Street Lighting

Toolkit

SCOTTISH FUTURES TRUST

A guide to using the financial model for developing a business case for Streetlighting Projects.

February 2015

Contents

Foreword

This updated and revised toolkit has been produced by Scottish Futures Trust following feedback from local authorities on the original toolkit produced in 2013.

The additions to the new toolkit include the following functionality;

> Accurate consumption calculated from Elexon Regime codes and Charge codes

> Ability to phase capital expenditure and investment drawdowns

> Multiple technical and financial scenarios can be run and compared, including the ability to consider the use of dimming

> Sensitivities regarding electricity forecasts can be analysed

> Additional infrastructure upgrade (eg column replacement) can be included and evaluated.

> Replacement costs including O&M savings can be specified for each lantern type.

> The model integrates both the technical and financial components for a business case appraisal.

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Introduction

This Toolkit and accompanying example business case model has been developed to assist Local Authorities to assess the impact of investing in energy efficiency measures within their street lighting asset. It covers measures such as LED lighting, control systems and the use of dimming and trimming.

It is designed to assist an initial feasibility assessment for development of an Outline Business Case and can be refined further for use in the Full Business Case as well as monitoring performance post implementation.

Disclaimer

The Street Lighting Toolkit consisting of the Financial Model and other documents (the "Toolkit") was developed by Scottish Futures Trust ("SFT"), to support the development of an initial feasibility study / Outline Business Case ("OBC") by providing a high level indication of the impact of an energy efficient upgrade on a Local Authority's street lighting asset. The Toolkit is not intended, and should not be used as the basis for investment decision making. The Toolkit has been developed using data and assumptions from a variety of sources which are believed to be a reasonable representation of costs at the time of publication.

As between any user of the Toolkit and the Toolkit Authors, the Toolkit Authors accept no duty of care for the contents of the Toolkit or its use. Accordingly, regardless of the form of action, whether in contract, delict or otherwise, and to the extent permitted by applicable law, the Toolkit Authors accept no liability of any kind and disclaim all responsibility for the consequences of any such user acting or refraining to act in reliance of the Toolkit.

Local Authorities are advised to undertake the development of a detailed business case prior to investing in their street lighting asset.

Future development of the toolkit is anticipated. For any enquiries, comments or suggestions regarding this document/ publication please contact Lindsay McGregor Lindsay.McGregor@scottishfuturestrust.org.uk or Toby Tucker Toby.Tucker@scottishfuturestrust.org.uk

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01. How to use the Toolkit

The Toolkit enables an initial, feasibility assessment to be undertaken of the potential impact of an investment to upgrade the energy efficiency of the street lighting asset. The Toolkit is aimed at assessing the high level financial impact, but further analysis will need to be undertaken by each Local Authority in order to confirm the actual savings involved.

Following the development of a feasibility study, Local Authorities will need to develop more detailed business cases. A key part of these business cases will be robust information in relation to the conditions of the columns. A conditions survey will indicate the extent to which columns need to be repaired or replaced and the design of the LED investment required i.e. meeting lighting level standards in different locations to take into account different column spacing.

SFT will be happy to discuss with Local Authorities the next stages of developing a street lighting Business Case.

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2. The Financial Model

2.1 Introduction

The Financial Model Toolkit is intended to provide a simple aid to quickly evaluate the potential viability of a street lighting upgrade programme. The Toolkit combines both the technical and financial components for developing an investment appraisal:

> **Technical Cost model Component – 'TechInp', 'ChgCode' and 'Regime' sheets** – these estimate the maintenance costs, energy costs and CO_2 emissions of a 'status quo' case based on the existing lighting inventory and compares the results to a selected 'upgrade' technical option. The outputs from this model include an estimate of the capital expenditure investment needed for the upgrade along with projections of energy costs, maintenance costs and CO_2 emissions. The results are summarised in the 'Tech Summary' sheet.

> **Financial Model** – this uses the outputs from the 'TechInp' sheet to generate the forecast nominal costs, carbon costs, funding costs, payback as well as associated savings for the technical option across the operational period.

Financial years within the model assume a 31 March year end (as default). It is assumed that costs used in the technical model are based on the same time frame.

The models have been set to automatically update when changes are made. If individual user's settings have been made so that the Model recalculates manually, then pressing F9 will process any changes or updates.

Throughout the spreadsheets a consistent colour coding approach has been adopted

User input cell / key Input data sheets

Key financial model output tabs

Cell data that is locked to user modification / key calculation sheets. These are not to be deleted.

Output, information or calculation cell which is locked to user modification

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3. Instructions for use of the Financial Model

This section provides detailed instructions for use of the Technical and the Financial components of the model. This is a reference guide and details the nature of each input cell across each of the sheets within the financial model. To develop an investment case / feasibility model, it will be beneficial to follow the 'Instructions for creating a bespoke Financial Model for your project' section below.

3.1 Overview

The financial model includes the following sheets:

Worksheet	Type of Worksheet	Overview of Worksheet
Front Cover	Disclaimer	On opening the financial model, a user is required to read and accept the disclaimer that appears to permit use of the model.
Key	Output	This sheet summarises the various colour coded cells that are used throughout the model.
Map	Output	This sheet provides an overview of how the financial model is structured. Clicking on the hyperlinks in the model flow diagram, take you to that sheet.
Tech Inp	Input	This sheet contains the key technical inputs for the current streetlighting inventory. This includes the regime, charge code and quantity for each inventory item held by the local authority and provided to their meter administrator for calculating the monthly electricity bill. There are input fields for exploring new technical solutions and phasing of capital works.
Fin Inp	Input	This is a key sheet for looking at the various financial assumptions underpinning the financial model and also for creating different scenarios for consideration.
ChgCode	Data / Input	This sheet contains external data held by Elexon for all lanterns that are currently available on the market. The unique charge code allows the power consumption for a particular lantern to be determined. There are input fields that allow capital costs for particular lantern types to be input, together with potential O&M costs or savings.

3. Instructions for use of the Financial Model (continued)

3.1 Overview (continued)

Worksheet	Type of Worksheet	Overview of Worksheet
Regime	Data	This sheet contains external data held by Elexon for the burning hours associated with a particular regime code and for a particular part of the UK. SFT will update the model on a periodic basis to reflect updates by Elexon as new products come to the market.
Tech Summary	Output	This is a summary of the technical outputs that compares by lantern type, the technical outputs of a particular solution with those of the current inventory.
Fin Summary	Output	This sheets contains key numerical and graphical results, output from the financial model. Selection input cells are located at the top of the sheet to allowing quick switching between various technical solutions and financial scenarios.
Results Tracker	Output	This sheet allows the output results of the current model to be compared with previous models.
Data Conv	Calculation	This sheet converts data outputs from the tech Output sheet which are shown in a horizontal format, and lists them in a vertical format for subsequent use in the financial part of the model.
Fin Calcs	Calculation	The key financial calculations for the financial model. These calculate forecast amounts for items such as electrical savings, CRC costs, O&M savings etc.
Lifecycle	Calculation	Calculates forecast lifecycle replacement costs in nominal terms, based on persistence factors detailed in the technical input sheet.
Time	Calculation	This sheet creates flags (that is a '1' or a '0') to mark various points and periods during the project. Multiplying flags by forecast amounts allows filtering of amounts to specific points in time or over defined periods.

The financial model has been set up to allow flexibility for user-defined inputs to test a variety of technical, financial, operational and cost parameters. However, where this functionality has been included reference parameters are provided in adjacent cells for information which may be input as default values. For example, indicative costs are provided but there is the ability for the User to input a different cost.

The following section provides detail on each of the sheets, key inputs and what they relate to and should be used as a reference guide. The information may be useful to refer to when following the 'Build a Project guide'.

3.1.1 Front sheet

Cell	Instructions
Dialogue box	On opening the financial model a dialogue box appears containing a disclaimer that needs to be accepted before the model will open. Answering 'no' to the disclaimer closes the model.

3.1.2 Key Sheet

Cell	Instructions
Not applicable	The sheet summarises the various colours and formats used within the financial model and what they mean.

3.1.3 Map Sheet

Cell	Instructions
Not applicable	The sheet provides an overview of how the model is structured.

3. Instructions for use of the Financial Model (continued)

3.1.4 Tech Inp Sheet

Technical sheet Assumptions

In order to facilitate use of the Technical part of the financial model a number of assumptions have been made. These are detailed below:

- The Technical Input Sheet analyses two conditions:
  - a 'Status Quo' case which requires details of the existing street lighting assets to be input for a starting 'base year' and then calculates costs assuming this inventory is maintained as is over the appraisal period; and
  - an 'Upgrade' technical option which considers replacement of some or all of the street lights, controls, as well as changes to Regime code. Costs and emissions are based on maintaining the upgraded lighting inventory, assuming no further changes following implementation of the technical option.
- The Technical Input Sheet allows phased upgrades over a number of years.
- The upgrade can include lantern and control systems, as well as the cost of columns and sleeving in various combinations.
- There are many hundreds of types of lanterns and lamp systems on the market, and such unmetered equipment is provided with a unique 'Charge Code' by Elexon who confirm various key technical specifications for the equipment such as power consumption. The technical model uses the Charge code table produced by Elexon to obtain the associated power consumption for a particular lantern charge code. The Elexon charge code sheet can be modified to include manageable selections of generic types with fixed assumed properties, associated costs etc.
- The cost outputs of the Technical Model are in real prices and exclude any VAT. Indexation assumptions are entered in the Financial Model.

This sheet contains the key technical input data for the current inventory and allows the user to develop various technical replacement options. The sheet is split into 4 main column blocks, the Current Inventory, the Proposed Inventory, the savings, and finally capital costs associated with the proposed inventory solution. There are two further blocks that allow the creation of various technical solutions as well as various phased capital investment profiles.

Current Inventory (columns B to P)

Cell	Instructions
Col B:P	Columns B to D require inputs for the regime code, charge code, and number of items for each lantern type in the existing estate. This input data is obtained from the monthly returns that are sent by Local Authorities to their meter administrator eg Power Data Associates, and used to calculate the unmetered electricity consumption and hence billing for unmetered electricity.
E2 (button)	Select a row or cell on the inventory line where you would like to split the existing inventory into a number of sub categories eg to separate out lanterns that may be in urban and rural locations. The button when pressed opens a dialogue box that asks how many of the units for the current inventory line to split out. Enter the amount you wish to split and press enter.
Col E:N	These are a series of 'look up calculations' that undertake the two key calculations;
	Use regime code value in col B to 'look up' the required values in the Regime data sheet for Regime code description (Col G), the Bright Annual Hours consumption (Col J), and the Dimmed Annual Hours (Col K).
	Use the charge code value in Col C to 'look up' the required values in the ChgCode data sheet for Charge Code description (Col E), manufacturers description (Col F) and importantly the bright and dimmed circuit power requirement (Col H&I).
	The O&M cost associated with a particular lantern type is picked up from the ChgCode sheet using the charge code information (Col C).
Col L&O	These columns contain the calculations for the current consumption (kWh) and energy cost (£) for each lantern type.
Col P	The energy cost for a particular lantern type is ranked in terms of cost compared to all other lanterns in the current inventory.
L4, O4, and P4	These cells contain the summary totals for the annual consumption, annual energy cost, and the proportion of energy cost caused by the top 10 energy consuming lantern types.

3. Instructions for use of the Financial Model (continued)

Proposed Inventory (Columns R to AI)

These calculations simply mirror those detailed above in the current inventory section. The key difference is that the charge codes and regime codes are for equivalent replacement lanterns in the proposed technical solution.

Cell	Instructions
Col R&S	These columns show if there is a different regime or charge code in the proposed technical solution compared to the current inventory, denoted by a: ! , or a ✓ where the technical solution does not differ from the current stock profile.
Col T:AI	Columns T to V use inputs for the regime and charge codes for a technical solution provided in columns BP onwards (see below) for each lantern in the proposed estate. The input data for the proposed technical solution is input in columns BP onwards.
Col W:AI	Again, these are a series of 'look up calculations' that undertake the two key calculations; > Use regime code value in col T to 'look up' the required values in the Regime data sheet for Regime code description (Col Y), the Bright Annual Hours consumption (Col AC), and the Dimmed Annual Hours (Col AD). > Use the charge code value in Col U to 'look up' the required values in the ChgCode data sheet for Charge Code description (Col W), manufacturers description (Col X) and importantly the bright and dimmed circuit power requirement (Col AA&AB). > The O&M cost associated with a particular lantern type is picked up from the ChgCode sheet using the charge code information (Col U).
Col AE&AH	These columns contain the calculations for the proposed consumption (kWh) and energy cost (£) for each lantern type.
Col AI	The energy cost for a particular lantern type is ranked in terms of cost compared to all other lanterns in the proposed inventory.
AE4, AH4, and AI4	These cells contain the summary totals for the annual consumption, annual energy cost, and the proportion of energy cost caused by the top 10 energy consuming lantern types.

Savings Calculations (Columns AK to AW)

These calculations calculate the differences in costs, CRC outputs, maintenance savings etc between the current and proposed inventory solutions for both the base year and an estimate for the whole life of the asset based on the operational period for the project.

Cell	Instructions
Col AK:AW	These columns provide summary calculations for the base year (and whole of life savings / (costs)) of the proposed technical solution compared to the current inventory line by line for each lantern type. The calculations detail the maintenance, kWh, tCO_2, CRC and electrical savings for each lantern type.

Capital Costs (Columns AY to BM)

These provide input fields for some of the capital costs associated with proposed technical solutions.

Cell	Instructions
Col AY:BA	Lantern costs – the capital costs for each proposed lantern replacement are provided in Col BA. This is obtained by using the charge code in column U, to look up the associated capital cost for that particular lantern type in column X of the ChgCode sheet. It is IMPORTANT TO NOTE that these CAPITAL COSTS NEED TO BE INPUT BY A TECHNICAL ADVISOR.
Col BB	Column replacement cost – the capital cost associated with replacing column for a particular lantern type is input here. A default value of £1,200 per column is used as a representative replacement cost.
Col BE	Sleeving cost – the capital cost associated with sleeving a column for a particular lantern type is input here. A default value of £150 per column is used as a representative sleeving cost.
Col BH:BI	CMS controls – The unit cost and quantity of CMS controls to be incorporated can be input here. A default unit cost of £97 per unit is used, but an assumed default of having zero CMS controls in place.

3. Instructions for use of the Financial Model (continued)

Proposed Technical Solutions (Columns BP onwards)

These require regime and charge code input fields for proposed technical solutions. The timing of when the capital expenditure will be incurred can be input in column BW onwards.

Cell	Instructions
Col BP:BQ	**Proposed Technical Solutions** - The regime and charge code for the equivalent replacement lantern are detailed in this column. It is helpful to take a copy of the current inventory inputs from columns B&C and use them as a 'Current Inventory' scenario.
BP2	Click this button to insert a new technical scenario. A dialogue box opens and a prompt for the scenario name to be entered. It is helpful to keep the name short and succinct. A new scenario is inserted with blank cells to populate for the new regime and charge codes. It is recommended that the current inventory regime and charge codes are copied and pasted into the new scenario. It is then a simple matter of altering the lantern specific regime and charge codes for the specific lantern types that are to be replaced.
BN1	This button removes the most recent scenario that was inserted.
Col BW	**Timing of Capex** - These inputs detail in which year the capital expenditure is to be incurred for the replacement lanterns. Different columns represent different Capex profiles that can be selected from the Fin Summary sheet. A useful approach is to assume a programme replacement of c.10,000 units per annum, starting with the highest energy saving replacements first. Additional capex profiles can be added or deleted by pressing the buttons at the top of column BS

ChgCode sheet

Cell	Instructions
Col W	This is a filter. If '0' is unchecked from the drop down menu, this will identify all charge codes that have a '1' associated with them. These are all the proposed lantern replacement solutions in the current technical solution. This allows quick aggregation of the proposed solutions so that the corresponding capital, labour, O&M and lifecycle costs can be input quickly and easily in columns X to AA. See below.
Col X	Input the lantern costs, including installation cost for each type of unit replacement type. Typical values that are being seen under the Excel Framework have been used as a default, but the user should look to obtain accurate costs of the replacement lanterns.
Col Y	Input the O&M cost associated with each lantern unit. Alternatively most of the current inventory can be kept with a nil value and a saving per replacement lantern included as a saving for the equivalent lantern replacement.
Col Z	Input the O&M labour cost associated with each lantern unit. Alternatively most of the current inventory can be kept with a nil value and a saving per replacement lantern included as a saving for the equivalent lantern replacement.
Col AA	Input the useful life associated with each lantern unit. This will allow appropriate replacement costs to be calculated. This has been left nil at the moment as it is expected that most LED replacements will last 25 years before requiring replacement and only a small percentage will fail each year and can be accommodated within existing O&M budgets.

