SEAI Lighting Upgrade Credits Calculation Tool Guidance for Use

Date: 12/03/2018

Version 1.0

Contents

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V1.0	12/03/2018	Published for use

Lighting Upgrade Credits Calculation Tool

1. Introduction

1.1. A number of SEAI programmes offer support to businesses and the public sector for lighting upgrade projects.

1.2. The SEAI Lighting Upgrade Credits Calculation Tool ("lighting tool") has been designed to help companies to calculate the energy savings attributable to their lighting projects in a way that is also easy for SEAI to check.

1.3. This guidance document will help users:

A. enter details into the tool correctly; and

B. understand exactly how the calculations are carried out.

2. Overview of the tool

2.1. There are a number of visible tabs in the tool. Table 1 below sets out the information included in each.

Table 1 Overview of the tool

Tab	Information to be input by the user	Outputs
Version		This tab shows the version number and version history of the tool.
Business		This tab displays a high-level project summary, based on information provided in tabs S1 to S30. The summary includes: • Annual savings (kWh, cost, CO_2) • Annual energy use and electricity cost (before & after) • Watts/m^2 (before & after) • Payback period This tab prints on a single A4 page.
Dashboard	You can enter the name of the relevant SEAI Programme and the Obligated Party (if applicable).	This tab displays the totals for each site, and the overall project totals. Information shown includes: • Annual savings (kWh, cost, CO_2) • Annual energy use (before & after) • % of new fittings that are Triple E of equivalent This tab prints on a single A4 page.
S1 ('site 1') *(Up to 30 sites can be entered in tabs S1 to S30)*	All site-specific information is input on this tab, including: • Site details • Operating hours • Details of original and new luminaires	There is a summary box showing the totals for the site, including: • Annual savings (kWh, cost, CO_2) • Annual energy use (before & after) • Watts/m^2 (after)

2.2. The tool also contains a number of hidden tabs. These are hidden and locked to make the tool easier to manage.

2.3. The hidden tabs include the following information:

A. A copy of the latest version of the Triple E Register.
The register is updated at least once every six months. The lighting tool will be updated as required to contain the full list of Triple E Luminaires.

B. Multiplication factors for use in the calculations within the lighting tool:

1. A table of default values for control gear losses

Lamp type	Control gear multiplication factor	
	< 400 W	>= 400 W
Tungsten	1.00	1.00
Tungsten halogen	1.00	1.00
Fluorescent Compact	1.00	1.00
Fluorescent 2D MB	1.20	1.20
Fluorescent T12	1.15	1.15
Fluorescent T8 MB	1.15	1.15
Fluorescent T8 EB	1.00	1.00
Fluorescent T5	1.00	1.00
Metal halide	1.10	1.05
Mercury	1.05	1.05
Low pressure Sodium EB	1.20	1.20
Low pressure Sodium MB	1.20	1.20
High pressure Sodium	1.10	1.05
LED	1.00	1.00

This is based on the values in Appendix C of the Energy Efficiency Obligation Scheme: Guidance on authenticating and claiming energy credits.

2. A table of conversion factors for kWh:

From	To	Factor
kWh	Kg CO_2	0.409
kWh	kWh (Primary Energy)	2.5

The CO_2 conversion factor is based on the Dwelling Energy Assessment Procedure (DEAP) and will be updated periodically.
The primary energy conversion factor used in this tool is that required under the Energy Efficiency Obligation Scheme until the end of 2020. It will be updated periodically to align with the requirements of the Energy Efficiency Directive.

3. Multiplication factors to account for daylight and occupancy controls:

Type of control	Factor
Daylight	0.9
Occupancy	0.9

4. A table of multiplication factors to take account of savings available from different lighting types:

Lighting type	Multiplication factor
New fitting (Triple E or equivalent)	1.0
Emergency lighting: Standalone system – unmaintained fitting	0.0
Emergency lighting: Integrated fitting	1.02
Emergency lighting: Signage - maintained	1.02
Fitting (NOT Triple E or equivalent)	1.0
Bulb (NOT Triple E or equivalent)	1.0
No new fitting installed	1.0

The lighting types shown in the table are used in a drop-down list in the site tabs (S1 to S30).

