

Report

Autumn 2015

Impact Evaluation of Resource Efficient Scotland 2013-2015



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1 Executive Summary

Resource Efficient Scotland (RES) is a Scottish Government-funded programme, delivered by Zero Waste Scotland, which helps Scottish-based organisations to reduce costs and carbon emissions by implementing resource efficiency measures, covering energy, water, raw materials and waste.

The programme commenced delivery in April 2013, combining previous Scottish Government-funded support in this area into a single offering, and extending the reach and ambition of that support. The activities of the programme have combined generic organisational advice and support with more targeted interventions in the public and private sectors, as well as activity which supports policy objectives for low carbon heat generation.

This report covers RES activity from inception to March 2015, or 24 months of delivery, though some of this period was a “ramp-up” period at the start of the programme. In reporting headline quantified impacts we seek to account for all activity taken, or planned to be taken, as a result of that advice at the time of impact assessment. Impact assessments were typically conducted in either summer 2014 or summer 2015.

On the basis of the interviews, and programme feedback, we expect some of this activity will continue to generate new impacts after this date – these are excluded from the figures quoted here. This includes significant areas of work, including a number of projects with the NHS and the entirety of our work on low carbon heat, where, at the time of writing, plans relating to identified and potential savings were still not sufficiently advanced to treat as “actuals”. We also acknowledge that some activity has proved challenging to quantify robustly – again, this is typically excluded from headline impact estimates.

Impact assessment does not neatly match calendar or delivery years (with some activity assessed on a one year cycle, and some on a two year cycle, depending on expected time to implement change). This report therefore sets out our cumulative calculation of impacts resulting from two years of activity – in contrast to the original programme targets, which were set based on a single year of activity. Below we have therefore presented what these targets would mean on a two-year basis, to aid comparison. All impact figures in this report are presented to two significant figures, so do not always sum.

In the period 2013-15 **the cumulative per annum impacts influenced by RES** (counting all outcomes that were better as a result of our engagement) were:

- **390 GWh of energy** – as against a two-year equivalent target of 90 GWh
- **1.1 million m³ of water savings** – as against a two-year equivalent target of 10 million m³
- **32,000 tonnes of waste diverted from landfill** (of which 12,000 tonnes is biodegradable waste) – as against a two-year equivalent target of 130,000 tonnes
- **20,000 tonne reduction in primary resource use** – as against a two-year equivalent target of 50,000 tonnes
- **16,000 tonnes of waste prevented** – as against a two-year equivalent target of 50,000 tonnes
- **160,000 tonnes of CO₂eq savings** (of which 120,000 tonnes come from energy measures, counted on a territorial basis, and 35,000 tonnes come from material savings, counted on a lifecycle basis) – as against a two-year equivalent target of 130,000 tonnes of CO₂eq
- **£32 million in cost savings** – as against a two-year equivalent target of £42 million

In practice we believe the most meaningful measure of the value of the programme is to consider the attributed lifetime impacts of our interventions, which takes into account both the *extent* to which we have improved outcomes (and is thus a better measure of our additional value) and the *length of time* we think changes will persist for. On this basis **the programme’s attributed lifetime impacts** resulting from delivery in the two years 2013-15 will be:

- **2,300 GWh of energy**
- **2.9 million m³ of water savings**
- **63,000 tonnes of waste diverted from landfill** (of which 36,000 tonnes will be biodegradable)
- **40,000 tonne reduction in primary resource use**
- **33,000 tonnes of waste prevented**
- **860,000 tonnes of CO₂eq savings** (of which 760,000 tonnes will come from energy measures, counted on a territorial basis, and 100,000 tonnes will come from material savings, counted on a lifecycle basis)
- **£170 million in cost savings**

This excludes any impacts from *additional* actions that may yet be taken in future based on advice given in the period.

Other notable quantified benefits include:

- **Influencing around 2,100 jobs** (which were either created or, more commonly, safeguarded through our interventions) – or just over 1,300 on an attributed basis. We would highlight this is not our net benefit in employment terms, due to the likelihood of displacement
- **Influencing around £78 million in capital investment** – or £55 million on an attributed basis
- **Influencing around £12 million in procurement** of recycled construction products – or £9 million on an attributed basis

The evaluation has highlighted the challenges with generating (and quantifying) change around materials savings (which also has an impact on cost savings reported). This reflects market demand to a large extent – businesses and other organisations are easier to engage on energy measures, more likely to seek us out for advice on energy measures, and more likely to take energy measures (as opposed to other recommendations) when advice is given – though this latter point may also reflect the prevalence of “quick wins” among commonly recommended energy measures (such as insulation, or lighting). It may be the case that for many companies energy is the biggest resource cost – crucially it is certainly the most obvious to decision makers. The “hidden” nature of material and waste costs also hampers impact assessment, as companies are less likely to have data both when consultants are making recommendations and quantifying identified savings, or when impact assessors ask about change.

It is challenging to summarise implementation rates, which vary significantly by activity, and are highly dependent on context, with beneficiary factors, as well as the support profile, as obvious variables. For those activities where an implementation rate could be calculated, implementation typically ranged between 30% and 70%. Typically implementation rates in year two were somewhat lower than in year one. The reasons for this are not clear, but may relate to the balance of projects evaluated, and the time frame on which this was done.

