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Scotland's Street Lighting Energy Efficiency Programme

Lindsay McGregor and Toby Tucker
31st August 2016



SFT's Mission

'to improve the efficiency and effectiveness of infrastructure investment in Scotland by working collaboratively with public bodies and industry, leading to better value for money and ultimately improved public services'.



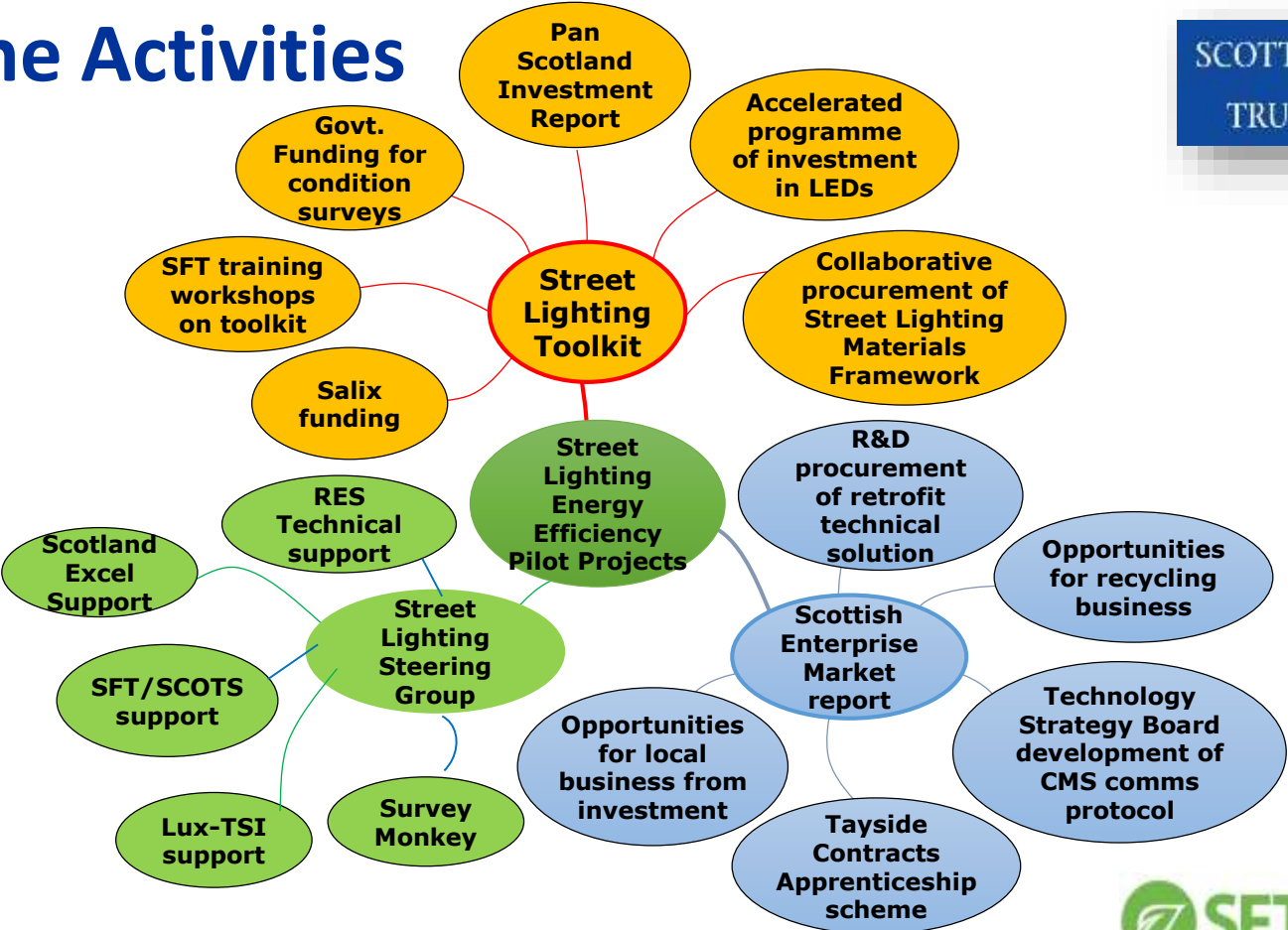
Low Carbon Work Streams

- **Low Carbon Infrastructure Transition Programme (LCITP)**
- **Street Lighting**
- **Non Domestic Energy Efficiency**
- **District Heating**