C. Contents of drop-down lists in use throughout the lighting tool:

1. SEAI Programme
The related drop-down list appears at the top of the Dashboard tab. It includes the following schemes:

a) BEC – Better Energy Communities
b) EEOS – the Energy Efficiency Obligation Scheme
c) Public Sector Programme
d) SME Programme

2. Obligated Parties
The related list appears at the top of the Dashboard tab. It includes all of the energy companies currently obligated under EEOS:

a) Airtricity
b) Bord Gais Energy
c) Bord na Mona
d) Calor
e) Electric Ireland
f) Energia
g) Enprova
h) Flogas
i) Lissan
j) Vayu

3. Counties
The related list appears at the top of each site tab (S1 to S30), in the Site Details box. It includes all 26 counties in the Republic of Ireland. Note that SEAI programmes do not operate in Northern Ireland.

D. Types of site, activities within them and typical hours of operation.
A copy of this table is published separately as an appendix to this guidance note[1].

3. Completing the tool

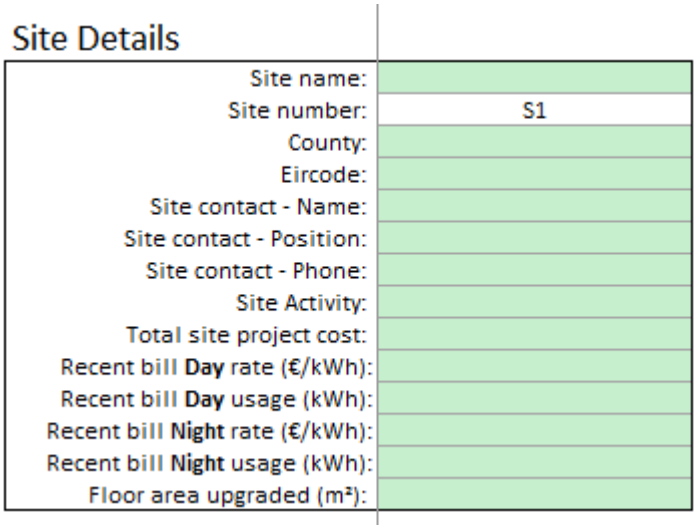
3.1. Use one workbook for each project. Where a project has more than 30 separate sites, more than one workbook will be needed.

[1] See Appendix 1: Sites and Operational Hours, available here: https://www.seai.ie/resources/tools/Appendix-1-to-Lighting-Tool-Sites-and-Operational-Hours.pdf

3.2. Assign a site number to each site within the project. Complete the relevant site tab for each site (complete S1 for site number 1, S2 for site number 2, etc).

3.3. All input fields in the tool are green.

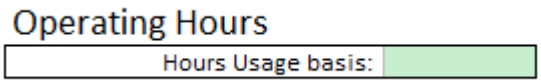
Step 1: Complete the Site Details box at the top of the page.



3.4. The table below provides instructions for completing the table. Some of the input fields are optional.

Field	Instructions for completion
Site name	Please always complete these fields. They will help SEAI in identifying the site.
County	
Eircode	
Site contact - Name	Users may find it helpful to complete the contact details for the site, for ease of reference.
Site contact - Position	
Site contact - Phone	
Site Activity	*MANDATORY FIELD* You must select the most appropriate option from the drop-down list in the cell. If you do not select an option, the spreadsheet will not calculate savings for the site.
Total site project cost	Enter the total project costs relating to this site. Costs should include all materials and labour associated with the lighting upgrade works.
Recent bill Day rate (€/kWh)	Refer to a recent electricity bill for the site. Enter the day rate cost per kWh shown on the bill. (If the site has a single tariff, enter the single tariff here).
Recent bill Day usage	Refer to a recent electricity bill for the site. Enter the total kWh consumption associated with the day rate. (If the site has a single tariff, enter the total site kWh here).
Recent bill Night rate (€/kWh)	Refer to a recent electricity bill for the site. Enter the night rate cost per kWh shown on the bill.
Recent bill Night usage	Refer to a recent electricity bill for the site. Enter the total kWh consumption associated with the night rate.
Floor area upgraded (m^2)	If you know the floor area of the upgraded section of the site (which may be the full site), please enter it here. This will help with benchmarking for information purposes.

