

***The Total Contribution of The Crown Estate 2011/12
Report on methodologies***
May 2013

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The Crown Estate's vision is "to be the UK's most respected property business because of the way in which we manage this portfolio of assets on behalf of the nation."

Introduction

nef consulting is pleased to submit this report disclosing the methodologies behind *Our Contribution - a report on The Crown Estate's Total Contribution to the UK*.

The Crown Estate set itself an ambitious goal for the Total Contribution report. This was first to express what it contributes to the UK overall – not just in terms of the net revenue it brings in, but in terms of its total 'triple bottom line' (economic, environmental and social).

In assessing its triple bottom line contribution, The Crown Estate wished to go further than simply tallying up its own direct impacts. It also wanted to identify the impacts brought about through its supply chain and by the different activities taking place on its portfolio. Although many of these activities are outside its immediate control, The Crown Estate often has an indirect or enabling influence over them and therefore could claim varying degrees of responsibility for them.

Background

nef consulting – the consultancy arm of nef (the new economics foundation) – draws on nef's history over twenty-five years as an innovator in social, economic and environmental analysis and measurement. We put new economics into action: measuring and calculating impact; putting social value at the core of decision making; and helping public, private and third sector organisations to understand the real value of what they do.

The Crown Estate commissioned **nef consulting** and partners, Landman Economics and Route2Sustainability, because our approach to value and measurement aligned closely with what it was aiming to achieve with this report.

At the start of the research project The Crown Estate set up a steering group to guide the project as a whole and separate working groups for each of the three indicator sets – economic, social and environmental. **nef consulting** worked closely with each of these working groups to determine which key indicators would be included in the report; to establish appropriate processes and procedures for gathering internal data from a variety of sources within The Crown Estate; and to check the data and the collection approaches being used on a regular basis.

As part of this, **nef consulting** created a set of templates for collecting the required data for each indicator set and across The

Crown Estate's main business areas (Urban, Rural and Coastal, Energy and Infrastructure, and Windsor).

Once the data had been collected we used the following methodologies to calculate the required metrics.

Baseline data

The 2011/12 Our Contribution report is just the start of what will be an on-going project to identify and measure the broader contribution of The Crown Estate and ultimately integrate it into its annual reporting. One of the main goals of this year's report was to review present data collection systems and introduce new systems where relevant. This has meant that the reporting in some areas has relied upon what might be termed 'best available' data. It has also meant that the data reported is intended to be the baseline for comparisons in future years. Significantly, this also means that we do not have historical data against which to compare this year's results.

Working principles

To support the aim of being transparent about the impacts of the full range of activities across The Crown Estate and its supply chain, **nef consulting** has been working with the following core principles in mind:

Credit

To illustrate the spectrum of responsibility and credit desired in the Total Contribution report, we have calculated each indicator according to the following three levels of influence:

- Direct contributions: activities carried out by The Crown Estate
- Indirect contributions: activities commissioned by The Crown Estate but carried out within its supply chain
- Enabled contributions: activities carried out on The Crown Estate's portfolio by its customers

Beyond the calculation of Direct, Indirect and Enabled metrics across the economic, environmental and social indicators, there is a further, more subtle, distinction between influence and attribution that we may wish to examine more closely going forward. We have chosen, for the current report at least, not to try and determine the extent to which the impacts (both positive and negative) of customers and suppliers can be attributed to The Crown Estate's actions. Looking ahead, however, when we will be able to compare any changes in impacts to this year's baseline data, we might want to look in more detail at how far The Crown Estate has influenced these changes.

Confidence

It is not practical, or even possible in some cases, to capture first hand (primary) data for every indicator. We have therefore used recognised methodologies, models and academic research to estimate results where necessary. Throughout this document, we have indicated the source of each indicator and whether it is:

- 1) Primary data
- 2) An estimate based on direct measurement, subject to certain assumptions or models
- 3) An assessment based on estimated data, subject to certain assumptions or models

Since we did not consider it appropriate to imply a false accuracy to the measures that incorporated estimates, models and assumptions, we have used appropriate forms of rounding to express these numbers and any others based on them.

Net contribution

Although we aim to capture both positive and negative outcomes from the activities across The Crown Estate portfolio, and to report the resulting net contribution, in this first baseline report it has not always been possible. In this baseline report for 2011/12, as a general rule, we have focused primarily on positive economic and social impacts. It is standard practice to report on negative environmental impacts, such as greenhouse gas emissions, waste and resource (eg water) consumption and in this report we have also looked at positive environmental impacts such as CO₂ sequestration.

We acknowledge that we have not been able to assemble robust evidence to document what we call the “counterfactual” (what would have happened anyway) or potential negative outcomes, such as what we term “displacement” (the impact one activity may have on another).

We have touched on the principle of ‘displacement’ in our case study of the Ormonde Wind Farm, where we consider the possible impact of the wind farm on other potential marine activities like fishing or tourism. In most cases, however, accounting for the counterfactual was not feasible. We could not, for instance, estimate how much offshore wind energy would have been produced on The Crown Estate’s portfolio ‘anyway’ (i.e. without The Crown Estate’s influence). This also links to the issues of credit, influence and attribution above.

As we develop better systems to capture data we intend to explore more potential negative outcomes and provide a more balanced report on performance.

Summary

According to these principles, there is still a long way to go for before we are able to say we have covered all aspects of The Crown Estate's Total Contribution. However, we are confident that The Crown Estate is committed to this set of principles and that over the next few years our combined efforts will produce a robust methodology for capturing it.

Data period

The data in this report relates to The Crown Estate's 2011/12 financial year as shown in the table below. However, in some places, estimates and calculations have been made using data that falls outside this period. For example, the Glenlivet case study uses data from the 2010 visitor survey for some calculations, on the assumption that visitor behaviour does not change dramatically from year to year and because historically such surveys have not been conducted annually.

Main economic, environmental and social indicators	Data relates to the financial year 2011/12. It covers those indicators selected as material to the business of The Crown Estate and for which the data is available within this timescale.
Case studies	Windsor/Glenlivet – data runs from the beginning of 2011/12 and runs into, and may include the whole of, 2012/13 as necessary, to capture as much of the picture as possible. Regent Street and Quadrant 3 – data relates to the time period covered by the construction project and the first months of operation. Ormonde Wind Farm – data relates to the time period covered by the project.

General methodologies for Direct, Indirect and Enabled indicators

Direct

Activities carried out by The Crown Estate itself

The Direct metrics relate to the impact of activities carried out in-house by The Crown Estate. Data is mostly available from The Crown Estate sources, such as the annual accounts, and calculations can be performed with a high degree of precision.

Indirect

Activities commissioned by The Crown Estate and carried out within its supply chain

The Indirect metrics relate to the impact of The Crown Estate's supply chain expenditure. They are calculated by breaking down this expenditure by sector/type and using this to estimate the impacts of The Crown Estate's suppliers using appropriate ratios, from, for example, the Office of National Statistics (ONS) or Defra. We can generally say that there is a high degree of confidence in the supply chain expenditure data but some loss of precision occurs in the breakdown by sector.

The next step is to translate this expenditure into estimates of the impacts of the suppliers. The ratios used for this are widely accepted and from credible sources (the ONS / Defra) but rely on inbuilt assumptions that impacts of The Crown Estate's suppliers are at the average level for their industry or sector. We therefore consider these values as estimates in which we can have a reasonable level of confidence.

Enabled

Activities carried out on The Crown Estate portfolio by customers

The Enabled economic metrics relate to the impact of The Crown Estate's customers. The initial basis for the calculation of these metrics is a breakdown of The Crown Estate's customers by activity (eg agriculture, retail, offices). This means that the starting point for the calculations incorporates a degree of uncertainty, as we do not have perfect knowledge of customers' activities. For example, in the calculation of enabled environmental impacts we may know that certain customers are involved in arable farming but not whether this is farming wheat, barley or sugar beet.

Based on the customer data we are then able to turn this into estimates of the impacts using similar ratios to those used for the indirect indicators (e.g. from the ONS or Defra). We therefore consider these values as estimates in which we can have a lower level of confidence.

Note

The calculation of The Crown Estate's contribution does not include induced activities – i.e. activities in other areas of the economy arising as a consequence of 'multiplier' effects due to The Crown Estate's economic activity – because of the difficulties of estimating induced effects with any precision.

Economic Contribution

Four different dimensions of The Crown Estate's economic contribution were analysed:

- Gross Value Added (Direct, Indirect and Enabled)
- Employment (Direct, Indirect and Enabled)
- Investment (Direct only)
- Contribution to HM Treasury (Direct and Indirect)

In this section we present our detailed methodologies for calculating each of these measures.

Best practice

Where possible we have used methodologies to calculate the economic impact of The Crown Estate that may be considered to be "best practice" - based on two recent papers from the Office for National Statistics (ONS):

- Measuring the economic impact of an intervention or investment – Paper One: Context & Rationale (referred to hereafter in this document as "ONS paper 1")
- Measuring the economic impact of an intervention or investment – Paper Two: Existing Sources & Methods (referred to as "ONS paper 2").

Both of these are available from: <http://www.ons.gov.uk/ons/rel/regional-analysis/measuring-the-economic-impact-of-an-intervention-or-investment/measuring-the-economic-impact-of-an-intervention-or-investment/index.html>

Gross Value Added (GVA)

Direct GVA

What this means

Direct GVA is defined as The Crown Estate's turnover/income minus the cost of goods and services it buys in.

The value for 2011/12

Direct GVA = £311million

The data source(s) and calculation(s) we have used

The data required for this calculation is available from The Crown Estate's accounts. First the value of turnover was calculated as

follows: revenue (£340.7m) + interest (£11.6m) plus joint venture income (£7.6m) = turnover (£359.9m), rounded up to £360m.

Total turnover minus supply chain costs or intermediate consumption (£49m) equals GVA: £311m

Data confidence

Direct GVA was calculated exactly using primary data.

Assumptions we have made

None

Indirect GVA

What this means

Indirect GVA is a measure of the impact of The Crown Estate's supply chain expenditure. It is calculated by breaking down this expenditure by sector/type, and turning this into employment and productivity of suppliers using appropriate ratios from the ONS.

