3	6	3 (43%)	0	0	0	4 (57%)	4 (57%)				
Overall Totals		165	41	25%	4	7	3	7	5 (12%)	0	4 (10%)	6 (15%)	26 (63%)	32 (78%)				

60W Cosmopolis (Previously 70W SON/T)														
O'Sullivan Crescent		93	23	25%	3.5	7	3	7	2 (9%)	0	3 (13%)	3 (13%)	15 (65%)	18 (78%)
All 36W LED (Previously 70W SON/T)														
Dearnley Avenue, Whiteside Avenue, & MacDonald Avenue		72	18	25%	4	7	3	7	3 (17%)	0	1 (5%)	3 (17%)	11 (61%)	14 (78%)

'After' questionnaires sent out on 28/01/2010. Results as of 01/03/2010

This is a 25% response rate for the estate to the 'After' questionnaires. There was a 46% response rate to the 'Before' questionnaires.



O'Sullivan Crescent Estate, Blackbrook – Summary

Previous energy consumption	10,670 kW Hr.	5,762 kgs CO ₂
New energy consumption	7,481 kW Hr.	4,040 kgs CO ₂
Reduction in energy	3,188 kW Hr.	1,722 kgs CO₂

30% savings in energy and CO₂

46% response to the “before” questions

25% response (to date) to the “after” questions

78% said that 60W Cosmopolis better than 70W SON-T

78% said that Stela 36W LED better than 70W SON-T



Conclusions from 2009 Pilot Schemes

- Significant energy and carbon savings (30% - 63%) can be made
- 46% public response to 'before' and 25% response to 'after' questions
- Concerns with "cut-off" from LED lanterns
- 78% preferred new "white" lighting
- Initial stakeholder research confirmed that improved street lighting contributed to the perception of safety and comfort as well as safe movement of pedestrians and cyclists at night





2010 - 2012 Investment Programme

The partners are undertaking a diverse investment programme over a three year period to create a system of highly efficient low energy public lighting solutions:

St Helens Council (GBR): Undertaking a range of energy efficient lighting installations to replace existing inefficient lighting - from main strategic routes to open space installations

2010 Programme:-

20 Schemes, 108 Streets, and public consultation involving focus groups on 3 schemes

Eindhoven (NLD): Specialising in dynamic LED lighting design solutions within a large industrial development site that is being transformed into a vibrant residential and commercial centre

Kaiserslautern (DEU): Introduction of innovative lighting from a renewable energy source in the heart of the city centre

Interleuven (BEL): Construction of sustainable lighting schemes utilising cutting edge technology within various residential and commercial areas



Lighting Before

- SOX and SON lanterns
 - Estimated annual energy consumption **10,012 KWH**
- Estimated annual CO₂ emissions **5,406 Kgs**

Lighting After

- 96W 80 LED Philips SpeedStar GreenLine lanterns
 - Estimated annual energy consumption **7,885 KWH**
- Estimated annual CO₂ emissions **4,258 Kgs**

36%
CO₂ & KWH
saving with
dimming

Tithebarn Road, Garswood

New scheme – Dimming 66% of full light
Output between 24:00 and 6:00





Conclusions from Tithebarn Road Joint Venture

- Initial Estimated Annual Energy saving of 2,121 KWh
- Initial Estimated Annual carbon saving of 1145 Kgs
- **Initial Estimated Annual Energy / CO2 Saving – 21%**
- Improved light distribution and uniformity
- Reduction in light pollution and glare
- Initial stakeholder consultation confirmed new installation contributed to the perception of safety and comfort as well as limiting light spillage





Better Lighting in Sustainable Streets



ST.HELENS ★ EINDHOVEN ★ INTERLEUVEN ★ KAISERSLAUTERN

Ipsos MORI Consultation

What do road users think of the new lighting – is it comfortable?
Is it better than the previous lighting?

117 Interviews

Qualitative Proposition

117 In-home and on-street interviews with users of the road after dark including commuters on nearby industrial estate

Rationale

- Feed into the decision as to whether to replicate this lighting in other parts of the borough so results must be robust
- Objectives are straight forward and do not warrant the probing of opinion