3.1.5 Regime sheet

No Input data is required on this sheet. It contains data on the annual burn hours for a given regime code in a particular region of the UK.

A link to the web page containing information on both the regime and charge codes is provided below.

http://www.elexon.co.uk/reference/technical-operations/unmetered-supplies/charge-codes-and-switch-regimes/

3.1.6 Tech Summary sheet

No input data is required on this sheet. It summarises the key outputs from the 'Tech Inp' sheet including Electricity, CRC and maintenance savings as well as capital costs, payback periods and carbon emissions.

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4. Financial part of the Model

4.1 Overview

The Financial sheets of the model use the outputs from the Tech Output sheet and develops the forecast future cashflows to show the economic impact. It has been designed to be transparent and user friendly. To facilitate this process, the financial sheets are structured into three main areas:

> Inputs ('Fin Inp', 'Tech Inp', 'Chg Code' and 'Regime') - where the user is required to input key project assumptions and costs;

> Calculations ('Time', 'Fin Calcs' and 'Lifecycle' and 'Data Conv' sheets) - which perform the necessary workings in order to convert the inputs into meaningful outputs; and

> Outputs ('Tech Summary', ' Results Tracker' and 'Fin Summary' sheets) - these present the results of the Financial Model.

The Financial Model has the functionality to perform scenario analysis, whereby the model has the capability to simultaneously run various different financial scenarios and allow the user to quickly switch between these. The active scenario can be selected in cell N3 of the 'Fin Summary' sheet. For details on this see the notes below.

4.2 General Assumptions

4.2.1 Timing

The model operates on an annual basis during both the delivery and operations period. The financial year has flexibility in determining the annual start date eg 1st January or 1st April for calendar or local authority financial years. The model has a default of an annual start date of 1st April.

4.2.2 Carbon Reduction Commitment

It is assumed that all of the Authority's street lighting electricity consumption will be measured as part of its CRC scheme obligations, and will accordingly be a cost to the Authority.

4.3 Model Operation

4.3.1 FinInp sheet

This sheet contains the financial inputs to be used in the model. There is the functionality to input more than one set of assumptions to allow various scenarios to be run, by inserting a new scenario by pressing the 'insert scenario' button in G2. A name for the new scenario should be entered followed by enter. The user should then work through the inputs making amendments as required. Sensitivities on the base case scenario can then be performed with relative simplicity.

The scenario identified in cell F2 (and is altered by Fin Summary cell N2, picks up the relevant inputs shown in column F). Only the data in column F flows through to the other sheets of the financial model. At least one scenario must have all the inputs

completed but it is not necessary to use more than one scenario if not required. For example if only one scenario is needed then inputs may be entered in column J only and the "base" scenario selected in cell N3 on the 'Fin Summary' sheet. To create a new scenario the user can press the 'new scenario' button and this will insert a new scenario, initially populated with inputs from the 'base case' assumptions.

Cell	Instructions
J9	Input the 1st day of the financial year for which the project will commence.
J10	Input the forecast financial year corresponding to the start date detailed in J9. Eg for 1/4/2014, the financial year is to 31/3/2015 ie 2015.
J14	Input the operational period over which the project is to be assessed (typically 25 years). This period will be the number of years the savings will be made following the last capital investment into the project eg for a 3 year capital programme, the total length of the project will be 28 years and the savings will be calculated over this period.
J17	In relation to lifecycle replacement costs, a delay (in years) can be input before the lantern or asset is replaced. The default position is 0 years.
J21	Input a general inflation assumption for forecast inflation of costs such as operation & Maintenance. A default value of 2.5% has been assumed.
J22	Option to input a value for savings that will be retained by the local authority centrally and not kept as a benefit within the project. These savings are indexed and assumed to be retained by the Council each year.
J23	Input an amount for professional, development and advisory fees that may be incurred upfront in developing the project.
J24	DECC forecast profile. Select a profile for the anticipated forecast REAL cost of electricity cost inflation as forecast by DECC. (1- low, 2-med, 3-high).
J27	Select the correct region for which the local authority uses in its monthly returns to its meter administrator.
J28	Input the current annual unmetered electricity cost for the local authority. The value calculated in cell O4 on TechInp sheet can be used if the information is not to hand.

4. Financial Component of the Model (continued)

Cell	Instructions
J34	Input the forecast inflation or deflation rate (a negative number) for forecast capital costs eg lanterns. The model has assumed a default of 0%. Experience has seen the cost of lanterns fall significantly in recent years and this trend is expected to continue into the near future. Accordingly, a flat cost assumption appears a reasonable assumption.
J40	Input a % for a reduction in savings that should be ring fenced within the project and not form part of the financial appraisal. This could be a retention of savings, say 5%, to cover additional electricity costs that will occur as residential housing developments are completed and new street lights become operational.
J43	Input the current base unit cost payable by the local authority for its electricity. A default of 10.6p per kWh is assumed.
J47	Input any contributions from capital budget or capital reserves to be used to offset against the capital costs for calculation of the net financing requirement i.e. the capital cost less this contribution will be used to calculate the value of any loans the Local Authority may be required to take out to finance the project.
J48	For any external financing, input the level of any committed facility that will be available for the project.
J49	Input the arrangement fee associated with any externally provided debt facility. The arrangement fee is calculated off the committed facility in J48 and not the actual debt requirement calculated in the model. It is important that the committed facility is greater than the calculated requirement.
J52	Input the commitment fee associated with any externally provided debt facility.
J53	Input the all in interest rate associated with the borrowing. A default of 4.5% has been used which conservatively represents the rate charged by the Public Works Loan Board ('PWLB') for 25 year financing.
J57, J59, J61, and J64	These relate to Inputs that should not be changed by the user and are highlighted grey.
Row 71	These are forecast CRC £/tCO_2 rates that can be changed and updated. A reference profile is provided that has been obtained from DECC, but may be over-written. The user of the financial model can input their view on how the cost of carbon will increase over time.

Cell	Instructions
Rows 78-80	These are forecast electricity prices provided by DECC under low, reference and high forecast scenarios. The forecasts are only provided out to 2030 and thereafter are assumed to remain flat. https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2014

4.3.2 Fin Summary sheet

This sheet summarises the key financial outputs from the model. It includes year 1 and total savings over the life of the project, together with payback periods, financing costs, NPVs and various graphs showing the forecast savings and costs over the life of the project. There are a couple of Inputs on this sheet that allow the user to readily see the impact of running various financial and technical scenarios which are detailed further below.

Cell	Instructions
N2	Drop down selection menu. Use this to select the relevant technical solution detailed in the 'Tech Inp' sheet in columns BP onwards.
N3	Drop down selection menu. Use this to select the relevant financial solution detailed in the 'Fin Inp' sheet in columns J onwards.
N4	Drop down selection menu. Use this to select the relevant capital expenditure profile for the project.
W2	Input a % value for no. of columns to be replaced. This is often useful when a local authority has not completed a detailed conditions survey and wishes to consider the impact of replacing a certain percentage or number of columns on the project. Work with SCOTS has indicated that the number of columns that require replacing or sleeving in a current estate are typically in the region of 10%. The total number of columns replaced can be seen in cell BC4 of the 'Tech Inp' sheet.
W3	Input a % value for no. of columns to be sleeved. This is often useful when a local authority has not completed a detailed conditions survey and wishes to consider the impact of sleeving a certain percentage or number of columns on the project. Work with SCOTS has indicated that the number of columns that require replacing or sleeving in a current estate are typically in the region of 10%. The total number of columns replaced can be seen in cell BF4 of the 'Tech Inp' sheet.

4. Financial Component of the Model (continued)

Cell	Instructions
W4	Drop down selection menu. Use this to select the timing of capital expenditure as detailed in columns BW onwards of the 'Tech Inp' sheet.
W5	Drop down selection menu. Use this to select the type of repayment profile that will be used to repay any borrowing used to fund the capital expenditure. The options are as follows; > Annuity – The level of debt service (ie interest and principal repayment) is fixed and repaid over the length of the project. > Sweep – All savings are used to repay any borrowing as quickly as possible. In a particular period the savings are used to ensure annual interest on the loan is repaid initially, and any savings that remain after this are used in their entirety to make a principal repayment. This profile is used to determine the payback period for the project post financing detailed in cell F41 and is typically a year longer than payback periods pre-financing. > Constant – the principal repayment is divided equally each year over the length of the project. > Bullet – interest only is charged on the borrowing over the life of the project, with all of the borrowing principal repaid as a single amount at the end of the project.

4.3.3 Results Tracker sheet

This sheet allows the results of the current outputs (Col G) to be compared with previous financial model outputs (eg different technical scenarios or financial outputs that have been used) in Col M onwards. Difference between these outputs are provided in Col I (in £) with the percentage movement detailed in Col J.

Cell	Instructions
E3	Pressing this button will paste a copy of the current outputs in Col G and insert them next to Col J. On clicking the button, a dialogue box opens with a prompt for a title for the current outputs that are to be entered. On clicking return the output results are inserted to the right of Col K.
G5	Drop down selection menu. Use this to select the required historic hard coded outputs from Col L onwards to compare with the current outputs in Col G.

4.3.4 Data Conv sheet

No input data is required on this sheet. It is used to take the results from the 'Tech Summary' sheet which are presented in a horizontal format for each lantern type and converts them to a vertical format for each lantern type. All output results for each lantern are then shown in single column G.

This is useful because EXCEL functionality can be used to sum up all items in a particular column that relate to a particular category eg electricity savings. These totals can then be used to generate future annual forecast values within the 'Fin Calcs' sheet.

4.3.5 Fin Calcs sheet

No input data is required on this sheet. This is the main calculation sheet for generating all the financial forecasts within the model. It contains the following main sections;

> Cashflow summary
> Energy saving calculations
> CRC savings
> Maintenance cost savings
> Savings directed back to the Local Authority
> Financing
> Payback calculations
> Discounted cashflows and NPVs

4.3.6 Lifecycle sheet

No input data is required on this sheet. No input data is required on this sheet. This sheet calculates the forecast lifecycle replacement cost based on the useful asset life of the lantern detailed in 'ChgCode' sheet Col AA.

4.3.7 Time sheet

No Input data required. This sheet calculates various flags ('1's and '0's) that are used in calculations throughout the model for such things as senior debt repayment profiles, operational periods etc.

4. Financial Component of the Model (continued)

4.4 Finance Structure

The model will draw down debt in the required amounts to target the net financing requirement of the project, being the total capital expenditure less any contributions, be it available capital or operational cash flow savings

The tranche of debt financing can be set to either an annuity basis where the total interest and capital payment for each year will be the same for every year of the debt term or equal instalments of principal (flat repayments) where the capital payments are the same for each year. Under the flat repayment profile more debt is repaid in early years compared to the annuity profile. This results in a higher debt service amount (interest plus repayment) in earlier periods.

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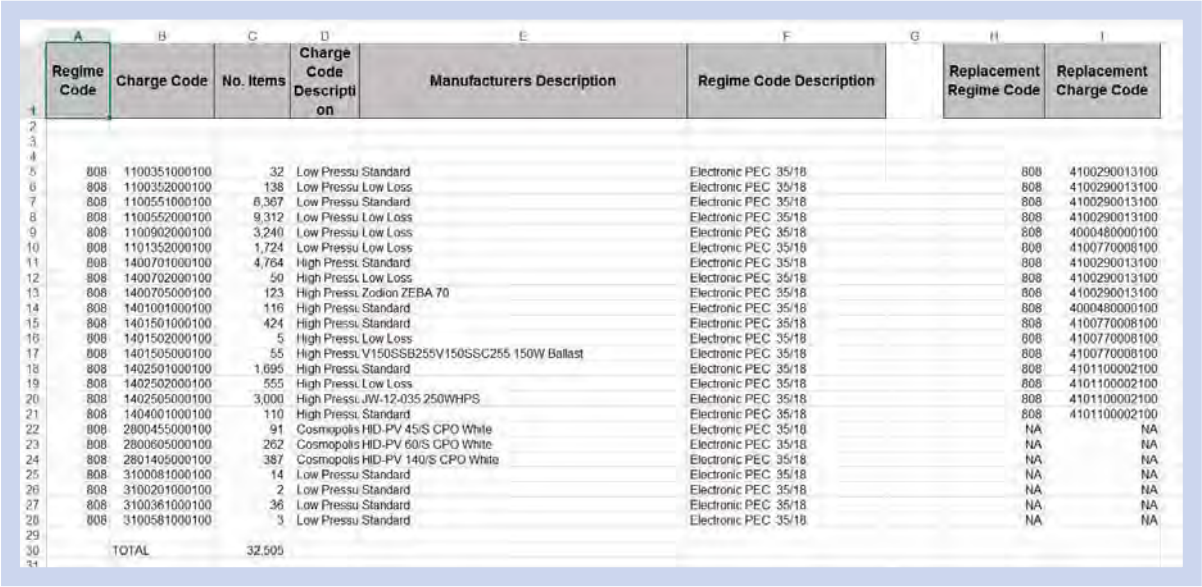
5. Instructions for Creating a Bespoke Financial Model for a Project

5.1 Introduction

This section provides a walkthrough of an indicative project, demonstrating how the inputs and assumptions have been applied to the model. It is intended to help Toolkit users to understand how the model works and how data should be entered into the models. Reference should be made to models including the worked example provided with the Toolkit. Screenshots are taken to illustrate how the model is created, by following each of the steps below.

5.2 Inputting the current Inventory profile

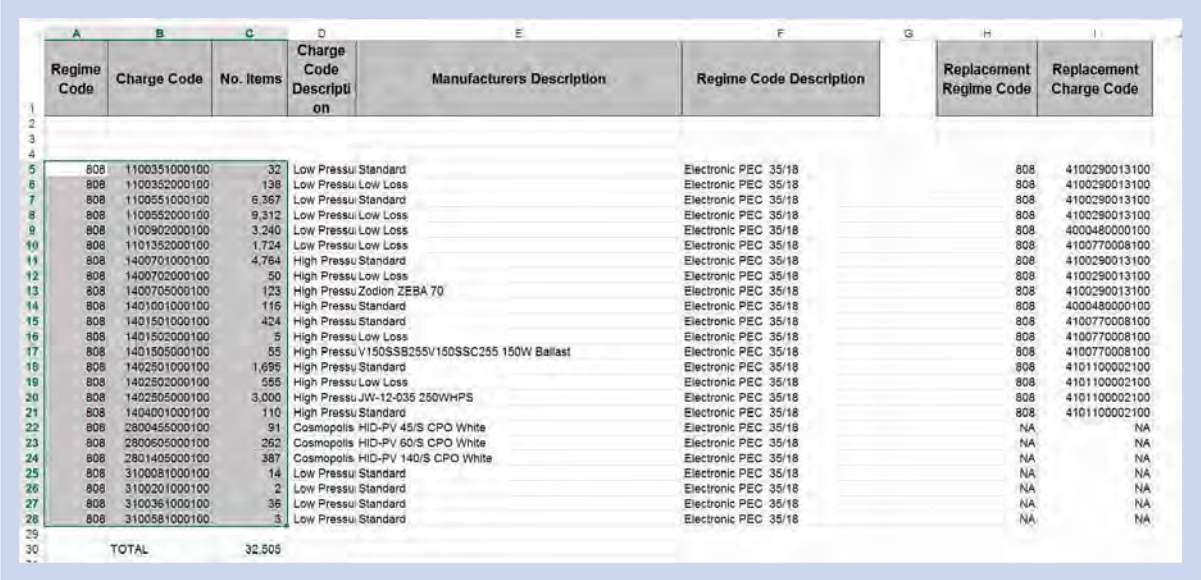
1. Open the financial toolkit model.
2. Next, open the Inventory file that forms part of the worked example. This should be similar to a typical inventory file sent to the meter administrator each month. Col H&I contain an example of potential LED replacement solutions that could be used to replace the existing estate. Please note these replacement lantern solutions are for illustrative purposes only and the required replacement solution will be subject to various criteria and so technical advice should be sought in this regard.