The value for 2011/12

Indirect GVA = £118m

The data source(s) and calculation(s) we have used

ONS paper 1 (Sections 4.3.2 and 4.4) suggests that methods for imputation of GVA vary according to the data available for the imputation. In this case, the best source of data available was The Crown Estate's supplier database. For each supply transaction the supplier database has data on:

- the size of the transaction;
- the industrial classification (four digit SIC2007 code) of the supplier.

Calculation of indirect GVA proceeds in two stages:

- The supplier database was used to sum the total value of transactions for each SIC2007 code, giving total value of supply chain activity by industry.
- This total value data was then converted into Gross Value Added data. This was done by using data from the ONS's Annual Business Survey (ABS) on output and GVA by 4-digit SIC2007code for 2011¹.

¹ ONS's Annual Business Survey data provides GVA by four-digit SIC and is based on a large-scale survey of businesses (The ONS "Blue Book") gives a

Data confidence

We have estimated The Crown Estate's indirect contribution based on the contributions of all the companies in The Crown Estate's supply chain. This meant that it was not possible or practicable to gain primary data as this would have been extremely time consuming. We have therefore used the standard approach of estimating GVA based on data on the industrial classification of each company in The Crown Estate's supply chain, combined with industry-level data on GVA from the Office for National Statistics, as the next best option.

Assumptions we have made

The implicit assumption when using this methodology is that the SIC2007 codes in the supplied database adequately describe the activities undertaken by each business in The Crown Estate's supply chain, and that the average value added by each business in the supply chain is equal to the average of all businesses classified under that particular SIC2007 code. These assumptions will not necessarily hold in practice, but they are likely to be a good first-order approximation to reality and use the best available data.

Enabled GVA

What this means

Enabled GVA is a measure of the economic value added by The Crown Estate's customers.

The value for 2011/12

Enabled GVA for The Crown Estate is estimated at £4,804m.

The data source(s) and calculation(s) we have used

The GVA Enabled by The Crown Estate was calculated using different methodologies for each of the component parts of the estate – Urban, Rural and Coastal, Energy and Infrastructure and Windsor. In some cases the estimation of Enabled GVA involves imputation procedures similar to those used for the calculation of Indirect GVA. In other cases, existing statistics from other sources (for example the British Marine Federation) were used.

Further details are provided in the appendices.

Employment

Employment is expressed as the number of full-time-equivalent (FTE) employees involved in The Crown Estate's Direct, Indirect and Enabled activities. Many employees and contractors, including those on The Crown Estate's payroll and those working for suppliers, may

more accurate estimate of total UK GVA but only for one digit SIC, and so is not detailed enough to use here.

not be employed full-time in economic activity generated directly or indirectly by The Crown Estate or in activities enabled by The Crown Estate. This means that the actual number of people involved in The Crown Estate's total activities is likely to be much larger than the FTE number.

Direct Employment

What this means

Direct employment is the number of people on The Crown Estate's payroll, expressed as the number of full-time-equivalent (FTE) employees.

The value for 2011/12

Total average employment for 2011/12 was 428 FTE employees (to the nearest whole person).

The data source(s) and calculation(s) we have used

The Crown Estate's Direct employment contribution consists of the number of FTE employees on The Crown Estate's own payroll and was calculated straightforwardly from information held in The Crown Estate's accounting systems.

Data confidence

Direct employment was calculated based on primary data and rounded up to the nearest number of full-time-equivalent (FTE) employees.

Assumptions we have made

None.

Indirect Employment

What this means

Indirect employment is the number of people in The Crown Estate's supply chain (expressed as the number of FTE employees) who produce the goods and services that The Crown Estate uses,

In the case of Indirect activity in particular, it is likely that only a part of each person's employment should be counted as part of The Crown Estate's economic contribution. For example, a typical firm in The Crown Estate's supply chain may supply hundreds of customers of which only one is The Crown Estate. Hence the FTE number of employees is a much more representative measure of employment activity than the "raw" number of employees involved in The Crown Estate's economic "footprint".

The value for 2011/12

The Crown Estate's estimated Indirect employment contribution is 2,054 full-time equivalent employees.

The data source(s) and calculation(s) we have used

As with GVA, the methodology for estimating The Crown Estate's Indirect employment contribution relies on imputation rather than an exact headcount of employees in the supply chain (due to the difficulty in obtaining precise data on employment in companies in the supply chain). The methodology used follows on from the GVA methodology and is fully consistent with it. Information on the number of employees within each four-digit SIC2007 code from the ONS's Annual Business Survey is used to derive a "GVA per employee" measure for each SIC code. This measure is then used to estimate the number of employees used to produce the GVA calculated for each SIC code in the GVA calculation above.

Data confidence

There is a high degree of confidence in the supply chain expenditure data but some loss of precision occurs in the breakdown by sector.

Assumptions we have made

Again as with GVA, the approach used assumes that purchases can be accurately allocated to a given SIC2007 four-digit industrial classification and that the average productivity of the labour employed by each business in the supply chain is equal to the average productivity of all businesses classified under that particular SIC2007 code. These assumptions will not necessarily hold in practice, but they are likely to be a good first-order approximation to reality and use the best available data.

Enabled Employment

What this means

Enabled employment is the number of people working for The Crown Estate's customers on its property, expressed as the number of full-time-equivalent (FTE) employees.

The value for 2011/12

The estimated Enabled employment contribution of The Crown Estate is 92,318 FTE employees.

The data source(s) and calculation(s) we have used

As with the calculations of enabled GVA, the methodology used for estimating the employment enabled by The Crown Estate varies according to which part of the estate is being analysed.

Further details are provided in the appendices.

GVA per full-time employee (FTE)

Table 1 below gives estimates of GVA per FTE employee based on the Direct, Indirect and Enabled economic contribution of The Crown Estate.

Table 1: Estimated GVA per Full-Time Equivalent employee

Level of contribution	Estimated GVA (£m)	Estimated employment	Estimated GVA/employee (£)	As % of UK GVA
Direct	311	428	726,636	0.02%
Indirect	118	2,054	57,449	0.01%
Enabled	4,804	92,318	52,038	0.32%

Investment

As well as measuring the Gross Value Added by The Crown Estate in its economic activities during 2011/12 we are also interested in The Crown Estate's performance in managing and enhancing the value of its properties, land and other assets. We refer to this as the *investment* component of The Crown Estate's Direct *economic* contribution.

Because of the difficulties involved in estimating an equivalent investment figure for The Crown Estate's supply chain or its customers, we do not attempt to estimate an investment figure for The Crown Estate's indirect or enabled contribution.

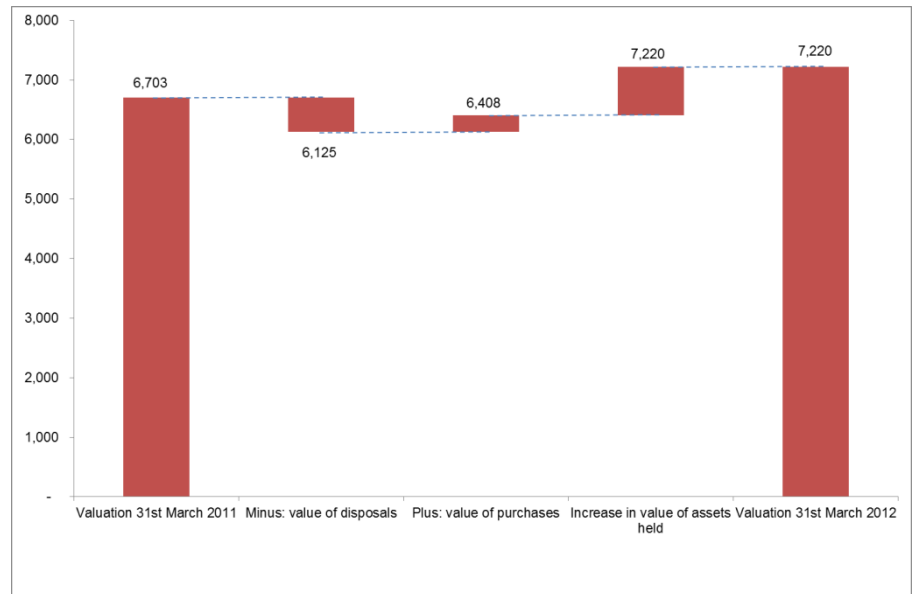
What this means

"Investment" is a term which has multiple meanings in economic analysis. For this report we are excluding external market conditions and defining investment as the increase in the value of The Crown Estate's properties, land and other assets which is attributable to its activities in maintaining and improving the portfolios.

The value for 2011/12

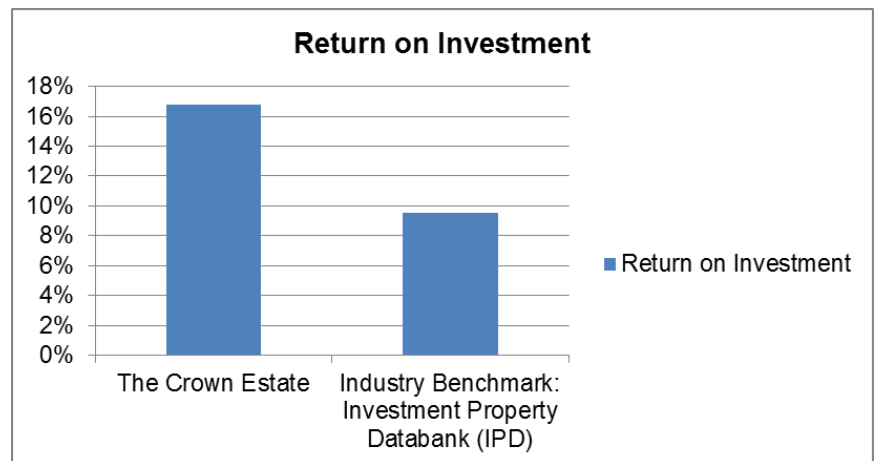
The overall increase in the value of our assets held between April 2011 and April 2012 was £812 million, after accounting for the value of purchases (+£283m), and disposals (-£578m). This is made up of general market movements, net investment in our assets, and tactical asset management that we undertake to enhance the value of our assets.