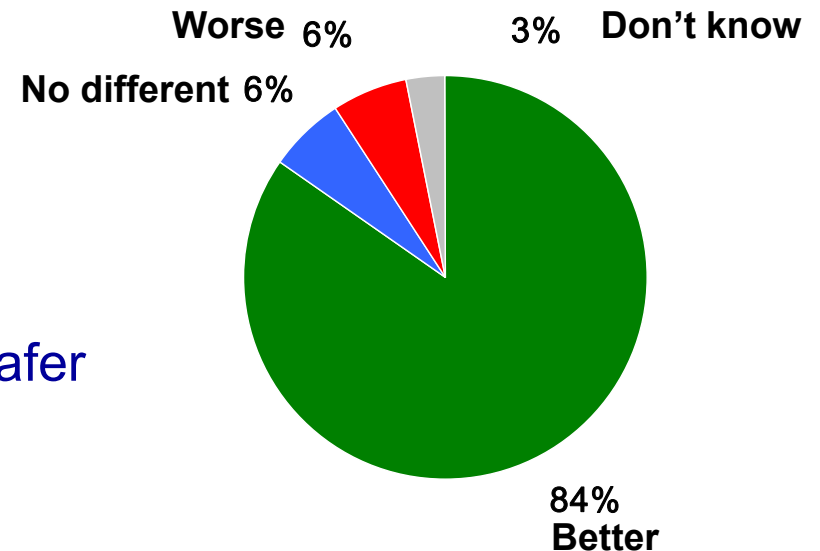


Results & conclusion

Philips SpeedStar 80 LED GreenLine LED lanterns 96W

117 interviews:

- 88% Drivers
- 58% Aware there was a change in lighting
- 66% Brighter
- 84% Believe the lighting is better
- 81% Believe the lighting makes the road safer

