Informing Decisions

Road-testing SE's Carbon Impact Assessment Tool

Report for Scottish Enterprise

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mvaconsultancy

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Summary

This report summarises the outputs from MVA Consultancy's 'road-testing' and review of Scottish Enterprise's Carbon Impact Assessment (CIA) tools.

The Brief for the Study listed three objectives of the Study, as follows:

- *'road test' the model and user guide by calculating the carbon impact of a small cross section of SE projects, as follows;*
  - *Amazon Fife;*
  - *Toshiba Medical Visualisation Systems (TMVS);*
  - *The Edinburgh Bio-quarter;*
  - *The Sustainable Transport Programme;*
  - *The Energy Technology Partnership Knowledge Exchange; and*
  - *The SMART Exporter programme.*
- *produce (if necessary) recommendations as to how the model and user guide could be revised and improved; and*
- *produce a short "how to do it" guide that will draw on the experience of using the carbon impact model to give practical guidance as to how the methodology should be used.*

This report contains the following sections:

- a description of the main terminology, methodology and assumptions used within the CIA Tool;
- summaries of MVA's attempts to use the CIA tool to assess the carbon impacts of each of the six pilot projects listed above;
- a summary of the 'lessons learned' from this consideration of the 6 pilot projects and a more-general discussion of issues which MVA feel might hinder the effective use of the Tool or its outputs, including some consideration of the current approach to carbon appraisal within SE's overall funding decision processes; and
- a summary of MVA's recommendations regarding how the model and user guide could be revised and improved;

The 'How to' Guide required as the third objective of the Study is contained in a separate document.

Overall, MVA felt the CIA Tool:

- is relatively easy to use;
- appears to include all of the relevant sources of greenhouse gases; and
- is likely to provide useful insight into the carbon impacts of SE investments (particularly at the Scottish level).

However, the report also identifies a number of measures which would further-improve the ease of use of the tool.

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1 Introduction

1.1 Background

1.1.1 This report summarises the outputs from MVA Consultancy's 'road-testing' and review of Scottish Enterprise's Carbon Impact Assessment (CIA) tools.

1.1.2 The Study has focussed on the application of Version 1.9 of the Excel-based Carbon Impact Model and its associated User Guide (V1.9, dated March 2011), but also includes consideration of the potential role for this tool and its companion 'Carbon Assessment Lite' tool within SE's overall funding decision-making processes.

1.1.3 The scope of the Study was set out in the Project Brief attached in Appendix A. This Brief listed three objectives of the Study, as follows:

- *'road test' the model and user guide by calculating the carbon impact of a small cross section of SE projects;*
- *produce (if necessary) recommendations as to how the model and user guide could be revised and improved; and*
- *produce a short "how to do it" guide that will draw on the experience of using the carbon impact model to give practical guidance as to how the methodology should be used. This is likely to cover such things as who should be consulted, the additional information that would be needed from project managers to implement the methodology and the development of any pro-formas that might be used to collect the basic metrics required to use the model.*

1.1.4 The Brief also suggested the set of six SE projects which should be used to pilot the CIA Tool, as follows:

- *Amazon Fife, an inward investment project that received a large amount of Regional Selective Assistance and will create around 750 jobs at a 1 million square foot unit on a site in Fife;*
- *Toshiba Medical Visualisation Systems (TMVS) - a project involved in customer analysis software that received support through SE's Research and Development grant;*
- *The Edinburgh Bio-quarter, a live project that involves a number of physical developments in the Little France area of South Edinburgh;*
- *The Sustainable Transport Programme, which is designed to co-ordinate and facilitate the funding of sustainable transport projects, to raise the profile and level of Scottish economic activity in this important emerging sector;*
- *The Energy Technology Partnership Knowledge Exchange, which aims to make a strategic investment in Energy and Low Carbon Knowledge Exchange and Business Support; and*
- *The SMART Exporter programme, delivered in partnership with the Scottish Chambers of Commerce, to assist new companies to become exporters.*

1.2 Overview of this Report

1.2.1 The remainder of this report is as follows:

- Chapter 2 describes the main terminology used within the Tool, its key methodological assumptions and the approaches recommended in the User Guidance etc, to help understand our description of the inputs, outputs and assumptions described in the subsequent chapters;
- Chapters 3 – 8 summarise our attempts to use the CIA tool to assess the carbon impacts of each of the six pilot projects listed above;
- Chapter 9 draws together the 'lessons learned' from our consideration of the 6 pilot projects and combines these within a more-general discussion of the inputs, outputs and/or assumptions which we feel might hinder the effective use of the Tool or its outputs, including some consideration of the current approach to carbon appraisal within SE's overall funding decision processes;
- Chapter 10 summarises our recommendations regarding how the model and user guide could be revised and improved;
- Appendix A includes a copy of the Brief;
- Appendices B – G include details (Screening sheet, Results (summary) sheet and Results (detailed) sheet) from the six pilot projects; and
- Appendix H compares the screening questions which appear in the main CIA Tool with those which are used in the Carbon Lite tool.

1.2.2 The 'How to' Guide required as the third objective of the Study (see previous section for details) is contained in a separate document.

1.2.3 Note that many/all of the assumptions and approaches used within the Tool have been discussed and agreed by SE during the Tool's creation and many of the resulting decisions do not have a definitive 'right or wrong' answer. In this review of the tool we use our experience of carbon foot-printing in general and our use of SE's CIA Tool in particular to inform our discussion of some of these assumptions and/or approaches. Within these discussions we focus on the issues which may significantly affect the use of the Tool or its outputs, including assumptions which we feel might be 'missed or misunderstood' by future users of the Tool and features which may influence the ease of use of the Tool, rather than on the minutiae of carbon accounting 'Best Practice'.

1.2.4 In particular, it should be noted here that this report is **NOT** designed to provide a detailed audit of the Tool or its parameters.

2 Terminology and Key Features of the Tool

2.1 Introduction

2.1.1 In this chapter we explain the terminology used within the Tool and highlight the key methodological assumptions and recommended approaches which have influenced our use of the Tool on the six Pilot Projects.

2.1.2 Many of the features we identify here are explained and discussed in more detail in Chapter 2 of the Tool's User Guide.

2.2 Overview of the Tool

2.2.1 The Tool aims to provide a comprehensive consideration of all of the potential carbon-related impacts of the projects being appraised, disaggregated as follows:

- emissions emitted to initially **deliver** the project vs the subsequent '**long-term**' change in emissions resulting from the ongoing 'operation' of the project;
- **direct** emissions (eg energy used to heat a new facility) vs **indirect** emissions (eg by commuters or visitors to a new facility) and including **embodied** emissions (eg from the energy used to mine/manufacture/move the materials used to create the relevant infrastructure);
- emissions from a wide range of activities (commuting, energy used by the employees, energy used heating the buildings, travel and accommodation, additional tourism, waste, impacts on turnover in the wider economy etc; and
- SE's 'share' of the emissions versus 'total' emissions, in recognition of the fact that some projects are only partially funded by SE and so only a corresponding proportion of the change in emissions can be accredited to SE.

2.3 User-friendly Features of the Tool

2.3.1 The tool contains a number of user-friendly facilities, including:

- colour-coding of cells to distinguish between user inputs, model parameters and calculated values;
- a screening process, to help the user decide which of the input sheets need to be completed;
- a 'Notes' section on each of the input sheets (with any comments pulled through to the main results summary page); and
- a logical and transparent lay-out of all of the model parameters used in the various emissions calculations.

2.4 The Appraisal Period

2.4.1 In general the tool requires the user to enter the relevant attributes for each relevant year (up to maximum of 21 years to 2030/31), though in some sheets the user needs to specify the number of 'profiled years', with the total emissions for these sheets calculated by simply multiplying the per annum emission by the relevant 'Number of Years' variable.

2.4.2 The Tool then amalgamates these annual emissions into a single total value for each of the components within the separate sheets and these totals are fed through to the Emission Summary sheets.

2.5 Valuing Carbon Impacts

2.5.1 As highlighted in Paragraph 2.34 of the User Guide, the Tool does not attempt to put a financial value on the predicted carbon impacts of a scheme.

2.5.2 We will return to this aspect in Chapter 9, when we consider the use of the Tool within SE's decision-making processes.

2.6 Geographic Scope and 'Gross versus Net' Emissions

2.6.1 Paragraphs 2.8 – 2.11 of the Guidance (under the heading 'Geographic scope') endeavours to highlight and discuss the 'thorny' issues associated with distinguishing between 'global' and 'Scottish' emissions.

2.6.2 Paragraph 2.11 of the Guidance notes that

- *'Users are encouraged to consider global carbon impacts'*;
- '*In most cases it will be necessary to report GROSS*[1] *figures for global impacts rather than NET figures';* and
- '*Users can also use the model to report Scottish impacts where it would be useful to report against the Scottish Climate Change Act targets*'.

2.6.3 The subsequent sections of the Guidance (discussing 'deadweight', 'leakage' and 'displacement' effects) consider the Tool being used for both 'Scotland-based' and global analysis.

2.6.4 As a result, it is not clear to the reader of the Guidance (or the user of the Tool) whether they are expected to use the Tool to consider the net global carbon impact of their investment or just its impact on 'Scottish' Greenhouse Gas (GHG) emissions (or both).

[1] The terms GROSS and NET are not formally defined in the Guidance, though are discussed further in Paras 2.17-2.18

2.6.5 At the start of this project, it was agreed that, since the location of greenhouse gas emissions is irrelevant (from a climate change perspective), we would endeavour to use the Tool to assess the net change in global Greenhouse Gas emissions. However, it quickly became apparent that:

- many of the Pilot Projects simply represented a transfer of activity into Scotland from somewhere else in the world, so few of the Tool's detailed input sheets needed to be completed (potentially reducing the value of this road-testing Study);
- where a net global greenhouse gas impact was considered likely, it was often difficult/impossible to quantify this effect, due to lack of information about the counter-factual/Do Nothing scenario; and
- there was a significant risk of confusion between the Economic Impact Appraisal (EIA) which (rightly) considers only the net impacts of the project on Scotland's economy and the consideration of the 'global' carbon impact.

2.6.6 As a result, a decision was taken to instead use the Tool to try to quantify the carbon impact at the 'Scottish' level, consistent with the EIA, and to highlight (qualitatively) within our discussions where these estimates significantly over or underestimate the greenhouse gas impacts at the global level.

2.6.7 We return to this aspect (and the associated issue of determining the relevant 'counterfactual'/'Do Nothing' assumptions against which to appraise the carbon impacts of SE projects and programmes) in our discussions and recommendations chapters.

2.7 Commuting Trips

2.7.1 When considering the Carbon Impacts of additional commuting trips, the Tool assumes a constant commuting distance (21.2km) for all employees and provides a Scottish default mode split profile for these trips, but allows the user to vary these default mode split proportions. The use of all motorised modes is considered to emit additional greenhouse gases, using standard values used in typical 'Carbon foot-printing' tools for bus and rail and an assumption that each car passenger emits 50% of emissions which they would have emitted if they had been car drivers.

2.8 Issues Associated with Potential Double-counting

2.8.1 Paragraphs 2.43 – 2.44 and Table 2-2 of the Tool's User Guide discuss the issue of potential double-counting' between different sets of calculations contained within the Tool.

2.8.2 The relevant section of this discussion is reproduced below:

'In order to provide flexibility to the user, some of the different tools incorporated in the model use different methods to calculate the same thing. For example, the model allows users to estimate the carbon impact of a project based on (a) changes in turnover of target businesses or (b) changes in employment in the target businesses. However both of these approaches rely on benchmark estimates of emissions for a typical business in this sector, and using both approaches would lead to double-counting of carbon impacts.'

2.8.3 Table 2-2 in the User Guidance endeavours to highlight which sheets are most likely to 'overlap' in this way. However, the Tool itself does not appear to undertake any checks or produce any specific 'warning messages' within the results summary or elsewhere if the user completes more than one of these potentially-overlapping sets of greenhouse gas calculations.

2.8.4 We provide some further discussion of this potential risk of double-counting in our discussions and recommendations chapters.

3 Amazon Fife

3.1 Background

3.1.1 This scheme involves £8.3m of SE Funding to secure Amazon's[2] commitment to opening a 1.2 million square foot state-of-the-art 'customer fulfilment' (aka distribution) centre in Fife, predicted to create around 750 additional jobs in Fife. SE's contribution represents about 11% of the project's total capital cost.

3.2 Inputs

3.2.1 Our appraisal of this project has made use of the following inputs:

- a face-to-face meeting with SE's Project Manager (James Cameron); and
- an Economic Impact Assessment (EIA) dated November 2010, including two supporting Excel spreadsheets.

3.3 Reference Case Assumptions

3.3.1 The Reference Case for this scheme is assumed to be Amazon's existing logistics network (ie we have not considered the possibility that Amazon would have built an alternative facility elsewhere in UK or Europe if they had not received SE support for the new facility in Fife.

3.4 Project Screening

3.4.1 The relevant impacts are considered to be:

- A1 – Infrastructure Development – the 1.2 million square foot purpose-built distribution centre; and
- either[3]:
  - B2 – Additional Employment (long term) –748 additional jobs, assumed to be in 'Cargo Handling and Storage'; or
  - the commuting impacts of the 748 employees plus 'G1 - Building Energy Use' for the 1.2million square feet of 'Warehouse'.

3.4.2 As recommended by the Tool's Guidance regarding double-counting, we have not endeavoured to include the impact of the scheme on Amazon's turnover, since the relevant impacts are likely to be captured via the more-detailed building and employee-related calculations described above.

3.4.3 The one significant category which we feel in the 'Cannot Quantify' category was the 'Fuel Consumption' impact of the new distribution centre will have on Amazon's global (and

[2] The large US-based multinational internet retailer

[3] The Tool's Guidance suggests that, to avoid double-counting, the User should choose one of these two sets of calculations and recommends the 'Building Energy' version if the necessary data are available for both

Scottish) logistics operations. We believe that the new distribution centre is likely to **significantly reduce global emissions**, since Amazon's global logistics are likely to become more-efficient as a result of the construction of the new facility. Within this global reduction there are also to be two competing effects on fuel use at the local Scottish level, namely the increased efficiency of the delivery of Amazon goods within Scotland, offset by the potential for increased Scottish fuel use to deliver goods from the new distribution centre to non-Scottish destinations. The relative size of these competing impacts is not clear.

3.4.4 None of the impacts on Amazon's logistics operations can be estimated from the information currently available to the MVA project team or SE's Project Manager.

3.4.5 However, if this appraisal was being completed 'for real', it would be possible to ask Amazon for an estimate of the likely changes in annual freight vehicle kilometres which they would hope to achieve by using the new facility. However, care would be needed to decide whether the Tool was being used to forecast changes in 'Scottish' or 'Global' greenhouse gas emissions, since the former would presumably require an estimate of the change in vehicle kilometres driven on Scottish roads.