Figure 1: Value of Direct Investment – waterfall chart



Our total return (being our capital growth, net capital receipts and net income as a percentage of capital employed) was 16.8% for the year ended 31 March 2012. This compared favourably to our industry wide bespoke benchmark² of 9.5% as illustrated by Figure 2 below.

Figure 2: Return on Investment compared with industry benchmark



The data source(s) and calculation(s) we have used

Figure 2 shows how the investment component of The Crown Estate's Direct economic contribution is calculated, using data from The Crown Estate's accounts 2011/12, and also data on the investment performance of properties under management by The Crown Estate compared with the Investment Property Databank (IPD) benchmark.

² As provided by Investment Property Databank

Data confidence

Direct investment was calculated exactly using primary data.

Contribution to HM Treasury

Direct contribution to HM Treasury

What this means

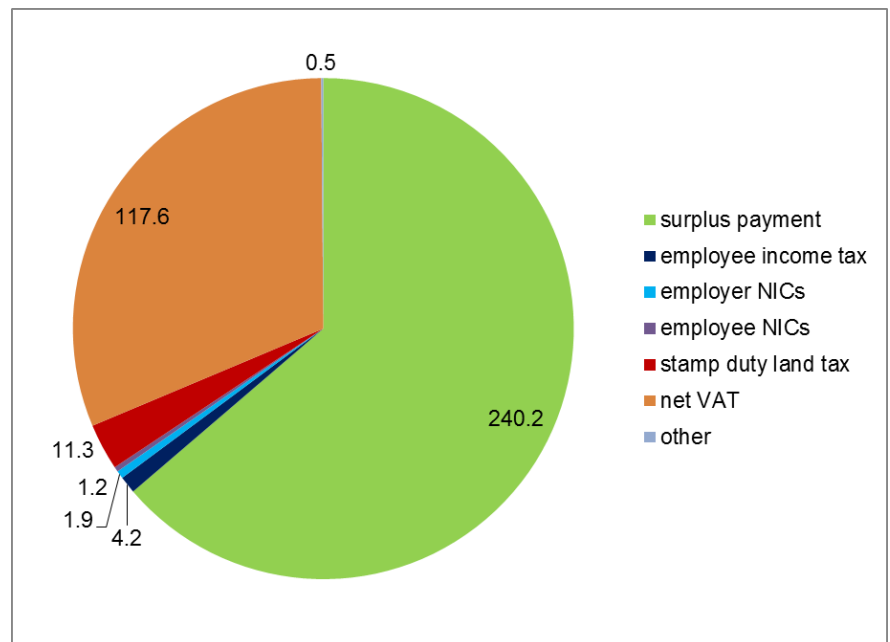
As a result of its unique constitution, governed by The Crown Estate Act 1961, The Crown Estate has a commercial mandate to enhance the value its portfolio and optimise the returns from its assets through good management. Any surplus made as a result of The Crown Estate's operations is paid directly to HM Treasury.

However on top of this, like any other business The Crown Estate contributes to the Treasury through payments of employee income tax, employee and employer National Insurance Contributions (NICs), stamp duty land tax, Value Added Tax (VAT) and other taxes.

The value for 2011/12

Total gross Direct contribution to HM Treasury in 2011/12 was £377 million, broken down as shown in Figure 3 below.

Figure 3: Direct Treasury contribution (gross), £ million



The data source(s) and calculation(s) we have used

The Direct contribution of The Crown Estate to HM Treasury was calculated as a sum of the following for 2011/12: payment of The Crown Estate's operating surplus to HM Treasury

- taxes paid by employees of The Crown Estate:
 - income tax
 - employee National Insurance contributions
- taxes paid by The Crown Estate:
 - employer National Insurance contributions
 - VAT
 - stamp duty land tax
 - other taxes (e.g. Landfill Tax, Climate Change Levy, etc.)

Data confidence

The Direct contribution to HM Treasury was calculated exactly using primary data.

Assumptions we have made

The Crown Estate's Section 106 contributions have not been considered as a tax for the purposes of the calculation of the contribution to HM Treasury.

Further details of the approach taken to Section 106 contributions are provided in the appendices.

Indirect contribution to HM Treasury

What this means

The Crown Estate's Indirect contribution to HM Treasury is the sum of the Value Added Tax (VAT), PAYE income tax and employee and employer National Insurance Contributions (NICs) of its supply chain.

The value for 2011/12

The total estimated Indirect contribution to HM Treasury as a result of The Crown Estate's supply chain is as follows:

Table 2: Indirect contribution to HM Treasury

VAT payments	£49.3 million
Income tax + NICs	£16.3 million
TOTAL	£65.6 million

The data source(s) and calculation(s) we have used

1) VAT

The Crown Estate's supply chain pays VAT to HMRC as a result of its service to The Crown Estate. Because some VAT charged to The Crown Estate by its suppliers cannot be reclaimed as input tax from HMRC, the figure reclaimed by The Crown Estate on its VAT returns is likely to be the best estimate, rather than the exact value, of the net VAT generated by and paid to HMRC by The Crown Estate's supply chain. This sum amounted to £49.3 million during the year to 31 March 2012.

2) PAYE income tax and national insurance

Such a direct method of calculation as that used for VAT is not possible in the case of the PAYE and national insurance (both employer's and employee's) paid within The Crown Estate's supply chain. Nor does The Crown Estate have any right to request this information from its suppliers. The result is that informed estimates of the likely tax sums paid by The Crown Estate's supply chain have to be made.

To estimate the income tax and national insurance contribution (NICs) payments made by and on behalf of workers employed by businesses in TCE's supply chain, we have used a two-stage process:

- Estimate total labour costs (including gross wages plus employer NICs) as a share of indirect GVA using data from the ONS's Annual Business Survey on labour costs and GVA for each four-digit SIC2007 code and combining this with the SIC2007 breakdown of the supplier database;
- Use information from the 2012 Budget on total income tax (£155 billion) and National Insurance Contributions (£106 billion), and compare this with data from the ONS's National Accounts (2012 *Blue Book*) on overall labour costs (£842 billion). This gives a figure of 31% for income tax plus NICs payments as a share of labour costs.

Data confidence

As with the Indirect GVA and employment calculations, an imputation methodology has been used for The Crown Estate's Indirect contribution to HM Treasury³.

³ To avoid terminological confusion here through the use of the adjective "indirect", we should make clear that the "indirect Treasury contribution" of

Assumptions we have made

Again, we assume that purchases can be accurately allocated to a given SIC2007 four-digit industrial classification and that PAYE income tax and national insurance payments of The Crown Estate's supply chain can be imputed from the ratios of labour costs to GVA in a given SIC code. These assumptions will not necessarily hold in practice, but they are likely to be a good first-order approximation to reality and use the best available data.

The Crown Estate is the contribution of taxes from companies that supply The Crown Estate (and their employees) rather than indirect taxes (such as VAT) paid by The Crown Estate – which are included in its **direct** Treasury contribution.

Case Study: Regent Street and Quadrant 3

Sustainability outcomes

Data for the environmental outcomes was derived from the 2012 Quadrant 3 Fact Sheet, provided by Sir Robert McAlpine.

Community Benefits

Note that the figures calculated for the benefits to the individual and to the State from employment gained via the Workplace Co-ordinator through the Recruit West End programme are not included in the calculation of the Total Contribution elsewhere in this report as they result as part of the planning process for Quadrant 3.

Individual

What this means

The economic value of changes in financial situation of those who gained employment via the Workplace Co-ordinator has been calculated as the difference between typical salary and estimated benefits and tax credits received by the unemployed individual.

The value for 2011/12

In total, for all 118 individuals that have gained employment the scheme is estimated to have created a net financial benefit of £539,000.

The data source(s) and calculation(s) we have used

Each individual is estimated to be £4,564 better off annually as a consequence of gaining employment through the programme. This is calculated, based on the assumptions below, by deducting the average benefits received per individual of £4,300 per year from the average net salary of £8,865 per annum. $£4,565 \times 118 = £538,670$, rounded to £539,000.

Data confidence

These figures are an assessment based on the following assumptions:

Assumptions we have made

In the absence of demographic profiling of those that gained employment through the programme, the typical individual is assumed to be:

- 30 years old, male and single with no dependents

- Living alone and renting privately at a cost of £400/month
- Paying £608.46/year in Council Tax

Using these assumptions to calculate benefits using GOV.UK's online Benefits Calculator, it can be seen that the individual would be eligible for £71.00 per week Jobseekers Allowance and £11.71 of Council Tax Benefit per year. This gives a total benefits received of £4,300 per year.

In terms of employment gained, it is assumed that these 118 individuals will be entering full-time retail positions. The Office for National Statistics Annual Survey of Hours and Earnings 2012 calculates the median annual full-time salary of sales and retail assistants to be £9,313.

The taxes and National Insurance (NI) contributions liable for payment by this individual are £242 and £207 respectively. This gives a net salary of £8,865 per annum.

The State

What this means

There is an additional economic value to the State that is derived from the changes in financial situation of those who gained employment via the Workplace Co-ordinator programme. For the programme's contribution to central Government, the figure is calculated from the difference between benefits paid to an individual while they are unemployed, and the taxes gained once an individual has found employment.

The value for 2011/12

The Government benefits economically by a total of £4,778/year per individual, £563,804 for all 118 individuals gaining employment.

The data source(s) and calculation(s) we have used

As calculated above, the benefits and tax credits assumed to be paid to an individual on the Recruit West End programme is £4,300/year.

The tax and National Insurance payments gained by central Government by an individual in a typical retail position in London is £448/year (tax of £241.60 and NI contributions of £206.52), as outlined above.

Therefore, the Government benefits economically by a total of £4,748/year per individual, £560,264 for all 118 individuals gaining employment.

Data confidence

As above.

Assumptions we have made

As above.

Environmental Contribution

This section details The Crown Estate's contribution to the UK's environmental performance. Where available data has allowed, this contribution has been calculated for Direct, Indirect (supply chain) and Enabled activities – in total The Crown Estate's 'value chain'.