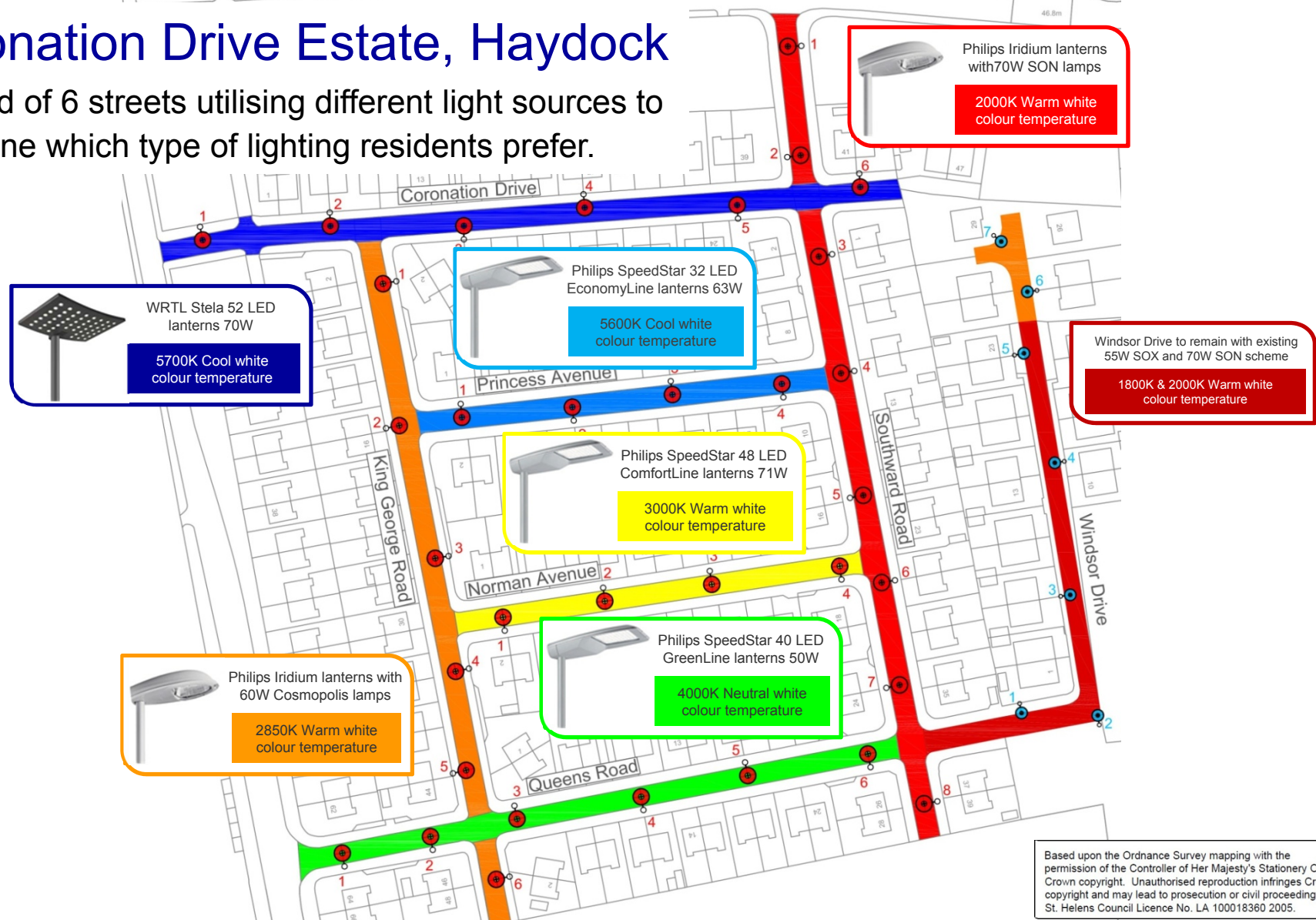


Coverage, vision & comfort score highly, around $\frac{3}{4}$ state they are satisfied with each element



Coronation Drive Estate, Haydock

Test bed of 6 streets utilising different light sources to determine which type of lighting residents prefer.



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Lighting before

41 No. 35W SOX,
1 No. 70W SON lanterns

Estimated annual energy consumption

10,282 KWH

Estimated annual CO2 emissions

5,551 Kgs



Lighting after

20 No. LED lanterns,
6 No. 60W CPO,
8 No. 70W SON

Estimated annual energy consumption

9,308 KWH

Estimated annual CO2 emissions

5,028 Kgs

**9%
CO2 &
KWH
saving**

Coronation Drive Estate - Haydock

April - November 2010

Residential		No.	No.	Accident	Crime RASCAR			Properties	Estimated		Estimated Annual			Correlated Colour		Colour	
Coronation Drive Estate - Haydock		old	new	Data	Data - Before			to survey	Annual Consumption		CO2 Production		%	Temperature CCT		Ir	
		lamps	lamps	'07 to '10	Dark - Lights lit			(Delivered	KWH		(0.54 Kgs per KWH)		Savings	Kelvin (K)		C	
Existing Lighting	New Lighting	+cols.	+cols.	(23/07/10)	2008	2009	2010	12/05/10)	Before	After	Before	After		Before	After	Before	
							to July										
1 Coronation Drive														800K Warm White		~5	Outdoors
7 lanterns 35W SOX, con.	WRTL Stela 52 LED, 70W	8	6	0	2	5	1	34	2064.39	1726.45	1114.77	932.28	16%	35W SOX	5700K Cool White		
1 lantern 70W SON/T, steel	5700K Cool White				(4)	(8)	(4)							2000K Warm White	70W Stela 52 LED	20-39	Outdoors
	All steel columns													70W SON/T			
2 Princess Avenue														800K Warm White	5500K Cool White	~5	Outdoors
4 lanterns 35W SOX, con.	Philips SpeedStar 32 LED,	4	4	0	3	1	0	24	966.65	1036.28	521.99	559.59	-7%	35W SOX	63W Econo.Line LED		
	63W EconomyLine (DX)				(3)	(2)	(0)										
	All steel columns																
3 Norman Avenue														800K Warm White	3000K Warm White	~5	Outdoors
4 lanterns 35W SOX, con.	Philips SpeedStar 48 LED,	4	4	0	6	1	0	24	966.65	1168.38	521.99	630.92	-17%	35W SOX	LED		
	71W ComfortLine (DW)				(6)	(5)	(3)										
	All steel columns																
4 Queens Road														800K Warm White	4000K Neutral White	~5	Outdoors
6 lanterns 35W SOX, con.	Philips SpeedStar 40 LED,	6	6	0	9	1	1	24	1449.98	1234.94	782.98	666.86	18%	35W SOX	50W GreenLine LED		
	50W GreenLine (DX)				(13)	(3)	(1)										
	All steel columns																
5 King George Road														800K Warm White	2600-2850K Warm W.	~5	Outdoors
9 lanterns 35W SOX, con.	Philips Iridium 60W Cosmo.	9	6	0	3	1	1	24	2175.97	1628.16	1175.02	879.2	25%	35W SOX	60W Cosmopolis		
	All steel columns				(5)	(4)	(1)										
6 Southward Road														800K Warm White	2000K Warm White	~5	Outdoors
11 lanterns 35W SOX, con.	Philips Iridium 70W SON/T	11	8	0	4	2	1	34	2658.3	2564	1435.48	1384	4%	35W SOX	70W SON/T		
	All steel columns				(6)	(3)	(2)										
7 Windsor Drive														800K Warm White	800K Warm White	~5	Outdoors
5 lanterns 35W SOX, con.	Keep existing scheme	(7)	-	0	2	0	0	24	(1953.79)	-	(1055.04)	-	-	35W SOX	35W SOX		
2 lanterns 70W SON/T, steel					(4)	(1)	(0)							2000K Warm White	2000K Warm White	20-39	Outdoors
														70W SON/T	70W SON/T		
Totals		42	34	0	29	11	4	188	10281.94	9308.02	5551.37	5027.7	9%				
					(41)	(26)	(11)		KWH	KWH	Kgs	Kgs					

No traffic count - Residential Estate

Priority scheme, Philips pilot scheme - For use in presentations as a white light trial scheme including public consultation by Ipsos MORI 2010

Ipsos MORI Consultation

Which lighting is preferred? How does the lighting affect the feeling of the neighbourhood and perceptions of safety?