3.4.6 Note that while Amazon's operations technically involves 'significant purchases of goods and services beyond the project delivery period' we have decided that having an extra distribution centre in Fife will not increase Amazon customers' shopping habits, so have answered 'No' to the 'E2 – Embodied Emissions (Long term)' screening question.

3.5 Other Assumptions

3.5.1 The other assumptions made include:

- Scottish default mode share for the additional commuting trips;
- a 6-month construction period;
- 3 'large' portable site accommodation units;
- no additional roads, car parks or landscaping are included; and
- impacts have been assumed for the 19 years between an assumed 2012/13 opening year and the default 2030/31 horizon year assumed within the Tool[4].

3.6 Summary of Results

3.6.1 Details from the CIA spreadsheet are included in Appendix B. The Tool predicts that this Amazon Fife project will lead to a 17,500 tonne increase in Scottish CO2(e) emissions during project delivery (ie construction of the distribution centre) and somewhere between a 75,000 tonne and 150,000 tonne 'long-term' increase from the 19 years of operation, depending on whether we use the 'building energy' or 'employee energy' values respectively.

3.6.2 These results exclude the (unquantifiable) benefits of any improved efficiency in Amazon's Scottish or global logistics, as discussed above.

[4] The EIA for this project only included benefits between 2011 and 2014

3.6.3 If we assume that in the 'Do Nothing' scenario Amazon would build a similar facility elsewhere, then all of these carbon impacts would largely disappear at the 'Global' level.

3.7 Issues Raised / Lessons Learned

3.7.1 The key lessons learned from this Pilot Project are as follows:

- the geographic scope (Scottish vs Global) is particularly relevant when considering companies such as Amazon which are already operating on the global scale – in particular, since Amazon's logistics operations are likely to be planned on a European-wide basis, the impact of the new Fife facility will automatically have significant freight-related impacts beyond Scotland's borders;
- the Tool does not include specific consideration of changes in freight vehicle movements, so the user would have to convert any estimates of changes in 'freight miles' into corresponding estimates of the changes in the consumption of fuel (eg diesel and/or aviation fuel);
- there is a discrepancy between the 4 years assumed in the EIA (2011-2014) and the 19 years (2012/13 - 2030/31) assumed in the CIA – in a 'real' application it would be desirable to understand and remove this inconsistency;
- Scottish Enterprise is unlikely to have the information necessary to predict the impact on logistics efficiency savings (and hence carbon reductions) arising from new freight distribution facilities, though it does have the potential to out-weigh some or all of the greenhouse gas increases from the additional commuting and building energy use; and
- there is a significant difference between the 'Employee Energy' and 'Warehouse Energy' variants of the calculations, with the employee energy use methodology predicting a much-higher carbon footprint – this is to be expected, since the employee-based calculation uses a comprehensive lifecycle approach, compared to the building energy use methodology (recommended by the Tool's Guidance) which excludes supply chain effects.

4 Toshiba Medical Visualisation Systems

4.1 Background

4.1.1 TMVS was founded (originally as Vaxar Ltd) in 1995 by graduates of the University of Edinburgh and was bought by Toshiba in 2009. It provides custom image analysis software for a number of large medical screening vendors. The R&D project will allow TMVS to undertake research to create a new business unit to develop leading edge informatics products in Scotland. Through this TMVS expects its products to establish a competitive edge over its global competitors.

4.1.2 According to the R&D Grant EIA, this could result in the turnover of the Scottish-based operations growing from £13.3m to £76.4m in 10 years.

4.1.3 The potential R&D grant will help TMVS demonstrate a cost-neutral business model to its parent company, making the case for continued investment in Scotland

4.2 Inputs

Our appraisal of this project has made use of the following inputs:

- a face-to-face meeting with SE's Project Manager (James Cameron);
- an Economic Impact Assessment (Word document and supporting Excel file) created by frontline (undated);
- a Due Diligence V8.3 (Word document) created by PERA (dated October 2010); and
- a 'Carbon Lite' appraisal for this project (dated November 2010).

4.3 Reference Case Assumptions

4.3.1 The Reference Case for this scheme is assumed to be that without Scottish Enterprise investment the software design and production would take place somewhere else 'overseas'.

4.4 Project Screening

The relevant impacts are considered to be:

- B1 – Additional Employment (Project Delivery) – 50 extra R&D jobs;
- B2 – Additional Employment (long term) – 94 extra long-term jobs; and
- C2 – Travel requirements of external parties – reduction in the need for international travel by locating the software design and production in Scotland, rather than overseas - we have used Sheet C2 for this, but it is actually a 'Long term' impact, rather than a 'Project Delivery' one.

4.4.1 As recommended by the Tool's Guidance regarding double-counting, we have not endeavoured to include the impact of the scheme on TMVS's turnover, since the relevant

impacts are likely to be captured via the more-detailed employee-related calculations described above.

4.4.2 We have not identified any significant 'Cannot Quantify' impact for this project.

4.5 Other Assumptions

4.5.1 The other assumptions made include:

- a reduced proportion of car trips in the commuting patterns, based on the central Edinburgh location assumed for these additional jobs; and
- a 10-year 'product-life' for the new software and its associated additional Scottish employment[5].

4.6 Summary of Results

4.6.1 Details from the CIA spreadsheet are included in Appendix C. The Tool predicts that this TMVS project will lead to around a 2,000 tonne increase in Scottish CO2(e) emissions, made up of a 2,600 tonne increase from the impacts of the extra employment (76% of which is 'Employee Energy' (Project Delivery = 276 tonnes, Long Term = 1,732 tonnes) and the remainder from the extra commuting (85 tonnes during Project Delivery plus 531 tonnes Long Term), partially offset by a 542 tonne reduction from the reduced need to travel to manage production of the software system overseas assumed in the Reference Case scenario.

4.6.2 The employment-related impacts would probably not apply at the 'global' level, since the relevant computer programmers would probably be in gainful employment somewhere in the world, leaving only the reduction in the 'Management Overseas Travel' benefit at the Global Emissions level.

4.7 Issues Raised / Lessons Learned

4.7.1 We chose to use the C2 Travel and Accommodation sheet to include the long-term reduction in TMVS staff travel, though this meant that this impact was then allocated to the Project Delivery emissions totals.

4.7.2 The application of the tool to this 'R&D Grant' project was fairly straightforward and no other specific difficulties or pitfalls were encountered.

[5] Source: frontline Economic Impact Assessment Assumptions

5 Edinburgh Bio-Quarter (EBQ)

5.1 Background

5.1.1 The over-riding objective of the EBQ project is to establish Scotland as one of the 'Top 10' worldwide locations.

5.1.2 The EBQ is in the Little France area of the South East of Edinburgh, close to the new Royal Infirmary, the University of Edinburgh's College of Medicine, the Queen's Medical Research Institute and the Edinburgh City Bypass.

5.1.3 Phase 1 Infrastructure works, creating 10 serviced plots, were completed in July 2006.

5.1.4 A Joint Venture Partner (ARE) was appointed to develop out the 7 of these service plots which remained in SE ownership.

5.1.5 In March 2008 SE Board approved investment to acquire further expansion land. This acquisition was completed in July 2010.

5.1.6 The EBQ site is planned, on completion, to provide more than 80,000 m^2 of further academic research space and an additional 115,000m^2 of accommodation for commercial research-based companies.

5.1.7 At the time of completion of the EIA (dated October 2010) two end-use buildings were at the implementation stage, as follows:

- The Scottish Centre for Regenerative Medicine Phase 1 (9,000m^2) was under construction and scheduled for completion in August 2011; and
- a life sciences business incubator facility (the Bio-Incubator) (7,700m^2) was on site and scheduled for completion in March 2012.

5.1.8 A further research facility, the Brain and Body Institute was 'at an advanced stage of planning', with a start on site programmed for 2014.

5.2 Inputs

Our appraisal of this project has made use of the following inputs:

- an initial face-to-face 'background' meeting with Alan Shirley;
- a face-to-face meeting with SE's Project representative (Margaret Warner);
- an Economic Impact Assessment (Word document) created by Malcolm Watson consulting (dated October 2010);
- an 'Approvals Summary Map' (2000-2010); and
- a Transport Assessment for the Edinburgh Bio-Quarter prepared by Colin Buchanan & Partners (dated August 2010).

5.3 Reference Case Assumptions

5.3.1 The Reference Case for this scheme is assumed to be that no new bio-medical research buildings would be constructed (in Scotland) and the relevant research and teaching would be carried out in existing facilities across the UK and beyond.

5.4 Project Screening

The relevant impacts are considered to be:

- A1 – Infrastructure Development – a total of around 220,000 m^2 of health research-related buildings (assumed to be constructed as 'steel-framed offices');
- B2 – a profile of additional long-term employment, reaching over 5,000 additional jobs by 2030/31; and
- C2 – Travel Impacts – a (rather arbitrary) guesstimate of the reduction in trips made by the occupants of the new facilities due to the co-location of the relevant health research labs, facilities and the Royal Infirmary within the Bio-quarter site – note that there is currently no way to record long term travel impacts such as these, since sheet C2 is set up to refer to the 'Project Delivery' phase only.

5.4.1 The 'G1 - Building Energy Use' sheet does not allow us to represent the build-up of the development over time (it is based on a single annual values and a 'Number of years' value), so we have chosen to base the calculations on the 'B2 Employee Energy' calculations.

5.4.2 We have not endeavoured to estimate the change in turnover of any organisation which might use the new facilities in the Edinburgh Bio-Quarter – this is OK because the relevant impacts are covered by the Employee Energy impacts described above.

5.4.3 We have not identified any other significant 'Cannot Quantify' impacts for this project.

5.5 Other Assumptions

5.5.1 Rather than getting bogged down in the details of which type of medical institute or research unit might occupy which site and what their turnover might be etc, we simply focussed on the buildings and likely number of new jobs created.

5.5.2 However, the geographic scope question reappears here, since it could probably be argued that the relevant research would take place somewhere else in the world if it doesn't take place in the EBQ (ie can we assume no net increase in global employment). It is unclear whether this research would take place in existing buildings, or if the construction of the EBQ buildings represents a net increase in the 'global' carbon footprint – it is probably not unreasonable to assume the true 'Do Nothing' will lie somewhere between these two extremes, suggesting an assumed 50% factor should be applied to the carbon cost of the new buildings.

5.5.3 We have also not tried to appraise the impacts of the downstream economic activity (in Scotland) resulting from this investment in this key growth sector.

5.5.4 The other assumptions made include:

- the mode share predicted within the Transport Assessment (TA) for the Edinburgh Bio-Quarter (which we understand is based on observed travel patterns to/from the Royal Infirmary) has been used – this has higher-than-default bus use, but lower-than-default levels of walking;
- a large construction team permanently on-site for a total of 120 months, using 4 large portable accommodation units over this period;
- 3 'large' portable site accommodation units;
- 1km of additional 'urban minor roads; and
- the maximum horizon year supported by the Tool (2030/31) was used (though note that the Economic Impact Assessment for this Edinburgh Bio-Quarter includes benefits up to 2038).

5.5.5 In the absence of a detailed Masterplan, we have made rather-arbitrary assumptions regarding the amount of car parking (10,000m^2) and landscaping (5,000m^2) created within the site.

5.6 Summary of Results

5.6.1 Details from the CIA spreadsheet are included in Appendix D. The Tool predicts that the project will have a 200,000 tonne carbon footprint, made up of over 85,000 tonnes (42%) from employee energy use, almost 80,000 (40%) from the Infrastructure construction and 33,000 tonnes (16.5%) from employee commuting, plus some 'loose change' from other impacts.

5.6.2 The employee-related components of these impacts would probably disappear at the 'Global emissions' level, since the relevant researchers would presumably carry out their research in other similar (but perhaps less-heat-efficient?) labs around the UK and the rest of the world.

5.6.3 It is not clear how much of the carbon cost of the new infrastructure would remain if we were to consider only the 'Global Emissions' – ie how much of this medical research and teaching etc would take place in existing buildings elsewhere in the UK or elsewhere in the world.

5.7 Issues Raised / Lessons Learned

5.7.1 The Building Energy sheet (Sheet G1) is not designed to handle a profile of additional buildings coming on-stream during the appraisal period. This could be handled by using the Tool to assess individual developments separately, but this would be awkward and lead to additional work. This is not a problem here (where we had a profile of employment), but should be considered within the larger debate regarding the handling of different multi-year appraisal periods.

5.7.2 In addition, the lack of a sheet for estimating Long Term Travel and Accommodation impacts required the use/misuse of sheet C2 (which is designed to include Project Delivery Impacts only).

5.7.3 Other potential difficulties identified include:

- the Global vs Scottish emissions debate;

- difficulties associated with knowing in advance exactly what will occupy a given development site (and hence how to classify its activities);
- the 2030/31 time horizon in the tool was not sufficient to include the full profile assumed in the EIA for this project;
- the User Guidance suggests we don't include both the buildings energy and the employee energy, with the former preferred, but this loses the commuting component – the tool should perhaps make it easier to include B1 Commuting but not B1 Employee Energy;
- it was not clear whether to code the additional roads within a 'greenfield' development as 'urban' or 'rural';
- it was not clear whether the lengths of single carriageway should be doubled (ie '1 lane in each direction');
- users will need to be helped to estimate the amount of car parking space needed for large developments;
- the inclusion of the almost-insignificant carbon footprinting from 'landscaping' with grass/bushes/trees) might be seen as a rather spurious level of detail; and
- additional guidance on how to estimate the number of 'Portable Accommodation' units is required.

6 Sustainable Transport Program

6.1 Background

6.1.1 The Sustainable Transport Programme (STP) proposes to use a series of co-ordinated projects to raise the profile, economic activity and resulting impact in the emerging Sustainable Transport sector. Any SE funding for Projects will be provided via access to existing Intervention Framework budgets potentially via a 'call' arrangement which it is envisaged will result in significant net additional GVA. Furthermore, the STP will consider whether other areas of public funding, notably the European Commission's Seventh Framework Programme for Research Funding EU FP7 and, potentially, the Technology Strategy Board (TSB), can be attracted to projects.

6.1.2 The key carbon-impacts-related features of this programme are as follows:

- it is a programme which will provide funding and support to a number of separate projects;
- the individual projects supported by the program will be assessed individually as they apply for potential funding;
- it is difficult to quantify the outputs at this stage, since it is not yet clear exactly what individual projects the programme will fund/support;
- it is likely, however, that the supported projects will lead to a significant reduction in total greenhouse gas emissions associated with transport, both in Scotland and globally; and
- the CIA tool may have a role in helping determine which projects are supported by the program.