The following seven Key Environmental Performance Indicators [KEPIs] were analysed:

1. Electricity Generation: MWh (Direct and Enabled)
2. Net Greenhouse Gas (GHG) Emissions: tonnes CO₂e (Direct, Indirect and Enabled)
3. Greenhouse Gas Emissions Produced: tonnes CO₂e (Direct, Indirect and Enabled)
4. Greenhouse Gas Emissions Avoided: tonnes CO₂e (Direct and Enabled)
5. Greenhouse Gas Emissions Sequestered: tonnes CO₂ (Direct and Enabled)
6. Water Consumption: m³ (Direct, Indirect and Enabled)
7. Waste: tonnes (Direct, Indirect and Enabled)

General methodologies for Direct, Indirect and Enabled environmental indicators

Direct Environmental Contribution

Data for the Direct contribution for the following four KEPIs was gathered directly from The Crown Estate: electricity generation; total greenhouse gas emissions; water consumption; and solid waste. We estimated the total CO₂ emissions avoided and sequestered and used these data to estimate net Direct CO₂ emissions.

Indirect Environmental Contribution

Data for the Indirect contribution for the following three KEPIs was quantified through extended input-output analysis (EIOA): total greenhouse gas emissions; water consumption; and solid waste.

EIOA requires extension of the UK published input-output tables (via UK ONS) to capture each industry sector's environmental performance. Expenditures provided by The Crown Estate are first reclassified and then relevant sector environmental intensities (via EIOA) applied.

Enabled Environmental Contribution

Data for the Enabled contribution to electricity generation was based on primary data provided by The Crown Estate. The Enabled contributions to greenhouse gas emissions (released, avoided and sequestered), water consumption and waste generation were all based on broad 'activity data.'

Electricity Generation

Electricity generation concerns generation from renewable sources / technologies.

Direct Electricity Generation

What this means

From a Direct point of view The Crown Estate generated electricity via solar PV array(s).

The value for 2011/12

In 2012/12, The Crown Estate directly generated 0.132 MWh of renewable electricity.

The data source(s) and calculation(s) we have used

Primary data was provided by The Crown Estate's sustainability team.

Data confidence

Direct electricity generation was calculated exactly.

Assumptions we have made

None

Indirect Electricity Generation

N/A

Enabled Electricity Generation

What this means

Enabled electricity generation is that generated on leased land (onshore wind plus solar PV arrays) and leased sea bed (offshore wind). Although The Crown Estate is active in all forms of renewable energy (ie. wind, solar, wave, tidal, hydro and biomass) only wind turbines (offshore and onshore) and solar PV were 'active' for the 2011/12 reporting year.

The value for 2011/12

In 2011/12, The Crown Estate Enabled 5,790,125 MWh of renewable electricity to be generated.

The data source(s) and calculation(s) we have used

The value reported was based on primary data disclosed by The Crown Estate.

Data confidence

Enabled electricity generation was calculated exactly.

Assumptions we have made

None

Net Greenhouse Gas (GHG) Emissions

"Net greenhouse gas emissions" refers to greenhouse emissions produced less those avoided via renewable electricity generation activities and those sequestered through forest cover.

Direct Net Greenhouse Gas (GHG) Emissions

What this means

The calculation of Direct net greenhouse gas emissions considers greenhouse gas emissions produced directly by The Crown Estate less emissions sequestered via forests managed by The Crown Estate and those avoided via the very small amount of renewable energy generated produced by solar PV on its urban portfolio.

The value for 2011/12

Direct net emissions were -33,783 tCO₂e. This means that more emissions were sequestered or avoided through forestry and renewable electricity generation than produced from Direct activities on The Crown Estate. Another way of saying this is that The Crown Estate can be considered “carbon positive” for its Direct net emissions.

The data source(s) and calculation(s) we have used

The value reported was based on primary data disclosed by The Crown Estate.

Data confidence

Direct net greenhouse gas emissions were calculated exactly by subtracting emissions sequestered and avoided from emissions produced.

Assumptions we have made

The assumptions used in the calculations of emissions produced, sequestered and avoided also apply to the calculation of net greenhouse gas emissions.

Indirect Net Greenhouse Gas (GHG) Emissions

What this means

Indirect net greenhouse gas emissions is the same as Indirect greenhouse gas emissions produced because we have not calculated emissions sequestered or averted through The Crown Estate's supply chain activities. (Undoubtedly some of The Crown Estate's suppliers were generating electricity via renewable technologies and managing forests. However, the quantities of greenhouse gases avoided and sequestered are beyond stable remote estimation methods and would require a detailed supplier survey which is beyond the scope of this baseline report.)

The value for 2011/12

Through Indirect activity of The Crown Estate's supply chain in 2011/12, 63,457 tCO₂ net emissions were produced.

The data source(s) and calculation(s) we have used

In the case of the supply chain, data was not available for sequestered and averted emissions so the net Indirect emissions figures are the same as the total Indirect greenhouse gas emissions.

Enabled Net Greenhouse Gas (GHG) Emissions

What this means

The Enabled net greenhouse gas emissions calculation refers to Enabled emissions produced less those sequestered CO₂ via forestry managed by The Crown Estate's tenants, less avoided greenhouse emissions via renewable electricity generation on leased land (onshore wind plus solar PV arrays) and leased sea bed (offshore wind).

The value for 2011/12

Enabled net emissions were -3,963,138 tCO₂e. This means that more emissions were sequestered or avoided by The Crown Estate's tenants through forestry and renewable energy than produced from Enabled activities on The Crown Estate.

The data source(s) and calculation(s) we have used

The value reported was based on primary data disclosed by The Crown Estate.

Data confidence

Enabled net greenhouse gas emissions were calculated exactly by subtracting emissions sequestered and avoided from emissions produced.

Assumptions we have made

The assumptions used in the calculations of emissions produced, sequestered and avoided also apply to the calculation of net greenhouse gas emissions.

Greenhouse Gas Emissions (GHG) Produced

The Greenhouse Gas Protocol sets out clearly defined standards for corporate reporting of GHG emissions produced. It is worth clarifying how the terminology used in the GHG Protocol compares with the terminology of the Direct, Indirect and Enabled contribution of The Crown Estate used in the total contribution report.

The GHG Protocol⁴ defines direct and indirect emissions as follows:

- Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

The GHG Protocol further categorizes these direct and indirect emissions into three broad scopes:

- Scope 1: All direct GHG emissions.
- Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- Scope 3: Other indirect emissions, such as those emanating 'upstream' from the extraction and production of purchased materials and fuels; transport-related activities in vehicles not owned or controlled by the reporting entity and those emanating 'downstream' from transportation and distribution, end of life treatment of sold products and importantly, in the context of The Crown Estate, leased assets.

Ref: http://www.ghgprotocol.org/files/ghgp/public/scopes_diagram.pdf

Therefore, although employing slightly different terminology (to clearly distinguish between upstream and downstream emissions), The Crown Estate's reporting boundaries are entirely consistent with the GHG protocol.

⁴ <http://www.ghgprotocol.org/calculation-tools/faq#directindirect>

Direct Greenhouse Gas Emissions Produced

What this means

The GHG Protocol defines Direct GHG emissions as emissions from sources that are owned or controlled by the reporting entity.

The value for 2011/12

Direct greenhouse gas emissions of The Crown Estate in 2011/12 were 3,727 tonnes CO₂e.

The data source(s) and calculation(s) we have used

Primary data for Direct Greenhouse Gas emissions were provided by The Crown Estate's sustainability team.

Data confidence

Direct greenhouse gas emissions were calculated exactly.

Assumptions we have made

We have assumed that The Crown Estate follows 'best practice' and that Direct emissions equates to Scope 1 of the Greenhouse Gas Reporting Protocol, as described above.

Indirect Greenhouse Gas Emissions Produced

What this means

Indirect GHG emissions are those that are a consequence of the activities of The Crown Estate's supply chain in producing the goods and services purchased.

The value for 2011/12

Indirect greenhouse gas emissions of The Crown Estate in 2011/12 were 63,457 tonnes CO₂e.

The data source(s) and calculation(s) we have used

Indirect greenhouse gas emissions were estimated using an extended input-output (EIO) model. The Crown Estate's expenditures were classified according to the EIO model sector classification and respective indirect environmental performance intensities applied.

Data confidence

Conventional input-output models are published by the UK Office of National Statistics (ONS). The conventional model is extended so that each constituent industry sector's performance for a number of environmental factors is quantified. The extended model is then subject to standard input-output calculations that result in each constituent industry sector's supply chain environmental performance intensities.

Assumptions we have made

Extended input-output modelling and analysis is increasingly commonplace. The approach is outlined in The UK Government's Department for Environment & Rural Affairs (Defra) 2012 Guidelines to Defra / DECC's "GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors."

Enabled Greenhouse Gas Emissions Produced

What this means

Enabled greenhouse gas emissions refer to the greenhouse gas emissions of customers of The Crown Estate. In the terms of the GHG Protocol, Enabled emissions would be included within the "downstream" element of Scope 3 emissions.

The value for 2011/12

Enabled greenhouse gas emissions of The Crown Estate in 2011/12 were 1,034,409 tonnes CO₂e.

The data source(s) and calculation(s) we have used

Enabled emissions were calculated for leased property (for office, retail and residential purposes) and leased land (for agricultural purposes). Emissions from leased property were calculated using emissions factors derived from actual performance data collected by the Chartered Institute of Building Services Engineers (CIBSE). Accordingly on average 0.08 tonnes of CO₂e are emitted per m² of property. Emissions from agricultural activities were calculated using emissions factors published by the Food Climate Research Network (FCRN). Accordingly, 6.1 tonnes of CO₂e are emitted per hectare of arable land and 12.4 tonnes of CO₂e are emitted per hectare of grazing land.

Data confidence

Our assessment of Enabled greenhouse gas emissions is based on estimated data concerning land use and subject to models using the emissions factors noted above.

Assumptions we have made

With regard to leased property emissions, due to the various energy types and use patterns of the leased property tenants being unknown, best practice emission factors (as provided by Defra) cannot be applied. That said, the method employed is in our opinion robust due to the large data set collected by CIBSE. With regard to leased land emissions, given the specific agricultural activities are unknown (eg. the types of crops produced) again best practice of crop specific emission factors cannot be applied.

Greenhouse Gas Emissions Sequestered

Direct CO₂ Emissions Sequestered

What this means

Direct sequestered CO₂ emissions refer to the CO₂ uptake (through photosynthesis) by the forests owned and managed by The Crown Estate.