Residential Focus Group

Qualitative Proposition

Two 'walkabout' focus groups – one recruited from the estate and one from the neighbouring estate (18 total)

Stage 1 – Initial thoughts

Stage 2 – Facial recognition

Stage 3 – Colour recognition

Stage 4 – Scoring

All stages done in situ



Professional Focus Group

Qualitative Proposition

One 'walkabout' focus group – 17 local professionals recruited, technical and non-technical

Part 1 – Initial thoughts & scoring

Part 2 – Visual acuity tests:

- Facial recognition
- Colour recognition
- Obstacle recognition

All stages done in situ





Testing Colour Recognition

Participants were asked to recognise colours on an underground map when standing between two light columns for different lighting.



	Red	Yellow	Green	Blue
King George Rd	✓	✓	✓	✓
Coronation Drive	✓	✓	✓	✓
Princess Avenue	✓	✓	✓	✓
Norman Avenue	✓	✓	✓	✓
Southward Road	✓	✓	X	X
Queens Road			X	X
Windsor Drive	X	X	X	X





Testing Facial Recognition



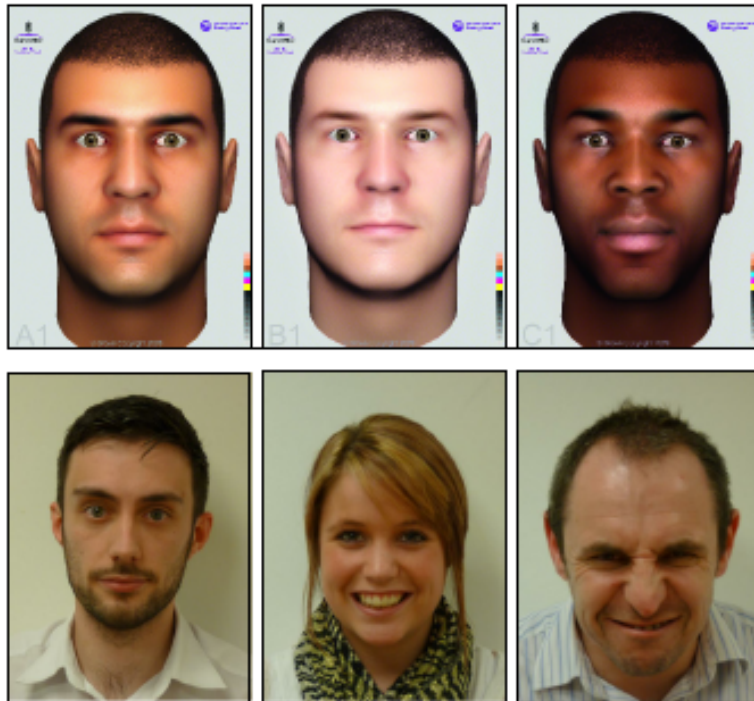
Participants were asked to recognise a photo of the Queen from the opposite side of the road.



Revised visual acuity tests – Professional group

Developed with Eindhoven University for combined colour and facial recognition testing and including obstacle recognition

Testing Facial Recognition



Participants were asked to identify:

- 3 demographic categories
- 3 facial expressions
- & distinguish features from 4m away



Testing Colour & Obstacle Recognition

1	2	3	4
5	6	7	8
9	10	11	12

Colour recognition

- Asked to recognise colours from 6m away when standing between two light columns



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A E I
 R O M
 N P S
 D F L
 K B W
 V C X
 Q T Y
 U Z G
 H A E
 R P L

Obstacle recognition

- Read a Snellen chart from 6m away
- To identify which point they could see an obstacle on pavement from 30m



Initial thoughts & perceptions of new lighting

Residents' Focus Group

Very good vision. Very safe. Best street so far.
(60W CPO lamps)

Burglars paradise
(70W SON lamps)

Very bright, can see everything. Safe!
(SpeedStar Eco LED)

Very bright on pavement. Very safe
(Stela LED)



Professional Focus Group

Not impressed.
Uniformity very poor.
Zebra effect. *Engineer*
(60W CPO lamps)