6.2 Inputs

6.2.1 The following inputs have been used in this assessment:

- an initial face-to-face 'background' meeting with Alan Shirley;
- a face-to-face meeting with Douglas Hyslop and John Murray (both of SE) on 6 April;
- an 8-page Scottish Enterprise Stage 3 Review Paper (dated 13 December 2010);
- a 4-page Scottish Enterprise Stage 3 Review Note (also dated 13 December); and
- an 83-page Optima report entitled 'Sustainable Transport –Strategic Options Study' dated May 2009.

6.3 Reference Case Assumptions

6.3.1 The Reference Case for this scheme is that in the absence of SE funding none of the supported projects would take place in Scotland. Since we are only considering Scottish-based greenhouse gas emissions here, it is not necessary to decide whether the corresponding research would take place elsewhere within this Reference Case scenario.

6.4 Project Screening

For individual projects funded by the program, some or all the relevant impacts are likely to include:

- A1 – Infrastructure Development (particularly Long Term);
- B2 – Additional Employment (particularly Long Term);
- C1 and C2 – Travel and accommodation (SE Staff and others involved in delivering the projects);
- E2 – Embodied emissions (particularly Long Term);
- F1 Company Turnover (though this is unlikely to be the best measure to use to appraise these projects); and
- I1 Fuel Consumption – particularly the likelihood of achieving significant reductions in the use of fossil fuel for transport, both in Scotland and beyond – NB this is likely to be the dominant carbon impact of this programme.

6.4.1 However, none of these impacts can be readily estimated for the Programme as a whole, especially not at the start of the Programme, when details of what projects and initiatives the Programme will fund are not yet available.

6.4.2 Many of these impacts are therefore flagged as 'Cannot Quantify' in our attempted completion of the CIA for this programme.

6.4.3 However, we have attempted to test three sets of potential impacts for the programme as a whole, primarily to get a feel for the relative scale of the likely carbon-related benefits.

6.5 Other Assumptions

6.5.1 We have therefore used sheets C1 and C2 to estimate the likely carbon impacts of additional attendance of SE staff and other funders at various European Joint Projects and compared these with some likely per annum long-term carbon savings which might result from the set of ten 'Pipeline Projects which were identified in SE's Stage 3 Review Paper for this programme (dated 13 December 2010).

6.5.2 For ease of reference these ten 'pipeline' projects are summarised briefly as follows:

- **ECT 'Foresighting' on Sustainable Transport** – initial exploration of the possibilities for increasing the role of Intelligent Transport Systems (ITS) in delivering more sustainable transport;
- Bid for 2011 EU FP7 **Regions of Knowledge** funding for a project to investigate 'Use of Intelligent Transport Systems in Urban and Regional Mobility' – any funding obtained will include budgets for 'travel & networking';
- **Sustainable Logistics** project - which is endeavouring to help Scottish freight operators reduce the carbon footprint of their logistics operations;
- **ITS Platform for Low Carbon Mobility** – combining earlier SmartCard and Plugged In Places research to help increase the public's (long term) use of low carbon travel options;

- **Plugged in Places** – helping to provide the charging infrastructure required to encourage the take-up and use of electric vehicles in the Central Belt of Scotland;
- **Sustainable Ferries** – support for an ERDF bid to explore the feasibility of procuring and using hybrid (electric/diesel) ferries on relevant Scottish Island routes;
- **Power Electronics** – R&D funding in the area of power electronics and battery technology;
- **Interreg Infrastucture Charging Point** – bid for EU Interreg funding to help extend the coverage of EV charging points to cover the full road corridor between the Scottish Central belt and Belfast via Stranraer;
- **Electric Vehicle Manufacture** (ongoing business development support for Allied Vehicles); and
- **Smart Grid Development** project – combining wind power and EV recharging infrastructure to further reduce the emissions reductions achievable by a move to electric vehicles.

6.5.3 In the Table below we summarise the impacts each of these projects on Scottish carbon emissions.

Table 6.1 Summarised Impacts on Scottish Carbon Emissions

Project	Assumed Impact
ECT 'Foresighting' on Sustainable Transport	Carbon impacts not quantified
Regions of Knowledge	40 additional European flights per annum (10 by SE staff), long term benefits not quantified
Sustainable Logistics	Equivalent of 10 Edinburgh-Inverness HGV trips removed per weekday
ITS Platform for Low Carbon Mobility	1000 cars used for an average of 10 miles less per day in Scotland
Plugged in Places	500 fossil-fuelled cars used for an average of 10 miles (16km) less per day in Scotland (embedded costs ignored)
Sustainable Ferries	10 ferry routes each saving 0.5 tonnes of fuel oil per day (embedded costs ignored)
Power Electronics	Additional take-up of EVs in Scotland, resulting in 500 additional EVs each replacing an average of 10 miles (16km) per day
Interreg Infrastucture Charging Point	100 additional EVs sold, each used for an average of 20 miles (32km) per day
Electric Vehicle Manufacture	Increased use of EVs is Scotland, offset by the additional construction – no net change
Smart Grid Development	500 MWr per annum reduction in the use of grid electric

6.5.4 It should be noted (in case it isn't already obvious?) that all of these predicted impacts are rather arbitrary guesstimates, rather than actual predictions, since here we are only testing the CIA tool, rather than actually appraising these projects. Note also that many of these projects have the potential to have much greater impacts on global emissions, through the development and sale of the relevant technologies to the rest of the world.

6.5.5 Combining these effects and making further arbitrary assumptions about fuel consumption and petrol/diesel splits results in a guesstimate of a reduction of 1,300 tonnes of petrol/diesel per annum, 1,800 fewer tonnes of marine fuel and the 500MWh reduction in the use of grid electric.

6.5.6 Each of these fuel-related impacts are assumed to be achieved between an 'opening year' of 2015/16 and the maximum horizon year included within the Tool (2030/31).

6.6 Summary of Results

6.6.1 Details from the CIA spreadsheet are included in Appendix E. Based on the inputs described above (optimistically assumed to be achieved each year between 2015/16 and 2030/31) the tool predicts a net reduction of over 41,000 tonnes of Scottish CO2(e) emissions. As noted above, the global carbon emissions impacts are potentially even higher than this.

6.7 Issues Raised / Lessons Learned

6.7.1 The main point from this Pilot Project is that it is not easy to use the Tool to appraise Programmes such as this the Sustainable Transport programme, because it is difficult to predict in advance the nature of the projects which will receive funding and/or what the carbon impacts of each of these projects will be.

6.7.2 It is therefore probably more appropriate to use the Tool to appraise the individual projects supported within the Program. Indeed, we believe that the Tool could form a useful part of the decision-making regarding which projects to support within the overall programme.

6.7.3 Other 'nuisance' features included the need to input the consumption of petrol and diesel in tonnes, rather than the more-obvious litres in the Fuel Consumption sheet (Sheet I).

7 Energy Technology Partnership Knowledge Exchange

7.1 Background

7.1.1 This project is one part of a wider programme to deliver a strategic investment in Energy and Low Carbon Knowledge Exchange and Business Support. It aims to do this through the engagement of eighteen strategic support staff providing critical mass and breadth of technology focus to achieve a step change in energy-related knowledge exchange activity.

7.1.2 The University of Strathclyde has submitted an ERDF application for funding to establish a Knowledge Exchange (KE) Network that will stimulate and accelerate Knowledge Exchange activity between academia and Small and Medium Enterprises (SMEs).

7.1.3 The aim of this network is to increase innovation, advance the development of the low carbon economy in Scotland and support Scotland, the UK and the EU to meet ambitious 2020 carbon targets.

7.1.4 The project will establish a network of 16 technical and business development professionals (plus a Project Director and Administrator) working directly with individual businesses across nine thematic areas to solve technical problems, promote collaboration and share best practice. The thematic areas are Carbon Capture and Storage, Marine Energy, Wind Energy, Power, Oil & Gas Diversification, Solar, Bio Energy, Energy Use In Buildings and Energy Conversion/Storage.

7.1.5 The project is scheduled to run for 3 years.

7.1.6 The development of the Knowledge Exchange network will provide:

- direct technology assistance to SMEs, focussed through nine thematic areas;
- business development support to SMEs to convert prospects for collaboration into projects with economic impact;
- new opportunities for SME secondments into the Energy Technology Partnership ETP and vice-versa;
- increased SME access to energy-related test and demonstration facilities in Scotland through the development of a 'Scottish Energy Laboratory; and
- greater alignment between ETP, Scottish SMEs and with policy/economic development agendas.

7.1.7 Total SE support for the project will be in the region of £500k and will be provided through the use of existing approved funding and at no additional cost to SE.

7.2 Inputs

Our appraisal of this project has made use of the following inputs:

- a phone-call with SE's Project Manager (Ian Murray);
- an Economic Impact Assessment (EAI) (a Word Document dated February 2011 and its supporting Excel file); and
- Energy Technology Partnership Knowledge Exchange Network Approval Paper (undated) - the profile of net additional jobs was obtained directly from Appendix 1.5 of this ETP KEN Approval document.

7.3 Reference Case Assumptions

7.3.1 The Reference Case assumption is simply that the new jobs funded by this project would disappear without the relevant SE funding.

7.4 Project Screening

The only relevant impacts for this project are considered to be:

- B1 & B2 – Additional Employment (Project delivery and Long Term) using the profile of net additional jobs between 2010/11 and 2017/18 provided in the EIA, which predicts a rise from 2 new jobs in 2010/11 up to a maximum of 34 in 2013/14 and back to 1 by 2017/18.

7.4.1 The project's ultimate aim is to boost the turnover of Scottish companies in the (low carbon) energy sector. However, it was not possible to determine what the resulting long-term increases in Scottish companies' turnover is likely to be, so it was not possible to use this as a measure of the likely long term impacts of this project.

7.4.2 The one significant category which we feel is in the 'Cannot Quantify' category for this project is the Fuel Consumption (Sheet I1), since the investment is likely to lead to significant reductions in the use of fossil fuels, both in Scotland and globally, but it is impossible to robustly predict the scale of these impacts at this stage.

7.5 Other Assumptions

7.5.1 The only other assumption which we have made is to use the default mode share for the extra commuting trips, though note that if the additional employees are based at the main Central Belt Universities, then this may over-estimate their car-use somewhat.

7.5.2 The profile of additional jobs used in the Economic Impact Assessment, between 2010/11 and 2017/18 has been used to define the time period used for the carbon appraisal of this project.

7.6 Summary of Results

7.6.1 Details from the CIA spreadsheet are included in Appendix F. The Tool predicts that the additional staff employed as a result of this ETP knowledge Exchange project will lead to a small (246 tonne) increase in Scottish CO2(e) emissions between 2010 and 2018.

7.7 Issues Raised / Lessons Learned

7.7.1 Once we had concluded that the Tool could not be used to predict the long-term (and potentially significant) impacts of this project in terms of reductions in the use of fossil fuels, it became straightforward to use the Tool to assess the minor impacts of the additional jobs, using information available in the EIA and Approval Paper.

8 SMART Exporter

8.1 Background

8.1.1 Smart Exporter is an ambitious new international trade skill programme, designed to increase Scottish skills in areas associated with exporting, establishing overseas production facilities, establishing joint ventures with overseas partners etc. The £7.6million funding is made up of £3.4m of European Social Funding and £4.2m split 50/50 between Scottish Development International (SDI) and Scottish Chambers International (SCI). SDI's contribution is therefore approximately £2.1m.

8.1.2 This will cover a combination of:

- in-house training for companies (involving a combination of web-based training modules and site visits by relevant trainers);
- subsidy for the hire of a dedicated overseas development manager;
- diagnostic tools for determining a company's 'International Preparedness';
- organisation and hosting of workshops and 'breakfast events' to promote 'best-practice' in companies' international strategies etc; and
- phone and email helpline and other technical support, covering all aspects of exporting and related approaches to developing overseas markets.

8.1.3 The project aims to '*raise the international aspirations and competencies of between 8,000 and 10,000 businesses over a 3-year period*' by providing training to around 12,000 individuals.

8.2 Inputs

8.2.1 Our appraisal of this project has made use of the following inputs:

- a face-to-face meeting with SE's Project Manager (Eric Simpson); and
- a Powerpoint Presentation, summarising the main components of the initiative.

8.3 Reference Case Assumptions

8.3.1 The Reference Case for this scheme is assumed to be that the relevant companies receive no training or other support to help grow their exports and so do not achieve any of the export growth assumed to result from the initiative.

8.4 Project Screening

8.4.1 The most-relevant carbon-related impacts are considered to be:

- C1- Travel and Accommodation SE Staff – Project Delivery – delivery of training courses etc;
- C2 – Travel by external parties – attendance at training courses, workshops etc; and
- F1 – Turnover – note that this is likely to be significant at the Scottish level, but less so at the Global level.

8.4.2 Other possible changes in the global carbon footprint resulting from the scheme include:

- improved efficiency within the global economy (eg by allowing the various countries to focus on what they do best) – small carbon reduction;
- reduced global energy consumption (eg by exporting Scottish Sustainable energy technology) - small carbon reduction;
- reduced need for exporting goods (by Scottish companies establishing new production facilities closer to their international markets) – small carbon reductions;
- increased global economic activity – small carbon increase; and
- additional exporting of goods and services (small carbon increase).

8.4.3 However, it is not possible (or at least not easy) to quantify any of these 'global economy' impacts.

8.4.4 From the limited data available it is not possible to quantify/predict either the Long term impacts on future infrastructure (Sheet A2) or the long-term impact on Scottish employment (Sheet B2) which might result from the initiative.

8.5 Other Assumptions

8.5.1 In the absence of definitive data, the following assumptions have been made about the various training courses, workshops etc:

- 10 trainers providing a training course or workshop every week-day, travelling on average 50 miles (80 km) by car to the relevant venue (ie a 100-mile round trip);
- 600 Scottish business managers travel to one event per year, travelling an average of 50 miles (80km) by car to the venue;
- 3,000 additional short haul International flights per year, as a result of the additional marketing and exporting activity;
- 10% of the 3,000 companies who receive training or support each year, (assumed to come from a cross-section of typical Scottish export industry sectors), increase their annual turnover by £100,000 as a result of the training, resulting in a total annual turnover increase of £30m; and
- the impacts are assumed to last for only one year, resulting in a 3-year appraisal period (ie determined by the assumed 3-year duration of the initiative).

8.5.2 These assumptions are obviously somewhat arbitrary and are designed to test the usability of the Tool, rather than to create a robust and detailed appraisal of this Smart Exporter Initiative. It is not clear from the data provided whether actual robust estimates of these types of outcome are available.

8.6 Summary of Results

8.6.1 Details from the CIA spreadsheet are included in Appendix G. Based on the assumptions above, the Tool predicts that 3 years of this Smart Exporter project would lead to a 116,000 tonne increase in Scottish CO2(e) emissions, 96% of which would be due to the increased Turnover.

8.6.2 This very high value suggests that either the turnover growth assumptions above or the Tool's sensitivity to increased turnover (or both) may be too high and should perhaps be reviewed.