	A	B	C	D	E	F	G	H	I
1	Regime Code	Charge Code	No. Items	Charge Code Descripti on	Manufacturers Description	Regime Code Description		Replacement Regime Code	Replacement Charge Code
2									
3									
4									
5	808	1100351000100	32	Low Pressu	Standard	Electronic PEC 35/18		808	4100290013100
6	808	1100352000100	138	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
7	808	1100551000100	8,367	Low Pressu	Standard	Electronic PEC 35/18		808	4100290013100
8	808	1100552000100	9,312	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
9	808	1100902000100	3,240	Low Pressu	Low Loss	Electronic PEC 35/18		808	4000480000100
10	808	1101352000100	1,724	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100770008100
11	808	1400701000100	4,764	High Pressu	Standard	Electronic PEC 35/18		808	4100290013100
12	808	1400702000100	50	High Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
13	808	1400705000100	123	High Pressu	Zodion ZEBA 70	Electronic PEC 35/18		808	4100290013100
14	808	1401001000100	116	High Pressu	Standard	Electronic PEC 35/18		808	4000480000100
15	808	1401501000100	424	High Pressu	Standard	Electronic PEC 35/18		808	4100770008100
16	808	1401502000100	5	High Pressu	Low Loss	Electronic PEC 35/18		808	4100770008100
17	808	1401505000100	55	High Pressu	V150SSB255V150SSC255 150W Ballast	Electronic PEC 35/18		808	4100770008100
18	808	1402501000100	1,695	High Pressu	Standard	Electronic PEC 35/18		808	4101100002100
19	808	1402502000100	555	High Pressu	Low Loss	Electronic PEC 35/18		808	4101100002100
20	808	1402505000100	3,000	High Pressu	JW-12-035 250WHPS	Electronic PEC 35/18		808	4101100002100
21	808	1404001000100	110	High Pressu	Standard	Electronic PEC 35/18		808	4101100002100
22	808	2800455000100	91	Cosmopolis	HID-PV 45/S CPO White	Electronic PEC 35/18		NA	NA
23	808	2800605000100	262	Cosmopolis	HID-PV 60/S CPO White	Electronic PEC 35/18		NA	NA
24	808	2801405000100	387	Cosmopolis	HID-PV 140/S CPO White	Electronic PEC 35/18		NA	NA
25	808	3100081000100	14	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
26	808	3100201000100	2	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
27	808	3100361000100	36	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
28	808	3100581000100	3	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
29									
30		TOTAL	32,505						
31									

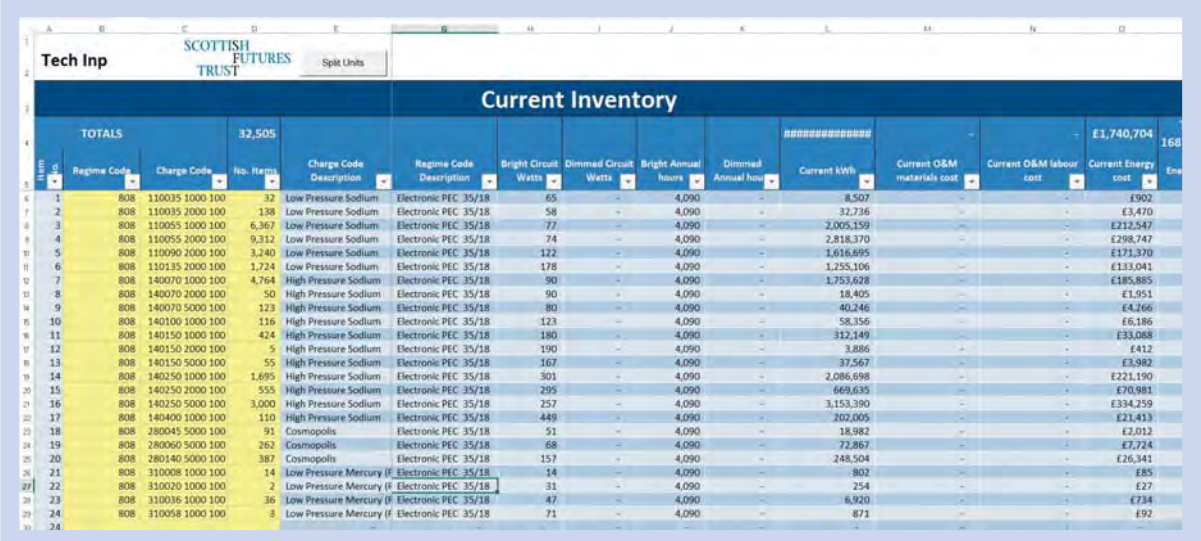
5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

3. Highlight and select the current inventory (cells A5:C28) as shown below and press Ctrl+C (this copies all the data from the cells);



	A	B	C	D	E	F	G	H	I
1	Regime Code	Charge Code	No. Items	Charge Code Descripti on	Manufacturers Description	Regime Code Description		Replacement Regime Code	Replacement Charge Code
2									
3									
4									
5	808	1100351000100	32	Low Pressu	Standard	Electronic PEC 35/18		808	4100290013100
6	808	1100352000100	138	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
7	808	1100551000100	6,367	Low Pressu	Standard	Electronic PEC 35/18		808	4100290013100
8	808	1100552000100	9,312	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
9	808	1100902000100	3,240	Low Pressu	Low Loss	Electronic PEC 35/18		808	4000480000100
10	808	1101352000100	1,724	Low Pressu	Low Loss	Electronic PEC 35/18		808	4100770008100
11	808	1400701000100	4,764	High Pressu	Standard	Electronic PEC 35/18		808	4100290013100
12	808	1400702000100	50	High Pressu	Low Loss	Electronic PEC 35/18		808	4100290013100
13	808	1400705000100	123	High Pressu	Zodion ZEBA 70	Electronic PEC 35/18		808	4100290013100
14	808	1401001000100	116	High Pressu	Standard	Electronic PEC 35/18		808	4000480000100
15	808	1401501000100	424	High Pressu	Standard	Electronic PEC 35/18		808	4100770008100
16	808	1401502000100	5	High Pressu	Low Loss	Electronic PEC 35/18		808	4100770008100
17	808	1401505000100	55	High Pressu	V150SSB255V150SSC255 150W Ballast	Electronic PEC 35/18		808	4100770008100
18	808	1402501000100	1,695	High Pressu	Standard	Electronic PEC 35/18		808	4101100002100
19	808	1402502000100	555	High Pressu	Low Loss	Electronic PEC 35/18		808	4101100002100
20	808	1402505000100	3,000	High Pressu	JW-12-035 250WHPS	Electronic PEC 35/18		808	4101100002100
21	808	1404001000100	110	High Pressu	Standard	Electronic PEC 35/18		808	4101100002100
22	808	2800455000100	91	Cosmopolis	HID-PV 45/S CPO White	Electronic PEC 35/18		NA	NA
23	808	2800505000100	262	Cosmopolis	HID-PV 60/S CPO White	Electronic PEC 35/18		NA	NA
24	808	2801405000100	387	Cosmopolis	HID-PV 140/S CPO White	Electronic PEC 35/18		NA	NA
25	808	3100081000100	14	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
26	808	3100201000100	2	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
27	808	3100361000100	36	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
28	808	3100581000100	3	Low Pressu	Standard	Electronic PEC 35/18		NA	NA
29									
30		TOTAL	32,505						

4. Move to the Financial toolkit model and the 'Tech Inp' sheet. Click cell B6 followed by the following key strokes Alt+E+S+V+enter (This copies only the values into the cells so that no formatting is lost). The current inventory fields should automatically populate using the data that is input. In the example below, the annual electricity consumption is 16.4GWh, with an associated cost of £1.74m (assuming a base electricity cost of 10.6p / kWh, see 'Fin Inp' J37.



Tech Inp

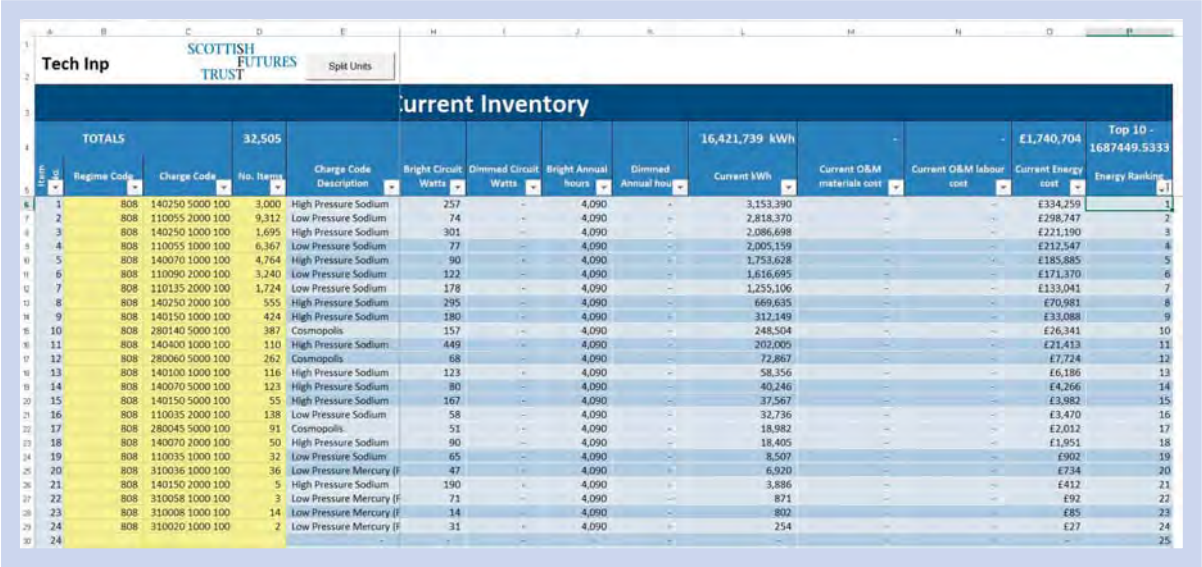
SCOTTISH FUTURES TRUST

Split Units

Current Inventory

	Item No.	Regime Code	Charge Code	No. Items	Charge Code Description	Regime Code Description	Bright Circuit Watts	Dimmed Circuit Watts	Bright Annual hours	Dimmed Annual hou	Current kWh	Current O&M materials cost	Current O&M labour cost	Current Energy cost
	TOTALS			32,505							##########	-	-	£1,740,704
6	1	808	110035 1000 100	32	Low Pressure Sodium	Electronic PEC 35/18	65	-	4,090	-	8,507	-	-	£902
7	2	808	110035 2000 100	138	Low Pressure Sodium	Electronic PEC 35/18	58	-	4,090	-	32,736	-	-	£3,470
8	3	808	110055 1000 100	6,367	Low Pressure Sodium	Electronic PEC 35/18	77	-	4,090	-	2,005,159	-	-	£212,547
9	4	808	110055 2000 100	9,312	Low Pressure Sodium	Electronic PEC 35/18	74	-	4,090	-	2,818,370	-	-	£298,747
10	5	808	110090 2000 100	3,240	Low Pressure Sodium	Electronic PEC 35/18	122	-	4,090	-	1,616,695	-	-	£171,370
11	6	808	110135 2000 100	1,724	Low Pressure Sodium	Electronic PEC 35/18	178	-	4,090	-	1,255,106	-	-	£133,041
12	7	808	140070 1000 100	4,764	High Pressure Sodium	Electronic PEC 35/18	90	-	4,090	-	1,753,628	-	-	£185,885
13	8	808	140070 2000 100	50	High Pressure Sodium	Electronic PEC 35/18	90	-	4,090	-	18,405	-	-	£1,951
14	9	808	140070 5000 100	123	High Pressure Sodium	Electronic PEC 35/18	80	-	4,090	-	40,246	-	-	£4,266
15	10	808	140100 1000 100	116	High Pressure Sodium	Electronic PEC 35/18	123	-	4,090	-	58,356	-	-	£6,186
16	11	808	140150 1000 100	424	High Pressure Sodium	Electronic PEC 35/18	180	-	4,090	-	312,149	-	-	£33,088
17	12	808	140150 2000 100	5	High Pressure Sodium	Electronic PEC 35/18	190	-	4,090	-	3,886	-	-	£412
18	13	808	140150 5000 100	55	High Pressure Sodium	Electronic PEC 35/18	167	-	4,090	-	37,567	-	-	£3,982
19	14	808	140250 1000 100	1,695	High Pressure Sodium	Electronic PEC 35/18	301	-	4,090	-	2,086,698	-	-	£221,190
20	15	808	140250 2000 100	555	High Pressure Sodium	Electronic PEC 35/18	295	-	4,090	-	669,635	-	-	£70,981
21	16	808	140250 5000 100	3,000	High Pressure Sodium	Electronic PEC 35/18	257	-	4,090	-	3,153,390	-	-	£334,259
22	17	808	140400 1000 100	110	High Pressure Sodium	Electronic PEC 35/18	449	-	4,090	-	202,005	-	-	£21,413
23	18	808	280045 5000 100	91	Cosmopolis	Electronic PEC 35/18	51	-	4,090	-	18,982	-	-	£2,012
24	19	808	280060 5000 100	262	Cosmopolis	Electronic PEC 35/18	68	-	4,090	-	72,867	-	-	£7,724
25	20	808	280140 5000 100	387	Cosmopolis	Electronic PEC 35/18	157	-	4,090	-	248,504	-	-	£26,341
26	21	808	310008 1000 100	14	Low Pressure Mercury (F	Electronic PEC 35/18	14	-	4,090	-	802	-	-	£85
27	22	808	310020 1000 100	2	Low Pressure Mercury (F	Electronic PEC 35/18	31	-	4,090	-	254	-	-	£27
28	23	808	310036 1000 100	36	Low Pressure Mercury (F	Electronic PEC 35/18	47	-	4,090	-	6,920	-	-	£734
29	24	808	310058 1000 100	3	Low Pressure Mercury (F	Electronic PEC 35/18	71	-	4,090	-	871	-	-	£92
30	24													

5. If you click the drop down menu at P5, and select 'smallest to lowest', this will rank the current inventory from the largest to lowest energy consuming lanterns. This is useful for prioritising which lanterns it may be best to consider replacing initially.