The value for 2011/12

Direct CO₂ emissions sequestered of The Crown Estate in 2011/12 were 37,509 tonnes CO₂e.

The data source(s) and calculation(s) we have used

The sequestration factors applied to The Crown Estate's forest cover were derived from The Crown Estate's "Potential carbon sequestration within the Crown Estate's Forestry Portfolio" report, prepared by the Edinburgh Centre for Carbon Management. Accordingly, the average annual CO₂ uptake factor was estimated to be 4.67 tonnes CO₂ / hectare.

Data confidence

Our assessment of Direct greenhouse gas emissions sequestered is based on estimated data concerning land use and subject to models using the sequestration factors noted above.

Assumptions we have made

We have based on our calculations on what we believe to be the best available data for the land use estimates and the sequestration factors.

Indirect CO₂ Emissions Sequestered

N/A

Enabled CO₂ Emissions Sequestered

What this means

Direct sequestered CO₂ emissions refer to the CO₂ uptake (through photosynthesis) by the forests owned by The Crown Estate and leased to its customers.

The value for 2011/12

Enabled CO₂ emissions sequestered of The Crown Estate in 2011/12 were 18,040 tonnes CO₂e.

The data source(s) and calculation(s) we have used

The sequestration factors applied to The Crown Estate's leased forest cover were exactly the same as those employed for Direct sequestration.

Data confidence

As with the Direct values, our assessment of Enabled greenhouse gas emissions sequestered is based on estimated data concerning land use and subject to models using the sequestration factors noted above.

Assumptions we have made

We have based our calculations on what we believe to be the best available data for the land use estimates and the sequestration factors.

Greenhouse Gas Emissions Avoided

Direct GHG Emissions Avoided

What this means

Direct greenhouse gas emissions avoided refers to those prevented through the Direct generation of electricity from renewable sources (in this case through solar PV on the urban portfolio only).

The value for 2011/12

Direct greenhouse gas emissions avoided by The Crown Estate in 2011/12 were 0.114 tonnes CO₂e.

The data source(s) and calculation(s) we have used

According to the British Wind Association 0.00086 tonnes of CO₂e are avoided for every 1 kWh of renewable electricity generation. This factor was applied to the 0.132 MWh of Direct renewable electricity generated by The Crown Estate in 2011/12.

Data confidence

Direct greenhouse gas emissions avoided were estimated using a measure of renewable energy generated and a conversion factor from reliable sources.

Assumptions we have made

We have based on our calculations on what we believe to be the best available data for the land use estimates and the sequestration factors.

Indirect GHG Emissions Averted

N/A

Enabled GHG Emissions Avoided

What this means

Enabled greenhouse gas emissions avoided refers to those prevented through the Enabled generation of electricity from renewable sources (e.g. wind turbines, solar PV arrays etc.).

The value for 2011/12

Enabled greenhouse gas emissions avoided by The Crown Estate in 2011/12 were 4,979,508 tonnes CO₂e.

The data source(s) and calculation(s) we have used

According to the British Wind Association 0.00086 tonnes of CO₂e are avoided for every 1 kWh of renewable electricity generation. This factor is applied to the 5,790,125 MWh of Enabled renewable electricity generated across The Crown Estate in 2011/12.

Data confidence

Enabled greenhouse gas emissions avoided were estimated using a measure of renewable energy generated and a conversion factor from reliable sources.

Assumptions we have made

We have based on our calculations on what we believe to be the best available data for the land use estimates and the sequestration factors.

Water Consumption

Direct Water Consumption

What this means

Water consumption comprises Direct supplied water (via water utility companies) plus abstracted water (via ground water wells and surface water tributaries & pumps directly managed by The Crown Estate).

The value for 2011/12

Direct water consumption by The Crown Estate in 2011/12 was 403,261 m³.

The data source(s) and calculation(s) we have used

The Direct supplied and abstracted water data was provided by The Crown Estate's sustainability team.

Data confidence

Direct water consumption was calculated exactly.

Assumptions we have made

None

Indirect Water Consumption

What this means

Indirect water consumption is water that is used as a consequence of the activities of The Crown Estate's supply chain in producing the goods and services purchased.

The value for 2011/12

Indirect water consumption of The Crown Estate in 2011/12 was 827,217 m³.

The data source(s) and calculation(s) we have used

Conventional input-output models are published by the UK Office of National Statistics (ONS). The conventional model is extended so that each constituent industry sector's performance for a number of environmental factors is quantified. The extended model is then subject to standard input-output calculations that result in each constituent industry sector's supply chain environmental performance intensities.

Data confidence

Indirect water consumption data were estimated using an extended input-output (EIO) model as with the Indirect greenhouse gas emissions.

Assumptions we have made

Extended input-output modelling and associated analysis is increasingly commonplace. The approach is deployed by Water Footprint Network (WFN) for their indirect calculations. WFN is the leading organisation for understanding industry water dependencies.

Enabled Water Consumption

What this means

Enabled water consumption comprises water supplied (via water utility companies) plus abstracted water (via ground water wells and surface water tributaries & pumps) to customers of The Crown Estate.

The value for 2011/12

Enabled water consumption by The Crown Estate in 2011/12 was 6,729,367m³.

The data source(s) and calculation(s) we have used

Enabled water consumption data was calculated for leased property (office, retail, residential) and leased land (for agricultural purposes). Water consumption of leased properties was based on The Crown Estate's disclosure concerning the water consumption of the properties they directly manage.

Knowing the percentage of the total property portfolio directly managed, the approximation for the non-managed portion is straightforward. Calculating water consumption of leased land required first estimating the agricultural yields via application of yield factors provided by Defra; for example, 7 tonnes of cereals / hectare. Subsequently water consumption factors published by the Water Footprint Network (WFN) were applied to yields. For example, according to the WFN, cereals require 1.65 m³ / tonne, horticultural products require 30.13 M³ / tonne, grazing (for meat) requires 84.39 m³ / tonne and grazing (for milk) requires 24.17 m³ / tonne.

Data confidence

Our assessment of Enabled water consumption is based on estimated data concerning land use and subject to models using the consumption factors noted above.

Assumptions we have made

With regard to leased property, more information concerning the activities of the tenants is required before activity specific water factors can be researched and then applied. Similarly greater understanding of the agricultural activities on the leased land is required before crop specific water factors can be applied. That said, the using WFN water factors (whether general or specific) is increasingly seen as best practice.

Waste

Direct Waste

What this means

Direct waste generation comprises non-hazardous waste plus hazardous waste plus mining waste (e.g. overburden).

The value for 2011/12

The Direct waste produced by The Crown Estate in 2011/12 was 341 tonnes.

The data source(s) and calculation(s) we have used

Primary data for Direct waste was provided by The Crown Estate's sustainability team.

Data confidence

Direct waste produced was calculated exactly.

Assumptions we have made

None

Indirect Waste

What this means

Indirect waste is waste that is generated as a consequence of the activities of The Crown Estate's supply chain in producing the goods and services purchased.

The value for 2011/12

The Indirect waste produced by The Crown Estate in 2011/12 was 94,314 tonnes.

The data source(s) and calculation(s) we have used

Indirect waste data was estimated using an extended input-output [EIO] model as with the net greenhouse gas emissions and water consumption.

Data confidence

Indirect waste data were estimated, as with the Indirect greenhouse gas emissions and Indirect water consumption.

Assumptions we have made

Extended input-output modelling and associated analysis is increasingly commonplace and is, in our opinion, best practice for this type of measurement.

Enabled Waste

What this means

Enabled waste generation consumption data was calculated for leased property (office, retail, residential) and leased land and seabed (for mining purposes).

The value for 2011/12

The Enabled waste produced by The Crown Estate in 2011/12 was 522,589 tonnes.

The data source(s) and calculation(s) we have used

Waste generation of leased properties was based on The Crown Estate's disclosure concerning the waste generation of the properties they directly manage. Knowing the percentage of the total property portfolio directly managed approximation for the non-managed portion is straightforward. Calculating waste generation of extractive activities (mining, quarrying and dredging) required first estimating the resource yields via disclosure from The Crown Estate. Subsequently resource specific extractive waste factors published by the British Geological Survey [BGS] and US Geological Survey's [USGS] Material Flows Analysis [MFA] were applied to the yields. For example, according to the BGS, the average extractive waste ratios for Sandstone, Limestone, Igneous Rock and Sand & Gravel are 11%, 11.1%, 11.2% and 11.2% respectively.

Data confidence

Enabled waste data were estimated as with the Enabled greenhouse gas emissions and Enabled water consumption.

Assumptions we have made

With regard to leased property more information concerning the activities of the tenants is required before activity specific waste factors can be researched and then applied. Similarly, greater understanding of the mining activities on the leased land and sea bed is required before more refined factors can be applied. That said, extractive waste factors are frequently employed to estimate the hidden flows of extractive activities.

Case Study: Ormonde Wind Farm

The Crown Estate not only seeks to contribute to the United Kingdom's socio-economic prosperity; it also aspires to be a key driver of environmental sustainability and energy security in the UK. To this end it is a leading advocate of renewable energy investments.

The Ormonde Offshore Wind farm (OWF) for instance, an investment of £500 million, is not only contributing to British Gross Value Added GVA and employment. It is also (a) enhancing environmental sustainability by avoiding the emissions of pollutants to the atmosphere, (b) preventing adverse health impacts produced by conventional energy generation and (c) contributing to energy security of the UK. With a capacity of 150MW the Ormonde OWF will generate clean energy equivalent to the annual electricity consumption of roughly 105,000 homes – thus reducing UK dependence on costly energy imports⁵.

Contributing to socio-economic prosperity

During its **construction** phase, we estimate that the Ormonde project contributed to a direct creation of 835 jobs⁶. Using multipliers from a Scottish Enterprise study, "Scottish Offshore Wind - Creating an Industry," we calculate that an additional 651 jobs were created via indirect and induced impacts⁷. The total number of jobs attributed to the construction phase of the project is therefore estimated to be 1,486 spread across a three year period. £500 million was invested for building the wind farm, with 32% of capital expenditures flowing directly to UK businesses.