8.6.3 On the other hand, a scheme which results in a £30million increase in annual turnover can be expected to have a correspondingly-significant increase in Scottish Industry's carbon footprint, especially since the Tool's turnover-based emissions calculations endeavour to include the full supply chain effects.

8.7 Issues Raised / Lessons Learned

8.7.1 The limited data provided for this project made it difficult to use the Tool in anything other than 'guesstimate' mode.

8.7.2 The results suggest a potential need to check the assumptions regarding the increase in turnover likely to result from this Exporter training and support and the sensitivity of the Tool to this Turnover value.

9 Lessons Learned and Discussion of Issues

9.1 Introduction

9.1.1 In this chapter we summarise the 'lessons learned' from our consideration of the 6 pilot projects and combine these within a more-general discussion of the inputs, outputs and/or assumptions which we feel might hinder the effective use of the Tool or its outputs.

9.1.2 We start by considering our understanding of the current (and likely future) uses of carbon appraisal within SE's overall funding decision processes.

9.2 Our Understanding of the Role of Carbon Appraisal within Scottish Enterprise

9.2.1 Our understanding is that the CIA is likely to be completed fairly late in SE's decision-making process. At this late stage it is likely to be more of a nuisance than an aid to good decision-making. In particular, it is likely to be too late in the overall process to help tackle or mitigate any 'high-carbon' impacts of particular projects.

9.2.2 We therefore encourage SE decision-makers to identify ways in which the CIA could be undertaken earlier, particularly for projects which are likely to have a significant (positive or negative) carbon impacts.

9.2.3 It would also be helpful if SE's 'Carbon Lite' assessment was fully consistent with the screening sheet of the full CIA tool, to avoid giving users of the two tools the perception that they are being asked to 'jump through two different hoops', or the same hoop twice'.

9.2.4 A table summarising the changes needed to achieve consistency between these two screening tools is provided in Appendix H.

9.2.5 We also believe that it is important that the predicted carbon impacts can be combined with the economic benefits within an overall appraisal to inform the SE decision-making process, so that the user of the EIA and CIA tools are not left with two incompatible measures of the costs and benefits of the scheme being appraised. We will return to this issue (of monetising the carbon impacts) later in this chapter.

9.3 Conclusions from the Six Pilot Studies

9.3.1 The key lessons learned from this Pilot Project are as follows:

- the geographic scope (Scottish vs Global) needs to be clearly explained to users of the Tool, particularly for applications where the Scottish and Global impacts are likely to be significantly different in scale and nature;
- the Tool appears to be missing an easy method for including long term transport impacts – sheet C2 can be used, but treats any changes as part of the Project Delivery and does not explicitly include changes in freight distribution (which therefore needs to be rather-cumbersomely entered via the Energy sheet (Sheet I), which deals in tonnes of fuel, rather than vehicle kilometres;

- the Amazon Fife appraisal suggested a significant difference between the 'Employee-based and the 'Building-based' estimates of the carbon impacts (probably due in part to the fact that employee-based methodology uses a comprehensive lifecycle approach while the building energy use methodology (recommended by the Tool's Guidance) excludes these supply chain effects – it may therefore be desirable to compare these two approaches on a set of other developments for which both indicators are available, in order to understand the scale of the typical differences in the predictions produced by these two alternative approaches;
- the suggested dichotomy between the 'Employee-based' and 'building-based' approach suggested by the Guidance appears to rule out the possibility of using a combination of 'employee commuting' and 'building energy' (ie sheets B2 and G) - this would appear to be a shortcoming of the tool and/or the Guidance;
- the Building Energy Sheet (Sheet G1) is not designed to handle a profile of additional buildings coming on-stream during the appraisal period;
- projects and programs which involve obtaining funding to assist a set of as-yet-unspecified activities or projects will find it difficult to use the tool in appraisal mode, but may be able to use it to help them prioritise their spend within the overall project or programme;
- the handling of a multi-year appraisal period is somewhat 'clunky' and would benefit from:
  - a more-unified approach between the different sheets and
  - an ability to change the appraisal period 'at the flick of a switch'.
- additional guidance on how to estimate the number of 'Portable Accommodation' units is required, as is the definition of road types and road length within infrastructure developments;
- in general, the tool appears to be better-suited for calculating and comparing increases in carbon from economic development than predicting reductions due to support for technologies which might change behaviour and/or lead to reductions in greenhouse gas emissions; and
- it may be desirable to double-check the 'Turnover' calculations, since the one project which used these forecast quite high increases in carbon, though this may have been simply due to corresponding high estimates of the increase in turnover.

9.4 Valuing Carbon Impacts

9.4.1 While the 'Funding per $tCO_2(e)$' indicator in the Results (Summary) makes sense for schemes which reduce the carbon emissions, is a rather unhelpful measure for any project which results in an **increase** in carbon emissions. For example, which is better, a scheme which costs £1m and increases carbon by 1000 tonnes, or a scheme which costs £5m and only increases carbon by 500 tonnes?. The problem is that both the cost and the increase in carbon are **disbenefits**, so taking their ratio is meaningless.

9.4.2 In addition, the calculation of SE's 'share' of the carbon impacts (based on funding or some other user-defined factor) adds a degree of unnecessary complication in the main results summary sheet.

9.4.3 What we believe both these measures are trying and (in our opinion) failing to do is to allow the user to combine/compare the carbon impact with the monetary costs and benefits of the scheme.

9.4.4 As highlighted in Paragraph 2.34 of the User Guide, the Tool does not attempt to put a financial value on the predicted carbon impacts of a scheme. As a result, the decision-maker considering the merits of a given project will need to consider their own multi-criteria decision-making process to weigh up the relative pros and cons of the various impacts of a given scheme (GVA, jobs, carbon, level of risk etc).

9.4.5 In particular, the Tool does not provide an easy answer to questions such as 'Do the carbon benefits of project X justify the amount required to deliver it?' or 'Do the Scottish GVA benefits arising from Project Y justify the additional amount of greenhouse gases it generates?'

9.4.6 However, without the corresponding estimates of GVA and additional employment etc, it is not possible to undertake this comparison of costs and benefits within the CIA tool.

9.4.7 However, it would obviously not be advisable to include all of the EIA indicators within this CIA tool.

9.4.8 Instead, we believe that the tool should simply determine the carbon footprint of the project as a whole (and therefore ignore the funding inputs entirely) and output this estimate of the weight of carbon increase or decrease, along with a **monetised value** of this carbon increase/decrease, using a forecast of the price of a tonne of carbon in the relevant future year[6].

9.4.9 The user of this tool will then:

- a) understand which components of the project are adding most to its carbon footprint; (as they do now) and
- b) be subsequently able to include the costs or benefits of this carbon impact on the cost-benefit trade off along with the more-familiar monetary costs and benefits, in order to make decisions on which projects to fund etc.

9.4.10 This would obviously require a corresponding change to Scottish Enterprise's current Economic Impact Assessment methodology, from a focus on GVA to something more akin to a wider cost-benefit analysis which takes account of the monetary value of any additional or reduced greenhouse gas emissions.

9.4.11 This, in our opinion, would then provide a much-more-useful consideration of the benefits (or disbenefits) of a scheme's greenhouse gas impacts within Scottish Enterprise's overall appraisal and decision-making process, than could be provided within the CIA tool itself.

[6]eg http://www.dft.gov.uk/webtag/documents/expert/unit3.3.5.php

9.5 The Appraisal Period

9.5.1 We believe that much more consideration must be given to the question of standardising the multi-year appraisal time period, especially if the tool is going to be used to compare between competing projects.

9.5.2 In general the tool requires the user to enter the relevant attributes for each relevant year (up to maximum of 21 years to 2030/31), though in some sheets the user needs to specify the number of 'profiled years', with the total emissions for these sheets calculated by simply multiplying the per annum emission by the relevant 'Number of Years' variable.

9.5.3 The different approaches to handling the multiple years in the different sheets is likely to be somewhat 'cumbersome' for the user and makes it a non-trivial exercise to vary the duration of the appraisal period.

9.5.4 In addition, the use of a fixed 2030/31 end-year (rather than a user-defined 'Length of Appraisal Period' input parameter will mean that schemes with later start-years will appear to generate less carbon than early-implementation schemes (simply due to the shorter appraisal period) and/or will also require Scottish Enterprise to re-issue regular (annual?) updates of the Tool with this horizon year extended.

9.5.5 As an alternative approach to allowing the user more flexibility over the appraisal period, the user could be required to provide inputs for each year up to the year where the change in the emissions reaches a 'steady-state' (which may be zero additional emissions for projects with a finite life). Predictions of emissions for this 'steady-state' year could then be used to predict the emissions for all subsequent years, allowing the total appraisal period to be specified and changed at will.

9.5.6 The amalgamation of the annual emissions into a single 21-year total value for each of the components within the separate sheets means that it is not easy for the user to apply any 'discounting' to these emissions (ie to give more weight to changes in emissions in the 'early years'). This is consistent with the current approach to greenhouse gas appraisal used in the UK, but underestimates the relative importance of the 'early years' when considering the science of climate change (cumulative effect of emissions, climate 'tipping points' etc).

9.5.7 This limitation is unlikely to be significant when using the Tool to appraise schemes with only limited net greenhouse gas impacts, but might be more-important when comparing schemes with significant carbon impacts (eg projects specifically designed to reduce greenhouse gas emissions and/or schemes which incur a large initial 'carbon footprint' for delivery and a gradual long-term carbon 'pay-back').

9.5.8 The Tool's disaggregation of emissions into 'Delivery' and 'Long-term' helps here, but an additional facility to automatically vary the appraisal period (for example to include the first five years only) might help to further-inform Scottish Enterprise's decision-making regarding these 'significant carbon impact' projects.

9.5.9 Note that if the decision to move the comparison of costs and carbon footprint into the Economic Impact Assessment (as discussed in the previous section), then the CIA tool should be adjusted to output the profile of annual carbon emissions (and/or their carbon pricing value), to allow the appropriate discounting to be undertaken later, as required.

9.6 Geographic Scope and 'Gross versus Net' Emissions

9.6.1 Paragraphs 2.8 – 2.11 of the Guidance (under the heading 'Geographic scope') endeavours to highlight and discuss the 'thorny' issues associated with distinguishing between 'global' and 'Scottish' emissions.

9.6.2 Paragraph 2.11 of the Guidance notes that:

- *'Users are encouraged to consider global carbon impacts'*;
- '*In most cases it will be necessary to report GROSS*[7] *figures for global impacts rather than NET figures';* and
- '*Users can also use the model to report Scottish impacts where it would be useful to report against the Scottish Climate Change Act targets*'.

9.6.3 The subsequent sections of the Guidance (discussing 'deadweight', 'leakage' and 'displacement' effects) consider the Tool being used for both 'Scotland-based' and global analysis.

9.6.4 As a result, it is not very clear to the reader of the Guidance (or the user of the Tool) whether they are expected to use the Tool to consider the net global carbon impact of their investment or just its impact on 'Scottish' Greenhouse Gas emissions (or both).

9.6.5 Our initial attempts to use the Tool in 'Global Emissions' mode on the six Pilot Projects quickly suggested that it was:

- a) difficult to predict non-Scottish impacts; and/or
- b) most of the impacts tend to cancel out at the global level.

9.6.6 This suggests to us it might be easier (and more useful) to do as we ended up doing here, namely to use the tool in 'Scottish--based emissions' mode and comment qualitatively on any impacts would either 'go away' or 'appear' at the global level.

9.7 Length of Commuting Trips

9.7.1 The calculation of emissions commuter distances appears to contain a number of flaws/weaknesses, as follows:

- the calculation appears to use the same average commuting distance (21.2km) for all modes – in reality motorised modes tend to be longer than this average while non-motorised modes tend to be much shorter;
- the user is not encouraged to vary this average commuting length to take account of the geographic location of the additional employment – our analysis of 2001 Census Travel to Work data suggests that the average length of car-commuting trips can vary significantly by location, from 50% shorter than the Scottish average up to more than 20% longer than this average value;
- it is debatable whether the incremental use of existing public transport services actually creates any additional greenhouse gas emissions – the user could perhaps be

[7] The terms GROSS and NET are not formally defined in the Guidance, though are discussed further in Paras 2.17-2.18

given an option to decide whether the extra public transport use can be catered for on existing bus and rail services (and hence incur no additional greenhouse gas emissions); and

- similarly, it is debatable whether car passengers generate the 50% of emissions of car drivers assumed in the model.

9.7.2 These observations are only likely to be relevant when using the Tool to appraise projects whose main carbon-related impact is the creation of a large number of jobs, particularly if the outputs are going to be used to help choose between alternative locations for these developments.

9.7.3 The existing model is also likely to under-estimate the carbon benefits of 'Travel Plan' measures designed to encourage the use of 'motorised but more sustainable' modes such as car-sharing, bus and rail, due to the assumption that car passengers and public transport users generate additional carbon.

9.7.4 For other projects, where commuting impacts are relatively insignificant compared to the overall carbon impact of the project, it is reasonable to avoid complicating the commuting calculations unnecessarily.

9.8 Issues Associated with Potential Double-counting

9.8.1 Paragraphs 2.43 – 2.44 and Table 2-2 of the Tool's User Guide discuss the issue of potential double-counting' between different sets of calculations contained within the Tool.

9.8.2 The relevant section of this discussion is reproduced below:

'In order to provide flexibility to the user, some of the different tools incorporated in the model use different methods to calculate the same thing. For example, the model allows users to estimate the carbon impact of a project based on (a) changes in turnover of target businesses or (b) changes in employment in the target businesses. However both of these approaches rely on benchmark estimates of emissions for a typical business in this sector, and using both approaches would lead to double-counting of carbon impacts.'

9.8.3 Table 2.2 in the User Guidance endeavours to highlight which sheets are most likely to 'overlap' in this way. However, the Tool itself does not appear to undertake any checks or produce any specific 'warning messages' within the results summary or elsewhere if the user completes more than one of these potentially-overlapping sets of greenhouse gas calculations.

9.8.4 Our experience of using the Tool suggests that the flexibility offered by the tool is very useful and we would not recommend removing any of the overlapping calculations. However, the suggestion in paragraph 2.44 of the User Guide that it is '*the responsibility of the user to ensure that double-counting is avoided*' is rather unhelpful.

9.8.5 Instead, we would recommend that the Tool should include more 'user-alerts', warning the user when their responses on the screening page suggests that double-counting may be about to be an issue.

9.9 Other Suggestions to Improve 'Ease of Use'

9.9.1 The following list contains a number of minor (and hopefully self-explanatory) suggestions for improving the user-friendliness of the Tool:

- the 'Cannot Specify' option on the screening sheet should be split into three options, as follows:
  - 'Cannot specify, but unlikely to be significant';
  - 'Cannot specify, but likely to lead to a significant increase in carbon emissions'; and
  - 'Cannot specify, but likely to lead to significant reductions in carbon emissions.