Step 2: Complete the Operating Hours box at the top of the page

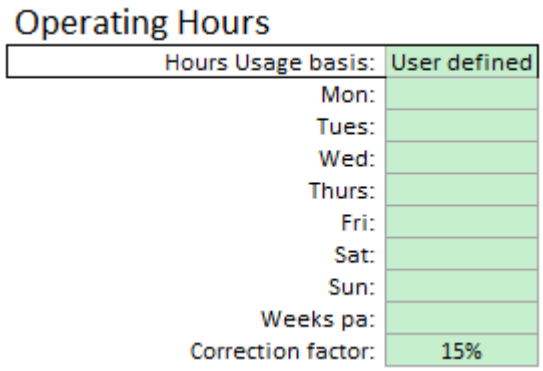


3.5. Use the drop-down list to select one of the four available options:

A. Low
B. Medium
C. High
D. User defined

3.6. Options A-C relate to the standard operational hours embedded in the lighting tool. These hours relate to the specific Site Activity selected in Step 1, above. Before selecting one of these three options, a user must have reviewed the standard operational hours and selected the category that is most representative of the site.

3.7. Option D (User-defined) allows users to input the actual operational hours for the site.



3.8. Enter the correct operational hours for each day of the week and the number of operational weeks per year. It is essential that you retain documentary evidence to justify the hours inputted here.

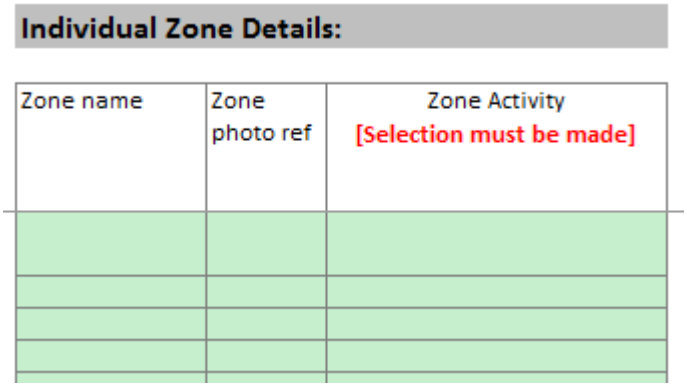
3.9. The total annual hours used for this site will be:

(Total hours per week) x (Weeks pa) x (1 – Correction factor)

3.10. The purpose of the correction factor is to account for the fact that some zones within the site will have the lighting in use for a shorter period than the standard operational hours; for example, a plant room.

3.11. The correction factor is set at 15% by default. If you have evidence to show a different variation in operation of lighting across the site, it is possible to insert a different figure into the correction factor box. Where this occurs, the user must provide written justification for this change in the Reason box which appears. SEAI may request further supporting evidence for this change.

Step 3: Complete the Individual Zone Details section



Individual Zone Details:

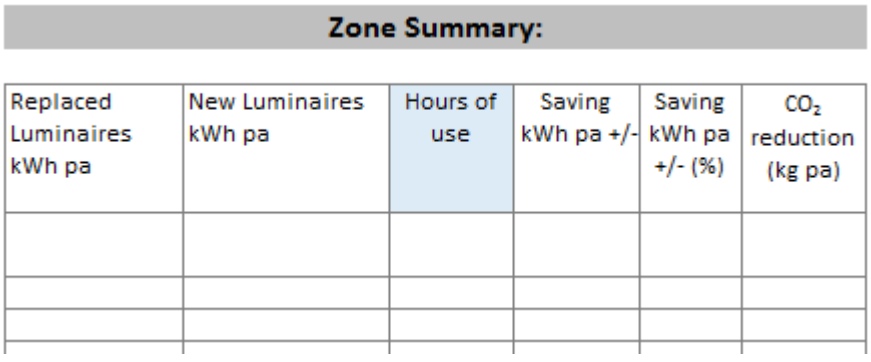
Zone name	Zone photo ref	Zone Activity [Selection must be made]

3.12. Complete these three columns with details of all zones where the lighting will be upgraded at the site.

Column heading	Instructions for completion
Zone name	This is a free text field. Enter a name to identify the specific zone, for example, "Room 101".
Zone photo ref	The SEAI programmes typically require photographic evidence that projects have been undertaken, including before and after photos of the specific zones treated.[2] Where photos are available of the zone (before and/or after the upgrade), please enter the photo reference(s) here. This is to assist with matching photos to zones.
Zone Activity	*MANDATORY FIELD* Use the drop-down list to select the activity type that best matches the zone. Where high/medium/low hours are selected for the site (at Step 2 above), the activity type chosen will determine the specific hours that will apply to the lighting in this zone.