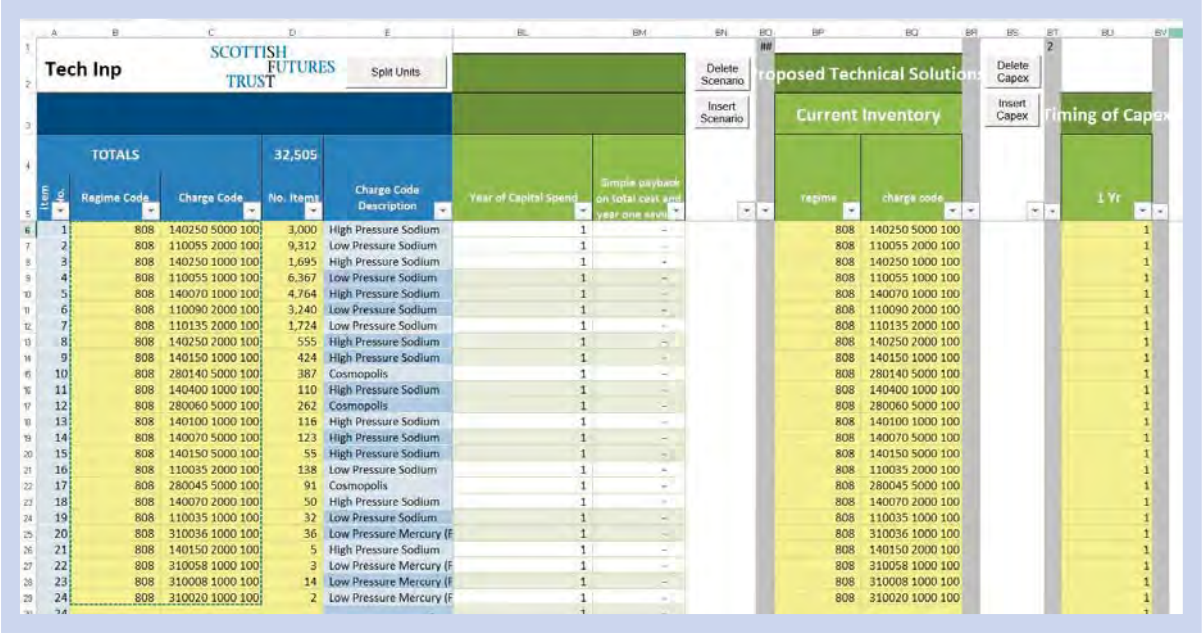


Tech Inp — SCOTTISH FUTURES TRUST — Split Units

Current Inventory

Item No.	Regime Code	Charge Code	No. Items	Charge Code Description	Bright Circuit Watts	Dimmed Circuit Watts	Bright Annual hours	Dimmed Annual hou	Current kWh	Current O&M materials cost	Current O&M labour cost	Current Energy cost	Energy Ranking
TOTALS			32,505						16,421,739 kWh	-	-	£1,740,704	Top 10 - 1687449.5333
1	808	140250 5000 100	3,000	High Pressure Sodium	257	-	4,090	-	3,153,390			£334,259	1
2	808	110055 2000 100	9,312	Low Pressure Sodium	74	-	4,090	-	2,818,370			£298,747	2
3	808	140250 1000 100	1,695	High Pressure Sodium	301	-	4,090	-	2,086,698			£221,190	3
4	808	110055 1000 100	6,367	Low Pressure Sodium	77	-	4,090	-	2,005,159			£212,547	4
5	808	140070 1000 100	4,764	High Pressure Sodium	90	-	4,090	-	1,753,628			£185,885	5
6	808	110090 2000 100	3,240	Low Pressure Sodium	122	-	4,090	-	1,616,695			£171,370	6
7	808	110135 2000 100	1,724	Low Pressure Sodium	178	-	4,090	-	1,255,106			£133,041	7
8	808	140250 2000 100	555	High Pressure Sodium	295	-	4,090	-	669,635			£70,981	8
9	808	140150 1000 100	424	High Pressure Sodium	180	-	4,090	-	312,149			£33,088	9
10	808	280140 5000 100	387	Cosmopolis	157	-	4,090	-	248,504			£26,341	10
11	808	140400 1000 100	110	High Pressure Sodium	449	-	4,090	-	202,005			£21,413	11
12	808	280060 5000 100	262	Cosmopolis	68	-	4,090	-	72,867			£7,724	12
13	808	140100 1000 100	116	High Pressure Sodium	123	-	4,090	-	58,356			£6,186	13
14	808	140070 5000 100	123	High Pressure Sodium	80	-	4,090	-	40,246			£4,266	14
15	808	140150 5000 100	55	High Pressure Sodium	167	-	4,090	-	37,567			£3,982	15
16	808	110035 2000 100	138	Low Pressure Sodium	58	-	4,090	-	32,736			£3,470	16
17	808	280045 5000 100	91	Cosmopolis	51	-	4,090	-	18,982			£2,012	17
18	808	140070 2000 100	50	High Pressure Sodium	90	-	4,090	-	18,405			£1,951	18
19	808	110035 1000 100	32	Low Pressure Sodium	65	-	4,090	-	8,507			£902	19
20	808	310036 1000 100	36	Low Pressure Mercury (F	47	-	4,090	-	6,920			£734	20
21	808	140150 2000 100	5	High Pressure Sodium	190	-	4,090	-	3,886			£412	21
22	808	310058 1000 100	3	Low Pressure Mercury (F	71	-	4,090	-	871			£92	22
23	808	310008 1000 100	14	Low Pressure Mercury (F	14	-	4,090	-	802			£85	23
24	808	310020 1000 100	2	Low Pressure Mercury (F	31	-	4,090	-	254			£27	24
24													25

6. Copy the regime and charge code inputs in Col B&C and paste these values into the proposed technical solution column BP:BQ, under 'Current Inventory'. This scenario represents the 'do minimum' or current 'status quo'.



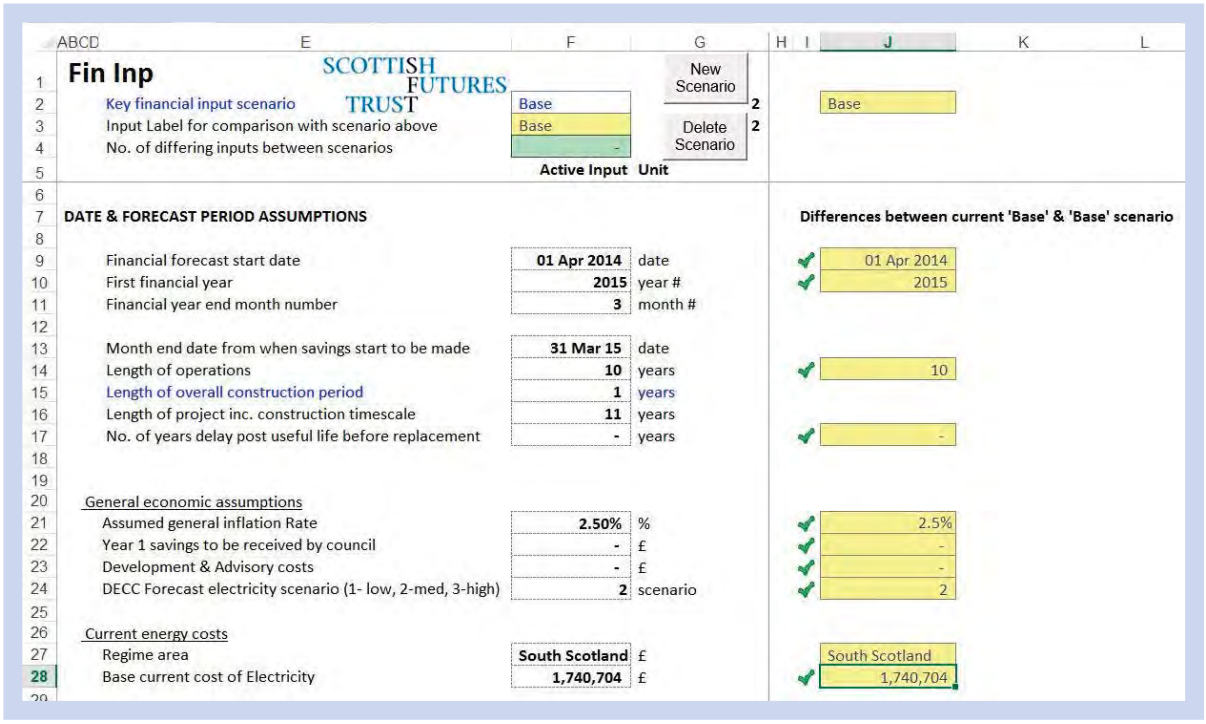
Tech Inp — SCOTTISH FUTURES TRUST — Split Units

Delete Scenario | Insert Scenario | roposed Technical Solution | Current Inventory | Delete Capex | Insert Capex | Timing of Capex

Item No.	Regime Code	Charge Code	No. Items	Charge Code Description	Year of Capital Spend	Simple payback on total cost and year one savi	regime	charge code	1 Yr
TOTALS			32,505						
1	808	140250 5000 100	3,000	High Pressure Sodium	1	-	808	140250 5000 100	1
2	808	110055 2000 100	9,312	Low Pressure Sodium	1	-	808	110055 2000 100	1
3	808	140250 1000 100	1,695	High Pressure Sodium	1	-	808	140250 1000 100	1
4	808	110055 1000 100	6,367	Low Pressure Sodium	1	-	808	110055 1000 100	1
5	808	140070 1000 100	4,764	High Pressure Sodium	1	-	808	140070 1000 100	1
6	808	110090 2000 100	3,240	Low Pressure Sodium	1	-	808	110090 2000 100	1
7	808	110135 2000 100	1,724	Low Pressure Sodium	1	-	808	110135 2000 100	1
8	808	140250 2000 100	555	High Pressure Sodium	1	-	808	140250 2000 100	1
9	808	140150 1000 100	424	High Pressure Sodium	1	-	808	140150 1000 100	1
10	808	280140 5000 100	387	Cosmopolis	1	-	808	280140 5000 100	1
11	808	140400 1000 100	110	High Pressure Sodium	1	-	808	140400 1000 100	1
12	808	280060 5000 100	262	Cosmopolis	1	-	808	280060 5000 100	1
13	808	140100 1000 100	116	High Pressure Sodium	1	-	808	140100 1000 100	1
14	808	140070 5000 100	123	High Pressure Sodium	1	-	808	140070 5000 100	1
15	808	140150 5000 100	55	High Pressure Sodium	1	-	808	140150 5000 100	1
16	808	110035 2000 100	138	Low Pressure Sodium	1	-	808	110035 2000 100	1
17	808	280045 5000 100	91	Cosmopolis	1	-	808	280045 5000 100	1
18	808	140070 2000 100	50	High Pressure Sodium	1	-	808	140070 2000 100	1
19	808	110035 1000 100	32	Low Pressure Sodium	1	-	808	110035 1000 100	1
20	808	310036 1000 100	36	Low Pressure Mercury (F	1	-	808	310036 1000 100	1
21	808	140150 2000 100	5	High Pressure Sodium	1	-	808	140150 2000 100	1
22	808	310058 1000 100	3	Low Pressure Mercury (F	1	-	808	310058 1000 100	1
23	808	310008 1000 100	14	Low Pressure Mercury (F	1	-	808	310008 1000 100	1
24	808	310020 1000 100	2	Low Pressure Mercury (F	1	-	808	310020 1000 100	1

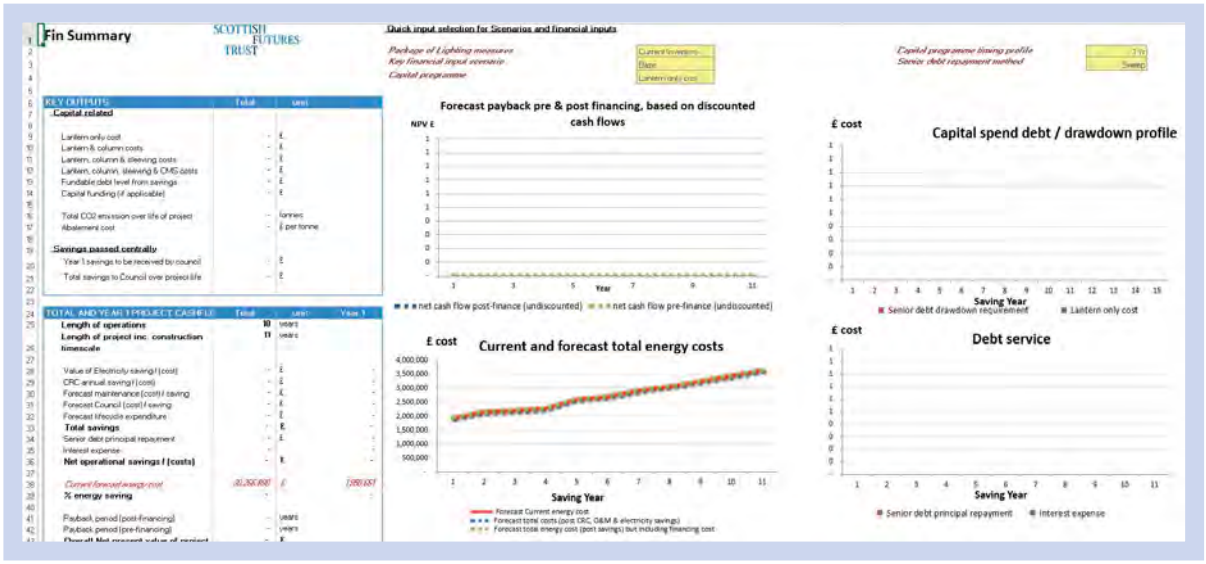
5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

7. Next, update the annual electricity cost. Use the figure calculated in 'Tech Inp' O4 to update the base current cost of electricity in 'Fin Inp' J28. Ensure the correct electricity company region in J27 is selected from the drop down menu in J27.



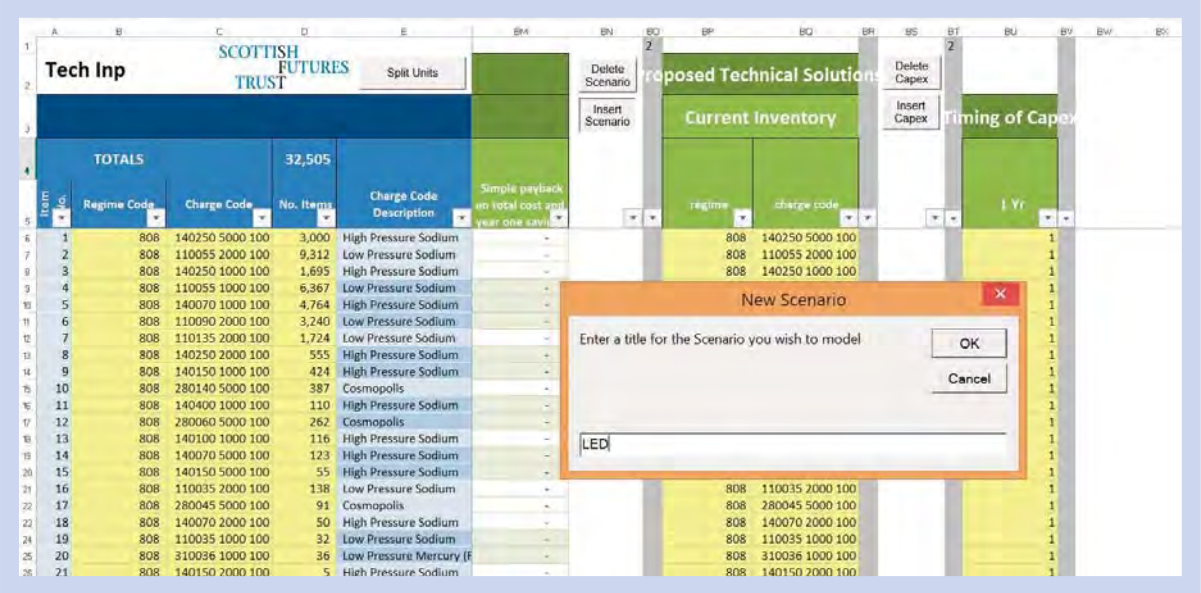
1	**Fin Inp**	SCOTTISH FUTURES TRUST		New Scenario		
2	Key financial input scenario		Base		2	Base
3	Input Label for comparison with scenario above		Base	Delete Scenario	2	
4	No. of differing inputs between scenarios		-			
5			**Active Input**	**Unit**		
7	**DATE & FORECAST PERIOD ASSUMPTIONS**					**Differences between current 'Base' & 'Base' scenario**
9	Financial forecast start date		**01 Apr 2014**	date		01 Apr 2014
10	First financial year		**2015**	year #		2015
11	Financial year end month number		**3**	month #		
13	Month end date from when savings start to be made		**31 Mar 15**	date		
14	Length of operations		**10**	years		10
15	Length of overall construction period		**1**	years		
16	Length of project inc. construction timescale		**11**	years		
17	No. of years delay post useful life before replacement		**-**	years		-
20	General economic assumptions					
21	Assumed general inflation Rate		**2.50%**	%		2.5%
22	Year 1 savings to be received by council		**-**	£		-
23	Development & Advisory costs		**-**	£		-
24	DECC Forecast electricity scenario (1- low, 2-med, 3-high)		**2**	scenario		2
26	Current energy costs					
27	Regime area		**South Scotland**	£		South Scotland
28	Base current cost of Electricity		**1,740,704**	£		1,740,704

8. The 'Fin Summary' sheet should look something like the picture below. It shows the current cost of electricity escalating over the forecast period.