(with the cell then coloured appropriately)

- at the moment, if the user completes an input sheet, then subsequently decides that that impact is not relevant (by answering 'No' in the screening sheet), then the relevant input sheet becomes hidden, but the values remain and continue to feed through to the carbon calculation - the Excel macro which hides any sheets 'turned off' by the user should therefore be amended to stop the carbon impact results from these hidden sheets continuing to feed through into the overall summary tables (but without losing the user inputs); and
- if the Funding sheet continues to be used, then

  EITHER

  – the assumed units of the input values should be changed from £k to £

  OR

  – the format of the input cells should be changed to show 1-Decimal Place (to alert the user to the '£K' assumption) and a warning added if the highest input value exceeds 500,000.0 (ie to attempt to spot when user's have mistakenly entered values in £ rather than £K).

10 Recommendations

10.1 Introduction

10.1.1 In this chapter we summarise our main recommendations, based on our discussions with the 'sponsor' of this road-testing project and the relevant Scottish Enterprise project managers, our attempts to use the Tool to complete the CIA's for the 6 Pilot Projects and our broader consideration of the Tool and its features, as discussed in the preceding chapter.

10.2 Recommendations

10.2.1 Our main recommendations are as follows:

1) Use of the Tool - SE should consider the use of the Tool earlier in the design and appraisal of their projects and programmes, to help identify the main carbon impacts early on in the process and to help inform the selection of projects etc;

2) **Consistency of Carbon Lite** – consideration should be given to making the Carbon Lite tool consistent with the screening sheet of the main CIA tool – see Appendix H for further details – this would reduce the burden of SE Project Managers and reduce the likelihood of inconsistency between the two screening processes;

3) Geographic Scope - the user should generally be encouraged to use the tool in 'Scottish-based emissions' mode and comment qualitatively on any impacts which would either 'go away' or 'appear' at the global level – this approach is likely to avoid some of the difficulties in trying to quantify the greenhouse gas impacts of changes which might occur beyond Scotland's borders, either in the Do Something scenario or in the 'No SE Investment' Reference Case;

4) Checking consistency of alternative approaches - SE should test a number of additional examples of 'Employee-based' vs 'Building-based' estimates of the carbon impacts of a new development and the 'turnover' version of the energy calculation, to understand the sensitivity of the predictions to this methodology choice;

5) Remove project costs - project costs should be removed from the Tool, since the calculation of carbon impacts per £ of investment is only a meaningful ratio for schemes which reduce carbon emissions (and these are likely to be a minority of the schemes tested using the Tool);

6) Appraisal period - the tool should make it easier (ie automated) for the user to change the appraisal period, making it easier to compare the carbon footprints for different projects on a like-for-like basis – the identification of a 'steady-state' year would facilitate this;

7) Monetising the carbon - The Tool should either include an ability to monetise the forecast stream of future carbon emissions, using 'standard[8]' carbon pricing forecasts or it should output the annual profile of 'tonnes of additional carbon' for the user-specified

[8] eg http://www.dft.gov.uk/webtag/documents/expert/unit3.3.5.php

appraisal period, which can then be monetised elsewhere – this is likely to assist with overall decision-making within SE;

8) Double-counting 'alerts' - the Tool should include more 'user-alerts', warning the user when their responses on the screening page suggests that double-counting may be about to be an issue – this would help to reduce the occurrence of these 'double-counting misuses of the Tool;

9) 'What you see is what you get' - the Excel macro which hides any sheets 'turned off' by the user should also stop the carbon impact results from these hidden sheets continuing to feed through into the overall summary tables – this would make it easier for the user to compare alternative methodologies and avoid mistaken double-counting or inconsistency between the users' assumptions and the model's outputs;

10) Additional choices in the screening sheet - The 'Cannot Specify' option on the screening sheet should be split into three options, as described in Section 9.9 – this would make it clearer to the reader of the screening sheet why a particular component of the potential carbon impact had not been included in the results and the likely importance of this 'omission';

11) Long-term Transport Impacts - Sheet C2 should be extended or duplicated to permit the inclusion of long-term transport-related impacts (including freight), ideally based on vehicle kilometres, rather than 'tonnes of diesel' – this would plug a potential gap in the overall greenhouse gas emissions calculations and remove the need for cumbersome HGV fuel-consumption predictions;

12) Mix-and-match - the user should be allowed/encouraged to combine 'employee commuting' and 'building-based energy' (ie sheets B2 and G1), since it is our understanding that these two methodologies both estimate valid non-overlapping types of greenhouse gas emissions from new commercial developments; and

13) Improved/corrected commuting trip-length - the average length of commuting trips should be adjusted to reflect the fact that motorised trips are on average much longer than the 'average over all modes' distance used in the present version and the user should be given the option to adjust these average trip lengths to reflect regional variations in this measure – this would improve the accuracy of this calculation and improve the ability for the user to encapsulate regional variation in commuting patterns.

Appendix A - The Brief

The Carbon Impact of Projects Funded by Scottish Enterprise

Introduction

The carbon footprint of projects supported by development projects is of increasing concern to public and private bodies. At the policy level the Scottish Government Economic Strategy has a target of reducing Scotland's emissions by 80% by 2050[1]. Scottish Enterprise's contribution towards this target is very much a work in progress, in part because of the difficulties in translating aspirational policy goals into practical measurement. However, in 2010 Scottish Enterprise published a model and user guide, developed in partnership with consultants, for assessing the carbon impact of projects[2].

The purpose of this commission is threefold:-

- "Road test" the model and user guide by calculating the carbon impact of a small cross section of SE projects;
- Produce (if necessary) recommendations as to how the model and user guide could be revised and improved; and
- Produce a short "how to do it" guide that will draw on the experience of using the carbon impact model to give practical guidance as to how the methodology should be used. This is likely to cover such things as who should be consulted, the additional information that would be needed from project managers to implement the methodology and the development of any pro-formas that might be used to collect the basic metrics required to use the model.

The Approach

The start of the process is to meet with SE staff responsible for implementing the carbon impact agenda and the Economics Team. At this meeting the appointed consultants will be provided with details of 6 projects that have recently undergone an economic appraisal by SE or consultants acting on SE's behalf. The suggested projects are:-

- Amazon Fife, a recent inward investment project that received a large amount of Regional Selective Assistance and will create around 700 jobs. The project is to be housed in a 1 million square foot unit on a site in Fife;
- TMVS a project involved in customer analysis software that received support through SE's Research and Development grant;
- The Edinburgh Bio-quarter, a live project that involves a number of physical developments
- Informatics in Scotland an industry led multi- strand project intended to strengthen Scotland's position as a centre fro informatics research and commercialisation;
- The Energy Technology Partnership Knowledge Exchange which aims to make a strategic investment in Energy and Low Carbon Knowledge Exchange and Business Support.
- The SMART Exporter programme, delivered in partnership with the Scottish Chambers of Commerce, to assist new companies to become exporters.

Appendix 1 gives further details of each of the projects.

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[1] http://www.scotland.gov.uk/Publications/2007/11/12115041/6

[2] The model and associated documentation is available at:-

http://www.evaluationsonline.org.uk/evaluations/Search.do?ui=basic&action=show&id=394

For each project the consultants will be provided with the economic impact appraisal and supporting documentation such as approval papers. These need to be analysed and related to the carbon impact guidance. The aim will be to assess:-

- The extent to which the project documentation enables the impact methodology to be implemented. It is not expected that this will be straightforward as project documentation is, generally, not produced with the carbon impact of projects in mind. As such judgements will need to be made and surrogate measures used. For example, for physical projects, estimates may have to be made as to floor space, construction methods and materials from which the carbon impacts can be estimated. As such the work requires a degree of creativity and lateral thinking; and
- The additional information that is needed to be able to implement the methodology.

This analysis should be informed by discussions with the appropriate project manager, either by telephone or face-to-face. Contact details will be provided for the managers and their co-operation will be sought prior to the work being commissioned. The purpose of this will be to provide additional information about the projects and to obtain any additional information.

It is not envisaged that contact with supported companies would be required for this project, although consultants should provide recommendations on how any data or information that is required and that SE does not hold could be obtained

Formatted: Bullets and Numbering

Although it is not envisaged that there will be contact, at this stage, with people outside of SE, for some projects it may be necessary to speak to others within SE, for example staff involved in infrastructure or business specialists. It is expected that these contacts, generally, will be by email or telephone rather than face-to-face. Consultants should cost for a maximum of 2 contacts per project.

Once these consultations are completed the appointed consultants should draw up a draft report. This should:-

- Outline the objectives of the work and the methodology used in the work;
- Briefly outline SE's carbon impact model, its objectives and the approach adopted;
- Detail the carbon impacts of the selected projects in so far as this can be determined from the methodology used;
- Outline the information gaps;
- Detail any ways that it is felt that the model can be improved in order to make it more user friendly (if needed) and capable of being used by people who may not be technical specialists;
- Outline the data that needs to be collected in order to implement the model in the future, taking account of any proposed changes to the model. This should include, as appropriate, data collection templates (both general and specific for particular types of project) along with suggestions as to who should be responsible for collecting this data;
- Drawing on the experiences of trying to use the model produce, probably as an annex to the report, a short guidance note for project managers and appraisers on how to undertake a carbon impact assessment. The emphasis of this needs to be on what has to be done to use the existing guidance, covering such things as who needs to be consulted, what needs to be asked and (referencing the templates) what project managers and others (specified) need to collect in order to be able to make use of the existing methodology. This is intended to be process, rather than technical, guidance.

SE will provide:-

- The existing guidance;
- Background details for each of the suggested projects;
- Contact details for the appropriate project managers.

In addition SE will make contact with the project managers and secure their co-operation prior to the start of the work.

Costings

The study will draw on existing information and data and as such will be largely desk based, along with a small number of consultations with SE staff. No company surveys are required. As such, a large number of days will not be required to complete the commission.

Submitting Bids

Consultants are asked to submit bids by 17.00 on 18th March 2011. Bids need to be a maximum of 12 pages (excluding curriculum vitae). Your rates and prices shall be deemed inclusive of all costs, expenses and dispersements howsoever incurred (see appendix 2)

As the brief is prescriptive it does not need to be fed back to SE. Rather consultants should outline in their submission:-

- Relevant experience that the proposed team can bring to this work;
- Their views on SE's carbon impact guidance;
- Any changes they would propose to make to the methodology and overall approach outlined above;
- Costs
- Details (supplemented by targeted CVs) of the staff who would do the work.

Bids should be submitted through the Public Contracts Scotland portal.

Selection of Preferred Bidder

The weightings to be given in the selection process are as follows:-

- Price – 40%; and
- Quality (60%), with the individual elements weighted as follows:-
    - Relevant experience (30%)
    - Critique of SE's carbon impact guidance (30%);
    - Suggested changes to the approach outlined (10%);
    - Details of staff who would do the work (30%).

Timescales

Proposals should be received by 12pm 18th March 2011.

An inception meeting will be held in w/b 21st March

Completion of two or three assessments by March 31st

A final report should be complete by 15th April

Contractual Conditions

By providing us with a quotation you agree to be bound by Scottish Enterprise's Terms and Conditions for Purchasing Services (copy available at http://www.scottish-enterprise.com/publications/terms-for-goods-and-services.doc) which will apply to any contract awarded to you after you have provided us with your quotation.

Scottish Enterprise is committed to meeting their responsibilities under the Freedom of Information (Scotland) Act 2002. Accordingly all information submitted to Scottish Enterprise may need to be disclosed and/or published by Scottish Enterprise. If you consider that any of the information included in your quotation is commercially confidential please identify it and explain (in broad terms) what harm might result from disclosure and/or publication. You should be aware that, even where you have indicated that information is commercially sensitive, we may be required to disclose and/or publish it. We may also be required to disclose and/or publish details of unsuccessful tenders.

Receipt by Scottish Enterprise of any material marked 'confidential' or equivalent should not be taken to mean that Scottish Enterprise accept any duty of confidence by virtue of that marking. Scottish Enterprise may publish the names and contact details of companies who have been issued with an Invitation to Quote document.

Please note that Scottish Enterprise is not bound by any quotes submitted and can reject in part or total the Proposal submitted by you.

Appendix 1

Project Details

Project	Brief Details	SE Funding	Key Outputs	Project manager and other key contacts	Time scale	Key Documentation
Amazon Fife	A large funding package put together to secure Amazon's commitment to a fulfilment centre in Fife. As an earlier proposal had been lost to Wales there was a major effort to land this	£6.5 million through RSA, SPSS and Training Plus	Construction of a 1 million square foot building and the creation of some 700 jobs	James Cameron (Project manager) Derek Ballantyne (Business Infrastructure manager) Gerry Boyce (RSA)	Development under construction with completion by October 2011 in time for the Christmas sales peak	Economic appraisal. Approval paper. RSA case paper
Edinburgh Bio-Quarter	The overarching objective of the EBQ project is to establish Scotland as one of the top 10 worldwide locations for biomedical research. The EBQ is situated to the South East of Edinburgh City Centre, co-located with the University of Edinburgh's College of Medicine, Royal Infirmary of Edinburgh	Refer to EBQ Financial Model (Autumn 2010) and EBQ EIA which documents total net cost to SE of £16.5m (2002 prices, discounted to 2002 over the project lifetime).	Phase 1 infrastructure works, creating 10 serviced plots, completed in July 2006. In March 2008, SE Board approved investment to acquire further expansion land with acquisition completed in July 2010. EBQ site is planned, on completion to provide more than 80,000 m^2 further academic	Rhona Allison David Leven (Infrastructure Project Manager) Margaret Warner	2002 – 2038 with a number of phased activities, outputs and timing of economic impact.	EBQ Investment Committee Paper Autumn 2010. EBQ Economic Impact Assessment (MW Consulting, October 2010). EBQ Commercialisation Economic Impact Assessment (2010). EBQ Monitoring and Evaluation Framework

	and the Queen's Medical Research Institute.		research space and an additional 115,000 m^2 of accommodation for commercial research based companies. Further, a 'Commercialisation Plan' has been developed and assessed.			documentation held by Project Team.
Informatics in Scotland	Informatics in Scotland is a new industry demand led national transformational programme designed to strengthen Scotland's position as an international centre for informatics research commercialisation and business innovation, including R&D	The estimated direct funding requested for Informatics in Scotland amounts to £1.7 million over three years. There would also be a potential wider Scottish Enterprise financial contribution through existing support mechanisms estimated at £10.3 million as well as wider public sector funding of £8.5 million. This gives a total funding package	10 major international conferences 60 Scottish SMEs collaborating on site at SICSA universities 60 business start ups	John Murray (Project manager) Jon Moore (SRO)	Programme to run between 2011 and 2014 – though programme impacts expects between 2011 and 2021	EIA report Project business plan Stage 3 Review Documentation (approval paper, supporting appendices, business plan)

		associated with Informatics in Scotland of £20.5 million				
TMVS R&D Grant	TMVS provides custom image analysis software for a number of large medical imaging vendors. The R&D project will allow it to undertake research to create a new business unit to develop leading edge informatics products in Scotland	£2.95 million Research and Development Grant between 2011 and 2013	Development of new informatics products that could result in turnover from Scottish based operations growing to £76.4m from £13.3m in 10 years	James Cameron (Project manager), Jim Watson (SRO)	R&D over the period 2011-2013 – product sales to 2021	EIA report Project due diligence Project approval paper (and wider supporting documentation)
The Energy Technology Partnership Knowledge Exchange	The project is part of a wider programme to deliver a strategic investment in Energy and Low Carbon Knowledge Exchange and Business Support. This is done by the engagement of 18 strategic support staff providing critical mass and breadth of technology focus to	The total expected project cost amounts to £3 million, made up of contributions from Scottish Enterprise (£0.5 million) the ETP universities (£0.3 million), other partners (£1.2 million) and ERDF funding (£1.1 million).	Turnover of £15 million in participating companies 63 new products developed in supported companies	Ian Murray (Project Manager) Jon Moore (SRO)	Project to run between 2011 and 2014	EIA Report Project application form

	achieve a step change in energy related knowledge exchange activity.					
SMART Exporter	Engagement with partners to raise the international aspirations and competencies of 8,000-10,000 businesses over a 3 year period. Delivered in partnership with Scottish Chambers	£3.4 million European Social Fund (ESF) allocation secured June 2010 towards a 3-year £7.5 million Programme	Support to 8,000-10,000 businesses over a 3 year period	Eric Simpson	2011-2013	Board approval paper Internal appraisal