In conjunction with wider Zero Waste Scotland activity, the RES programme has also delivered a range of benefits which are “softer” or more qualitative in nature, but are also a key component of the value delivered by Zero Waste Scotland as an organisation, and RES as a programme within that. These benefits extend beyond the scope of RES in several cases. Some of these less quantifiable benefits include improving the understanding, confidence, or ability of beneficiary organisations and individuals to address resource efficiency issues, or champion behaviour change on their own, through training, capacity building, or as a side effect of receiving dedicated support for specific improvements. Often hard benefits were recorded in impact assessment from these elements of support but these may not be the greatest benefit in the longer term. RES is an integral part of Zero Waste Scotland and has facilitated other Zero Waste Scotland programmes – for example by identifying and initiating work on re-use in decommissioned hospitals, now being taken forward by Zero Waste Scotland’s Re-use programme, which will produce additional quantified impacts in future. Finally, in the period 2013-

2015 the programme has enabled or facilitated the smooth implementation of a number of government policy and regulatory initiatives, including the Waste (Scotland) Regulations, the Carrier Bag Charge (Scotland) Regulations, and the Energy Savings Opportunity Scheme. These activities do not contribute directly to quantifiable impacts for the programme reported here, but are a clear element of the value added by the programme.

Feedback from beneficiary organisations during the period was overwhelmingly positive. Customer satisfaction was high, and RES was almost always seen as credible and knowledgeable. In the case of direct support RES may provide ideas that organisations would otherwise not have had, provide expertise organisations lacked for themselves, and/or provide confidence that an already identified measure was the right course of action, and worth investing in. This external support can also help the credibility of resource efficiency options within organisations, especially where these are long term and require significant up-front investment – in these cases the ultimate audience may be senior managers or directors, who will make the final investment decisions, and we can help organisations build the internal case to get management buy-in.

Barriers to resource efficiency remain, and are consistent with experience elsewhere. Most commonly identified barriers include time, financing, or practical constraints (such as short leases on premises). Sometimes these barriers may prevent something being taken forward – but they may also simply delay implementation. While organisations are keen to receive additional implementation support and often believe this would help to put recommendations into practice, our actual experience suggests the value of follow up work in generating additional change can be quite context dependent. Challenges around measurement are mentioned above in the context of impact assessment – it also seems likely the lack of data (particularly visible data on costs) deters businesses from engaging with the service, or acting on recommendations. RES support can help overcome this, but this remains more challenging for some areas (water, material savings) than others (energy). Cost savings and competitiveness remain the primary drivers cited by businesses for wanting support, though in some sectors taking resource efficiency measures is seen as a customer expectation or requirement as well. For the RES programme itself, achieving a balance between maximising the number of small to medium enterprises (SMEs) engaged, and maximising quantified environmental and economic savings will remain challenging, as in many sectors SMEs may not account for the largest share of potential resource efficiency savings.

Going forward RES will need to agree ways of calculating and reporting impact in cases where multiple agencies and programmes are supporting the same outcomes. We've done this successfully with Scottish Futures Trust (SFT) and the Energy Saving Trust (EST) in the period 2013-2015, but in future significant parts of our impacts will be co-delivered, including low carbon heat work with the Heat Network Partnership and public sector projects referred to in the Scottish Government's Low Carbon Infrastructure Programme (LCITP). We will be reviewing our approach to programme impact assessment in 2016, but welcome funder and partner input to these questions. Zero Waste Scotland will use the information in this report to inform future priorities and plans for RES delivery.

2 Background and Context

2.1 About Zero Waste Scotland

Zero Waste Scotland is funded by the Scottish Government to support the delivery of circular economy, resource efficiency and low carbon policy priorities.

Zero Waste Scotland is helping Scotland to become more efficient in its use of resources. As a facilitator and enabler of change, we help to reduce waste, increase energy efficiency and use water more responsibly - all as part of a journey towards a low-carbon, sustainable economy.

2.2 About Resource Efficient Scotland

The Resource Efficient Scotland programme is delivered by Zero Waste Scotland for the Scottish Government. It is funded by grant contributions from the Energy and Low Carbon and the Zero Waste policy teams within the Scottish Government.

The programme commenced in 2013, combining Scottish Government-funded support to businesses covering energy, water and materials efficiency into a single offering.

The programme is designed to help the public and private sector reduce costs by implementing resource efficiencies in energy, water, and raw materials and improvements in waste management. It is estimated that the Scottish economy could save £2.9 billion through the implementation of resource efficiency measures. These savings can help increase business competitiveness and boost profitability, whilst also contributing to greenhouse gas emission reductions.

2.3 About this report

This report provides a summary of the Resource Efficient Scotland programme and its impacts from its inception in April 2013 up to March 2015.

It provides information about the activities carried out by the programme and the impacts associated with each, where available.

Resource Efficient Scotland has delivered many different projects in different sectors and with different customers. To simplify reporting we have categorised projects under four areas. These are:

- Resource Efficient Scotland advice and support service (RESASS)
- Resource efficiency support to the private sector
- Resource efficiency support to the public sector
- Low carbon heat

There is some overlap between these areas – in particular the RESASS element of the programme is not just a programme of generic resource efficiency support, but also a delivery channel for the private and public sector programmes. The extent to which this is the case is detailed in section 4. In impact assessment terms we have counted impact at the point of delivery – thus where overlap occurs, impact is only counted once. This can skew the apparent performance of some work areas. These overlaps are highlighted where relevant.

We report actual savings to date in this report (based on actions taken, underway, or, to some extent, where firm plans are in place). However we expect that some impacts from some areas of work from this period (including all of our low carbon heat work area) will only be realised in the future. Where this is a significant consideration, this is highlighted in section 4.