3.13. If there is more than one type of original or new luminaire in a given zone (as part of the upgrade project), that zone should be entered again in another row for each additional lighting type.

3.14. Note that the operational hours that will be taken into account for each zone can be seen in the Zone Summary section of the page:

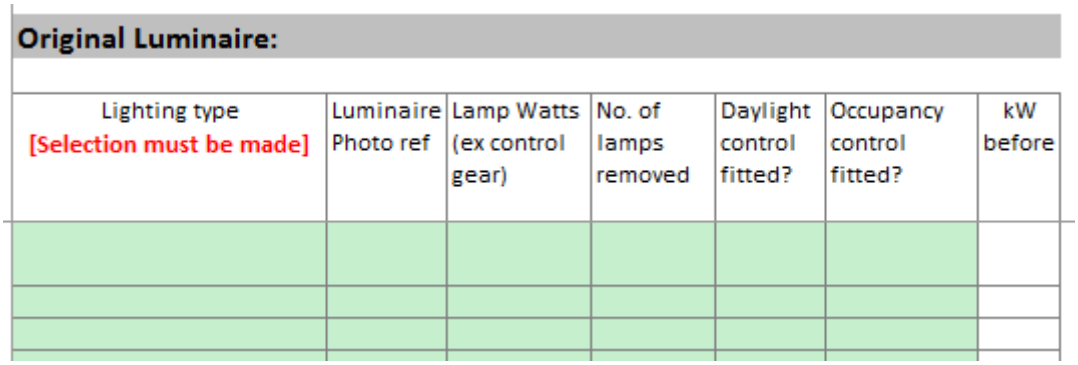


Zone Summary:

Replaced Luminaires kWh pa	New Luminaires kWh pa	Hours of use	Saving kWh pa +/-	Saving kWh pa +/- (%)	CO_2 reduction (kg pa)

[2] For full details of applicable SEAI evidence requirements, check with the relevant SEAI programme.

Step 4: Complete the Original Luminaire section



Original Luminaire:

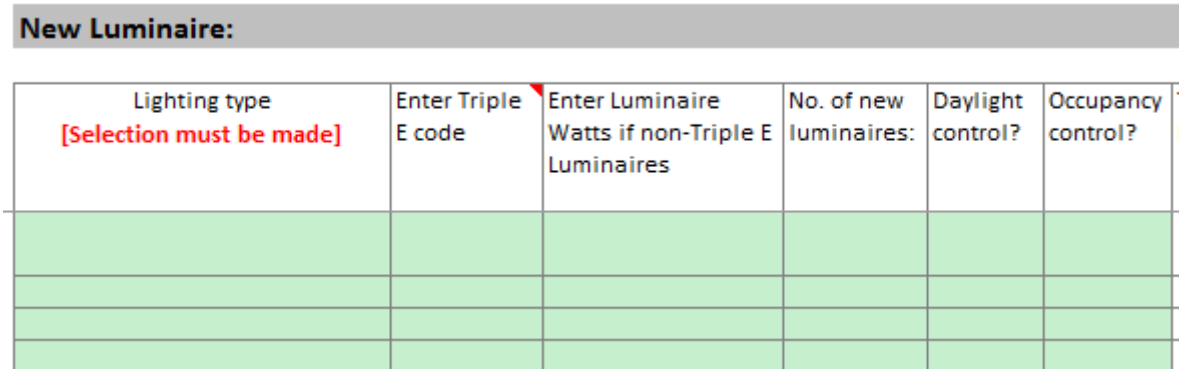
Lighting type [Selection must be made]	Luminaire Photo ref	Lamp Watts (ex control gear)	No. of lamps removed	Daylight control fitted?	Occupancy control fitted?	kW before

3.15. Complete the six input columns with details of all original lighting which is being upgraded as part of the project.