Adequate, friendly
Consultant
(70W SON lamps)

Poor, uninviting, cut-off,
too severe. *Consultant*
(SpeedStar Eco LED)

Cold. Car park lighting.
Neighbourhood Manager
(Stela LED)

Ranking of preferred lighting

Residents' Focus Group

1. Philips Iridium lanterns with
60W Cosmopolis lamps 2850K
King George Road 9 votes
2. WRTL Stela **LED lanterns 74W 5700K**
Coronation Drive 7 votes
3. Philips SpeedStar EconomyLine
LED lanterns 63W 5600K
Princess Avenue 2 votes

Southward Road - **70W SON/T lamps 2000K**
unanimously considered to have the worst
lighting

SON is considered out of date and inefficient

Creating a safe environment is key



Professional Focus Group

1. Philips SpeedStar ComfortLine
LED lanterns 71W 3000K
Norman Avenue 4.5 votes
2. Philips Iridium lanterns with
70W SON/T lamps 2000K
Southward Road 3 votes
3. WRTL Stela **LED lanterns 74W 5700K**
Coronation Drive 2.5 votes
4. Philips SpeedStar GreenLine
LED lanterns 47W 4000K
Queens Road 2 votes
5. Philips Iridium lanterns with
60W Cosmopolis lamps 2850K
King George Road 1.5 votes
6. Philips SpeedStar EconomyLine
LED lanterns 63W 5600K
Princess Avenue 0.5 votes

Conclusion

Residential Focus Group prefer the **60W Cosmopolis lamp**



Professional Focus Group prefer the **SpeedStar ComfortLine LED lanterns**





Broad Oak Area – Dimming scheme

Scheme to reduce 97no. conventional 70W SON lamps to 50W SON with additional dimming