Street Lighting Energy Efficiency Programme - Steering Group



Programme Activities



Funding Partners

SFT has worked with Salix over the past 3 years to support pilot LED street lighting programmes

- ✓ Scotland is **leading the UK** in it's adoption of energy efficient LED street lighting
- ✓ Salix have worked with **22 Scottish Councils**
- ✓ Nearly **£10m** of funding allocated to Street lighting
- ✓ **36,000** lanterns replaced
- ✓ Over **£1.6m** saved annually
- ✓ **7,000 tCO₂** annual savings
- ✓ **£31m** lifetime savings
- ✓ **134,700 tCO₂** lifetime savings
- ✓ Employment

SALIX

SOLVING ENERGY EFFICIENCY FINANCE IN THE PUBLIC SECTOR

Organisation which have benefited from Salix Interest free energy efficiency loans

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Aberdeen City Council	Edinburgh Napier University	Reid Keir College
Aberdeenshire Council	Edinburgh University	Robert Gordon University
Aberdeen University	Elmwood College	Scottish Agricultural College
Abertay University	Falkirk Council	Scottish Borders Council
Angus Council	Glasgow Life	Shetland Islands Council
Argyll and Bute Council	Glasgow School of Art	South Ayrshire Council
Barony College	Glasgow University	South Lanarkshire Council
Clydebank College	Heriot-Watt University	St Andrews University
Dumfries & Galloway Council	Langside College	Stirling Council
Dundee City Council	Midlothian Council	Stirling University
Dundee College	North Ayrshire Council	Strathclyde University
East Ayrshire Council	North Lanarkshire Council	University of Dundee
East Dunbartonshire Council	Oatridge College	
East Lothian Council	Orkney Islands Council	
East Renfrewshire Council	Perth and Kinross Council	
Edinburgh City Council	Perth College	
Edinburgh Leisure	Queen Margaret University	



Accrued and Projected Programme Benefits



10,000 LED Street Lights
(April 14)



Accumulative Savings

£7m

24,500 tCO₂e



131,000 LED Street Lights
(April 16)