Appendix 2 Pricing Schedule

Tenderers are required to complete the following proforma showing all of the costs associated with their tender. Any additional costs will not be considered.		
Pricing Element (A day rate is based on a 7 hour working day.)	Total No. hours/ element	Price (excl VAT)
Data analysis	Hrs – Day Rate - Cost -	
Finalise report	Hrs - Day Rate - Cost -	
	Sub Total VAT Total	£ £ £

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	Yes	A 1.2 million square foot purpose build distribution centre in Fife	A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRECT
A2		Will the project lead to future infrastructure development?	LONG TERM	No		A2_INFRASTRUCTURE
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	No	We assume that the greenhouse gas emissions from the construction jobs will be included in the A1_Infrastructure Development calculations	B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT
B2		Will the project have a long-term impact on employment?	LONG TERM	Yes	763 (Gross)/748 Net new jobs in Fife	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	No		C1_TRAVEL & ACCOM DIRECT
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	No	The reductions in GHGs from improved efficiency in Amazon's distribution network are covered in I1_Fuel Consumption	C2_TRAVEL & ACCOM INDIRECT
D1	CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No	The warehouse is unlikely to significantly affect the total demand for the goods being distributed through it, either in Scotland or globally	E2_EMBODIED EMISSIONS
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	Cannot quantify	Impossible to quantify, but the relevant emissions impacts will have been picked up via the relevnat three detailed input sheets	F1_TURNOVER
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	Yes	If calculated based on the 'warehouse' emissions parameters the results is much lower than when based on the employee energy figures??	G1_BUILDING ENERGY USE
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	Cannot quantify	It is not possible to quantify the (possibly-significant) reduction in Amazon's distribution-related emissions, either in Scotland or globally ?	I1_FUEL CONSUMPTION
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE

Appendix B - Amazon Fife

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	Yes	A 1.2 million square foot purpose build distribution centre in Fife	A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRECT	Infrastructure development' covers construction projects, site servicing, groundwork and relocation.
A2		Will the project lead to future infrastructure development?	LONG TERM	No		A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	No	We assume that the greenhouse gas emissions from the construction jobs will be included in the A1_Infrastructure Development calculations	B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD - EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		Will the project have a long-term impact on employment?	LONG TERM	Yes	763 (Gross)/748 Net new jobs in Fife	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	No		C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	No	The reductions in GHGs from improved efficiency in Amazon's distribution network are covered in I1_Fuel Consumption	C2_TRAVEL & ACCOM INDIRECT	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	CHEMICAL REACTIONS/ INDUSTRIAL	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No	The warehouse is unlikely to significantly affect the total demand for the goods being distributed through it, either in Scotland or [illegible]	E2_EMBODIED EMISSIONS	
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	Cannot quantify	Impossible to quantify, but the relevant emissions impacts will have been picked up via the relevant three detailed input sheets	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	Yes	If calculated based on the 'warehouse' emissions parameters the results are much lower than when based on the employee energy figures??	G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	Cannot quantify	It is not possible to quantify the (possibly-significant) reduction in Amazon's distribution-related emissions, either in Scotland or globally ?	I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out.

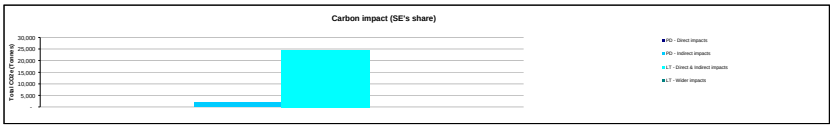
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

CONSTRUCTION PHASE	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	36
PD - Indirect impacts	1,985
Total CO2e Project Delivery	1,974

OPERATION	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	24,599
LT - Wider impacts	-
Total CO2e Long Term	24,599

Carbon impact (SE's share)	26,572	tCO2e
Total SE funding	£8,290	k
Funding per tCO2e	£312	

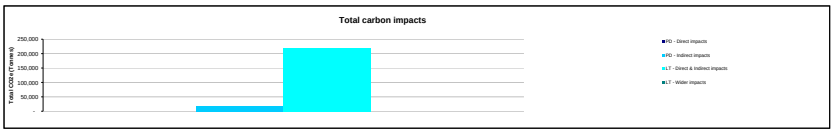


TOTAL CARBON IMPACTS

CONSTRUCTION PHASE	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	76
PD - Indirect impacts	17,379
Total CO2e Project Delivery	17,454

OPERATION	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	217,461
LT - Wider impacts	-
Total CO2e Long Term	217,461

Total carbon impact	234,915	tCO2e
Total funding, all sources	£73,299	k
Funding per tCO2e	£312	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSMENT

Please enter any significant assumptions used in this model

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1 INFRASTRUCTURE DIRECT

The amount of 'portable site accommodation' is DTC's guesstimate.

A1 INFRASTRUCTURE INDIRECT

Warehouse is assumed to be 1.2 million sq ft - Source: DTC's meeting with JC on 14 April 2011. No new roads assumed and no land-scaping or significant areas of car parking

A2 INFRASTRUCTURE

B1 EMPLOYEE ENERGY USE DIRECT

B1 COMMUTING INDIRECT

B2 EMPLOYEE ENERGY USE

Need to decide whether to count the jobs or the buildings energy use - employment sector assumed to be "Cargo handling and storage" - impacts assumed up to 2030/31 despite the EIA only including 4-years worth of benefits

B2 EMPLOYEE COMMUTING

Source: EIA dated Nov 2010. Default mode shares assumed. Impacts assumed up to 2030/31 despite the EIA only including 4-years worth of benefits

C1 TRAVEL & ACCOM DIRECT

C2 TRAVEL & ACCOM - INDIRECT

D1 INDUSTRIAL PROCESSES

E1 EMBODIED INDIRECT

E2 EMBODIED EMISSIONS

F1 TURNOVER

G1 BUILDING ENERGY USE

Warehouse is assumed to be 1.2 million sq ft - Source: DTC's meeting with JC on 14 April 2011. Watch for double-counting, if both employee and building energy are included. Impacts assumed up to 2030/31 despite the EIA only including 4-years worth of benefits

H1 TOURISM

J1 FUEL CONSUMPTION

J1 WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	9
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	9
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	1,966
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	1,966
Employee Energy Use	Long Term	Direct & Indirect	16,001
Commuting Impacts	Long Term	Direct & Indirect	1,194
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	7,403
		TOTAL LT DIRECT AND INDIRECT IMPACTS	24,599
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	76
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	76
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	17,379
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	17,379
Employee Energy Use	Long Term	Direct & Indirect	141,457
Commuting Impacts	Long Term	Direct & Indirect	10,555
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	65,449
		TOTAL LT DIRECT AND INDIRECT IMPACTS	217,461
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

Appendix C - Toshiba Medical Visualisation Systems

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	No		A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRE	Infrastructure development' covers construction projects, site servicing, groundwork and
A2		Will the project lead to future infrastructure development?	LONG TERM	No	Confirmed via discussions with James Cameon	A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	Yes	Values confirmed via a discussion with JC 14/4/2011	B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD - EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		Will the project have a long-term impact on employment?	LONG TERM	Yes	Values confirmed via a discussion with JC 14/4/2011	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	No		C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	Yes	Reduced need for long-distance travel managing the development of the software somewhere overseas	C2_TRAVEL & ACCOM INDIREC	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No		E2_EMBODIED EMISSIONS	
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	No	Turnover effects assumed to be included in the employee effects in B1	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details.
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	No		G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	No		I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out

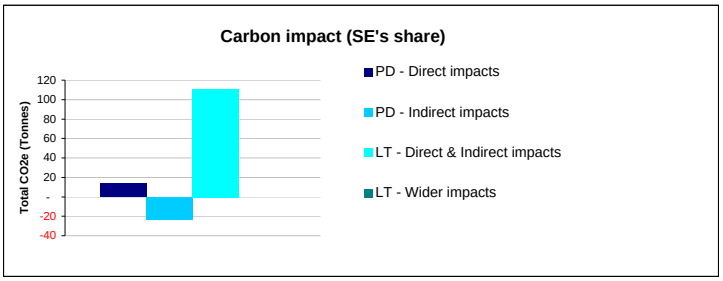
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	14
PD - Indirect impacts	-22
Total CO_2e Project Delivery	-9

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	111
LT - Wider impacts	-
Total CO_2e Long Term	111

Carbon impact (SE's share)	102	tCO_2e
Total SE funding	£2,950	k
Funding per tCO_2e	£28,815	

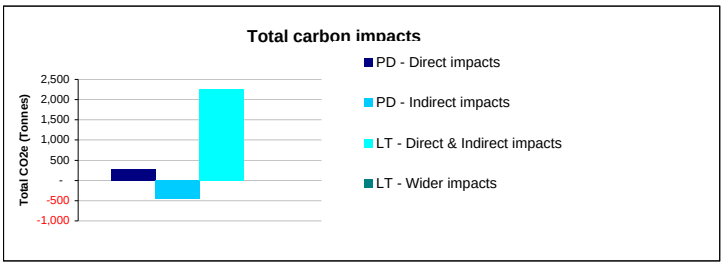


TOTAL CARBON IMPACTS

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	276
PD - Indirect impacts	-457
Total CO_2e Project Delivery	-181

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	2,263
LT - Wider impacts	-
Total CO_2e Long Term	2,263

Total carbon impact	2,082	tCO_2e
Total funding, all sources	£60,000	k
Funding per tCO_2e	£28,815	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSMENT

Please enter any significant assumptions used in this model

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1_INFRASTRUCTURE DIRECT

A1_INFRASTRUCTURE INDIRECT

A2_INFRASTRUCTURE

B1_EMPLOYEE ENERGY USE DIRECT

50 jobs at the minute will increase by 26 if R&D grant awarded, but would fall to 26 if grant not forthcoming - Source: Meeting between DTC & JC on 14 April. We have assumed that the R&D would protect these jobs for 3 years

B1_COMMUTING INDIRECT

Edinburgh City centre, so mode share for car reduced and walk and bus increased - new values are somewhat arbitrary, but could be determined 'properly' in a 'real' application of the Tool

B2_EMPLOYEE ENERGY USE

Total workforce predcited to rise to 120 (vs the 26 core staff who would remain if the grant is not awarded) - Source: Meeting with JC and DTC on 14 April. Unclear how many years to include in the appraisal - 10 years of production assumed here

B2_EMPLOYEE COMMUTING

Edinburgh City centre, so mode share for car reduced and walk and bus increased - new values are somewhat arbitrary, but could be determined 'properly' in a 'real' application of the Tool

C1_TRAVEL & ACCOM DIRECT

C2_TRAVEL & ACCOM - INDIRECT

Without the R&D grant, the production would be carried out somewhere else - probably in the Far East - and the PM's who remain in Edinburgh would have to make regular (eg quartrerly) trips out to manage this software development

D1_INDUSTRIAL PROCESSES

E1_EMBODIED INDIRECT

E2_EMBODIED EMISSIONS

F1_TURNOVER

G1_BUILDING ENERGY USE

H1_TOURISM

I1_FUEL CONSUMPTION

J1_WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	14
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	14
Commuting Impacts	Project Delivery	Indirect	4
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-27
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	-22
Employee Energy Use	Long Term	Direct & Indirect	85
Commuting Impacts	Long Term	Direct & Indirect	26
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	111
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	276
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	276
Commuting Impacts	Project Delivery	Indirect	85
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-542
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	-457
Employee Energy Use	Long Term	Direct & Indirect	1,732
Commuting Impacts	Long Term	Direct & Indirect	531
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	2,263
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

Appendix D - Edinburgh Bio-Quarter (EBQ)

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	Yes		A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRE	Infrastructure development' covers construction projects, site servicing, groundwork and
A2		Will the project lead to future infrastructure development?	LONG TERM	No	All of the proposed infrasructure is assumed to be included as part of the project delivery	A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	Yes	Construction workers	B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD - EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		Will the project have a long-term impact on employment?	LONG TERM	Yes		B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	No		C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	Yes	Co-locating the various research facilities will reduce the need to travel	C2_TRAVEL & ACCOM INDIREC	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	CHEMICAL REACTIONS/ INDUSTRIAL	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No		E2_EMBODIED EMISSIONS	
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	Cannot quantify	The main carbon impacts will be covered by the appraisal of the new buildings and additional employment	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details.
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	No	Emissions based on employees energy use, rather than the buidling's carbon footprint	G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	No		I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out

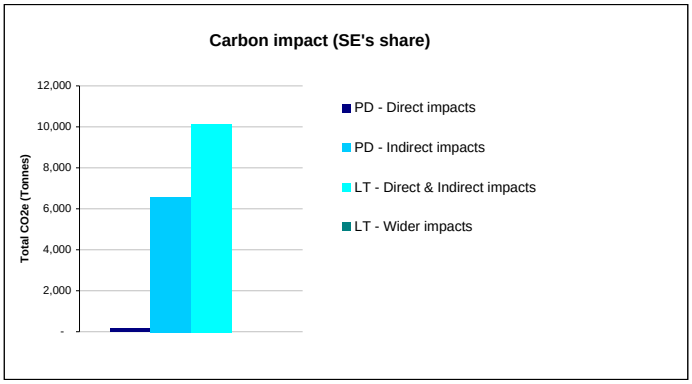
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	136
PD - Indirect impacts	6,580
Total CO_2e Project Delivery	6,716