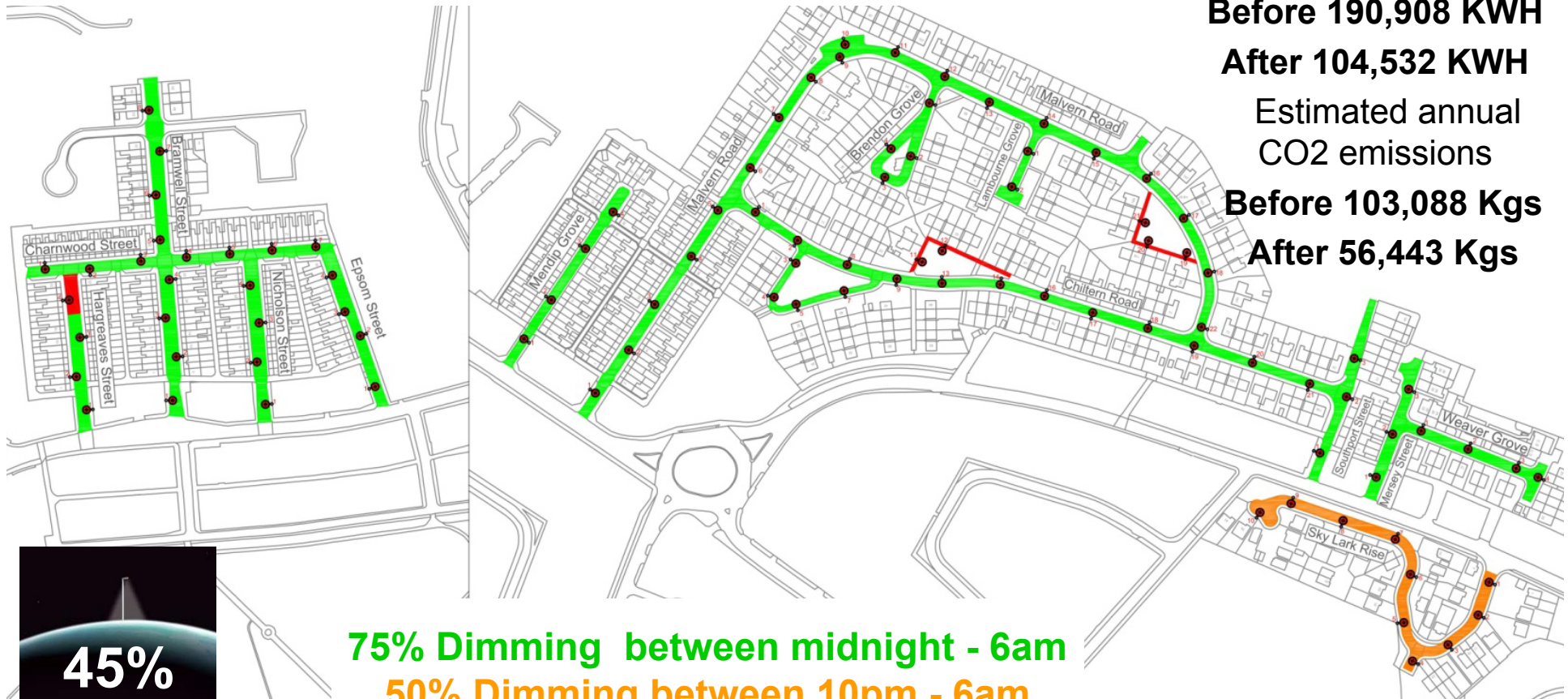
Lighting

Estimated annual energy consumption
Before 190,908 KWH

After 104,532 KWH

Estimated annual CO2 emissions
Before 103,088 Kgs

After 56,443 Kgs



45%
CO2 & KWH
saving

75% Dimming between midnight - 6am

50% Dimming between 10pm - 6am

100% No dimming applied to lamp

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Ipsos MORI Consultation

Is there a noticeable difference in perceived quality of light among residents?

600 Postal surveys Quantitative Proposition

600 Self completion postal surveys to residents who were not informed about the works. Half to receive the survey prior to the work, half to receive the survey after the work is completed. Is there a difference in perceptions?

Rationale

- To identify differences in response need statistically reliable data
- There is no probing of opinion required, however, there is an option for residents to sign up for further qualitative research if results appear 'surprising'



Results & conclusion

Urbis lanterns with 50W SON lamps and dimming

600 postal surveys:

Good street lighting is considered important in relation to safety

Noticeable differences in quality of lighting after reduction.
 Net agreement significantly lower with reference to:



- There being enough street lights – Before 73% After 58%
- The neighbourhood being evenly lit – Before 70% After 50%
- Being able to see objects at a distance – Before 56% After 35%
- The front of the house being adequately lit – Before 75% After 58%



Feeling **‘very unsafe’** increased from **10%** before to **21%** after works

Ipsos MORI Consultation – Broad Oak revisited 2011

Why did the satisfaction fall so significantly?

Residents' Focus Group

Qualitative Proposition

A residents' focus group formed from those who completed the postal survey. 8 participants attended for a 90 minute discussion following a topic guide.

Rationale

- To get a clearer understanding of the reasons behind their change in perceptions.
- The residents will be informed of the changes with possible cause and effect scenarios occurring



Results & conclusion

Urbis lanterns with 50W SON lamps and dimming

Residents' Focus Group:

- 6 of 8 had not noticed a difference
- Respondents did not see any benefits
- Once told, the reduction was deemed irresponsibly by Council
- Environmental argument did not strike accord with participants
- Reassurance needed about crime & benefits must be publicised

If we are suffering, what is in it for us?

A thieves paradise

Kids think they can get away with things when lights are darker

It takes a lot longer for it to brighten up

Who benefits from the money anyway, it never gets passed on



Rainhill & Marshalls Cross Areas – Dimming schemes

Rainhill lighting White light

Before 135no. 70W SON lamps
After 135no. **50W CDO-TT** lamps
with dimming

Estimated annual energy consumption

Before 50,315 KWH

After 27,660 KWH

Estimated annual CO2 emissions

Before 27,170 Kgs

After 14,935 Kgs

Marshalls Cross lighting Conventional SON

Before 81no. 70W SON lamps
After 81no. **50W SON** lamps
with dimming

Estimated annual energy consumption

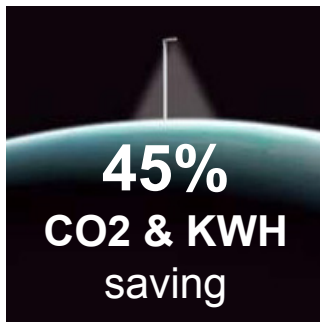
Before 30,191 KWH

After 16,378 KWH

Estimated annual CO2 emissions

Before 16,303 Kgs

After 8,844 Kgs



75% Dimming between midnight - 6am
50% Dimming between 10pm - 6am
100% No dimming applied to lamp





Better Lighting in Sustainable Streets

BLISS

Rainhill lighting before



Rainhill Lighting after



45%
CO₂ & KWH
saving

Ipsos MORI Consultation

Why did the satisfaction fall so significantly in Broad Oak?

Did the change to white light in Rainhill have an effect on satisfaction?

1003 Postal surveys Quantitative Proposition

Self completion postal surveys were sent to 602 properties in Rainhill and 401 in Marshalls Cross, before and after the works. Residents were fully informed about what was proposed. Is there a difference in perceptions?