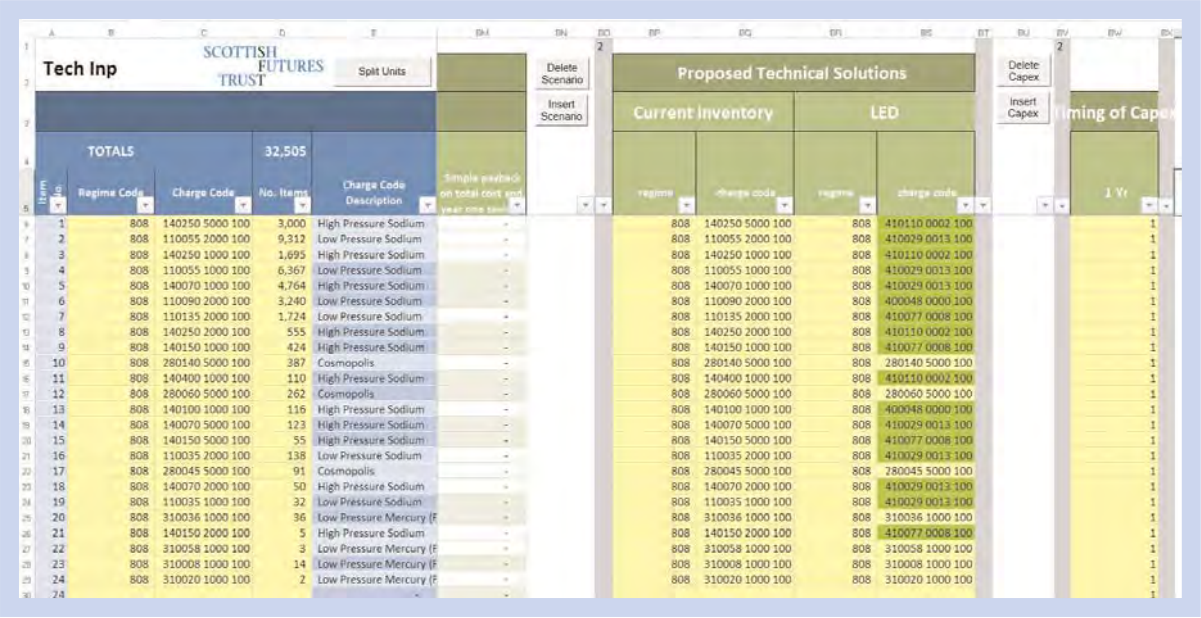


5.3 Inputting an LED replacement technical solution

9. Go to 'Tech Inp' sheet. Click the button at Cell BP2 ('Insert Scenario'). A dialogue box comes up, at the prompt type LED as the proposed scenario name and click 'OK'.

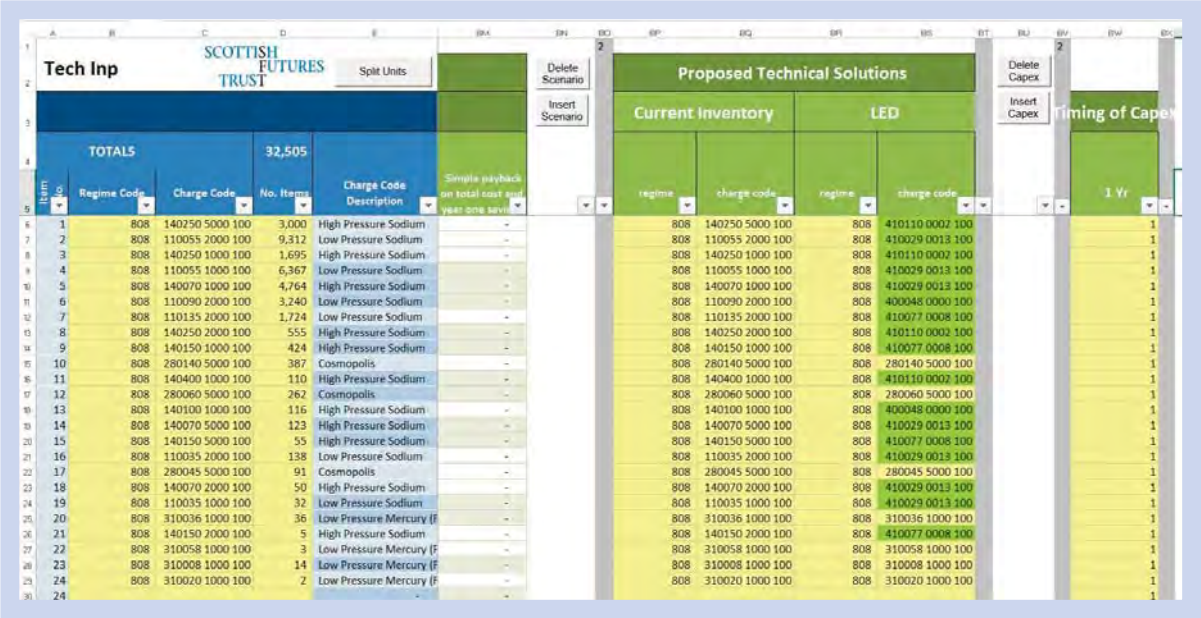


10. The current inventory Regime and Charge codes in Col BP:BQ are automatically pasted into the respective regime and charge code columns for the new 'LED' scenario.

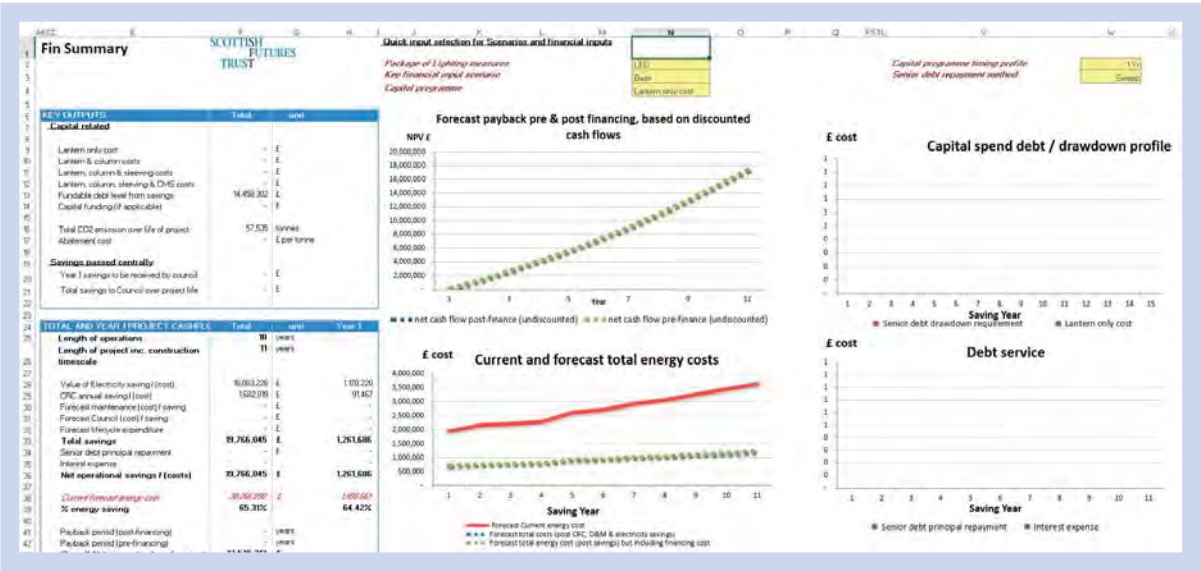


5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

11. Working down columns BR and BS, replacement solutions for each line of inventory can be developed. Use the example replacement charge codes provided in the inventory sheet – these can be cut and pasted or manually typed in. The picture below shows which lanterns have been replaced.

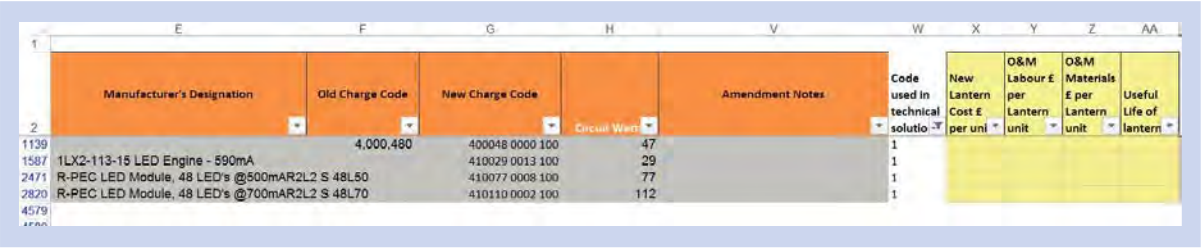


12. To see the impact of using this new technical scenario, go the 'Fin Summary' sheet and from the drop down menu in N2, Select 'LED'. The graphs and numbers on the summary sheet should update and look something like the picture below.



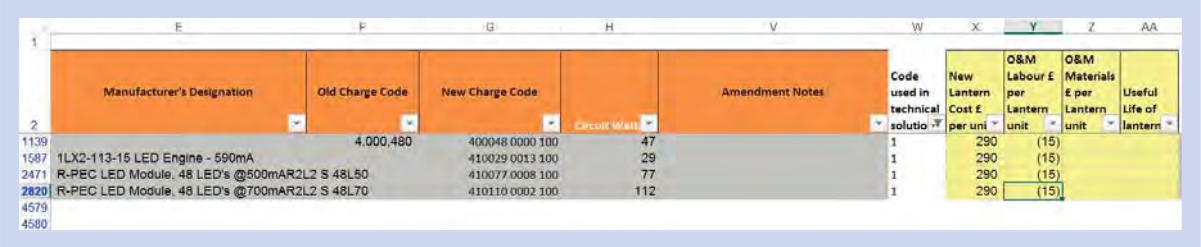
13. Importantly, there do not appear to be any capital costs associated with this solution per the graphs or outputs in cells F9:F12. This is because the lantern replacement solutions require capital costs to be attributed to them, which is done as follows;

14. Go to the 'ChgCode' sheet click the drop down options in cell W2, uncheck the box next to the '0' followed by 'OK'. This filters all the charge codes that have a '1' allocated to them and these represent all those charge codes that are being used as replacement solutions in the current technical solution.



	E	F	G	H	V	W	X	Y	Z	AA
1										
2	Manufacturer's Designation	Old Charge Code	New Charge Code	Circuit Watt	Amendment Notes	Code used in technical solutio	New Lantern Cost £ per uni	O&M Labour £ per Lantern unit	O&M Materials £ per Lantern unit	Useful Life of lantern
1139		4,000,480	400048 0000 100	47		1				
1587	1LX2-113-15 LED Engine - 590mA		410029 0013 100	29		1				
2471	R-PEC LED Module, 48 LED's @500mAR2L2 S 48L50		410077 0008 100	77		1				
2820	R-PEC LED Module, 48 LED's @700mAR2L2 S 48L70		410110 0002 100	112		1				
4579										

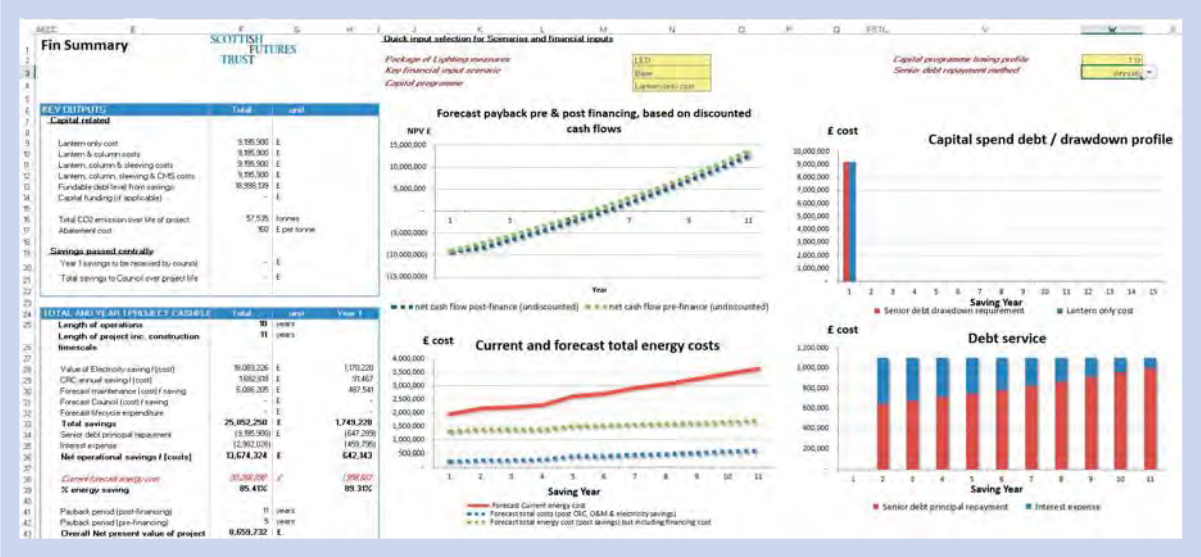
15. The capital costs and maintenance savings against each of these charge codes can simply be entered next to each lantern replacement solution. In this example, a lantern and installation cost of £290, with associated O&M savings of £15 pa is assumed for each lantern replacement. It is important to note that TECHNICAL ADVISOR INPUT IS REQUIRED TO GIVE APPROPRIATE COSTS AND SAVINGS FOR LANTERN REPLACEMENT SOLUTIONS.



	E	F	G	H	V	W	X	Y	Z	AA
1										
2	Manufacturer's Designation	Old Charge Code	New Charge Code	Circuit Watt	Amendment Notes	Code used in technical solutio	New Lantern Cost £ per uni	O&M Labour £ per Lantern unit	O&M Materials £ per Lantern unit	Useful Life of lantern
1139		4,000,480	400048 0000 100	47		1	290	(15)		
1587	1LX2-113-15 LED Engine - 590mA		410029 0013 100	29		1	290	(15)		
2471	R-PEC LED Module, 48 LED's @500mAR2L2 S 48L50		410077 0008 100	77		1	290	(15)		
2820	R-PEC LED Module, 48 LED's @700mAR2L2 S 48L70		410110 0002 100	112		1	290	(15)		
4579										
4580										

5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

16. On returning to the 'Fin Summary' sheet, a more appropriate set of graphs and outputs are displayed. ALWAYS double check to ensure that ALL CAPITAL costs have been included.

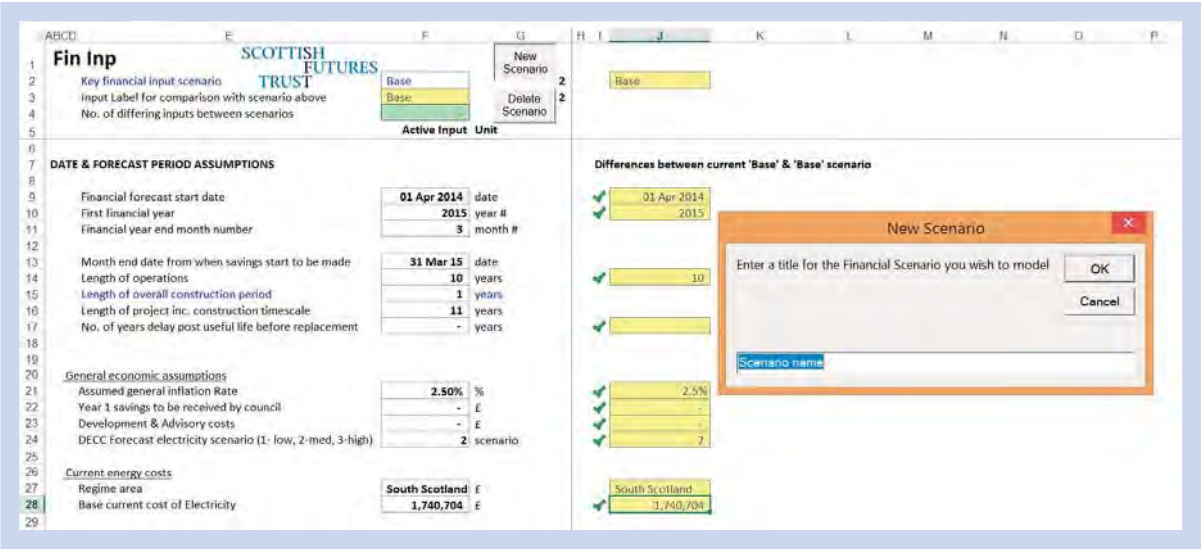


5.4 Refining the financial model

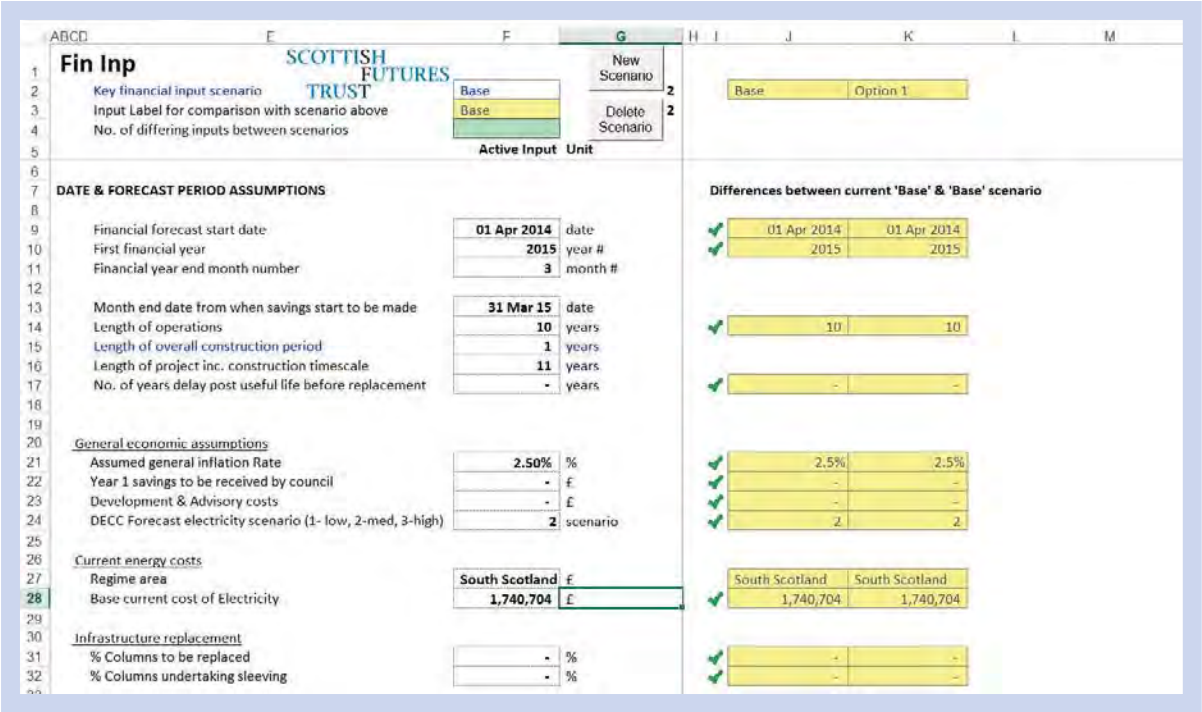
The following steps can be used to refine the basic model further and consider the impact of different technical scenarios as well as varying financial assumptions.