3 How did we generate change?

3.1 Resource Efficient Scotland advice and support service

The Resource Efficient Scotland advice and support service (RESASS) provides a one-stop-shop for resource efficiency support for all types of organisations across Scotland. The service provides direct advice and support to help businesses save money by taking simple steps to increase energy and water efficiency, prevent waste and recycle more materials.

The service has been delivered for Zero Waste Scotland by a consortium led by the Energy Savings Trust (EST), together with Ricardo-AEA, who are in turn supported by an extensive set of over 40 specialist sub-contractors¹ from across Scotland. In addition the service liaises closely with other relevant public and private sector support programmes to refer and signpost additional or complementary services.

3.2 Resource efficiency support to the private sector

To complement the general advice available to businesses through the advice and support service, the programme also delivers a range of more targeted interventions in specific sectors, identified for their potential to achieve significant resource efficiency savings. During the period 2013-15, the programme targeted the following sectors:

- Food and drink (includes production, manufacture, retail and distribution)
- Hospitality, tourism and events
- Built environment

3.3 Resource efficiency support to the public sector

The programme supports the Scottish public sector to help it lead the transition to a low carbon economy and deliver its obligations under the Climate Change (Scotland) Act 2009, the Energy Efficiency Action Plan for Scotland 2010 and the Waste (Scotland) Regulations 2012.

Our activities span the whole of the public sector; however, the main focus is on interventions and organisations where the most significant resource efficiency savings can be achieved.

3.4 Low carbon heat

Our activities in this area support the Scottish Government's Heat Vision for Scotland and Heat Generation Policy (Statement), with ambition and related targets to decarbonise Scotland's heat supply by 2050, with significant progress to 2030.

We are an active participant in the Heat Network Partnership for Scotland and support its aims to streamline technical support to developers of district heating schemes.

¹ Sub-contractors include Grant Thornton, Mabbetts & Associates, and the Energy Saving Scotland advice centre contractors (Changeworks Resources for Life, Energy Agency, SCARF and the Wise Group, who provide regional reach and additional specialist support)

4 What are the programme impacts to date?

Section 4.1 presents an overview of quantified impacts in the period. Section 4.2 details our general method for the impact assessments reported here. We then present impacts for the programme in four distinct areas, in each case focusing on quantified economic and environmental savings, and detailing how these were derived, and any uncertainties around this. We briefly mention “softer” impacts on behaviour change in some cases – typically where these were a strong feature of feedback during impact assessment, or where there is good evidence for behaviour change, but robustly quantifying the impact against the standard indicators is challenging.

4.1 Total quantified impacts to date

The impacts of the RESASS, private sector, and public sector programmes can be summed on a broadly comparable basis. The table below therefore shows our best estimate of total impacts in terms of standardised indicators over the period 2013-2015. We emphasise that this shows only realised benefits to date, and it seems likely some work areas will see further future impacts from work in the 2013-2015 period after 2015. Direct benefits from our work on Low Carbon Heat are not shown here, as these remain identified rather than actual at the current time. These numbers may not reflect in full some qualitative benefits from the programme, or cases where impacts cannot be directly quantified. Expectations around future benefits, and areas which are harder to quantify, are discussed in more detail in the rest of this section.

Impacts achieved to date	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
Influenced per annum impacts 2013-2015	390,000	1,100,000	120,000	12,000	20,000	20,000	16,000	35,000	32,000,000
Attributed lifetime impacts 2013-2015	2,300,000	2,900,000	760,000	36,000	27,000	40,000	33,000	100,000	170,000,000

Table 4.1 Realised impacts to date from all programme activity in the period 2013-2015 by indicator (all numbers rounded to 2 significant figures)

Other notable quantified benefits include:

- Influencing around 2,100 jobs (which were either created or, more commonly, safeguarded through our interventions) – or just over 1,300 on an attributed basis. We would highlight this is not our net benefit in employment terms, due to the likelihood of displacement (discussed later).
- Influencing around £78 million in capital investment – or £55 million on an attributed basis.
- Influencing around £12 million in procurement of recycled construction products – or £9 million on an attributed basis.

4.2 General approach to calculating and reporting impacts

4.2.1 *How have we split the programme for the purposes of impact assessment?*

We first describe the RES advice and support service (RESASS). This is an SME assistance programme in itself, but it is also a delivery *mechanism* with the private and public sector programmes feeding projects into RESASS to be delivered via this channel (in both 2013/14 and 2014/15 in the case of private sector projects, and in 2013/14 only in the case of public sector projects). In addition, any Scottish organisation may contact RESASS, or use tools and guidance, for light touch support. As impact assessment takes place on a sampled basis (i.e. we speak to a selection of organisations and scale the impacts) it is not generally possible to disaggregate these components of the RESASS in top line reporting, and we have not done so here. Subsequent sections therefore consider private sector support and public sector support *excluding organisations routed through RESASS*, to avoid double-counting.

4.2.2 *What do we count as a “realised” impact?*

This section sets out the impacts achieved by the programme to date. Where we talk about quantified impacts these are things that have happened, or are in process. We also account for already “planned”² activity in our savings totals. It is however possible, and in some cases likely, that beneficiaries may subsequently undertake further actions. As we cannot predict the future, these are not counted towards our impacts to date, but we may choose to revisit some projects in future to capture and report *additional* savings if we think they are likely. Uncertainty of this nature is most likely in complex projects (where beneficiaries may decide on and implement only some recommendations at a time), in larger organisations (where decision-making and sign off may take longer), or where implementation is dependent on external financing (where organisations may not yet know if they can fund the change). We highlight in the results where we think the impact assessment presented may underestimate impacts for reasons of time lag.