Table 3: Total contribution during construction phase

	GVA (£ million)	Employment
Direct	n/a	835

⁵ This figure assumes a capacity factor of 38% as estimated in the Environmental Impact Assessment of the Ormonde Wind Farm, based upon the British Wind Energy Association methodology.

⁶ Ref: http://www.vattenfall.co.uk/en/ormonde-inauguration/file/120919_ormonde_press_pack.pdf_22363140.pdf

⁷ We have taken the average of an upper bound estimate of 1.93 and a lower bound estimate of 1.63 for the multiplier and taken the midpoint of the two as the central estimate, giving a total multiplier effect of 1.78 for direct + indirect + induced. This leads to total induced + indirect employment of $(0.78 \times 835) = 651.3$.

Indirect and induced	n/a	651
Total	n/a	1,486

Throughout its **operational** phase, the Ormonde OWF will directly support 40 jobs, of which 28 are locally contracted. The indirect and induced employment impact is estimated to be 33.7 full time equivalent jobs. In total, the Ormonde OWF will contribute to a total creation of 73.7 FTE jobs.

Table 4: Total expected contribution during operational phase (per annum)

	GVA (£ million)	Employment
Direct	12.73	40
Indirect and induced	10.28	33.7
Total per annum	23.56	73.7

Promoting environmental sustainability

When evaluating the impacts of energy investments it is critical not only to analyse the emissions attributable to this investment and operation, but also the emissions which would have been emitted in an alternative scenario: i.e. if the same amount of energy was produced through another energy source. In this case, the alternative scenario would have been energy generation from conventional energy sources, for instance a UK coal power plant.

We estimated that if the same amount of energy was to be produced by a coal power station, then an additional 429,415 tonnes of CO₂ per year would have been released in the atmosphere. This saving is directly attributable to the operation of OWF and is based on the methodology used by the British Wind Energy association and Environmental Impact Assessment (EIA). Typical emissions from a coal power plant are assumed to be of 860 grammes of CO₂ per kWh. In order to derive savings in emissions throughout the operational phase we calculated the capacity in kWh

or MWh of the Ormonde wind-farm by multiplying: 1) the rated capacity (150 MW) of the OWF; 2) the capacity factor (38%) of time during which the OWF operated at full capacity thus reflecting the intermittent nature of wind power; and 3) the number of hours (8,760) in a year. We thus obtained total (average) MWh capacity then multiplied by CO₂ emissions which would have been emitted to produce the same amount of energy through a coal power-plant.

Protecting the health of British society

Both Sulphur Dioxide (SO₂) and Nitrogen Oxide (NOx) emissions are prominent sources of air pollution and have numerous adverse impacts on societal health conditions. Beyond direct health costs, both chemical compounds also contribute to the formation of Particulate Matter (notably PM10 and PM25), thus exacerbating health risks. The UK authorities are aiming to significantly curb both SO₂ and NOx emissions.

For producing the same amount of energy, it is estimated that a typical coal power station would emit an additional 4,993 tonnes of sulphur dioxide (SO₂) and 1498.5 tonnes of Nitrogen Oxides (NOx) emissions per year. Put differently, these avoided emissions constitute a positive impact of this project in reducing air pollution and health risks to the UK population.

DEFRA has provided estimates of the costs borne by the British economy and society as a consequence of these pollutants. Each ton of SO₂ emissions is estimated to generate a health cost of £1,633 while each ton of NOx emissions generates a health cost of £955. In total, we thus estimate that the health benefits (“avoided health costs”) generated by the Ormonde project are equivalent to £9.5 million per year.

Table 5: Total expected SO₂ and NOx emissions saved per annum

	Emissions saved (tons)	Estimated unit social cost of emissions (£/ton)	Total value created (£million)	Emissions valuation sources
Sulphur Dioxide (SO ₂)	4,993	1,633	8.1	DEFRA (2010)

Nitrogen oxides (NOx)	1,499	955	1.4	DEFRA (2010)
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Minimizing social and environmental disruptions

Despite substantial benefits, offshore wind farms can also induce costs on local communities and ecosystems (particularly marine life). These need to be contrasted with the listed benefits. Most common adverse impacts include: (a) negative socio-economic impacts on local communities through tourism revenue reduction; (b) reduction in aesthetic quality (measured through aesthetic values of communities); (c) impacts on birds; (d) impacts on fishes and marine mammals (and thus on local fish catch revenue). There are two instruments of mitigation of these potential impacts: (1) either through careful site selection or (2) through technology.

- Careful site selection: The site selected is of relatively low ecological value. For example, the bird population of the area has been assessed to be low. It is also situated within 10km offshore which minimizes potential visual disturbance and aesthetics values, particularly relative to other nearby offshore wind farms – situated much closer to the shoreline (eg. 4km).
- Technology and planning: In order to reduce potential loss of fishing income, for instance, wind turbines have been designed to be evenly spaced in row, thus ensuring that it will be possible to trawl within the wind farm area.

Overall, the impact assessment did not point to a significant adverse impact on either tourism or marine mammals. On the one hand, numerous studies provide evidence that offshore wind farms can both repel and attract visitors; one the other hand, impacts on marine mammals are still scientifically contentious: depending on the academic study, the impacts can range from totally insignificant to changes of behavioural patterns of both fishes and mammals.

Building resilient communities

Although a precise quantification of local impacts is impossible to this date (due to lack of available data), a substantial amount of operations and maintenance budget will be spent within local communities, if and when possible. In particular, the Ormonde project will employ 28 locally contracted technicians for maintenance and

operations purposes. Further, part of the benefits will be recycled into a local traineeship programme for community members, thus enhancing skills and employment opportunities. A more detailed analysis would be required to assess and quantify the impacts on local communities, notably in terms of economic resilience and social well-being. This would allow computing the full stream of costs and benefits in a holistic “triple bottom line” perspective (economic, social and environmental).

Case Study: Glenlivet

The Glenlivet estate is a multi-use upland estate situated within the Cairngorms national park. It stretches on 23,000 hectares, split between agricultural lands, natural and semi-natural woodlands, commercially exploited woodlands and natural and semi-natural grasslands crossed through by paths and mountain-bike tracks to support recreational activities.

Each year the Glenlivet estate hosts approximately 30,000 visitors. It is estimated that the new mountain bike tracks and a forest hub under construction will attract an additional 13,500 to 18,500 visitors each year. The multi-use nature of Glenlivet means that there are numerous economic, social and environmental benefits created. A significant part of these impacts can be captured through (1) empowerment of local communities in a remote part of Scotland, both via income generation and employment creation; (2) recreational value created, notably for visitors but also, more broadly, for the Scottish and British populations; (3) additional ecosystem services notably obtained through investments in a) sustainable forestry and b) sustainable agriculture.

Contributing to wealth and job creation in Scotland

Currently, we estimate that, in total per year, visitors spend an amount of £1.6 million when visiting the Glenlivet estate and surroundings. This is based on responses to the visitor survey.

33% of survey respondents were passing through (Q.13) and 30% spent under £20 (Q.17 – 16% under £10 and 14% spent £10-£20). Based on this (and assuming that passing through visitors spend less than those staying) we estimate that passing through and non-staying visitors spend £290,000 ($16/30 \times 30,000 \times £5$ plus $14/30 \times 30,000 \times £15$).

For overnight visitors we made the following calculations:

- 1) From the survey data we calculated the average amount spent per visit (£388) and the average number of nights stayed (5.95), to determine an average of £65.25 spend per day, as shown in table 6 below:

Table 6: Average spend and duration of stays at Glenlivet

Total spending on the estate (assuming overnight visitors spend £25 or more)			
Average spent (£)	Decimal/p	Number -p	Total spending p.a.
25		28	£700
75		21	£1,575
150		19	£2,850
350		37	£12,950
650		20	£13,000
900		15	£13,500
1000		16	£16,000
Total		156	£60,575
Average			£388
Number of nights			
0	0.33	72	
1	0.05	11	11
3	0.18	39	117
6	0.32	69	414
11	0.07	15	165
15	0.05	10	150
Total		144	857
Average			5.95

- 2) We then calculated the total spend per year as follows:
- a. There are 102 hotels and b&b beds located on the Glenlivet estate. Based on the Scottish national average occupancy of 53% (ref Andy Wells, The Crown Estate) and 365 days per year, we estimated that 19,732 nights are spent in hotels, b&b and self-catering.
 - b. From this we estimate that £1,287,513 is spent by overnight visitors per year. Adding this to the £290,000 estimated for passing through visitors we calculated that the 30,000 visitors per year spend £1,577,513.
 - c. Assuming a GVA share on turnover of 32%⁸ Direct GVA created is £504,774. Using a national multiplier of 1.8 from the same report induced GVA creation flowing to the Scottish national economy is estimated to be of £403,819 for a total GVA contribution of roughly £0.9 million.

⁸ CJC consulting: market and non-market benefits of forestry in Scotland

Generating income and employment in remote communities

A £500,000 investment in new mountain bike tracks and forest hub is expected to generate additional revenue and employment opportunities for local communities. The new mountain bike tracks are expected to place Glenlivet among the most prominent mountain bike hubs in Scotland. Throughout the construction phase, a gross revenue of £800,000 and 1.5 FTE jobs will be generated in the local area. Throughout the operational phase, the total direct and induced income accruing to Glenlivet and Tomintoul is expected to be of 336,000 per year while enhancing employment opportunities through the creation of 6.4 FTE jobs.

Enhancing the well-being of Scottish and British populations through recreational services

Ecosystems provide numerous “services” as analysed by the British National Ecosystem Assessment (NEA, 2011). These include, among others, regulating services, provisioning services, recreational services and health services. Nonetheless, these “services” are (more often than not) poorly captured through market prices. Numerous techniques have thus been developed to value ecosystem services for comparing them like-for-like with market activities. Eliciting the well-being derived by visitors to numerous national parks and recreational activities, a report of the UK Forestry Commission determined through a contingent valuation analysis that the well-being value accruing the visitors is worth between £7.90 and £14.99 per visitor per visit – depending on the recreational activity undertaken (Christie et al, 2005). These figures are strictly separate from the actual amount spent per visit. Transposing these figures to the Glenlivet estate through benefit transfer, we estimate that the well-being (consumer surplus) generated by the Glenlivet estate (through recreational activities only) could amount to £440,292 per annum. The current investment in mountain bike tracks and forest hub are projected to generate an additional recreational benefit of £239,522 per annum – assuming 16,000 additional visitors, as forecast.