Rationale

- The pre works questionnaire is same as Broad oak to enable comparison of respondent profiles and their neighbourhood perceptions.



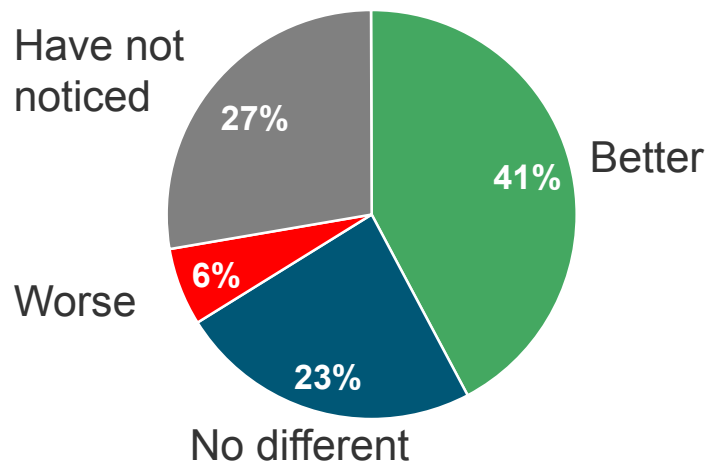
- There is no probing of opinion. However, the post works questionnaire is amended to ask what changes had been noticed as a result of the works.

Results & conclusion

Rainhill – 50W CDO-TT white light

602 postal surveys:

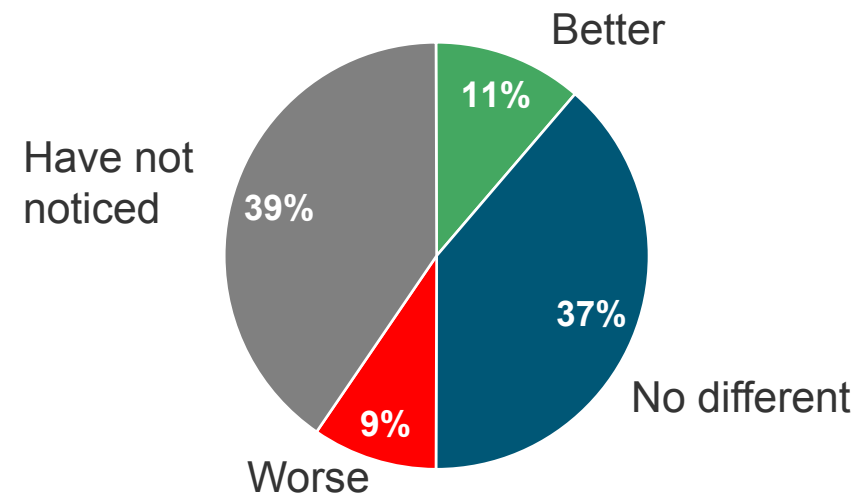
- Almost half not noticed colour change
- Results remained consistent
- 58% Lighting is an improvement
- 33% Believe lighting is brighter
- **84% Satisfied with new lighting**



Marshalls Cross – 50W

401 postal surveys:

- 76% Stated there was no difference
- Net satisfaction **fell significantly**
- 11% Lighting is an improvement
- **1%** Believe lighting is brighter
- **45% Satisfied with new lighting**





St Helens 2011 Investment Programme Preview

- A focus on lighting control & emerging technology looking at high crime areas
- 30 proposed schemes
- 125+ streets
- % potential energy and carbon saving
- Public consultation on 9 case study schemes



Summary of 2011 Investment Programme

Investment Area 1 - Strategic Routes:

- 3 sites: A570 / A580 250w lantern retro fits

Investment Area 2: Primary & Secondary Distributor Routes

- 8 sites: Rural / Urban / Town Centre - 8 / 10m LED, CPO & SON with option to Control & Monitor

Investment Area 3: Residential Areas:

- 24 sites: Medium / High crime risk – 6m LED, CPO & SON with Control & Monitor

Investment Area 3: Residential Areas: (Cyclic Maintenance Smart Ballast retro fit)

- 5 sites: Low / medium / High crime risk – retro fit 50w SONT part night dim ballast to replace existing 70w SONT installation

Investment Area 4: Commercial / Industrial Centres:

- 5 sites: Medium / High crime risk – 8m / 10m LED with Control & Monitor

Investment Area 5: Car Park & Open Spaces:

- 4 sites: Dynamic Motion Detection Control and Monitor Systems

Westminster Drive Estate - Haydock

LED trials

Residential		No. old lamps	No. new lamps	Accident Data '07 to '10 (23/07/10)	Crime RASCAR Data - Before			Properties to survey (Delivered 13/05/10)	Estimated Annual Consumption KWH		Estimated Annual CO2 Production (0.54 Kgs per KWH)		% Savings	Correlated Colour Temperature CCT Kelvin (K)		Colour In	
					Dark - Lights lit	2008	2009		2010	Before	After	Before		After	Before		After
Westminster Drive Estate - Haydock		+cols.	+cols.														
Existing Lighting	New Lighting																
1 Westminster Drive																	
8 lanterns 55W SOX, con. 4 lanterns 70W SON/T, 1 steel, 3 concrete	Philips Fortimo 62W LED lanterns	12	13	1 Dark	6 (10)	10 (11)	0 (0)	52	3749.28	3314.61	2024.65	1789.84	12%	1800K Warm White 55W SOX 2000K Warm White 70W SON/T	5000K Cool white 62W LED	-5 20-39	Outdoors
2 Fountains Avenue																	
4 lanterns 55W SOX, con. 1 lantern 70W SON/T, steel	Urbis Claro 51W 42 LED lanterns	5	6	0	2 (3)	1 (2)	0 (1)	23	1541.73	1259.52	832.54	680.1	18%	1800K Warm White 55W SOX 2000K Warm White 70W SON/T	3500K Warm white 51W LED	-5 20-39	Outdoors
3 Buckfast Avenue																	
All lanterns 55W SOX, con.	EON Marlin 1000 65W 66 LED lanterns	10	10	0	0 (0)	0 (0)	0 (0)	52	2922.5	2713.6	1578.15	1465.3	7%	1800K Warm White 55W SOX	6000K Cool white 65W LED	-5	Outdoors
4 Woburn Close																	
2 lanterns 55W SOX, con.	Thorn Dyana 45W 36 LED lanterns	2	3	0	0 (0)	0 (0)	0 (0)	15	584.5	556.02	315.63	300.24	5%	1800K Warm White 55W SOX	4200K Neutral white 45W LED	-5	Outdoors
5 St. Albans Close																	
2 lanterns 55W SOX, con.	Kingfisher LED-in 46W 48 LED lanterns	2	3	0	1 (1)	0 (0)	0 (0)	15	584.5	568.32	315.63	306.87	3%	1800K Warm White 55W SOX	6000K Cool white 46W LED	-5	Outdoors
6 Abbey Way North																	
2 lanterns 55W SOX, con. 1 lantern 70W SON/T, steel	LED Roadway 43W 48 LED lanterns	3	3	0	0 (2)	0 (0)	0 (0)	1	943.52	543.72	509.51	293.58	42%	1800K Warm White 55W SOX 2000K Warm White 70W SON/T	5000K Cool white 43W LED	-5 20-39	Outdoors
7 Abbey Way South																	
2 lanterns 55W SOX, con.	WE-EF RFL530 68W 24 LED lanterns	2	3	0	1 (1)	0 (0)	0 (0)	0	567.7	838.65	306.56	452.85	-32%	1800K Warm White 55W SOX	3000K Warm white 68W LED	-5	Outdoors
		36	41	1 Dark	10 (17)	11 (13)	0 (1)	158	10893.74	9794.44	5882.67	5288.99	10%				

Scheme for use in conjunction with Coronation Drive Estate scheme 2010 in Ipsos MORI research

No traffic count - Residential Estate



Early Outcomes

- UK is leading Europe
- No “one size fits all”
- LEDs not the universal panacea. At present high capital cost negates energy cost savings. Reliability unknown but lifetimes could be 30 years
- Age & stock condition a key issue in decision making
- Simple retro fit interventions may deliver optimum cost/benefit.
- High potential for savings.
- 70w SON (pink light) reduced to 50w with modern control could save £450 per lantern over 30 years for minimal investment. Colour affects community acceptance. further trials with CDO (white light) retrofit are planned
- Community involvement leading to democratic design.



The Interreg Programme Experience

Good Points - A continuing source of co-finance
A good cross-learning process and a fertile source of innovation
Street community tests developed by Eindhoven University
Reputational building
Different design standards and ways to deliver street lighting

And The Not So Good -

Bureaucratic at times
The lead is responsible for partners and all finance claims
Do not define investments too clearly at application stage
The project will develop





- If “Invest to Save” is applied to all street lighting installations, the energy costs could reduce by 40% (£520,000 for St Helens)
- Potential carbon savings of £31-41,000 as £/tonne rises
- Payback for simplest lighting modification is 6 years
- More control and dimming increase savings