We draw a clear distinction in each section between identified impacts and actual impacts. A significant part of our delivery involves detailed one-to-one advice to individual companies and organisations. In these cases we know the sum total of resource efficiency improvements they could make – and can report these as identified savings. Actual savings obviously only relate to those measures which are in fact subsequently undertaken. Where identified and actual savings have a matched scope, an implementation rate can be calculated. But caution is needed in doing so – some of our interventions (including almost all light touch support) do not quantify identified savings, they simply recommend actions in more general terms. No implementation rate can be calculated in these cases. We only calculate an implementation rate on a like-for-like basis therefore, and this can only be done for specific activities, projects, or measures, not for the programme as a whole (where total identified savings offer only partial coverage of all savings available).

² “Planned” impacts are based on the impact assessment interviews, and this is therefore a measure of beneficiary certainty. In estimating our totals we do make a discount (typically 50%) for measures that are merely “planned” by beneficiaries, reflecting past experience in similar impact assessments which show that some planned impacts may not materialise.

4.2.3 How do we define the changes that occur and the extent they are a result of our intervention?

This report discusses impacts in terms of the following:

- **Net³ per annum impacts** – this is all relevant activity undertaken by beneficiaries, regardless of whether we are credited with influencing it or not. Where identified savings data is available, we believe net per annum impacts are the best measure to use to calculate an implementation rate, but otherwise we typically ignore that fraction of savings made that we are not credited with having influenced, and they are not presented here.
- **Net per annum influenced impacts** – this is all relevant activity where the beneficiaries credit our support with improving outcomes to any extent. This is the basis of the programme targets. These are cumulative in each year of activity – i.e. the benefits from year one are, broadly speaking ongoing (though see the comment on lifetime impacts below, which takes a more sophisticated approach), so those in year two are additional.
- **Net per annum attributed impacts** – this is all relevant activity where the beneficiaries credit our support with improving outcomes, but the extent to which impacts are attributed to the programme is on the following basis (contrasted to “influenced” impacts above). This is done on the following basis⁴:

Beneficiary response	% of total impacts we report having “influenced”	% of total impacts we “attribute” to our activity
Outcomes are unlikely to have happened without our support	100%	100%
Outcomes are a lot better as a result of our support	100%	50%
Outcomes are little better as a result of our support	100%	25%
Our support made no difference	0%	0%

³ In fact the model provides both “net” and “gross” impacts. Gross impacts are the immediate impacts to beneficiaries of our support for all actions taken or planned irrespective of the extent to which they are the result of a particular delivery activity, whereas net impacts consider substitution, displacement, leakage, multiplier effects and attribution. This report focuses on net impacts.

⁴ It is possible within our overall impact modelling to test the sensitivity of assumptions around attribution, but these factors are used throughout this report unless otherwise stated. Note that this approach also means that if two contributory factors were considered essential, whilst we would claim 100% attribution, so too might another project partner. In an overall cost benefit analysis this would need to be adjusted for.

Table 4.2 Approach to attributing impact

In practice we have not presented net per annum attributed impacts in isolation in this report for conciseness. But they are an important step to understand when looking at our lifetime figures.

- **Net attributed lifetime impacts** – this is as above but factors in a lifetime for an intervention. Typically this is around one to two years for behaviour change measures alone; around five years in most other cases; and around 10 years for investments in infrastructure or physical kit. Differing rates of drop-off are assumed, and net present value is accounted for in lifetime cost savings⁵. We stop claiming credit for impacts after 10 years in almost all cases, as while benefits may accrue beyond 10 years, our claim to have “caused” them becomes weaker over time, irrespective of the actual lifespan of the change⁶. We believe this measure is the best indication of our value for money.

4.2.4 How are the standard programme indicators defined and measured?

The standard programme measures include:

- **Reduced energy consumption** may come from electricity savings or reduced use of other fuels (e.g. gas and oil for space heating). We count savings at point of use/point of intervention only. We only count savings arising in Scotland towards our indicator.
- **Water savings** are counted by volume. These relate to onsite savings, with downstream savings (such as offsite sewage and waste water treatment) not accounted for. Associated carbon and energy savings in the wider water treatment system do not count towards programme targets.
- **Carbon savings from energy measures** are calculated in tonnes of carbon dioxide equivalent (CO₂eq). We count territorial emissions only for energy related savings.
- **Biodegradable waste diverted from landfill** and **non-biodegradable waste diverted from landfill** both count material diverted up the waste hierarchy. Combined they give our total landfill diversion.
- **Reduced primary resource use** is potentially counted in two ways:
 - Directly, at a hypothetical “factory in-gate” (i.e. where the resources enter the process our intervention targets). This means a process efficiency that saves one tonne of aluminium contributes one tonne to our target. In practice this understates our impact as it excludes the raw materials consumed upstream in generating our tonne of aluminium in the first place (e.g. the bauxite extracted at the mine, the materials used in transporting it, and so on). This definition also excludes primary energy (e.g. tonnes of coal or barrels of oil) associated with the energy savings above.
 - Indirectly, where increased recycling, repair, or re-use displaces virgin raw materials. This may not happen at the site where our intervention occurs – with displacement happening in the wider market place. We apply standard displacement factors (i.e. one tonne of material recycled does not equate to one complete tonne of material consumption saved) to account for inefficiencies in behaviours,

⁵ This is done consistently for all activities (the large majority) assessed as part of our standard impact model fieldwork. One or two other cases have diverged slightly – typically where lifespans are sufficiently short, or impacts sufficiently small, that it has not been cost effective to model lifetime cost savings in detail.