2016-2021



£255m



Annual
Savings

£21m

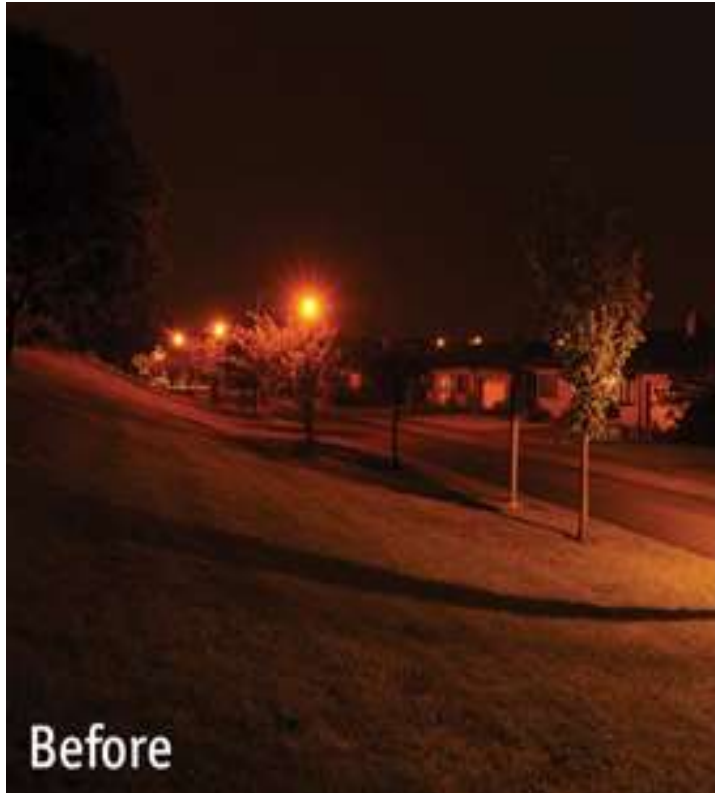
106,354 tCO₂e

Accumulative
20 Years Savings

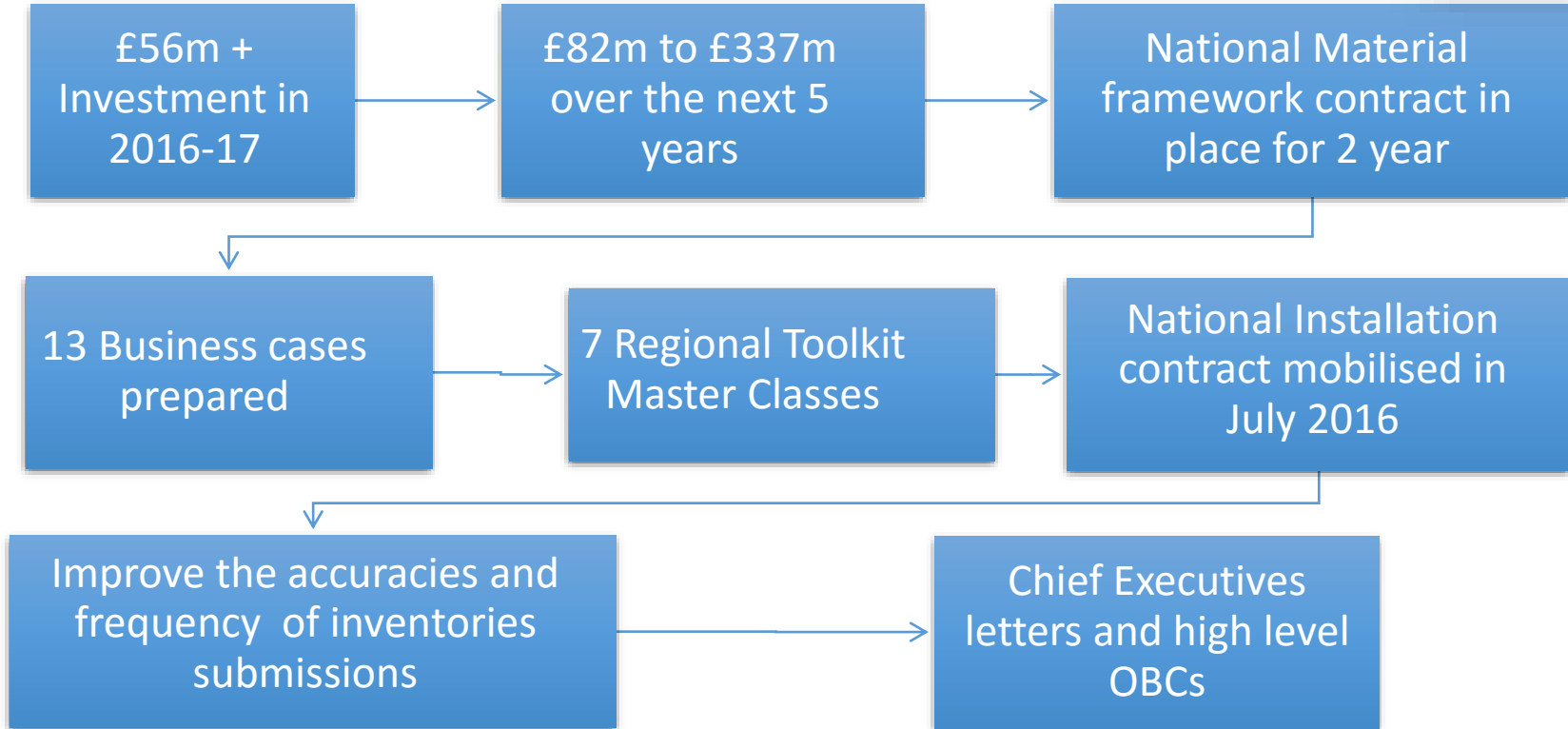
£1.2b

2.623m tCO₂e

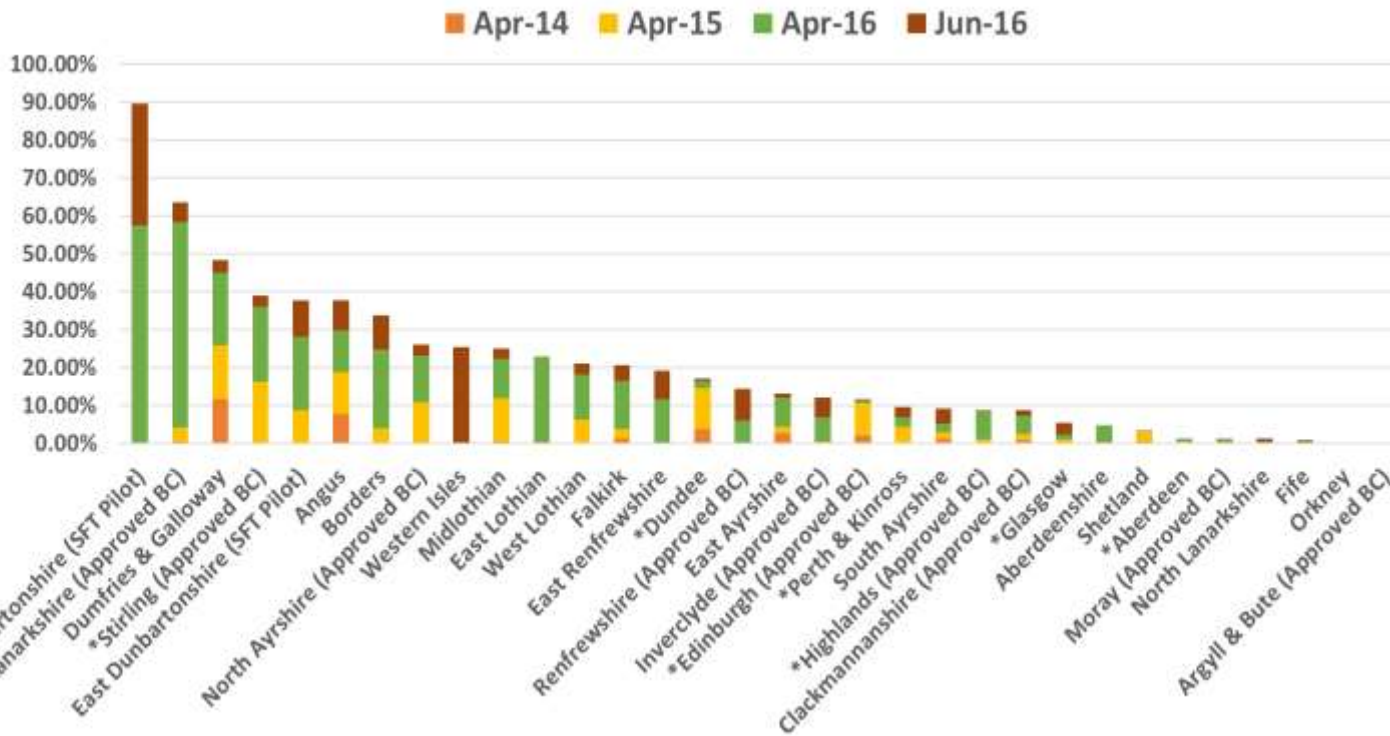
West Dunbartonshire Council LED Trial



Where are we now ?



Percentage of Lighting Stock converted to LED



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SCOTS



SP ENERGY
NETWORKS



Scotland's Street Lighting Programme

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The Chartered Institution of
Highways & Transportation



WINNER
Sustainability

Street Lighting Energy Efficiency Toolkit

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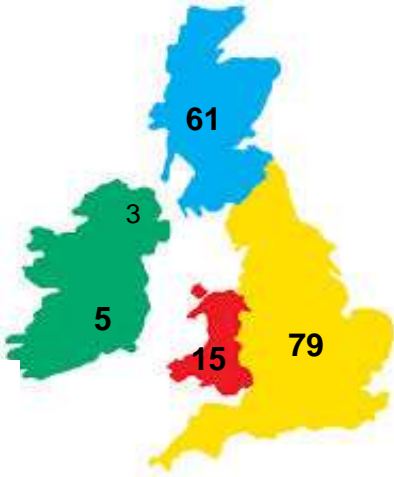
Street Lighting Energy Efficiency Toolkit Launch

16th February 2015

What's been happening in the last 18 months?



 Department of Energy & Climate Change



AROUND the WORLD



Over 200 Free download requests

What the Toolkit can do ?