5.5 Alternative financial scenarios

17. Go to the 'Fin Inp' sheet. Click the 'New Scenario' button in G1. A dialogue box opens requesting a title for the new input.



18. Type 'Option 1' and click 'OK' or press enter. A new financial scenario is inserted alongside the 'Base' scenario with the new title 'Option 1'. All of the base case assumption values are copied across into this new scenario.



	Fin Inp	SCOTTISH FUTURES TRUST		New Scenario		
	Key financial input scenario		Base		2	Base / Option 1
	Input Label for comparison with scenario above		Base	Delete Scenario	2	
	No. of differing inputs between scenarios					
			Active Input	**Unit**		
	DATE & FORECAST PERIOD ASSUMPTIONS					**Differences between current 'Base' & 'Base' scenario**
	Financial forecast start date		01 Apr 2014	date		01 Apr 2014 / 01 Apr 2014
	First financial year		2015	year #		2015 / 2015
	Financial year end month number		3	month #		
	Month end date from when savings start to be made		31 Mar 15	date		
	Length of operations		10	years		10 / 10
	Length of overall construction period		1	years		
	Length of project inc. construction timescale		11	years		
	No. of years delay post useful life before replacement		-	years		- / -
	General economic assumptions					
	Assumed general inflation Rate		2.50%	%		2.5% / 2.5%
	Year 1 savings to be received by council		-	£		- / -
	Development & Advisory costs		-	£		- / -
	DECC Forecast electricity scenario (1- low, 2-med, 3-high)		2	scenario		2 / 2
	Current energy costs					
	Regime area		South Scotland	£		South Scotland / South Scotland
	Base current cost of Electricity		1,740,704	£		1,740,704 / 1,740,704
	Infrastructure replacement					
	% Columns to be replaced		-	%		- / -
	% Columns undertaking sleeving		-	%		- / -

5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

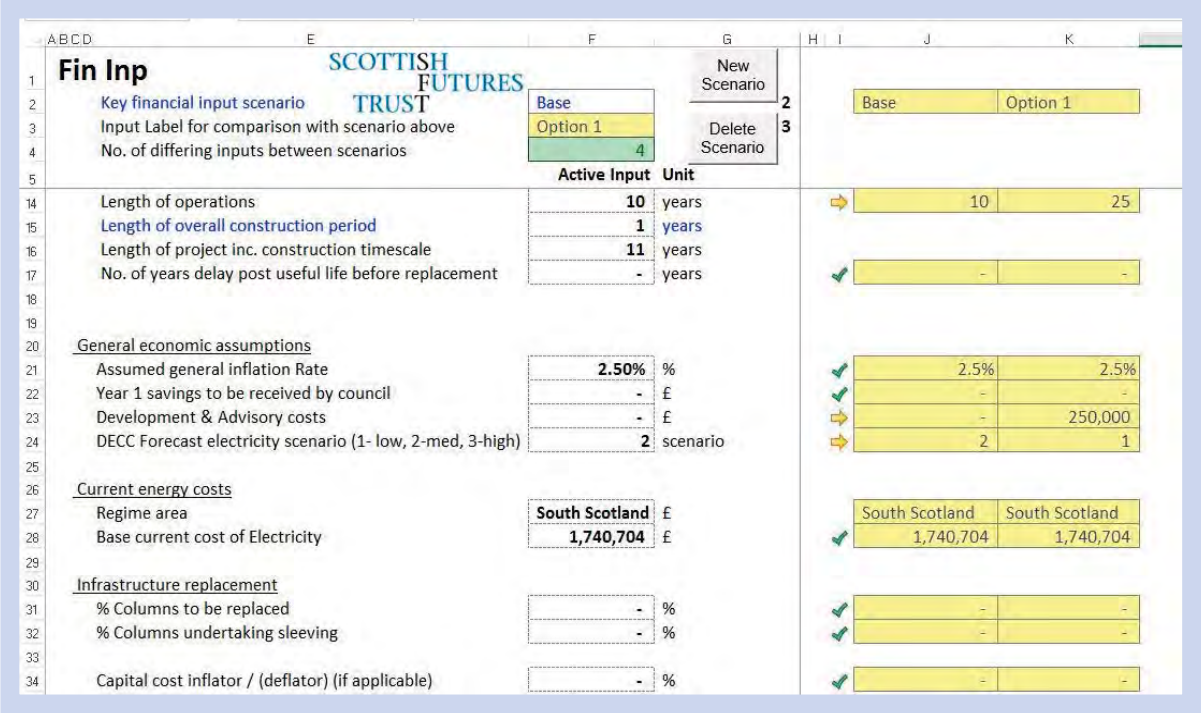
19. Modify the inputs in the 'Option 1' column to the required values for the new financial scenario. The following adjustments can now be made.

> Cell K14 = 25 (adjust the project length from 10 years in 'Base' scenario to 25 years)

> Cell K23 = 250,000 (adjust to include additional development costs)

> Cell K24 = 1 (adjust the DECC forecast escalation profile to 'low')

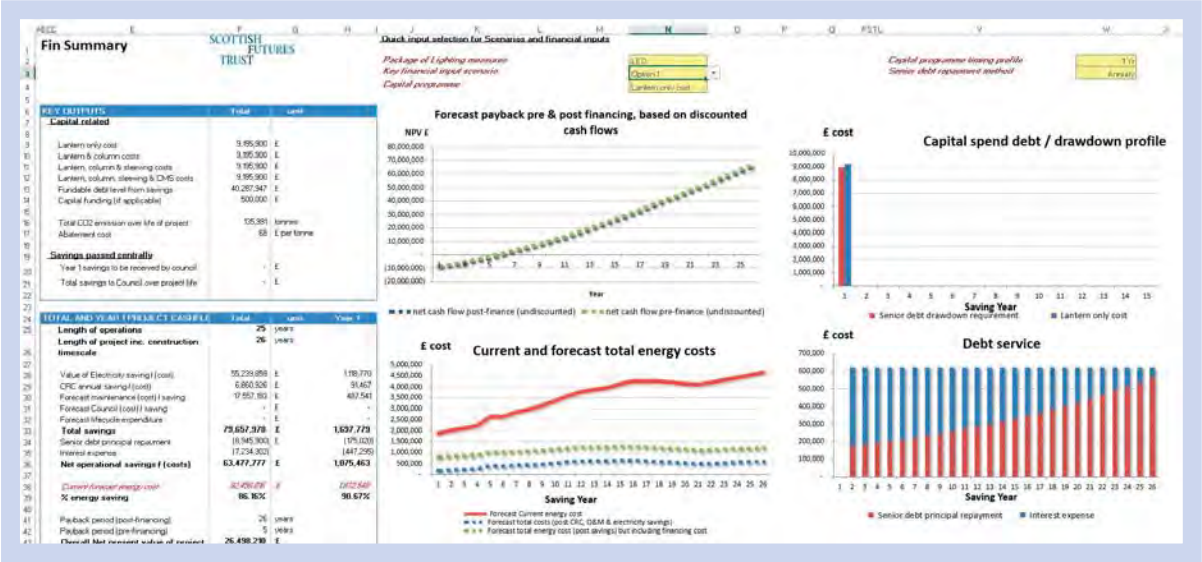
> Cell K47 = 500,000 (reflect capital grant available from the Council)



1	**Fin Inp**	SCOTTISH FUTURES TRUST		New Scenario			
2	Key financial input scenario	Base		2		Base	Option 1
3	Input Label for comparison with scenario above	Option 1		Delete Scenario 3			
4	No. of differing inputs between scenarios	4					
5		**Active Input**	**Unit**				
14	Length of operations	**10**	years		⇨	10	25
15	Length of overall construction period	**1**	years				
16	Length of project inc. construction timescale	**11**	years				
17	No. of years delay post useful life before replacement	**-**	years		✓	-	-
18							
19							
20	General economic assumptions						
21	Assumed general inflation Rate	**2.50%**	%		✓	2.5%	2.5%
22	Year 1 savings to be received by council	**-**	£		✓	-	-
23	Development & Advisory costs	**-**	£		⇨	-	250,000
24	DECC Forecast electricity scenario (1- low, 2-med, 3-high)	**2**	scenario		⇨	2	1
25							
26	Current energy costs						
27	Regime area	**South Scotland**	£			South Scotland	South Scotland
28	Base current cost of Electricity	**1,740,704**	£		✓	1,740,704	1,740,704
29							
30	Infrastructure replacement						
31	% Columns to be replaced	**-**	%		✓	-	-
32	% Columns undertaking sleeving	**-**	%		✓	-	-
33							
34	Capital cost inflator / (deflator) (if applicable)	**-**	%		✓	-	-

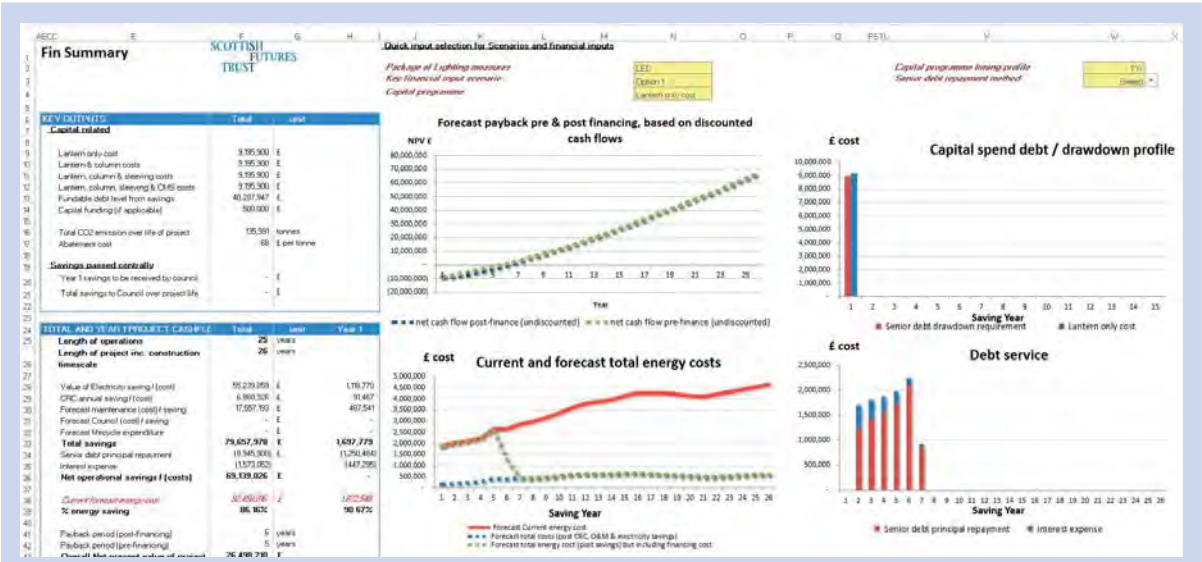
You will see that Orange arrows are shown in Col I where the values for 'Option 1' differ from those in the 'Base' Option. You can compare the inputs for different scenarios by selecting a scenario from the drop down box in Cell F3.

20. To see the impact of these changes on the model, go to the 'Fin Summary' sheet. Adjust dropdown selection in Cell N3 to 'Option 1'. You can switch between different scenarios at any point once they have been set up. The 'Fin Summary' sheet will have changed to the picture below.



5.6 Amending the financial repayment profile

21. You can consider the impact of changing between different senior debt repayment profiles from the drop down selection in Cell W3. In cell W3, select 'sweep' and the graphs as well as outputs should change as follows. Notice that the Payback period (post financing) cell 41 is reduced dramatically.

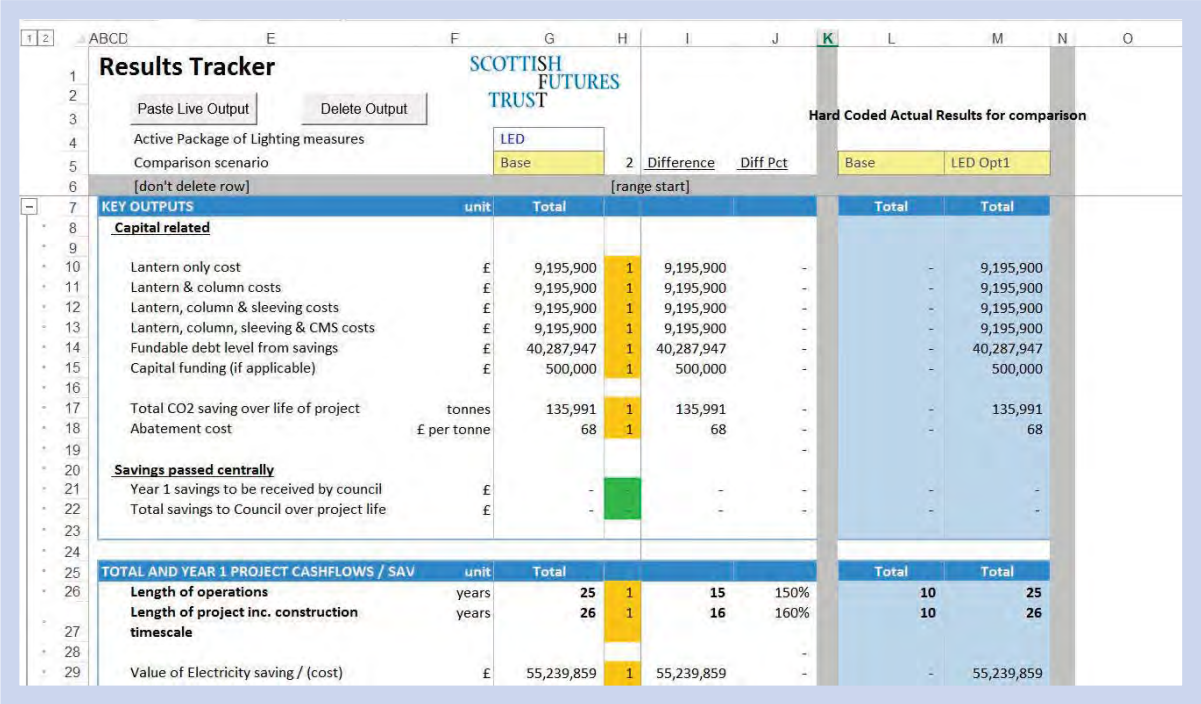


5. Instructions for Creating a Bepoke Financial Model for a Project (continued)

5.7 Track the Output changes of the current amendments against the base model

22. Select the 'Results Tracker' tab. Click the 'Paste live output' button Cell E3. A dialogue box opens requesting a new title. Type 'LED Opt1' as the title – this title combines the current technical solution ('LED') with the financial data ('Option 1'). You can compare the current outputs in Col G with any other previously modelled outputs by using the drop down selection in Cell G5.