Pushing for climate change mitigation through sustainable forest management

The Crown Estate has been leading a) the establishment of sustainable forest management practices as well as b) afforestation and reforestation efforts on the Glenlivet estate, notably by planting 60,000 additional trees including indigenous Scottish Pines. This responds to the Scottish government’s strategic objective of

woodlands expansion for 1) ensuring timber production and revenues in Scotland 2) mitigating climate change through enhancement of the carbon sequestration capacity of woodlands 3) ensuring the preservation of critical ecosystem services.

Woodlands cover approximately 14% of the Glenlivet estate. In addition to providing critical ecosystem services, Woodlands also act as carbon sinks, thus contributing to climate change mitigation efforts. We estimate that the Glenlivet estate's woodlands manage to sequester approximately 17,800 tonnes of carbon dioxide (CO₂) per year, i.e. an average of 5.4 tons of carbon dioxide (CO₂) per hectare per year. Based on the UK Treasury's estimation of the social cost of carbon dioxide emissions (i.e. £24.8 per tonne of CO₂ emissions), we estimate that the contribution of GE to climate change mitigation through carbon sequestration amounts to £431,222 per year.

Case Study: Windsor

Stretching across 6,300 hectares, the Windsor estate is comprised of 3,100 hectares of woodland, 1,600 hectares of parkland, 1,200 hectares of agricultural land, 250 hectares of commercial and residential lettings and another 250 hectares dedicated exclusively to leisure amenities – notably including golf clubs and the Royal Ascot racecourse. The Windsor estate hosts each year approximately 3 million visitors undertaking numerous recreational activities from sport events to mountain biking and trekking.

In addition to its economic and employment contribution, the Windsor estate also contributes to environmental sustainability and conservation notably through the management of areas of special ecological interest such as the Swinley Forest, which is a designated *Special Protection Area (SPA)* and part of the European *Natura 2000* network.

The contribution of Windsor to UK GVA is of £19.5 million including direct, Indirect and Enabled impacts while it generates a total employment contribution of 285.2 FTEs, also encompassing Direct, Indirect and Enabled impacts.

Social Contribution

Impacts on recreational well-being (a “contingent valuation” perspective)

Eliciting the well-being derived by visitors to numerous national parks and recreational activities, a report of the UK Forestry Commission determined through a contingent valuation analysis that the average well-being value accruing the visitors is worth between £7.90 and £14.99 per person per visit – depending on the recreational activity undertaken (Christie *et al*, 2005). These figures are strictly separate from the actual amount spent per visit. Rather, they refer to the “consumer surplus” benefits derived from visiting the ecosystem, (additional willingness-to-pay) for a combination of any of its specific attributes. Transposing these figures to the Windsor estate through benefit transfer, we estimate that the well-being (consumer surplus) generated on the Glenlivet estate (through recreational activities only) could amount to £39.9 million per annum, assuming an approximate amount of 3 million visitors.

Appendix 1:

Enabled Economic Indicators – detailed methodologies

This section presents detailed methodologies for the calculation of Enabled GVA and employment for each part of The Crown Estate (Urban, Rural & Coastal, Energy & Infrastructure and Windsor). The methodology for calculating the Enabled economic contribution differs somewhat for each part of the estate according to the data available.

As with the Indirect economic contribution, calculating the Enabled economic contribution involves a large amount of imputation. However in the Enabled case, the amount of imputation which has to be undertaken is generally greater than for the Indirect case because we know less about The Crown Estate’s customers from the data on its records than we do about the supply chain. Hence the methods used here rely on more stringent assumptions than the methods used for the Direct and/or Indirect economic contribution, and the results are more speculative.

Urban

The Crown Estate collects data on floor space in the urban portfolio devoted to different categories of usage (e.g. by use class). Using this data, employment and GVA in the urban portfolio is calculated using a two-stage process as follows:

Stage 1: Guidance from the Homes and Communities Agency on the number of square metres of floor space per full-time equivalent employee in different business use categories is used to derive a figure for Enabled employment.

Stage 2: ONS data on GVA per full-time employee in different sectors is used to estimate enabled GVA based on the employment information provided.

Table 7 gives details of these calculations.

Table 7: Urban portfolio: Estimated employment and GVA by use class

Property segment	Floor space (m ²)	Estimated FTE	Estimated GVA (£m)
Industrial - Rest of UK	71,799	1,994	122

Industrial - South East	51,158	1,421	87
Industrial - Distribution	70,144	1,002	50
Offices - West End	487,749	40,646	2,413
Offices - Rest of UK	8,908	742	44
Offices - Rest of SE	42,579	3,548	211
Offices - West End Grade A	60,401	5,033	299
Offices - Midtown	36,447	3,037	180
Other	97,492	8,124	482
Retail - Central London	198,709	10,458	236
Retail - Shopping Centre	69,227	3,644	82
Retail - Warehousing	201,806	2,242	181
Retail - Rest of UK	17,295	910	21
Hotel	38,443	769	17
Total	1,452,157	83,572	4,426

Rural and Coastal

The calculation of GVA for the Rural and Coastal portfolio includes only the rural components. This is because information was not available for the activities which take place on the coastal portfolio (principally marinas and yachting, and aquaculture) on the proportion of these activities in the UK which takes place on land or seabed owned or managed by The Crown Estate rather than elsewhere. Hence this analysis was unable to estimate reliable figures for Enabled GVA and employment in the coastal part of the portfolio. It is

hoped that, in future years, additional analysis can be undertaken so that it is included.

Rural portfolio

For the rural part of the portfolio, The Crown Estate supplied information on area of land used for various activities (agriculture, forestry, sporting rights etc.). The methodology used here for calculating Gross Value Added from activities taking place on the rural portfolio is as follows:

- 1) Recent statistics from DEFRA⁹ and the Forestry Commission¹⁰ were used to supply figures on the total area devoted to dairy agriculture, non-dairy agriculture and forestry in the UK.
- 2) The total land devoted to each activity on the rural portfolio is expressed as a percentage of total UK land use for this activity.
- 3) Using statistics for overall GVA in industry sector A (agriculture, forestry and fishing) and the breakdown into different subsectors within that sector in the ONS's Annual Business Survey (ABS) data, plus the percentages calculated in (b) above, GVA on the rural portfolio is calculated for each activity.

Employment for each activity is calculated, using information from the ABS on total employment within each category of industrial activity. (Note that sporting rights, which account for around 107,000 acres of land use on the rural portfolio, were not included in these calculations because of the difficulty of finding reliable statistics on total land used for sporting rights in the UK as well as GVA information at a fine enough level of disaggregation to produce reliable estimates. It is hoped to include GVA and employment estimates arising from land devoted to sporting rights in future updates to these estimates).

The results are shown in Table 8 below.

⁹ See <http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-landuselivestock-farmingstats-june-statsrelease-junefinalengland2012-121101.pdf>

¹⁰ See <http://www.forestry.gov.uk/website/forstats2012.nsf/LUContents/061E41873F94CC788025735D0034F33B>

Table 8: Estimates of Enabled GVA and employment estimates - Rural portfolio

Activity	Total area: The Crown Estate (ha)	As % of total UK area	Estimated employment (FTE)	Estimated GVA (£m)
Agriculture, Dairy	8,951	0.2425	4,499	81.5
Agriculture, non-dairy	86,868	1.7992		
Forestry	6,601	0.2131	30	0.8
TOTAL			4,529	83.3

Energy and Infrastructure

Our figures for Enabled economic contribution of the Energy and Infrastructure portfolio consist of the two activities for which data were available: (a) offshore wind, and (b) marine aggregates. Different methodologies are used in each case.

Offshore wind

The methodologies used to calculate the GVA and employment for the offshore wind component of the Energy and Infrastructure portfolio involves scaling up the GVA and employment estimates of the construction and operational phases from the Ormonde Wind Farm case study. This was done proportionately to take account of the full electricity generating capacity of the UK's offshore wind capacity (2.7 GW according to The Crown Estate's publication *Offshore Wind 2012*.)

Table 9 shows the relevant calculations. (Note that we only use estimates of GVA and employment directly generated by offshore wind whereas the case study gives Indirect and induced multiplier effects as well; this is to make the estimates consistent with other parts of the Enabled contribution calculations where we have not tried to estimate multiplier effects).

Table 9: Estimates of Enabled GVA and operational employment: Energy and Infrastructure

Scope	Output (MW)	GVA (£m)	Employment (FTE)
Ormonde Wind Farm case study	150	12.7	40
Entire UK offshore wind sector	2,700		
The Crown Estate total		229.1	720

In addition to the 720 full-time equivalent jobs supported by fully operational offshore wind capacity, there is also another 1.5 GW of offshore wind capacity currently under construction. Scaling up the figures for number of FTE jobs created during the construction phase at Ormonde, we calculate that another 2,783 FTE jobs per year are currently supported by construction of new offshore wind capacity around the UK¹¹. Therefore, **total Enabled employment in the offshore wind portfolio is estimated at 3,503 FTE jobs and Enabled GVA is £229 million.**

Marine aggregates

Figures from the British Marine Aggregates Producers Association show that total employment in the marine aggregates sector is 640 FTEs. Data from The Crown Estate shows that approximately 99% of total UK production of marine aggregates takes place on Crown Estate seabed. Thus, **we estimate that total Enabled employment in The Crown Estate marine aggregates sector is 634 FTEs.**

BMAPA statistics indicate that total production in the marine aggregates sector is 9.94 million tonnes per year compared with 206 million tonnes per year for the aggregates sector (including onshore aggregates) as a whole. Combining this information with data on total GVA in industrial sector B (mining and quarrying) from the ONS Blue Book 2012 and figures from the ONS Annual Business Survey on the ratio of total GVA in the aggregates subsector compared, **we**

¹¹ This calculation assumes an average construction time for offshore wind projects of 3 years.

estimate that total GVA in the marine aggregates portfolio for 2011/12 was £65 million.