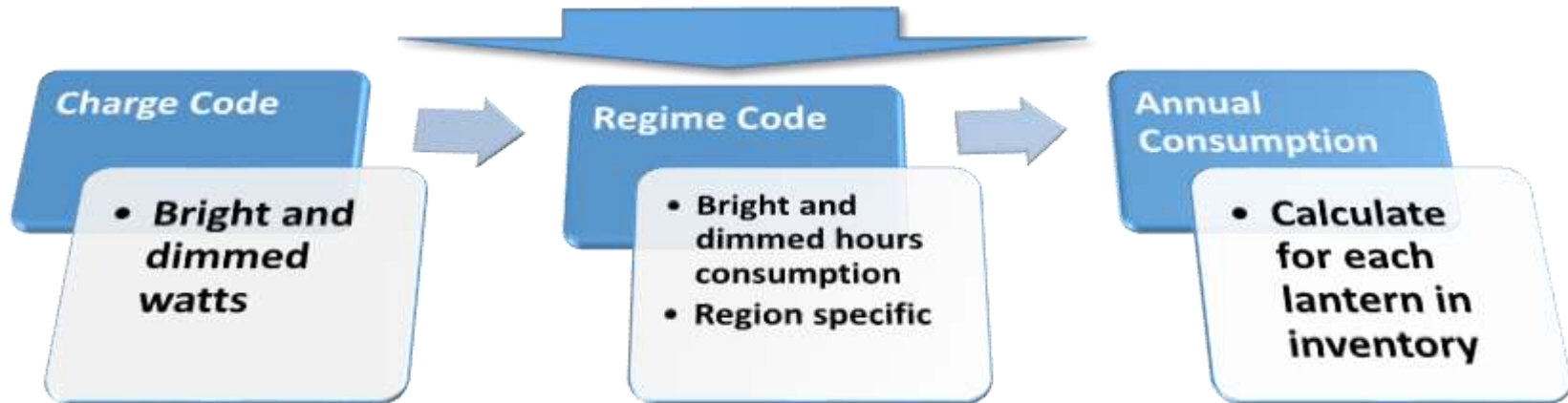
- ☀️ **Regime and Charge Codes** used to calculate consumption figures
- ☀️ Toolkit allows for **different Technical solutions** to be run, **compared and optimised**
- ☀️ Technical model will include **up to date** equipment **information** from the recent Scotland **excel material contract**
- ☀️ Costs for complete **column replacement, sleeving and gear Tray conversion** options have been included.
- ☀️ Financial model allows **phased technical solutions** and investment over a number of years

Typical inventory supplied to Host Electricity Company

Regime Code	Charge Code	No. Items	Charge Code Description	Manufacturers Description	Regime Code Description
808	1100351000100	32	Low Pressu Standard		Electronic PEC 35/18
808	1100352000100	138	Low Pressu Low Loss		Electronic PEC 35/18
808	1100551000100	6,367	Low Pressu Standard		Electronic PEC 35/18
808	1100552000100	9,312	Low Pressu Low Loss		Electronic PEC 35/18
808	1100902000100	3,240	Low Pressu Low Loss		Electronic PEC 35/18
808	1101352000100	1,724	Low Pressu Low Loss		Electronic PEC 35/18
808	1400701000100	4,764	High Pressu Standard		Electronic PEC 35/18
808	1400702000100	50	High Pressu Low Loss		Electronic PEC 35/18
808	1400705000100	123	High Pressu Zodion ZEBA 70		Electronic PEC 35/18
808	1401001000100	116	High Pressu Standard		Electronic PEC 35/18
808	1401501000100	424	High Pressu Standard		Electronic PEC 35/18
808	1401502000100	5	High Pressu Low Loss		Electronic PEC 35/18
808	1401505000100	55	High Pressu V150SSB255V150SSC255 150W Ballast		Electronic PEC 35/18
808	1402501000100	1,695	High Pressu Standard		Electronic PEC 35/18
808	1402502000100	555	High Pressu Low Loss		Electronic PEC 35/18
808	1402505000100	3,000	High Pressu JW-12-035 250WHPS		Electronic PEC 35/18
808	1404001000100	110	High Pressu Standard		Electronic PEC 35/18
808	2800455000100	91	Cosmopolis HID-PV 45/S CPO White		Electronic PEC 35/18
808	2800605000100	262	Cosmopolis HID-PV 60/S CPO White		Electronic PEC 35/18