23. If a column of results need to be deleted, click the 'Delete Output' button at the top of the sheet.



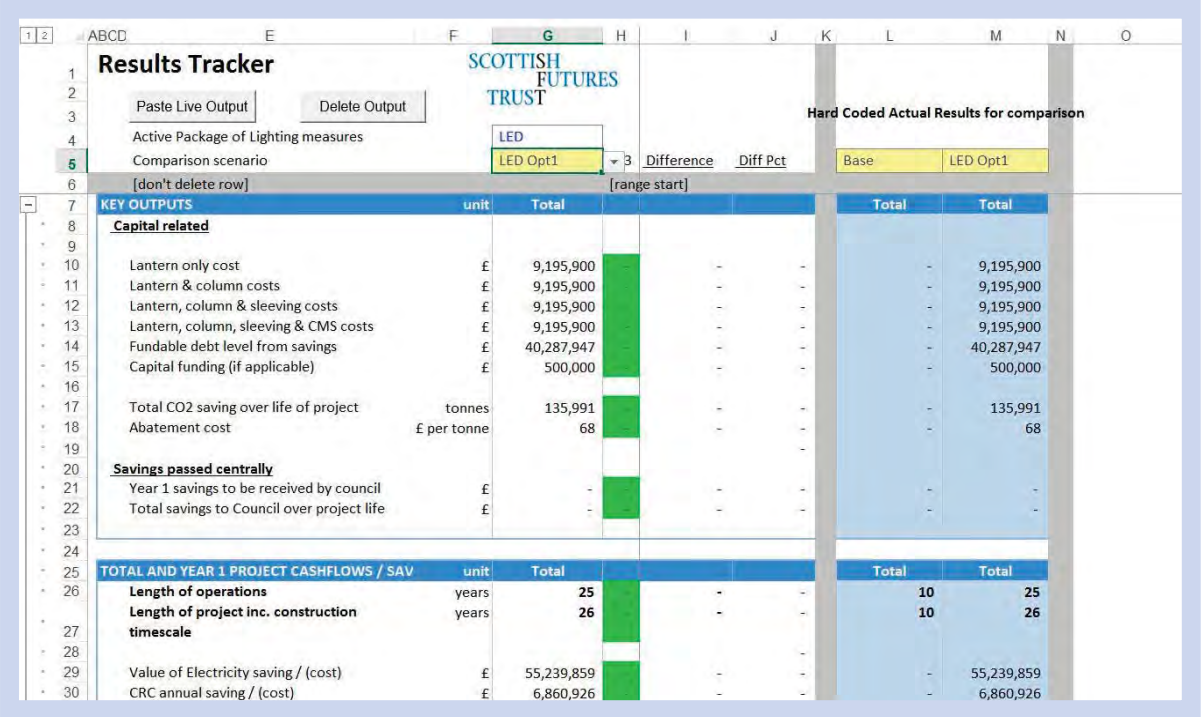
Results Tracker

SCOTTISH FUTURES TRUST

Paste Live Output | Delete Output

Hard Coded Actual Results for comparison

4	Active Package of Lighting measures		LED						
5	Comparison scenario		Base	2	Difference	Diff Pct	Base	LED Opt1	
6	[don't delete row]			[range start]					
7	**KEY OUTPUTS**	**unit**	**Total**				**Total**	**Total**	
8	**Capital related**								
10	Lantern only cost	£	9,195,900	1	9,195,900	-	-	9,195,900	
11	Lantern & column costs	£	9,195,900	1	9,195,900	-	-	9,195,900	
12	Lantern, column & sleeving costs	£	9,195,900	1	9,195,900	-	-	9,195,900	
13	Lantern, column, sleeving & CMS costs	£	9,195,900	1	9,195,900	-	-	9,195,900	
14	Fundable debt level from savings	£	40,287,947	1	40,287,947	-	-	40,287,947	
15	Capital funding (if applicable)	£	500,000	1	500,000	-	-	500,000	
17	Total CO2 saving over life of project	tonnes	135,991	1	135,991	-	-	135,991	
18	Abatement cost	£ per tonne	68	1	68	-	-	68	
20	**Savings passed centrally**								
21	Year 1 savings to be received by council	£	-		-	-	-	-	
22	Total savings to Council over project life	£	-		-	-	-	-	
25	**TOTAL AND YEAR 1 PROJECT CASHFLOWS / SAV**	**unit**	**Total**				**Total**	**Total**	
26	**Length of operations**	years	**25**	1	**15**	150%	**10**	**25**	
27	**Length of project inc. construction timescale**	years	**26**	1	**16**	160%	**10**	**26**	
29	Value of Electricity saving / (cost)	£	55,239,859	1	55,239,859	-	-	55,239,859	



Results Tracker

SCOTTISH FUTURES TRUST

Paste Live Output | Delete Output

Hard Coded Actual Results for comparison

4	Active Package of Lighting measures		LED						
5	Comparison scenario		LED Opt1	3	Difference	Diff Pct	Base	LED Opt1	
6	[don't delete row]				[range start]				
7	**KEY OUTPUTS**	**unit**	**Total**				**Total**	**Total**	
8	**Capital related**								
9									
10	Lantern only cost	£	9,195,900		-	-	-	9,195,900	
11	Lantern & column costs	£	9,195,900		-	-	-	9,195,900	
12	Lantern, column & sleeving costs	£	9,195,900		-	-	-	9,195,900	
13	Lantern, column, sleeving & CMS costs	£	9,195,900		-	-	-	9,195,900	
14	Fundable debt level from savings	£	40,287,947		-	-	-	40,287,947	
15	Capital funding (if applicable)	£	500,000		-	-	-	500,000	
16									
17	Total CO2 saving over life of project	tonnes	135,991		-	-	-	135,991	
18	Abatement cost	£ per tonne	68		-	-	-	68	
19						-			
20	**Savings passed centrally**								
21	Year 1 savings to be received by council	£	-		-	-	-	-	
22	Total savings to Council over project life	£	-		-	-	-	-	
23									
24									
25	**TOTAL AND YEAR 1 PROJECT CASHFLOWS / SAV**	**unit**	**Total**				**Total**	**Total**	
26	**Length of operations**	years	**25**		**-**	-	**10**	**25**	
27	**Length of project inc. construction timescale**	years	**26**		**-**	-	**10**	**26**	
28						-			
29	Value of Electricity saving / (cost)	£	55,239,859		-	-	-	55,239,859	
30	CRC annual saving / (cost)	£	6,860,926		-	-	-	6,860,926	

06

6 Technical Refinements

6.1 Modify the timing of the capital investment programme

24. Select the 'Tech Inp' tab. A useful approach to get an initial capital investment programme is to assume that approximately 10,000 units can be replaced annually. Naturally this is only indicative, but gives a reasonable approach for a manageable project. It is also sensible to replace those assets that have the highest electricity consumption as a priority in order to maximise savings in the early years of the project. The ranking profile in Col P provides a useful aid for doing this, and the filtering applied earlier gives us the significant energy consuming lanterns at the top of the list. The top 10 energy consuming lantern types typically these represent >90% of the overall electrical consumption, and it is not untypical for the top 5 lantern types represent >70% of the overall electricity consumption. In terms of procurement, it can result in only a handful of lantern type replacements need to be considered to achieve a successful project.

25. Click the 'Insert Capex' button at BS3. Again, a prompt for the name profile is required. Type '3 Yr' and click 'OK'. In Col BX, for each lantern in the current inventory that is to be replaced, input the year in which this will occur, illustrated as follows. In doing this, try to ensure the total no. of units replaced each year is approximately 10,000.

Tech Inp

SCOTTISH FUTURES TRUST

Split Units

oposed Technical Solutions

Delete Capex

Insert Capex

Timing of Capex

Inventory

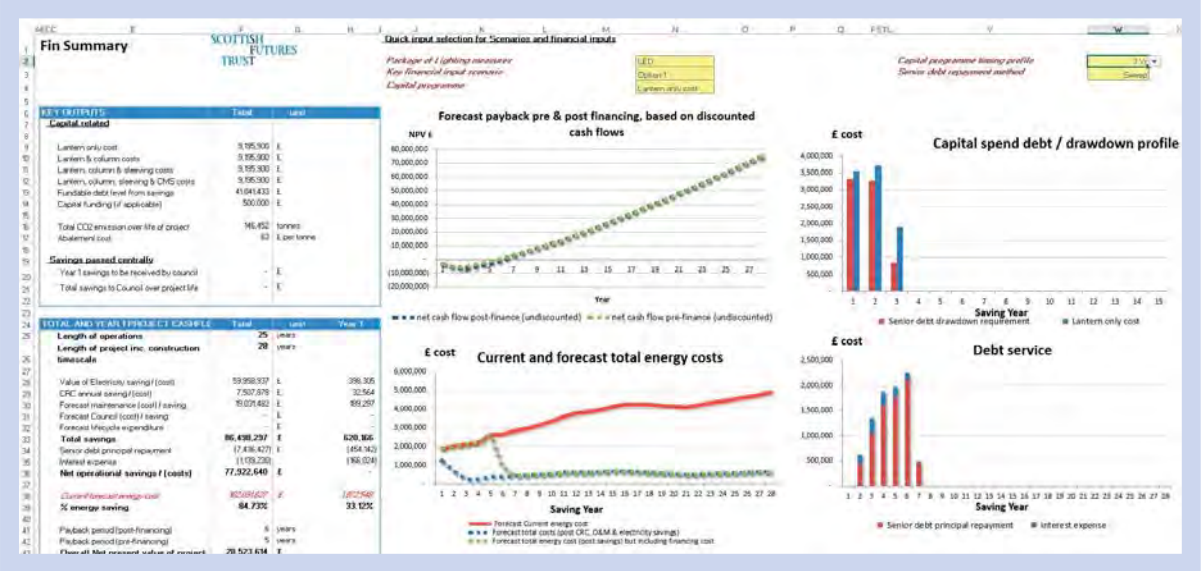
LED

TOTALS

32,505

Item No.	Regime Code	Charge Code	No. Items	Charge Code Description	charge code	regime	charge code	1 Yr	3 Yr
1	808	140250 5000 100	3,000	High Pressure Sodium	140250 5000 100	808	410110 0002 100	1	1
2	808	110055 2000 100	9,312	Low Pressure Sodium	110055 2000 100	808	410029 0013 100	1	1
3	808	140250 1000 100	1,695	High Pressure Sodium	140250 1000 100	808	410110 0002 100	1	2
4	808	110055 1000 100	6,367	Low Pressure Sodium	110055 1000 100	808	410029 0013 100	1	2
5	808	140070 1000 100	4,764	High Pressure Sodium	140070 1000 100	808	410029 0013 100	1	2
6	808	110090 2000 100	3,240	Low Pressure Sodium	110090 2000 100	808	400048 0000 100	1	3
7	808	110135 2000 100	1,724	Low Pressure Sodium	110135 2000 100	808	410077 0008 100	1	3
8	808	140250 2000 100	555	High Pressure Sodium	140250 2000 100	808	410110 0002 100	1	3
9	808	140150 1000 100	424	High Pressure Sodium	140150 1000 100	808	410077 0008 100	1	3
10	808	280140 5000 100	387	Cosmopolis	280140 5000 100	808	280140 5000 100	1	1
11	808	140400 1000 100	110	High Pressure Sodium	140400 1000 100	808	410110 0002 100	1	3
12	808	280060 5000 100	262	Cosmopolis	280060 5000 100	808	280060 5000 100	1	1
13	808	140100 1000 100	116	High Pressure Sodium	140100 1000 100	808	400048 0000 100	1	3
14	808	140070 5000 100	123	High Pressure Sodium	140070 5000 100	808	410029 0013 100	1	3
15	808	140150 5000 100	55	High Pressure Sodium	140150 5000 100	808	410077 0008 100	1	3
16	808	110035 2000 100	138	Low Pressure Sodium	110035 2000 100	808	410029 0013 100	1	3
17	808	280045 5000 100	91	Cosmopolis	280045 5000 100	808	280045 5000 100	1	1
18	808	140070 2000 100	50	High Pressure Sodium	140070 2000 100	808	410029 0013 100	1	3
19	808	110035 1000 100	32	Low Pressure Sodium	110035 1000 100	808	410029 0013 100	1	3
20	808	310036 1000 100	36	Low Pressure Mercury (F	310036 1000 100	808	310036 1000 100	1	1
21	808	140150 2000 100	5	High Pressure Sodium	140150 2000 100	808	410077 0008 100	1	3
22	808	310058 1000 100	3	Low Pressure Mercury (F	310058 1000 100	808	310058 1000 100	1	1
23	808	310008 1000 100	14	Low Pressure Mercury (F	310008 1000 100	808	310008 1000 100	1	1
24	808	310020 1000 100	2	Low Pressure Mercury (F	310020 1000 100	808	310020 1000 100	1	1

To see the impact of this replacement programme profile, select the 'Fin Summary' tab. In cell W3, select '5 yr' to see the impact of the capital investment profile. Note, the Capital Spend profile graph has changed from a single column to multiple columns. The model adjusts for the annual financing requirement accordingly.



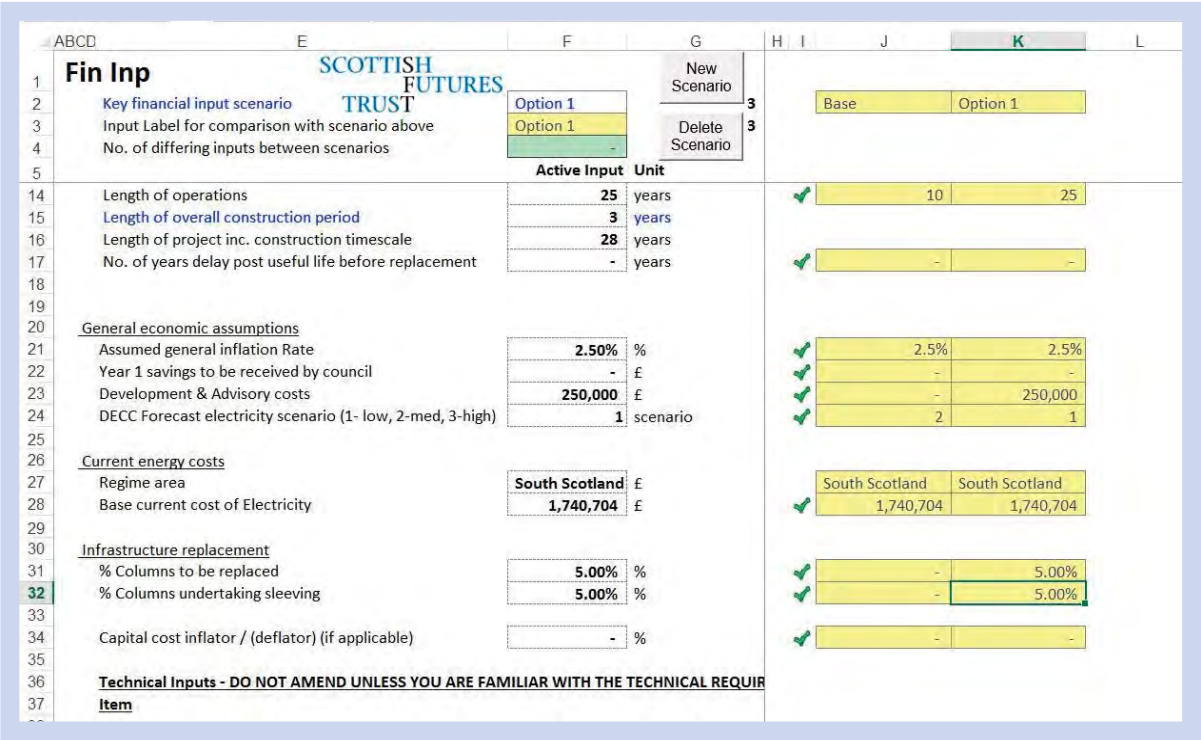
26. To delete a capex programme profile, click the 'Delete Capex' button on the Tech Inp sheet, at BS2.

6.2 Include general column / sleeving replacement costs

It is likely at the time of undertaking a feasibility study, that a conditions survey for the current street lighting estate will have been undertaken. However, it is useful to understand what the cost associated with column and/or sleeving replacement may be.

27. Select the 'Fin Inp' sheet. Rows 31 and 32 allow a certain percentage of columns in the existing estate to be replaced. The outputs in Fin Summary cells F11 and F12 will change accordingly. To see the impact of including either of these capital cost profiles, the capital programme can be amended from the drop down menu in Cell N4 on the Fin Summary sheet. The results are shown below. The total number of columns replaced / sleeved can be seen in 'Tech Inp' cells BC4 and BF4.