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	10,140
LT - Wider impacts	-
Total CO_2e Long Term	10,140

Carbon impact (SE's share)	16,856	tCO_2e
Total SE funding	£16,500	k
Funding per tCO_2e	£979	

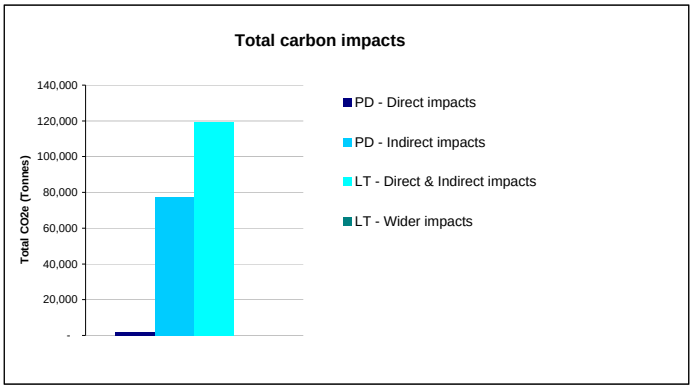


TOTAL CARBON IMPACTS

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	1,597
PD - Indirect impacts	77,218
Total CO_2e Project Delivery	78,815

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	118,996
LT - Wider impacts	-
Total CO_2e Long Term	118,996

Total carbon impact	197,811	tCO_2e
Total funding, all sources	£193,639	k
Funding per tCO_2e	£979	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSME

Please enter any significant assumptions used in this model

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1_INFRASTRUCTURE DIRECT

A1_INFRASTRUCTURE INDIRECT

Need to get road lengths and areas of car parking and landscaping etc from MW

A2_INFRASTRUCTURE

B1_EMPLOYEE ENERGY USE DIRECT

Construction employee energy use is assumed to be included in the Infrastructure calculations

B1_COMMUTING INDIRECT

B2_EMPLOYEE ENERGY USE

20% Optimism Bias figures used (from BioInfElAv6.0OB20%1.xls)

B2_EMPLOYEE COMMUTING

Mode share based on RIE 2006 mode share (from Table 4.2 of the TA for the EBQ). Note that the emissions from bus users is likely to be over-estimated, since there is likely to be sufficient space on existing bus services to RIE.

C1_TRAVEL & ACCOM DIRECT

C2_TRAVEL & ACCOM - INDIRECT

Every employee makes 1 less trip per year, due to the co-location of the various research facilities - based on the average number of employees between 2011 and 2030 (=2300) and guesstimated mode share/trip lengths. Distance assumed to be the total 2-way length of the trip

D1_INDUSTRIAL PROCESSES

E1_EMBODIED INDIRECT

E2_EMBODIED EMISSIONS

F1_TURNOVER

G1_BUILDING ENERGY USE

The new buildings are assumed to achieve a 'Very Good' BREAM rating

H1_TOURISM

I1_FUEL CONSUMPTION

J1_WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	136
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	136
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	6,759
Other travel and accomm	Project Delivery	Indirect	-179
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	6,580
Employee Energy Use	Long Term	Direct & Indirect	7,299
Commuting Impacts	Long Term	Direct & Indirect	2,841
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	10,140
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	1,597
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	1,597
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	79,323
Other travel and accomm	Project Delivery	Indirect	-2,105
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	77,218
Employee Energy Use	Long Term	Direct & Indirect	85,655
Commuting Impacts	Long Term	Direct & Indirect	33,341
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	118,996
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

Appendix E - Sustainable Transport Program

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	**INFRASTRUCTURE DEVELOPMENT**	**Will the project directly fund infrastructure development?**	PROJECT DELIVERY	Cannot quantify	Infrastructure impacts would be determined on a project-by-project basis, but is unlikely to be a significant component of the overall carbon footprint of the full program	A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRE	Infrastructure development' covers construction projects, site servicing, groundwork and relocation.
A2		**Will the project lead to future infrastructure development?**	LONG TERM	Cannot quantify	It is likely that some individual projects might lead to infrastructure development, but this is unlikely to a significant component of the impact of the overall programme and would eb best appraised ona poroject-by-project basis	A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	**ADDITIONAL EMPLOYMENT**	**Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?**	PROJECT DELIVERY	Cannot quantify	Employemeny impacts would be determined on a project-by-project basis - however, commuting and other employee-related carbon impacts are unlikely to be a significant component of the overall carbon footprint of the programme delivery	B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		**Will the project have a long-term impact on employment?**	LONG TERM	Cannot quantify	Long term employment impacts are likley, but would be best appraised on a project-by-project basis - they are unlikely to be significant relative to the main carbon-	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	**TRAVEL AND ACCOMMODATION**	**Will the project lead to SE employee/contractor travel and/or accommodation?**	PROJECT DELIVERY	Yes	Staff travel impacts would be determined on a project-by-project basis, but are unlikely to be a significant component of the overall carbon footprint of the programme	C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		**Will the project directly induce any significant travel requirements by external parties?**	PROJECT DELIVERY	Yes	Staff travel impacts would be determined on a project-by-project basis, but are unlikely to be a significant component of the overall carbon footprint of the programme	C2_TRAVEL & ACCOM INDIREC	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	**CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES**	**Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?**	LONG TERM	No	Not clear if any of the technology which is likely to be supported by the Programme should be included here, though the Guidance excludes emissions from fuel consumed for energy generation, so probably not	D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	**EMBODIED EMISSIONS**	**Will the project involve significant purchases of goods and services during the project delivery period?**	PROJECT DELIVERY	No	The emissions embodied in goods and services would be determined on a project-by-project basis, but are unlikely to be a significant component of the overall carbon footprint of the programme	E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		**Will the project involve significant purchases of goods and services beyond the project delivery period?**	LONG TERM	Cannot quantify	The emissions embodied in goods and services would be determined on a project-by-project basis, but are unlikely to be a significant component of the overall carbon footprint of the programme	E2_EMBODIED EMISSIONS	
F1	**TURNOVER**	**Will the project lead to a rise in turnover for a company/group of companies/sector?**	LONG TERM	Cannot quantify	Company turn-over would be determined ona project-by-project basis - however, turn-over is unlikley to be the best measure to us to appraise the Carbon Impact of this Programme	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details.
G1	**BUILDING ENERGY USE**	**Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?**	LONG TERM	No		G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	**TOURISM**	**Will the project lead to a change in the number of tourist trips to/within Scotland?**	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	**FUEL CONSUMPTION**	**Will the project lead to changes in the consumption of fuel or electricity?**	LONG TERM	Yes	**This is likely to be the key (beneficial) carbon-related impact of this Programme - however, the actual savings can really only be assessed properly on a Project-by-Project basis**	I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	**WASTE AND MATERIALS**	**Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?**	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out

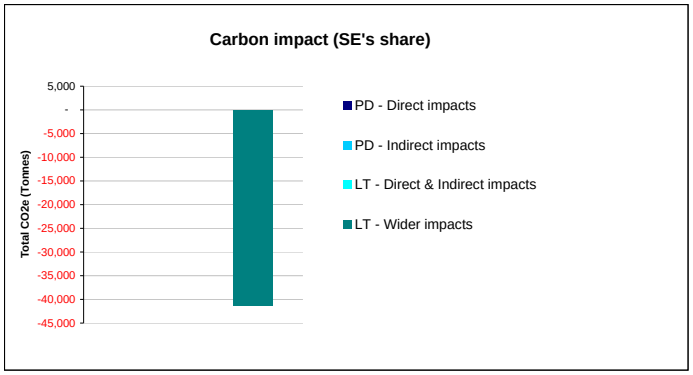
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	8
PD - Indirect impacts	-
Total CO_2e Project Delivery	8

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	-
LT - Wider impacts	-41,282
Total CO_2e Long Term	-41,282

Carbon impact (SE's share)	-41,273	tCO_2e
Total SE funding	£5,000	k
Funding per tCO_2e	-£121	

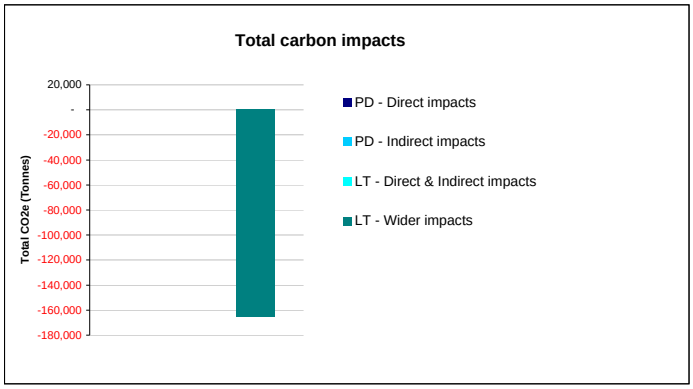


TOTAL CARBON IMPACTS

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	33
PD - Indirect impacts	-
Total CO_2e Project Delivery	33

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	-
LT - Wider impacts	-165,126
Total CO_2e Long Term	-165,126

Total carbon impact	-165,094	tCO_2e
Total funding, all sources	£20,000	k
Funding per tCO_2e	-£121	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSM

The results above assume the full £5m SE spend but only the 'Pipeline' schemes included in the assessment

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1_INFRASTRUCTURE DIRECT

A1_INFRASTRUCTURE INDIRECT

A2_INFRASTRUCTURE

B1_EMPLOYEE ENERGY USE DIRECT

B1_COMMUTING INDIRECT

B2_EMPLOYEE ENERGY USE

B2_EMPLOYEE COMMUTING

C1_TRAVEL & ACCOM DIRECT

EU Joint Projects, collaboration, Regions of Knowledge Projects, etc - 10 SE employees scaled up to match the travel by all the other funders

C2_TRAVEL & ACCOM - INDIRECT

Attendance at EU Joint Projects, collaboration, Regions of Knowledge Projects, etc by non-SE staff - assumed to be pro rata with the 75% funding by other organisations

D1_INDUSTRIAL PROCESSES

E1_EMBODIED INDIRECT

E2_EMBODIED EMISSIONS

F1_TURNOVER

G1_BUILDING ENERGY USE

H1_TOURISM

I1_FUEL CONSUMPTION

See separate spreadsheet

J1_WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	8
		TOTAL PD DIRECT IMPACTS	8
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	-
Employee Energy Use	Long Term	Direct & Indirect	-
Commuting Impacts	Long Term	Direct & Indirect	-
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	-
Fuel consumption	Long Term	Wider impacts	-41,282
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-41,282

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	33
		TOTAL PD DIRECT IMPACTS	33
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	-
Employee Energy Use	Long Term	Direct & Indirect	-
Commuting Impacts	Long Term	Direct & Indirect	-
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	-
Fuel consumption	Long Term	Wider impacts	-165,126
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-165,126

Appendix F - Energy Technology Partnership Knowledge Exchange

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	No		A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIREC	Infrastructure development' covers construction projects, site servicing, groundwork and
A2		Will the project lead to future infrastructure development?	LONG TERM	Cannot quantify	Not possible to predict or quantify the outcomes of the investment, but reasonable to assume that it would help deliver a number of examples of more-sustainable energy production infrastructure	A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	Yes	Extra employees in years 0 to 2 treated as 'Delivery' effects	B1_EMPLOYEE ENERGY USE_DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD - EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		Will the project have a long-term impact on employment?	LONG TERM	Yes	Extra employees in year 3 and beyond treated as 'Long term'	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	Cannot quantify	Unlikley to be significant	C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	No		C2_TRAVEL & ACCOM INDIREC	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No		E2_EMBODIED EMISSIONS	
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	Cannot quantify	Impossible to predict the long-term impacts on company turnover	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details.
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	No		G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	Cannot quantify	This investment is likely to lead to significant reductions in the use of fossil fuels (both in Scotland and globally), but it is impossible to predict this robustly at this stage	I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out

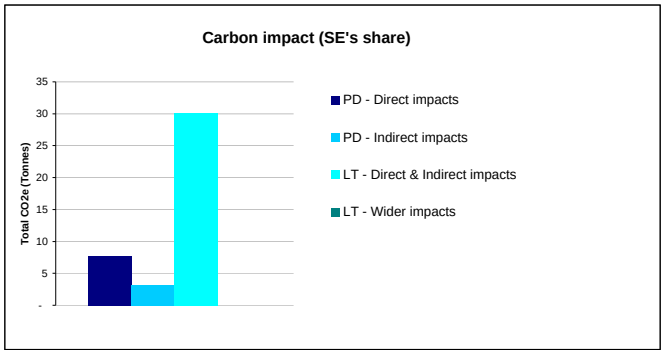
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	8
PD - Indirect impacts	3
Total CO_2e Project Delivery	11

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	30
LT - Wider impacts	-
Total CO_2e Long Term	30

Carbon impact (SE's share)	41	tCO_2e
Total SE funding	£500	k
Funding per tCO_2e	£12,217	

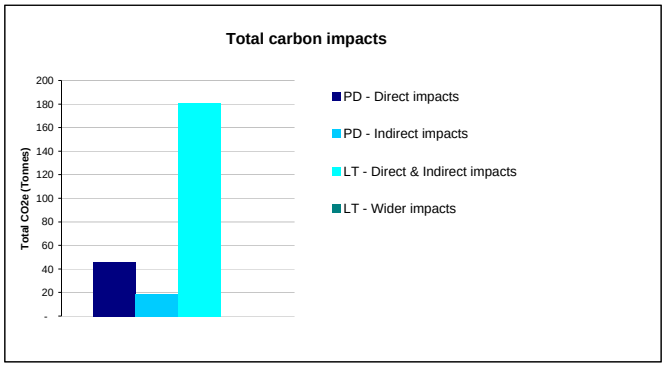


TOTAL CARBON IMPACTS

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	46
PD - Indirect impacts	19
Total CO_2e Project Delivery	65

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	181
LT - Wider impacts	-
Total CO_2e Long Term	181

Total carbon impact	246	tCO_2e
Total funding, all sources	£3,000	k
Funding per tCO_2e	£12,217	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSMENT

Please enter any significant assumptions used in this model

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1_INFRASTRUCTURE DIRECT

A1_INFRASTRUCTURE INDIRECT

A2_INFRASTRUCTURE

B1_EMPLOYEE ENERGY USE DIRECT

B1_COMMUTING INDIRECT

Default mode-share used - though if the additional employees are based at the main Central Belt Universities this may over-estimate their car-use somewhat

B2_EMPLOYEE ENERGY USE

Source: Appendix 1.5 of KEN Approval Paper

B2_EMPLOYEE COMMUTING

C1_TRAVEL & ACCOM DIRECT

C2_TRAVEL & ACCOM - INDIRECT

D1_INDUSTRIAL PROCESSES

E1_EMBODIED INDIRECT

E2_EMBODIED EMISSIONS

F1_TURNOVER

G1_BUILDING ENERGY USE

H1_TOURISM

I1_FUEL CONSUMPTION

This investment is likely to lead to significant reductions in the use of fossil fuels, both in Scotland and globally - however, it was NOT posible to quantify these future carbon savings from the information provided.