⁶ This longer lifespan is typically most relevant for energy projects; another reason to draw a cut-off point at the 10 year line is that associated carbon savings rely on an assumption about the emissions from grid electricity in many cases; as Scotland’s energy mix changes in future, so too will the comparative carbon savings. For the purpose of estimating impact, we have used current grid carbon factors, including for future impacts. However, the further into the future we go, the greater the uncertainty – but the greater the likelihood there will have been significant changes.

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markets, and processes between a recycling action taken and any ultimate displacement effect. We acknowledge that in a global marketplace displacement may not always occur in Scotland.

- **Waste prevention** counts both savings from processes on site, and improvements that will be seen at end of life (e.g. from lightweighting packaging, or improved product design).
- **Carbon savings from material efficiency measures** count the lifecycle impact in line with the Scottish Carbon Metric, as this is the best measure of Scotland's environmental impact in carbon terms. There is a small risk this might double count with savings from energy in cases where we improve the efficiency of an industrial process on-site in Scotland where material and energy savings are mutually dependent. We think this risk is small in practice in the projects we have supported, and have discounted it in the current analysis.
- **Cost savings** represent savings in operational costs to the beneficiary organisation⁷.

The impact assessment here is not a cost-benefit analysis, though the data collected to produce this assessment would inform such an exercise. Specifically, we do not monetise non-financial benefits (such as carbon savings), and we count aspects such as cost savings in line with our strategic ask from government (for example landfill tax savings are a benefit to the businesses we target, and are counted in their entirety in our impact figures). This document summarises a diverse range of impact assessment. Additional data and analysis can be made available on request in relation to specific activities.

⁷ Where data is available these account for running costs as well as cost savings, but exclude capital investment. Capital investment is estimated where data is available, and reported separately.

4.3 Quantified impacts from Resource Efficient Scotland advice and support service

4.3.1 Coverage of service and funding source

The RESASS consists at the top level of “in-depth” support (typically one-to-one, and involving at least half a day of consultant time – and sometimes much more) and “light touch” support (telephone and email advice lines, savings finder tools, generic guidance, and training). A large number of activities and sub-activities are delivered under these two broad categories (and are listed as an appendix). Beneficiaries may benefit from more than one support element in some cases. This element of the programme is co-funded by Scottish Government’s Zero Waste Policy team and Energy and Low Carbon team.

We have impact assessed this activity annually (in summer 2014 and summer 2015), and results are shown relative to the year in which impact assessment was carried out – this usually matches delivery year, but some activity with longer lead-in times in year one was held for impact assessment in year two, and all impacts for these activities are reported in the second year⁸.

4.3.2 Extent of overlap with private sector and public sector programmes

As highlighted in the introduction to this section, some beneficiaries from our other work areas/audiences in practice received support through the RESASS mechanism. Specifically this included a small number of in-depth support projects with public sector organisations in 2013/14, and, for light touch support, public sector organisations are among the beneficiaries in both 2013/14 and 2014/15. Similarly private sector companies engaged by our sector specialists were often funnelled into the RESASS channel for the actual delivery aspect of specific projects in both 2013/14 and 2014/15, and whilst the RESASS has an explicit SME focus, large organisations have always been able, and encouraged, to use the light touch support. As all organisations channelled through RESASS are counted here, this overstates the effect RESASS would have had in isolation (and, conversely, subsequent sections understate the benefits of our sector specific engagement).

4.3.3 Extent of overlap with other government schemes

RESASS delivery overlaps to some extent with government energy efficiency loans delivered by the Energy Savings Trust (EST) in the period 2013-15. In these cases financing was provided via the EST, but applications required a technical review by RESASS as a prerequisite. This means the two streams of government financing (via the EST and RESASS) have contributed to the same impacts. These impacts are counted in the totals presented below (where impact assessment shows we have contributed), but the scope of these shared impacts are subsequently highlighted for transparency, and to inform any overall assessment of value from this work area.

⁸ We have also made one amendment to figures in our 2013/14 submission on impacts to government. In 2013/14 we included a provisional estimate for impact for a small number of “large saving potential” projects. However, we felt this insufficiently captured impacts given a low response rate during surveying, and long project lead-in times. We therefore reassessed these in 2014/15, and have removed them from 2013/14 totals displayed in the current report, and placed the entirety of the revised impact into 2014/15.

4.3.4 Quantified benefits to date

Programme targets were set on the basis of influenced cumulative per annum impacts – i.e. the extent to which RESASS has contributed to better outcomes in 2015, as opposed to a situation in which we had done nothing. This is presented below:

Impacts achieved to date: Influenced per annum	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
RESASS In Depth Support 13/14	36,000	0 ⁹	15,000	2,000	15	330	0	4,000	3,000,000
RESASS Light Touch Support 13/14	130,000	330,000	30,000	2,700	11,000	4,200	2,300	5,600	8,000,000
RESASS In Depth Support 14/15	27,000	100,000	17,000	210	1	170	2	220	3,900,000
RESASS Light Touch Support 14/15	120,000	380,000	34,000	5,000	2,000	2,000	2,000	10,000	7,200,000
RESASS Total Impacts 2013-2015	310,000	800,000	96,000	9,900	13,000	6,700	4,300	20,000	22,000,000

Table 4.3 Cumulative per annum influenced RESASS impact 2013-15 by indicator. All numbers rounded to two significant figures, individual rows do not always sum with total impacts

Additionally we were credited with influencing 2,100 jobs being created or safeguarded over the two year period. We would highlight that this figure is descriptive of employment benefits in beneficiary organisations only, and is not our impact on net employment. In some cases jobs may be purely additional (where they are concerned specifically with energy and resource management by a company). In other cases however there is likely to be some displacement of employment (where efficiency gains improve competitiveness and enable a company to retain or employ new staff, this may be at the expense of a competitor, and in some cases that competitor will be based in Scotland).