6. Technical Refinements (continued)

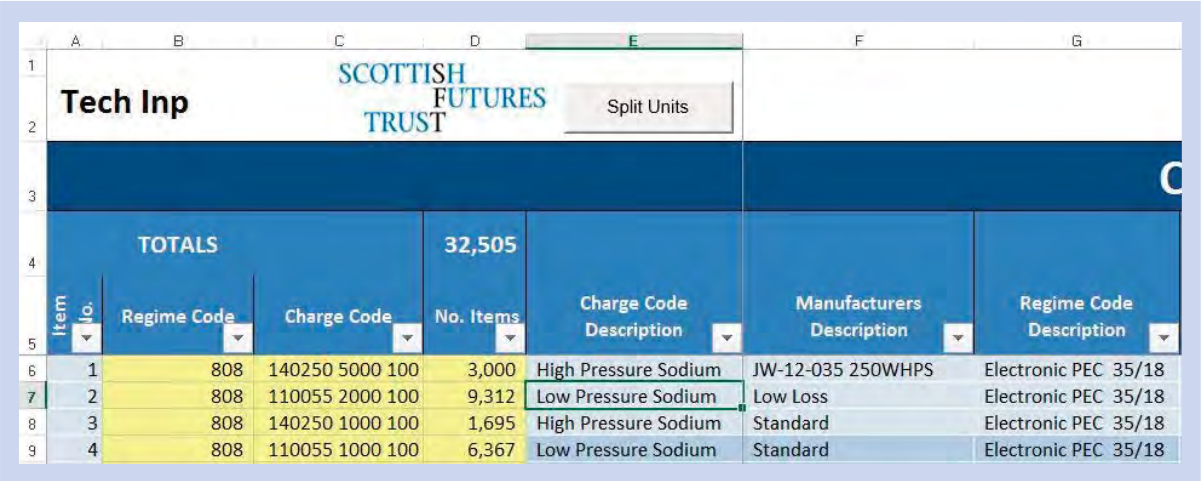


	E	F	G	J	K
1	**Fin Inp** SCOTTISH FUTURES TRUST		New Scenario		
2	Key financial input scenario	Option 1	3	Base	Option 1
3	Input Label for comparison with scenario above	Option 1	Delete Scenario 3		
4	No. of differing inputs between scenarios	-			
5		**Active Input**	**Unit**		
14	Length of operations	**25**	years	10	25
15	Length of overall construction period	**3**	years		
16	Length of project inc. construction timescale	**28**	years		
17	No. of years delay post useful life before replacement	**-**	years	-	-
18					
19					
20	General economic assumptions				
21	Assumed general inflation Rate	**2.50%**	%	2.5%	2.5%
22	Year 1 savings to be received by council	**-**	£	-	-
23	Development & Advisory costs	**250,000**	£	-	250,000
24	DECC Forecast electricity scenario (1- low, 2-med, 3-high)	**1**	scenario	2	1
25					
26	Current energy costs				
27	Regime area	**South Scotland**	£	South Scotland	South Scotland
28	Base current cost of Electricity	**1,740,704**	£	1,740,704	1,740,704
29					
30	Infrastructure replacement				
31	% Columns to be replaced	**5.00%**	%	-	5.00%
32	% Columns undertaking sleeving	**5.00%**	%	-	5.00%
33					
34	Capital cost inflator / (deflator) (if applicable)	**-**	%	-	-
35					
36	**Technical Inputs - DO NOT AMEND UNLESS YOU ARE FAMILIAR WITH THE TECHNICAL REQUIR**				
37	**Item**				

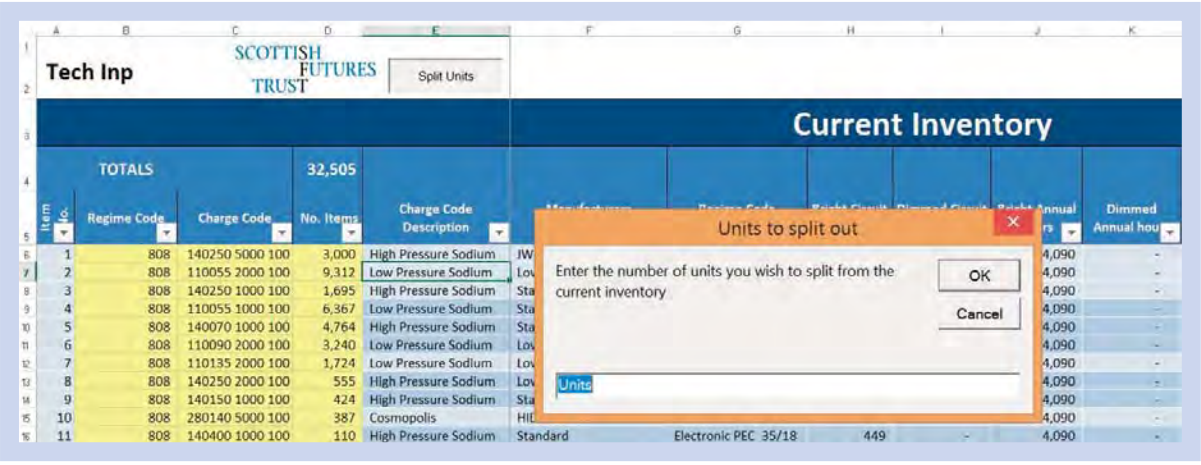
6.3 Split Lantern Inventory

The inventory report submitted to the meter administrator typically lists only the total units for a particular lantern type. In developing a capital programme it may be desirable to split the particular lantern inventory into smaller amounts for various reasons eg some of the inventory may not be replaced or requires a different technical solution, or the inventory may be spread over a wide geographical area and the programme may require a lantern replacement strategy that looks at an area by area programme, eg urban vs rural locations. Current Inventory lines (and associated technical solutions) can be split as follows.

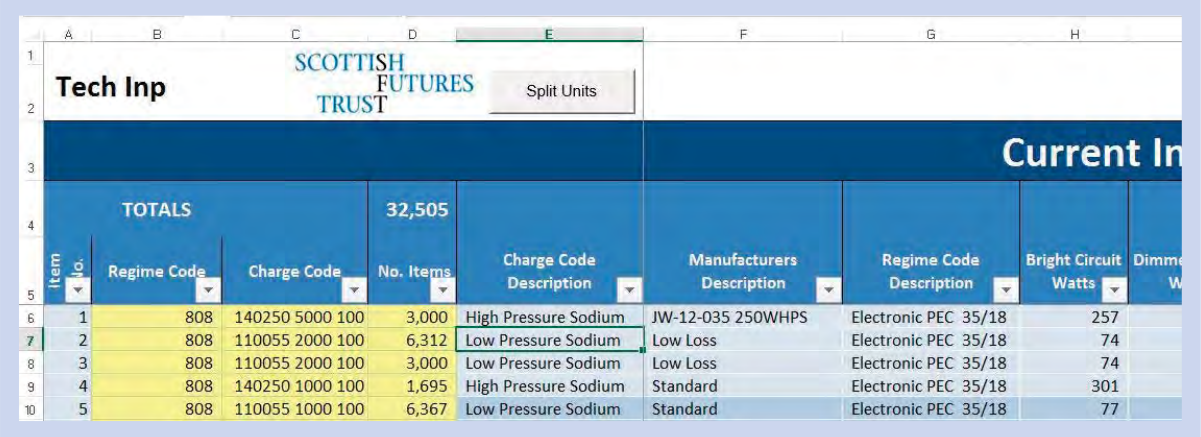
28. Select the 'Tech Inp' tab. Select a cell in the row of the current inventory line to be split. In the example below, it is required to split out 3,000 units for the 55W SOX (9,312 units on row 2). Ensure a cell in the required row (or the value 9,312 itself is highlighted).



29. Click 'Split Units' Cell E2. A dialogue box opens requesting the number of units to be split out. Enter 3,000 and click 'OK' or type enter.

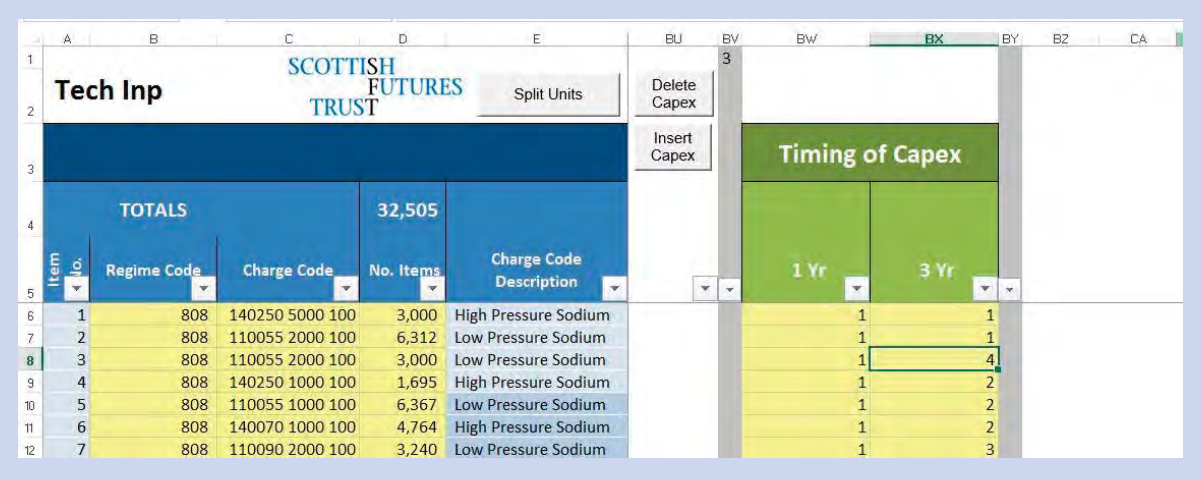


The lantern line has now been split out into 6,312 and 3,000 units respectively.



6. Technical Refinements (continued)

Any required amendments eg technical solution or timing can now be made in the new line containing the 3,000 units. Eg these lanterns are now to be replaced with LEDs in Year 4 and not Year 1.



Item No.	Regime Code	Charge Code	No. Items	Charge Code Description	1 Yr	3 Yr
TOTALS			32,505			
1	808	140250 5000 100	3,000	High Pressure Sodium	1	1
2	808	110055 2000 100	6,312	Low Pressure Sodium	1	1
3	808	110055 2000 100	3,000	Low Pressure Sodium	1	4
4	808	140250 1000 100	1,695	High Pressure Sodium	1	2
5	808	110055 1000 100	6,367	Low Pressure Sodium	1	2
6	808	140070 1000 100	4,764	High Pressure Sodium	1	2
7	808	110090 2000 100	3,240	Low Pressure Sodium	1	3

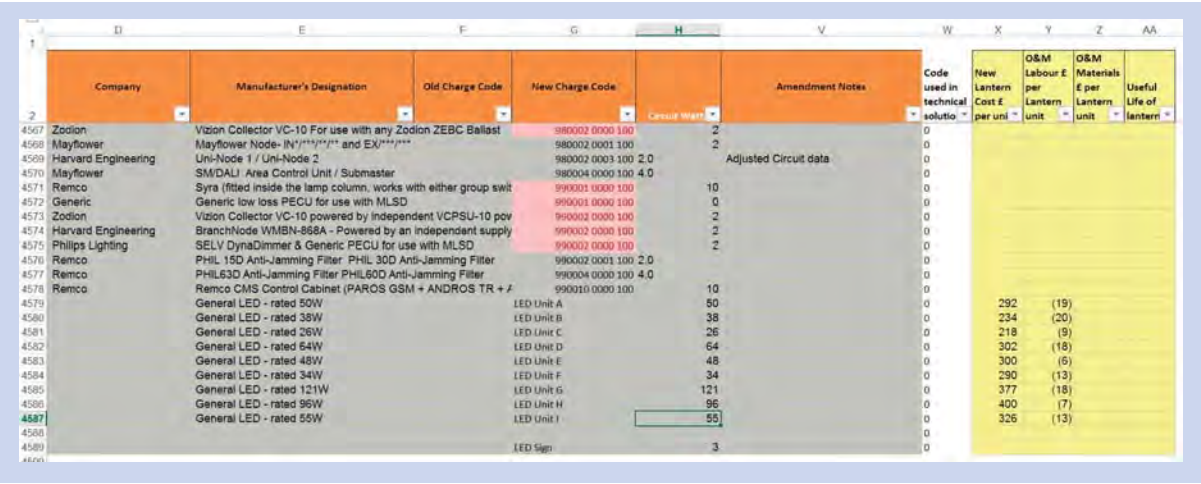
Tech Inp

SCOTTISH FUTURES TRUST

Split Units | Delete Capex | Insert Capex | Timing of Capex

6.4 Create 'Generic' technical lantern replacements

In developing a project, the charge code for a particular replacement solution may be inadequate or a more general solutions may wish to be created. This can be done easily by adding new 'general' charge codes at the bottom of the 'ChgCode' sheet along with the associated data for power consumption, capital costs, maintenance savings etc. An example of how this may look is provided below – they can be used to create solutions where the full specification of the lantern is not yet identified.



Company	Manufacturer's Designation	Old Charge Code	New Charge Code	Circuit Watts	Amendment Notes	Code used in technical solutio	New Lantern Cost £ per uni	O&M Labour £ per Lantern unit	O&M Materials £ per Lantern unit	Useful Life of lanterr
Zodion	Vizion Collector VC-10 For use with any Zodion ZEBC Ballast		980002 0000 100	2		0				
Mayflower	Mayflower Node- IN*/***/**/** and EX***/***		980002 0001 100	2		0				
Harvard Engineering	Uni-Node 1 / Uni-Node 2		980002 0003 100	2.0	Adjusted Circuit data	0				
Mayflower	SM/DALI Area Control Unit / Submaster		980004 0000 100	4.0		0				
Remco	Syra (fitted inside the lamp column, works with either group swit		990001 0000 100	10		0				
Generic	Generic low loss PECU for use with MLSD		990001 0000 100	0		0				
Zodion	Vizion Collector VC-10 powered by independent VCPSU-10 pov		990002 0000 100	2		0				
Harvard Engineering	BranchNode WMBN-868A - Powered by an independant supply		990002 0000 100	2		0				
Philips Lighting	SELV DynaDimmer & Generic PECU for use with MLSD		990002 0000 100	2		0				
Remco	PHIL 15D Anti-Jamming Filter PHIL 30D Anti-Jamming Filter		990002 0001 100	2.0		0				
Remco	PHIL63D Anti-Jamming Filter PHIL60D Anti-Jamming Filter		990004 0000 100	4.0		0				
Remco	Remco CMS Control Cabinet (PAROS GSM + ANDROS TR + /		990010 0000 100	10		0				
	General LED - rated 50W		LED Unit A	50		0	292	(19)		
	General LED - rated 38W		LED Unit B	38		0	234	(20)		
	General LED - rated 26W		LED Unit C	26		0	218	(9)		
	General LED - rated 64W		LED Unit D	64		0	302	(18)		
	General LED - rated 48W		LED Unit E	48		0	300	(6)		
	General LED - rated 34W		LED Unit F	34		0	290	(13)		
	General LED - rated 121W		LED Unit G	121		0	377	(18)		
	General LED - rated 96W		LED Unit H	96		0	400	(7)		
	General LED - rated 55W		LED Unit I	55		0	326	(13)		
						0				
			LED Sign	3		0				

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7. The use of Central Management System (CMS)

There is the ability to include the costs of CMS and replacement units in columns BH and BI of the Tech Inp sheet. However, energy savings & costs associated with the deployment of CMS have not been reflected in the current iteration of the model. SFT are looking at the most appropriate way to model the benefits of these systems and will form part of the ongoing development of the model.

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8. The use of Dimming Technologies

The toolkit can incorporate the use of dimming technologies and these will be reflected in both the applicable Regime and Charge Codes selected. It is important to note that the use of certain regime codes that provides both 'bright' and 'dimmed' annual hours, need to be matched with an appropriate charge code that details both the 'bright' and 'dimmed' circuit wattages so that the total annual consumption can be calculated accurately. Where appropriate charge codes may be difficult to identify, it is recommended that 'generic' dimmable lantern charge codes are created (as detailed above) with the bright and dimmable wattages included in columns H and L of the ChgCode sheet. Again, appropriate technical advice should be sort in developing these generic charge codes.

The model can only accommodate the use of single stage dimming at this point in time. Consideration is being given as to how best to incorporate multi-level dimming switch regime codes as a future development to the toolkit. This would allow further detailed refinement of potential preferred technical solutions.

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