Column heading	Instructions for completion
Lighting type	*MANDATORY FIELD* Use the drop-down list to select the type of lighting being replaced. The options are shown in section 2.3.B.1 of this guidance note. It is critical that the correct type of lighting is selected. Documentary evidence, such as photographic evidence, is typically required to support the selections made.[3]
Luminaire Photo ref	Where a photograph is available showing the type of light being removed, please enter the photo reference here. This is to assist with matching photos to fittings.
Lamp Watts (ex control gear)	Enter the watts for an individual lamp. Do not add control losses into this figure. Control losses will be addressed separately in the tool. See section 2.3.B.1 above for more details.
No. of lamps removed	Enter the number of individual lamps removed in this zone. For example, if there are two lamps per fitting and 10 fittings are being removed, enter 20.
Daylight control fitted	If there are daylight controls in place before the lighting project begins for a particular lighting type and zone, select 'Yes' from the drop-down list. Otherwise, select 'No' or leave the field blank.
Occupancy control fitted	If there are occupancy controls in place before the lighting project begins for a particular lighting type and zone, select 'Yes' from the drop-down list. Otherwise, select 'No' or leave the field blank.

[3] For full details of applicable SEAI evidence requirements, check with the relevant SEAI programme.

Step 5: Complete the New Luminaire section



New Luminaire:

Lighting type [Selection must be made]	Enter Triple E code	Enter Luminaire Watts if non-Triple E Luminaires	No. of new luminaires:	Daylight control?	Occupancy control?

3.16. Complete the six input columns with details of all new lighting installed as part of the project.

Column heading	Instructions for completion
Lighting type	*MANDATORY FIELD* This field must be completed in all cases, even if no new lighting is being installed. The purpose of this field is to identify whether lighting is Triple E or equivalent, emergency lighting, or if no new lighting is being installed. There is a drop-down list with all permissible options. See section 2.3.B.4 above for details of the options available and the associated multiplication factors. ◆ If you are installing emergency lighting which is also Triple E or equivalent, please select the relevant emergency lighting option from the drop-down list.
Enter Triple E code	All luminaires on the Triple E register have an 8-character reference number, in the format: LIGXXXXX. If the new luminaire being installed is on the Triple E register, enter its Triple E code. The Triple E Luminaire Details and Rating (Watts) will automatically populate in the fields to the right of this section. If the new fitting is not on the Triple E register, please enter details of the new fitting here, for example the manufacturer name and luminaire type.
Enter Luminaire Watts if non-Triple E Luminaires	If the new luminaire is on the Triple E register, this field will be automatically greyed out. If the new luminaire is not on the Triple E register, enter the total watts for the luminaire. Some SEAI programmes allow a small proportion of new lighting to be in the form of lamp replacement (rather than full luminaire replacement). In this case, ensure that the total watts for the luminaire, including any control losses, are entered.
No. of new luminaires	Enter the number of new luminaires of the specific type being installed in the specific zone. Where individual lamps are replaced, rather than complete luminaires, the total number of luminaires should be entered. For example, if there are two lamps per fitting and 10 fittings are being removed, enter 10.

Daylight control	If daylight controls will be in place at the end of the lighting project, for a particular lighting type and zone, select 'Yes' from the drop-down list. Otherwise, select 'No' or leave the field blank.
Occupancy control	If occupancy controls will be in place at the end of the lighting project, for a particular lighting type and zone, select 'Yes' from the drop-down list. Otherwise, select 'No' or leave the field blank.

4. Formulas used

4.1. Calculating energy use by the original luminaires (kWh):

$$\frac{\text{Lamp watts (ex. control gear)} \times \text{Control gear factor} \times \text{No. of lamps removed} \times \text{Daylight control factor} \times \text{Occupancy control factor} \times \text{Lighting type correction} \times \text{Hours of use}}{1{,}000}$$

4.2. Calculating energy use by the new luminaires (kWh)

$$\frac{\text{Rating (watts)} \times \text{No. of luminaires} \times \text{Daylight control factor} \times \text{Occupancy control factor} \times \text{Lighting type correction} \times \text{Hours of use}}{1{,}000}$$

5. Identifying the savings

5.1. The lighting tool shows savings achieved at three levels:

A. Zone level

B. Site level

C. Project level

5.2. Users can identify zone level savings in the Zone Summary section of each site tab:

Zone Summary:

Replaced Luminaires kWh pa	New Luminaires kWh pa	Hours of use	Saving kWh pa +/-	Saving kWh pa +/- (%)	CO_2 reduction (kg pa)

5.3. Savings are available for each site in two places. Firstly, they can be found in the Summary Information box at the top of each site tab:

Summary Information

Replaced luminaires kWh pa:	
New luminaires kWh pa:	
Saving kWh pa:	
Saving kWh pa:	0%
CO2 reduction (t/a):	
Cost saving (€ pa):	
Upgraded W/m² :	