J1_WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	8
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	8
Commuting Impacts	Project Delivery	Indirect	3
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	3
Employee Energy Use	Long Term	Direct & Indirect	21
Commuting Impacts	Long Term	Direct & Indirect	9
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	30
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	46
SE Travel & Accommodation	Project Delivery	Direct	-
		TOTAL PD DIRECT IMPACTS	46
Commuting Impacts	Project Delivery	Indirect	19
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	-
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	19
Employee Energy Use	Long Term	Direct & Indirect	129
Commuting Impacts	Long Term	Direct & Indirect	52
Turnover	Long Term	Direct & Indirect	-
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	181
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

Appendix G - SMART Exporter

PROJECT SCREENING

	NAME	QUESTION	TIME PERIOD	YES/NO/?	User comment/notes	IF 'YES' GO TO WORKSHEET	GUIDANCE NOTES
A1	INFRASTRUCTURE DEVELOPMENT	Will the project directly fund infrastructure development?	PROJECT DELIVERY	No		A1_INFRASTRUCTURE DIRECT A1_INFRASTRUCTURE INDIRE	Infrastructure development' covers construction projects, site servicing, groundwork and
A2		Will the project lead to future infrastructure development?	LONG TERM	Cannot quantify	The support provided may enable companies to expand their production but it is impossible to quantify this at this stage	A2_INFRASTRUCTURE	This question is intended to capture projects that aim to incentivise future construction projects (e.g. site servicing projects).
B1	ADDITIONAL EMPLOYMENT	Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?	PROJECT DELIVERY	No		B1_EMPLOYEE ENERGY USE DIRECT B1_COMMUTING INDIRECT	If you answer 'yes' then please complete both 'PD - EMPLOYEE ENERGY USE' AND 'COMMUTING IMPACTS' worksheets (Note: does not include infrastructure contractor site staff who are counted in A1_INFRASTRUCTURE INDIRECT)
B2		Will the project have a long-term impact on employment?	LONG TERM	Cannot quantify	The support provided may enable companies to expand their workforce but it is impossible to quantify this at this stage	B2_EMPLOYEE ENERGY USE B2_EMPLOYEE COMMUTING	Please only answer yes if an assessment of the expected changes in employee numbers has been carried out
C1	TRAVEL AND ACCOMMODATION	Will the project lead to SE employee/contractor travel and/or accommodation?	PROJECT DELIVERY	Yes	A variety of workshiops, in-house training courses etc	C1_TRAVEL & ACCOM DIRECT	This sheet relates to travel and accommodation paid for by SE
C2		Will the project directly induce any significant travel requirements by external parties?	PROJECT DELIVERY	Yes	Attendance at training, but may also increase travel to overseas markets	C2_TRAVEL & ACCOM INDIREC	Answer yes if you are likely to hold any type of activity/event (within or outside of Scotland) where representatives from industry or other stakeholders will be expected to travel to it at their own expense
D1	CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES	Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?	LONG TERM	No		D1_INDUSTRIAL PROCESSES	Please only answer yes if there is likely to be a significant impact on emissions from industrial processes.
E1	EMBODIED EMISSIONS	Will the project involve significant purchases of goods and services during the project delivery period?	PROJECT DELIVERY	No		E1_EMBODIED INDIRECT	Please do not include buildings/infrastructure or waste and materials considered on other sheets
E2		Will the project involve significant purchases of goods and services beyond the project delivery period?	LONG TERM	No		E2_EMBODIED EMISSIONS	
F1	TURNOVER	Will the project lead to a rise in turnover for a company/group of companies/sector?	LONG TERM	Yes	This might be the easiest way to assess the impacts on the companies receiving the training?	F1_TURNOVER	Please only answer yes if an assessment of the expected additional increase in turnover has been carried out. Note that including turnover-based estimates might lead to double-counting emissions from some activities - please consult the User Guide for details.
G1	BUILDING ENERGY USE	Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?	LONG TERM	No		G1_BUILDING ENERGY USE	It is likely that only projects that have answered "yes" to the project delivery infrastructure development question above will need to answer yes to this question
H1	TOURISM	Will the project lead to a change in the number of tourist trips to/within Scotland?	LONG TERM	No		H1_TOURISM	Please only answer yes if an assessment of the expected change in tourist numbers has been carried out
I1	FUEL CONSUMPTION	Will the project lead to changes in the consumption of fuel or electricity?	LONG TERM	No		I1_FUEL CONSUMPTION	Please answer yes only if the project supports development of specific technologies or measures for which an assessment of potential energy consumption or savings has been carried out.
J1	WASTE AND MATERIALS	Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?	LONG TERM	No		J1_WASTE	Please only answer yes if an assessment of the expected change in use of materials and/or method of disposal has been carried out

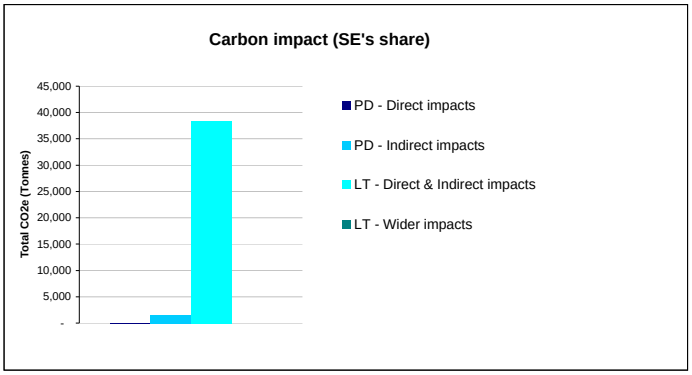
SUMMARY OF RESULTS

CARBON IMPACTS (SE's SHARE)

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	68
PD - Indirect impacts	1,541
Total CO_2e Project Delivery	1,609

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	38,419
LT - Wider impacts	-
Total CO_2e Long Term	38,419

Carbon impact (SE's share)	40,028	tCO_2e
Total SE funding	£3,748	k
Funding per tCO_2e	£94	

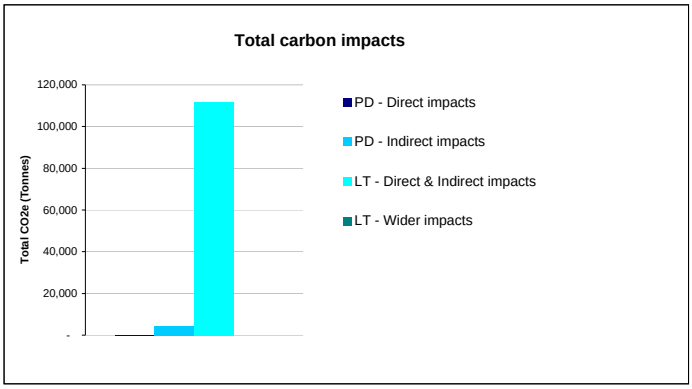


TOTAL CARBON IMPACTS

PROJECT DELIVERY	
CARBON IMPACT SOURCE	TOTAL, tCO2e
PD - Direct impacts	197
PD - Indirect impacts	4,481
Total CO_2e Project Delivery	4,677

LONG TERM	
CARBON IMPACT SOURCE	TOTAL, tCO2e
LT - Direct & Indirect impacts	111,687
LT - Wider impacts	-
Total CO_2e Long Term	111,687

Total carbon impact	116,365	tCO_2e
Total funding, all sources	£10,897	k
Funding per tCO_2e	£94	



USER NOTES ON ASSUMPTIONS BUILT INTO CARBON IMPACT ASSESSM

Please enter any significant assumptions used in this model

USER NOTES ON UNQUANTIFIED CARBON IMPACTS

THE CELLS BELOW CONTAIN A COPY OF USER NOTES ON INDIVIDUAL WORKSHEETS

A1_INFRASTRUCTURE DIRECT

A1_INFRASTRUCTURE INDIRECT

A2_INFRASTRUCTURE

B1_EMPLOYEE ENERGY USE DIRECT

B1_COMMUTING INDIRECT

B2_EMPLOYEE ENERGY USE

B2_EMPLOYEE COMMUTING

C1_TRAVEL & ACCOM DIRECT

10 trainers providing a training course or workshop every week-day, travelling on averge 50 miles to the relevant venue

C2_TRAVEL & ACCOM - INDIRECT

Managers travelling to training courses and events, plus 1 additional overseas trip per year from each of the 3000 companies who receive Smart exporter support each year - NB these values are rather 'arbitrary'

D1_INDUSTRIAL PROCESSES

E1_EMBODIED INDIRECT

E2_EMBODIED EMISSIONS

F1_TURNOVER

10% of the 3000 companies who get support increase their turnover by £100,000 as a result of the training - these are assumed to come from an arbitrary sub-set of the likely export industries

G1_BUILDING ENERGY USE

H1_TOURISM

I1_FUEL CONSUMPTION

J1_WASTE

DETAILED RESULTS

CARBON IMPACTS (SE's SHARE)

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	68
		TOTAL PD DIRECT IMPACTS	68
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	1,541
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	1,541
Employee Energy Use	Long Term	Direct & Indirect	-
Commuting Impacts	Long Term	Direct & Indirect	-
Turnover	Long Term	Direct & Indirect	38,419
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	38,419
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

TOTAL CARBON IMPACTS

CARBON IMPACT SOURCE	STAGE	SUB CATEGORY	TOTAL, tCO2e
Infrastructure	Project Delivery	Direct	-
Employee Energy Use	Project Delivery	Direct	-
SE Travel & Accommodation	Project Delivery	Direct	197
		TOTAL PD DIRECT IMPACTS	197
Commuting Impacts	Project Delivery	Indirect	-
Infrastructure	Project Delivery	Indirect	-
Other travel and accomm	Project Delivery	Indirect	4,481
Embodied Emissions	Project Delivery	Indirect	-
		TOTAL PD INDIRECT IMPACTS	4,481
Employee Energy Use	Long Term	Direct & Indirect	-
Commuting Impacts	Long Term	Direct & Indirect	-
Turnover	Long Term	Direct & Indirect	111,687
Chemical reactions	Long Term	Direct & Indirect	-
Infrastructure	Long Term	Direct & Indirect	-
Embodied emissions	Long Term	Direct & Indirect	-
Buildings Energy Use	Long Term	Direct & Indirect	-
		TOTAL LT DIRECT AND INDIRECT IMPACTS	111,687
Fuel consumption	Long Term	Wider impacts	-
Tourism	Long Term	Wider impacts	-
Waste and materials	Long Term	Wider impacts	-
		TOTAL LT WIDER IMPACTS	-

Appendix H - Comparison of CIA Screening and 'Carbon Lite' Questions

Carbon Lite			Screening Questions from the CIA			
Project Delivery Direct Impacts						
1a	ENERGY	Expected energy use during the project delivery period.		**B1a**	**EMPLOYMENT ENERGY USE- PROJECT DELIVERY DIRECT**	**Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?**
1b	TRAVEL	Travel and accommodation for SE staff and contractors in delivering the project		**C1**	**TRAVEL AND ACCOMMODATION - DIRECT**	**Will the project lead to SE employee/contractor travel and/or accommodation?**
??	INFRASTRUCTURE - DIRECT		Missing in Carbon Lite	**A1a**	**INFRASTRUCTURE DEVELOPMENT - DIRECT**	**Will the project directly fund infrastructure development?**
Project Delivery - Indirect Impacts						
2a	EXTERNAL TRAVEL	Likely travel and accommodation by external parties including commuting		**B1b**	**ADDITIONAL EMPLOYMENT - PROJECT DELIVERY - COMMUTING INDIRECT**	**Will the project lead to the hiring of new employees and/or safeguarding existing jobs during the project delivery period?**
2b	EMBODIED EMISSIONS	Any significant purchases of goods and servcies financed by the project		**E1**	**EMBODIED EMISSIONS - PROJECT DELIVERY INDIRECT**	**Will the project involve significant purchases of goods and services during the project delivery period?**
??	INFRASTRUCTURE - INDIRECT		Missing in Carbon Lite	**A1b**	**INFRASTRUCTURE DEVELOPMENT - INDIRECT**	**Will the project directly fund infrastructure development?**
Longer Term - Direct and Indirect Impacts						
3a	CARBON INTENSITY	Expected change in energy intensity from subsequent changes in operations, turnover or production efficiency	Inconsistent	**F1**	**TURNOVER**	**Will the project lead to a rise in turnover for a company/group of companies/sector?**
3b	CHEMICAL REACTIONS	Any change in emissions from chemical reactions		**D1**	**CHEMICAL REACTIONS/ INDUSTRIAL PROCESSES**	**Will the project lead to a change in the level of GHG emissions associated with an industrial chemical process?**
3c	COMMUTING	New employees commuting		**B2b**	**LONG TERM EMPLOYEE COMMUTING**	
??	EMBODIED EMISSIONS - LONG TERM		Missing in Carbon Lite	**E2**	**EMBODIED EMISSIONS - LONG TERM INDIRECT**	**Will the project involve significant purchases of goods and services beyond the project delivery period?**
Longer Term - Wider Impacts						
4a	RENEWABLES	Carbon intensity of generating electricity or heat	No direct equivalent in CIA			
4b	ENERGY DEMAND	Wider impact of the project on longer term changes in energy demand	Sub-divide?	**B2a**	**LONG-TERM EMPLOYEE ENERGY USE**	**Will the project have a long-term impact on employment?**
				G1	**BUILDING ENERGY USE**	**Will the project lead to changes in the ongoing use of energy for space heating and lighting in a building?**
				I1	**FUEL CONSUMPTION**	**Will the project lead to changes in the consumption of fuel or electricity?**
4c	RESOURCE EFFICIENCY	Use of materials and waste	Inconsistent	**J1**	**WASTE AND MATERIALS**	**Will the project lead to a change in the amount of waste produced or to the methods used for waste treatment or disposal?**
4d	TRANSPORT	Transport		**C2**	**C2_TRAVEL & ACCOM INDIRECT**	**Will the project directly induce any significant travel requirements by external parties?**
??			Tourism not mentioned explicitly in Carbon Lite	**H1**	**TOURISM**	**Will the project lead to a change in the number of tourist trips to/within Scotland?**
??	LONG TERM INFRASTUCTURE		Missing in Carbon Lite	**A2**	**LONG TERM INFRASTUCTURE**	**Will the project lead to future infrastructure development?**
Other Sustainability Impacts						
5a	ENVIRONMENTAL IMPACTS	Any other environmental impacts	Not required in CIA			
5b	SOCIAL IMPACTS	Other social impacts	Not required in CIA			

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