⁹ Insufficient water quantified savings measures were surveyed in 2013/14 to allow for robust sampling and scaling, though we do know water saving took place as part of some in-depth projects. This figure is therefore an underestimate of actual savings.

Of the cumulative per annum influenced impacts for 2013-15, those shared with the EST loan scheme account for £650,000 of cost savings and 4,800 MWh of energy savings.

A better measure of our value considers both the extent to which we have influenced change (typically resulting in a per annum reduction in impacts) and the length of time for which we think change will persist (typically resulting in an increase in impacts). Accounting for these two factors gives a better measure of the value of our programme:

Impacts achieved to date: Attributed lifetime	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
RESASS In Depth Support 13/14	290,000	0	120,000	13,000	81	2,000	13	23,000	22,000,000
RESASS Light Touch Support 13/14	610,000	370,000	140,000	4,800	14,000	7,400	4,400	12,000	26,000,000
RESASS In Depth Support 14/15	220,000	470,000	150,000	1,000	2	800	8	2,000	32,000,000
RESASS Light Touch Support 14/15	490,000	410,000	120,000	11,000	5,000	7,000	8,000	34,000	23,000,000
RESASS Total Impacts 2013-2015	1,600,000	1,300,000	520,000	30,000	19,000	17,000	12,000	71,000	100,000,000

Table 4.4 Attributed lifetime RESASS impact 2013-15 by indicator. All numbers rounded to two significant figures, individual rows do not always sum with total impacts

Attributed impacts on jobs were 1,300 jobs created or safeguarded – the same caveats apply as identified above. This figure is counted only once, and is not multiplied to account for lifetimes. The impact assessment also identified approximately £44 million in investment in resource efficiency being attributed to us as a result of our interventions – this is one-off investment, not an ongoing expenditure.

Of the lifetime attributed impacts, those shared with the EST loan scheme account for £6.8 million in cost savings and 46,000 MWh of energy savings.

4.3.5 Implementation rate to date

Appendix 2 provides a summary of implementation rates for identified savings via RESASS in-depth support over the 2013-15 period. In general terms the percentages of cost savings realised as a proportion of all identified savings ranged between 35% and 70%. Carbon and energy savings realised ranged from 25% to 75%. We highlight that differences between implementation rates in activities (and indeed between years) described in Appendix 2 may well be down to the individual organisations assisted as much as any differences in delivery route.

Overall, implementation rates in 2014/15 were lower than those reported in 2013/14. Reasons for non-implementation that are frequently cited in both years through both quantitative and qualitative feedback include cases still awaiting a decision, cases where finance has proved unavailable, and cases where beneficiaries feel the solution proposed is not, ultimately, right for them. Barriers to implementation are discussed in more detail in section 5. However, client satisfaction and reasons for not taking recommendations forward are broadly similar between years, so it seems likely that differences in implementation are not primarily down to any changes in the way the service is delivered. We'd highlight that as well as potential differences in advice given, and beneficiary circumstances between the two years, there is no guarantee that the two sampled populations are comparable – for example slower projects may be more likely to have been assessed in year two, and year two beneficiaries were approached some months earlier for impact assessment than in the previous year.

Renewable energy recommendations had a significant impact on implementation rates for energy savings in 2014/15. In particular, where recommended technologies actually have a greater kWh demand than those previously installed but enable beneficiaries to achieve cost and carbon savings. Where these types of recommendations have not been taken forward implementation rates for energy are higher.

The impact assessment captures both actions taken and planned actions. Section 4.2.2 discusses how we account for planned action in more detail. For RESASS multi-day support (Table 4.5 below) there were fewer actions reported as “planned” in 2014/15 (23%) when compared to 2013/14 (31%) and a higher proportion reported as “not taken/no plans” (30% in 2013/14 vs 46% in 2014/15).

Status of actions	13-14 RESASS Multi-day	14-15 RESASS Multi-day
Taken the action in full/in part	36%	29%
Have definite plans to take the action but have not yet done so	31%	23%
Have not taken the action and have no plans to take the action	30%	46%

Table 4.5 The status of identified actions for RESASS multi-day visits evaluated in two phases in 2013/14 and 2014/15

In 2013/14 we noted the potential to underestimate implementation due to the total potential savings identified including some “either/or” measures – i.e. in practice it is not possible for a site to take both. For the 2014/15 evaluation clear optional measures were identified during dataset preparation and we believe the identified savings dataset is not significantly impacted by this issue¹⁰.

4.3.6 *Expectation of future impacts*

Some beneficiaries may take further action in future, especially beneficiaries of in-depth support. We do not know the extent to which this is likely, and may investigate further in 2016.

4.3.7 *Sources of uncertainty*

We would highlight that in-depth and light touch support work in different ways. The former typically provides quantified identified savings for the majority of measures, which improves confidence at impact assessment. We also understand the full population of beneficiaries well, having worked with them all closely.