The key calculation

Data from Elexon



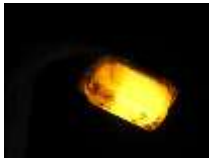
ANNUAL COST

$$(W \times \text{hours} = \text{kWh}) \times p/\text{kWh} = \text{£}$$

Example Replacement

SOX Lantern LED Equivalent Lantern

135w	→	60w
90w	→	45w
55w	→	24w
35w	→	18w



SON Lantern LED Equivalent

400w	→	180w
250w	→	100w
150w	→	69w
100w	→	40w
70w	→	35w



Fluorescent Lanterns LED Equivalent

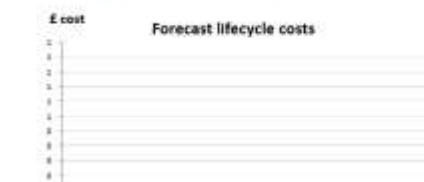
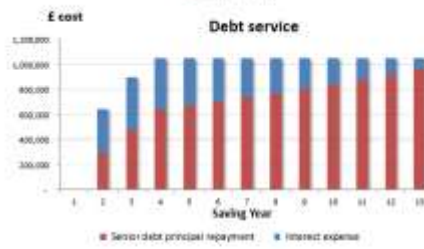
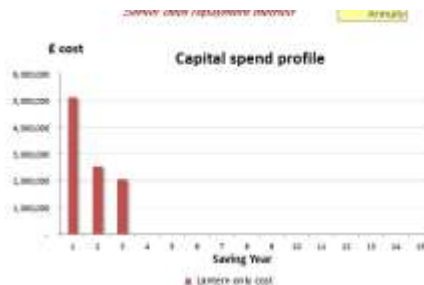
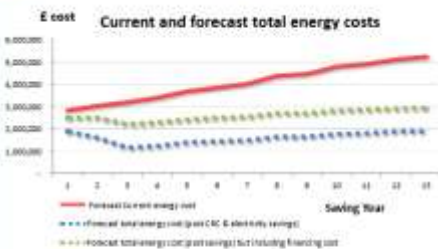
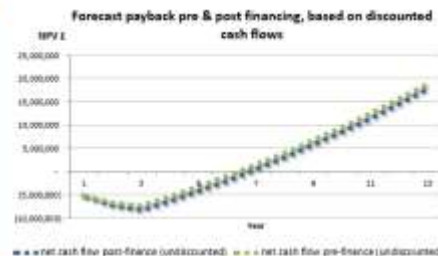
36w PLL	→	20w
42w PLT	→	20w
55w PLL	→	24w

Financial Summary

KEY OUTPUTS	Total	cost
Capital related		
Lantern only cost	9,736,798	£
Lantern & column costs	9,736,798	£
Lantern, column & sleeving costs	9,736,798	£
Lantern, column, sleeving & CHG	9,736,798	£
Fundable debt level from savings	22,765,769	£
Capital funding (if applicable)	-	£
Total CO2 emission over life of Abertaweck cost	80,913	tonnes
Abertaweck cost	121	£ per tonne
Savings passed centrally		
Year 1 savings to be received by	-	£
Total savings to Council over	-	£

TOTAL AND YEAR 1 PROJECT CA	Total	cost	Year 1
Length of operation	10	years	
Length of project inc. construction timescale	13	years	
Value of Electricity saving (cost)	24,389,893	£	590,200
DFC annual saving/(cost)	-2,567,326	£	-93,527
Forecast maintenance (cost)£	4,987,375	£	274,828
Forecast Council (cost) saving	-	£	-
Forecast lifecycle expenditures	-	£	-
Total savings	31,974,333	£	942,955
Senior debt principal repayment	(5,736,798)	£	(299,798)
Interest expense	(2,383,312)	£	(184,472)
Net operational savings £	30,872,313	£	259,257
Current forecast energy cost	£2,692,967	£	£2,692,969
% energy saving	68.45%		32.46%
Payback period (post-financing)	13	years	
Payback period (pre-financing)	6	years	
Overall Net present value of NPV(Capex) only	£1,015,391	£	11,000

CLINICAL ASSUMPTIONS	Input	Unit
Financial forecast start date	01 Jan 14	date
First financial year	3714	year #
Months per model period	12	months
Financial year end month number	12	month #
Month and date from when savings start to be made	31 Dec 14	date
Length of project inc. construction timescale	13	years



Key Financial Observations

- ☀️ DECC Electricity costs forecast still expect prices to double in 10 years.
- ☀️ Total cost reduced by c.50-65% by converting to LED.
 - ☀️ CRC savings - 5-10%
 - ☀️ O&M Savings – 20-30%
 - ☀️ Electricity savings – 70-80%
- ☀️ Scottish Councils have Investment plans of £255m over the next 5 years and rising
- ☀️ Typical payback 5-6 years pre-finance, 6-7 years post-finance.
- ☀️ Current energy cost profile - Top 5 lanterns - 60-70%, Top 10 Lanterns – 90%+ of.
- ☀️ Overall: c.£200m investment will deliver c.£864m savings after financing costs



An Investment tidal wave is coming!



Chartered Institute of
Highways and
Transportation
Annual Awards Dinner
9th June 2015

Contact Details

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