Total enabled employment and GVA in the Energy and Infrastructure estate

Adding together the offshore wind and marine aggregates components, total **Enabled GVA in the Energy and Infrastructure portfolio is estimated at £294 million, with Enabled employment estimated to be 4,137 full-time equivalent jobs.**

Windsor

Calculations of GVA and employment for Windsor use data on the capital value of the agriculture and forestry components of the estate – agriculture, forestry. The commercial component of the estate was excluded from the calculations because of a lack of information on business use in the Windsor commercial estate, which made it impossible to use the same technique for GVA estimation as was used for the urban estate. GVA and employment were estimated using the ratios between capital value and GVA (and between GVA and employment) established in the agriculture and forestry sectors (see calculations for rural portfolio earlier) and the urban portfolio (for the commercial and owner-occupied sectors).

Table 10 below shows the calculations involved.

Table 10. Calculation of GVA and employment – Windsor estate

Subdivision	Estimated employment (FTEs)	Estimated GVA (£m)
Agriculture	72	1.3
Forestry	8	0.2
TOTAL	80	1.5

Summary of estimated Enabled economic contribution

Table 11 collates all the information on estimated Enabled GVA and employment from this section and sums the figures to give total estimates of the Enabled economic contribution of The Crown Estate.

Table 11: Enabled economic contribution of The Crown Estate: overall estimates

Part of estate	Enabled Employment (FTE)	Enabled GVA (£m)
Urban	83,572	4,426
Rural & Coastal	4,529	82
Energy & Infrastructure	4,137	294
Windsor	80	2
TOTAL	92,318	4,804

Appendix 2:

Comment on Section 106 contributions

Summary

This short briefing note provides a protocol for how the social, economic and environmental impacts of investments made through Section 106 (s106) arrangements is accounted for in The Total Contribution, and other impact reporting initiatives of The Crown Estate.

We address the following questions:

- What is best practice established for inclusion of s106 contributions in corporate reporting?
- Should s106 contributions be included in The Total Contribution report?
 - as tax payments;
 - as social, environmental or economic benefits?

It is our recommendation that s106 contributions should not be included in Total Contribution report unless:

- The Crown Estate goes above and beyond mandated criteria in the s106 agreement; or
- The contributions made offset negative impacts of a development and those impacts have also been reported.

If s106 contributions are included as a result of exceeding the above criteria, then the connection to s106 needs to be clearly stated.

Our rationale is explained below:

Background

We have placed an interpretation on s106 contributions as mitigation of negative impacts which make proposed developments acceptable, in their totality, in planning terms.

A tension is likely to exist in practice with developers seeking to minimise, and planning authorities seeking to maximise contributions. Nevertheless, s106 agreements once agreed are a legal requirement and therefore whether to include them or not is not simple.

Precedent in corporate reporting

There is not best practice in whether s106 contributions should or should not be included. From our extensive research the only available example of a s106 contribution being included is in the “British Land: Economic Footprinting Study, May 2011, Methodology.” s106 contributions are included in a Total Tax Contribution (TTC) which, “covers all the different taxes and levies paid by companies – including business rates, stamp duties, employer and employee NIC, VAT, PAYE, s106 payments and others.”

s106 contributions though are not supposed to be a tax and should not be reported as one in this case. s106 contributions can be distinguished as payments for permission for a subsequent land use to take place following development. The organisations making these contributions are not direct beneficiaries themselves of the contributions they are making; the contribution instead makes the land use acceptable to a range of stakeholders in the wider community.

See below for a worked example of i) and a hypothetical example of ii) above

NB. s106 contribution should not be double-counted. If, for example, the social impact of a contribution is quantified as part of the Total Contribution project because it is over and above that mandated, it should not also be quantified in financial terms as a tax payment.

How do we deal with cases where we contribute in a minor way to someone else’s or a group initiative?

It is too complicated at this stage in the development of our methodology to try to allocate impacts amongst multiple participants – the principle of attribution (see annex A i). We recommend that this is something to be considered in future versions of the total contribution.

Example

Examples of treatment of types of contributions made as a result of s106 Agreements

i) As part of the s106 Agreement for Quadrant 3 (April 2008) The Crown Estate made the following commitments:

- Payment of £250,000 (over two years) as a contribution to the Local Employment and Training Initiative (three year programme) to be utilised as follows: (a) £150,000 funding for the Workplace Co-ordinator (b) £100,000 as funding for the outreach and training required for the Development.

-
- Funding will support a full-time Workplace Co-ordinator and offer The Crown Estate tenants with a free service providing appropriately skilled local people for vacancies.
 - Funding will also provide a 'package of support' to assist job-seekers, to be delivered by a consortium of established providers.

Our assessment in the case of this example is as follows:

Although the social impact of this initiative has been significant, generating 270 job placements for unemployed Westminster and Lambeth residents between April 2010 and December 2012, with 118 of these jobs secured in 2011-12, these jobs should not be counted towards The Crown Estate's Total Contribution. This is because, even though the agreement does not specify a number of jobs to be provided, the funding for the Workplace Co-ordinator who secured the jobs is paid from the s106 agreement.

However, we would be happy for the number of jobs facilitated by the Workplace Co-ordinator to be included within a case study of the development, as long as the links to the s106 agreement are explicitly made.

Attribution - In the above example it is clear that other parties are involved in the provision of the Workplace Co-ordinator but there are no details of what other 'support' The Crown Estate will provide, beyond the financial contribution. This suggests that other providers (ie. the Cross River Partnership) will deliver the additional support such as interview practice, CV development and on-the-job mentoring. It is understood that The Crown Estate has embraced this initiative, provided desk space and equipment for the Workplace Co-ordinator, and used its influence to 'open doors' for him. However it is impossible to quantify the number of jobs (or proportion thereof), or quality of service, this "above and beyond contribution" has directly resulted in.

ii) There could also be cases where the s106 agreement mitigates against certain negative impacts that are reported within The Total Contribution. As a hypothetical example, a s106 agreement could include provision of funding for an air quality initiative to mitigate against local air pollution caused by a development. If the local air pollution has been included within the calculation of the total air pollution attributable to The Crown Estate, it would seem reasonable to include the air quality initiative in the report, as long as the links to s106 agreements were explicitly made.

Appendix 3:

Comment on social indicators

From the outset of the project, it was understood that most organisations, The Crown Estate included, do not currently systematically collect data relating to the social outcomes and impacts of their activities across the whole organisation.

nef consulting and The Crown Estate therefore agreed that the approach to providing data on social indicators would be through a series of case studies. Following the initial working group meetings, it was further agreed that one case study would be provided for each of The Crown Estate's main business areas: Urban; Rural and Coastal, Energy and Infrastructure; and Windsor. As a result the data collection templates, developed by **nef consulting**, for collecting social data were circulated to each business area.

What came back from this data collection exercise was extremely varied and ranged from detailed, though sometimes out of date, previously published case studies, to data on outputs (as opposed to outcomes), such as numbers of visitors on the Windsor estate.

This variety and inconsistency of data has presented great challenges in developing a clear overall picture of social outcomes achieved. However at the level of the individual case studies, some genuinely interesting findings have emerged and, by cross-referencing this data with academic literature, we believe we have formed some useful insights into the social dimension of The Total Contribution of The Crown Estate. These insights are presented in the case studies of the main report.

As a next step, **nef consulting** proposes to provide further details on each of the case studies along with a set of recommendations for improved data collection and social impact evaluation methods for the next stage of The Total Contribution project.

Regent Street and Quadrant 3 Case Study

Social outcomes for the individual

Given the lack of well-being data collected directly from those 118 who have gained work, it is not possible to ascertain the actual improvement in well-being experienced by these individuals, so instead the economic and well-being valuation is presented in a single figure from the Powdthavee paper.

Should The Crown Estate wish to roll out employment programmes more widely, the administration of measures that capture well-being should be considered. Two psychometric measures that are designed to specifically measure well-being are the Short Warwick-Edinburgh Mental Well-Being Scale (SWEMWBS) and the subjective well-being questions on the Office for National Statistics Integrated Panel Survey. These well-being indicators would enable measures to be taken at different time points, and allow well-being scores of those gaining employment through the Crown Estate's employment programmes to be benchmarked against other societal groups both regional and national.

Other beneficiaries

It should be noted that other stakeholders may benefit from the change in employment status experienced by the 118 individuals that have gained work. For example, there is a large body of evidence suggesting that outcomes for children differ substantially depending on whether their parents are in employment.

Bradley and Corwyn found that low socioeconomic status can negatively impact on physical and mental health, cognitive, social and emotional elements of children's development. McLoyd (1998) explored the relationship between socioeconomic disadvantage and educational attainment. Poor children do not achieve academically when compared to wealthier peers, with studies demonstrating a number of reasons for this, including less cognitive stimulation at home and lower expectations of teachers.

Significantly, the detrimental effects that poor parental mental health and low income have on young people do not end in late childhood, but can affect the entire life course. Trzesniewski et al reported on a longitudinal study taking various measures from birth and various other time points in development in 1,037 participants. Low adolescent self-esteem led to long-term issues such as poor adult mental and physical health, as well as poor economic prospects. Young adolescents with low self-esteem were also more likely to be later convicted of crime. If children can be prevented from this path it is likely that cost savings will also be accrued to Government Departments, for example the Department of Work and Pensions and those bodies involved in the criminal justice system.

Although it is beyond the scope of this analysis to infer outcomes for other stakeholder groups given the data available, the above evidence suggests there is potential for other stakeholder groups to experience significant benefits as a consequence of the employment programme. It is recommended that should The Crown Estate wish to expand such employment programmes, they invest in stakeholder

engagement initiatives to understand in great detail potential economic and social outcomes not just for those gaining employment, but also secondary stakeholder groups.

Harder-to-reach groups

The Crown Estate could also consider the type of individuals they target for employment programmes. For example, it has been demonstrated that it is more difficult for the long-term unemployed to gain employment than those have been unemployed for a shorter period of time. Furthermore, in the current economic climate, young people in particular are experiencing high levels of unemployment, with the unemployment rate for 18-24 year olds being the highest it has been for 25 years. Given the difficulties social groups such as these find when seeking employment, there may be value in considering schemes that particularly target more difficult-to-reach individuals.