For light touch support a greater number of assumptions need to be made to quantify likely impacts, especially where beneficiaries do not have good savings or consumption data when interviewed. Additionally, we have much less background information on these organisations, so are more vulnerable to sampling error or non-response bias. It may be the case that the “attribution” assumption works less well for light touch support at the lower end of the scale too; for example “outcomes were a little better as a result of the support” may be relatively less important for light touch organisations, but still apply to large impacts. Our approach is consistent with previous impact evaluations in this topic area.

In conclusion, we are relatively confident in the estimated impacts for the REASS activity, but confidence in light touch impacts is lower than for in-depth support, and we would caution against direct comparison of impacts in the two streams without consideration of the qualitative differences between the two, including the nature of the organisations helped, and where they are in the resource efficiency journey. Our independent evaluation consultants recommended that robust comparison between activity streams in this way would be dependent on a much stronger experimental design; in practice our analysis categories to date reflect delivery imperatives, and this may well maximise overall programme effectiveness, even if it limits some forms of analysis.

¹⁰ In the 2013/14 RESASS impact assessment we highlighted that our approach to calculating implementation rates for evaluation purposes is based on a like-for-like comparison of identified potential savings, and savings accruing from actions taken, among beneficiaries sampled in the impact assessment. This remains the case. There is a discrepancy between this approach, and one that relies on the project database – using the figures in the project database would give higher quantified impacts than the figures quoted throughout this report, but possibly a lower apparent implementation rate. We think this difference relates to the way sampling and scaling work in the impact assessment, and also to how savings are recorded in our project database. We will continue to work to close these gaps for future impact assessments, but believe the figures given here are the most robust assessment of implementation rates as they result from an independent third party assessment, and reflect the lower claim regarding absolute impacts of the two possible scaling methods that could be applied.

4.4 Quantified impacts from other support to the private sector

4.4.1 *Coverage of service and funding source*

Our private sector programmes focused particularly on the food and drink sector, the hospitality sector, and the construction sector during this period, although one other general business intervention outwith the scope of RESASS is also counted here. Work included collaboration with industry bodies to identify resource efficiency projects with both immediate savings potential, and the potential to demonstrate new concepts to a wider audience, as well as specific tools, applications, or training. Programme funding also supported some cross nation work undertaken by WRAP – specifically voluntary agreements with the food and drink sector (Courtauld Commitment, and Federation House Commitment), and the hospitality industry (Hospitality and Food Services Agreement).

The impact assessments carried out for this activity are more diverse than for RESASS, and a list is available in an appendix.

This work area also contributes to a number of longer term but less immediately quantifiable changes. This includes work on sustainable events management undertaken for the Commonwealth Games and Ryder Cup in 2014, but now offering a model for events management large and small in future. It also includes funding to the UK Product Sustainability Forum (which explores ways to make the food and drink supply chain more sustainable). Neither contributes to the quantified totals below, but may do so in future.

This element of the programme is co-funded by Scottish Government's Zero Waste Policy team and Energy and Low Carbon team. It is worth emphasising the entirety of Zero Waste Scotland's work with specific sectors does not fall under the RES remit, even where the beneficiary groups are similar, or indeed the same (examples include work on circular economy business models, carrier bag charging, and with the textiles sector). These elements are thus excluded here.

4.4.2 *Extent of overlap with RESASS and approach to cross-nation work*

A large amount of work was identified and channelled into RESASS via our sector programmes. These are counted in the RESASS impacts, unless otherwise stated¹¹.

Programme funding to cross-nation work poses two potential challenges to evaluation.

Firstly, it raises the possibility we may measure a change two ways – for example a beneficiary of RESASS or other RES private sector funding may also be reporting change via a voluntary agreement. Typically we do not think this is a significant issue because the voluntary agreement targets in question

¹¹ We set up a sampling regime for impact assessment that aimed to interview all beneficiaries of these more unique projects (which typically relate to a relatively small group of companies in each case, and are hard to scale if some beneficiaries are unavailable for interview). Where this is achieved, we can comment on the individual activity with confidence. Where it was not achieved it was decided that it was more robust to scale impact estimates according to the larger RESASS sample, but this does mean these projects cannot be isolated in the impact data.

have relatively little overlap with measures taken under RES, and, similarly, most RES SME beneficiaries are not signatories to the voluntary agreements in question.

Secondly the timing of the UK voluntary agreements does not entirely match the RES review period here. In these cases we have apportioned impacts to year, but would not claim that this is exact. In particular, some impacts falling within the review period may result from earlier investment. WRAP have also had to model some impacts from later in the period 2013-15 where signatory reporting data does not wholly match the RES reporting period. Our approach to this is briefly stated in the appendix, and more detail is available on request.

4.4.3 Quantified benefits to date

Programme targets were set on the basis of influenced cumulative per annum impacts – i.e. the extent to which RES has contributed to better outcomes in 2015, as opposed to a situation in which we had done nothing. This is presented below:

Impacts achieved to date: Influenced per annum	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
Additional benefits to the food and drink sector 2013-2015	2,700	53,000	1,000	440	1,300	6,300	7,900	6,400	2,600,000
Additional benefits to the hospitality sector 2013-2015	200	1,600	31	1,800	910	1,500	810	4,700	460,000
Additional benefits in other sectors ¹² 2013-15	1,800	2,000	830	90	3,900	4,600	2,600	3,500	860,000
Total impacts from non-RESASS private sector support 2013-2015	4,700	70,000	1,800	2,300	6,100	12,000	11,000	15,000	4,000,000