5.4. Site level savings can also be found in the Dashboard tab. The following information is available for each site:

A. Site No.
B. Site Name
C. County
D. Site Activity
E. Hours Profile: High/Medium/Low or User defined
F. Replaced luminaires kWh pa
G. New luminaires kWh pa
H. Saving kWh pa
I. % Energy Saving
J. Primary energy saving (kWh pa)
K. New fitting (Triple E or equivalent), %
L. % New fitting (Triple E)
M. No new fitting installed, %
N. $C0_2$ reduction (tonnes/annum)
O. Cost saving

5.5. The Dashboard tab also shows the overall totals across all 30 sites, giving the Project savings.

5.6. The Business tab shows the overall savings at project level.

6. Troubleshooting

6.1. Why has the word 'No' appeared at the end of the New Luminaire section on a site tab?

New Luminaire:

Lighting type [Selection must be made]	Enter Triple E code	Enter Luminaire Watts if non-Triple E Luminaires	No. of new luminaires:	Daylight control?	Occupancy control?	Triple E Luminaire Details	Rating (Watts)	kW after	New luminaire details entered?
No new fitting installed									No

This is a flag to users that no new fitting has been installed for that zone (see step 5 above). It does not impact on any savings calculated by the lighting tool for that zone, as there may be a legitimate reason why no new fitting has been installed.

There are two causes of this flag appearing:

1. if 'No new fitting installed' is selected as the Lighting type; or
2. if incomplete details of the new luminaire are provided in the New luminaire section.

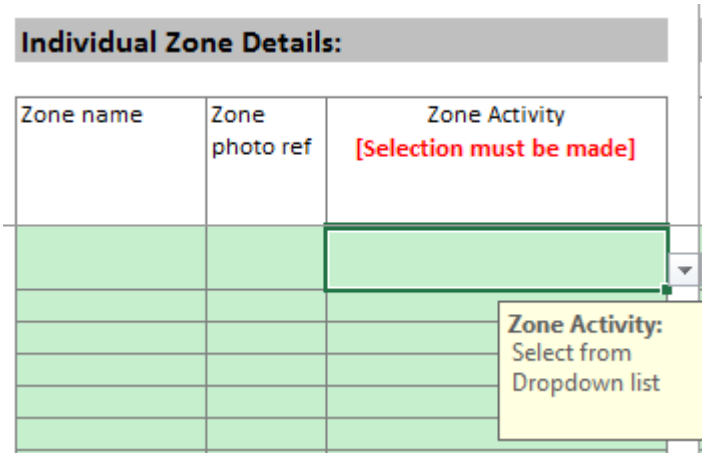
6.2. Why has the phrase 'Zone Activity?' appeared in the Zone summary on a site tab?

Zone Summary:

Replaced Luminaires kWh pa	New Luminaires kWh pa	Hours of use	Saving kWh pa +/-	Saving kWh pa +/- (%)	CO_2 reduction (kg pa)
Zone Activity?	Zone Activity?				

This is an alert to users when the Zone Activity field has not been completed (see step 3 above). No savings will be calculated for a zone until its activity type has been selected.

6.3. Why is the drop-down list for the Zone Activity not working?



This drop-down list is populated based on the Site Activity selected at Step 1 above. It will not be possible to use this drop-down list if the Site Activity has not been selected.

6.4. I have entered a Triple E code in the New Luminaire section but the 'Triple E Luminaire Details' fields says 'Not on Triple E register'. Why has this happened?

Check:

1. Have you entered the code correctly? It should be in the format AAANNNNN, eg LIG12345.
2. Is the code published on the most up-to-date version of the Triple E register[4]? If not, the product may be awaiting publication on the Triple E register. Alternatively, the code you have entered may relate to a product which has not yet been approved as Triple E.

If you discover that the product is not Triple E equivalent, it may not be eligible for support, depending on the SEAI programme. Please check with SEAI if you are unsure.

6.5. I am having a problem not covered by this Troubleshooting section. What should I do?

1. The first thing is to make sure you have read the instructions for completing the lighting tool in section 3 above.
2. If you are still having problems, contact the relevant team at SEAI:

[4] Available at: http://triplee.seai.ie/AcaProducts/Search.aspx

SEAI programme	Email address	Phone number
BEC	bec@seai.ie	01 808 2162
EEOS	eeos@seai.ie	
Public Sector Programme	business@seai.ie	
SME Programme		