¹² Specifically construction, and a small amount of SME/generic business support outwith RESASS scope (funding to Crichton Carbon Centre)

Table 4.5 Cumulative per annum influenced RES private sector (excluding RESASS) impact 2013-15 by indicator (all numbers rounded to two significant figures)

A better measure of our value considers both the extent to which we have influenced change (typically resulting in a per annum reduction in impacts) and the length of time for which we think change will persist (typically resulting in an increase in impacts). Accounting for these two factors gives a better measure of the value of our programme:

Impacts achieved to date: Attributed lifetime	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
Additional benefits to the food and drink sector 2013-2015	13,000	160,000	7,000	900	2,700	13,000	16,000	13,000	6,100,000
Additional benefits to the hospitality sector 2013-2015	1,700	2,600	270	4,800	1,900	3,700	2,700	13,000	1,400,000
Additional benefits in other sectors 2013-15	15,000	9,600	7,000	96	2,000	4,600	1,400	1,900	1,800,000
Total impacts from non-RESASS private sector support 2013-2015	31,000	210,000	14,000	5,900	6,500	21,000	20,000	28,000	9,300,000

Table 4.6 Attributed lifetime RES private sector impact (excluding RESASS) 2013-15 by indicator (all numbers rounded to two significant figures)

In addition to the standard indicators above, work with the construction sector led to an additional “influenced” £12 million per annum of procurement of recycled material for supported construction projects, or just over £9 million attributed spend. The impact of this on procurement will be cost neutral, so it is not a cost saving for the beneficiaries of our support per se, but contributes to the wider zero waste objective of growing demand for recycled products. We have not ventured to calculate a further lifetime impact for this benefit and have treated it as a one-off, however, as the next section highlights this is likely to be conservative – perhaps significantly so.

4.4.4 *Expectation of future impacts*

Some activity from 2013-15 may deliver benefits in future. Successful projects will be disseminated via industry bodies and may generate replication elsewhere. We would count the impacts of this based on separate impact assessment of any dissemination activity undertaken in future. As with RESASS, there may also be specific recommendations within projects that are only acted on after April 2015.

Work in the built environment is difficult to extrapolate into the future. Some of the specific projects we have supported are still in progress, and so immediate benefits are predicted rather than verified. However, significantly, qualitative feedback implies several businesses will replicate best practice from these projects on similar future projects, or across their portfolio, in future. For the present we haven’t counted this longer term or wider impact as uncertainty is high, but it could contribute a very significant future impact, with beneficiary firms and organisations having control over hundreds of millions of pounds worth of construction spend. We will consider how this can be followed up from both a delivery and evaluation perspective in future.

4.4.5 *Sources of uncertainty*

Some of these are covered in the text above, or are similar to RESASS. We would however highlight that whereas most RES impact assessment is bottom-up (with site-based recommendations and follow up) some of the components of this work area are more top-down (based on sector data), in particular the cross-nation voluntary agreements. In the latter case influence and attribution assumptions have to be approached somewhat differently, and a judgment of value should consider these qualitative differences as well as the raw numbers.

It is also the case that much of the data for these cross-nation agreements is submitted at UK level. Thus assigning a realistic share of impact to Scotland is not straightforward and proxies have to be used. The basis for the nation splits is highlighted briefly in the appendix against the relevant agreement. We are reasonably confident in the case of Courtauld (where UK employment figures were used as a proxy for nation impacts) as we believe the sector is likely to be performing in a similar way across the UK. In the case of Federation House, site specific data is available for Scotland in many cases, so again we can be reasonably confident about the nation impacts.

In the case of the Hospitality and Food Service Agreement we suspect that the split of sites across nation which is used as a proxy may underestimate Scottish impacts – the sector in Scotland is subject to a significantly different operational environment both in terms of regulation (specifically the Waste (Scotland) Regulations), awareness (with RES providing far greater awareness of resource efficiency than might be the case in other nations) and potentially business drivers (for example any impacts, positive or negative, from major tourist events like the Commonwealth Games or Ryder Cup). Additionally, questions to signatories around influence and attribution were only asked with a UK perspective – responses to these might also have been significantly different for Scotland in isolation. For the future, a better way to isolate Scottish impacts, and explore drivers of change in Scotland, would significantly improve confidence in estimated impacts from this particular voluntary agreement.

It is possible that some impacts relating to the Product Sustainability Forum (a cross-nation forum with the food and drink sector) are missed in this analysis. The forum supports research and pilot projects for resource efficiency with companies across the UK supply chain. Material savings from the forum (its primary focus) are assumed to be captured as part of Courtauld impacts (where reporting is based on sector data and should reflect the extent to which innovations have been adopted). However some pilot projects have also delivered energy savings. The extent to which these are then incorporated into the supply chain is not currently known, though it seems likely any impacts will be longer term.

4.5 Quantified impacts from other support to the public sector

4.5.1 *Coverage of service and funding source*

Support to the public sector under RES encompasses a wide range of activity. This includes direct advice on resource efficiency measures to specific sites, and work with organisations managing multiple (often diverse) sites, with varying degrees of additional assistance needed to cascade change through organisations. As well as direct advice, guidance and training have also been prepared and provided.

The impact assessments carried out for this activity are more diverse than for RESASS, and a list is available in appendix 1.

This work area also contributes to a number of wider goals. For example while we have included work on carbon management plans in quantitative impact assessment, feedback suggests it also has an important role to play in improving the quality of organisational plans and reporting, and the confidence of those charged with developing plans for the future.

This element of the programme is co-funded by Scottish Government's Zero Waste Policy team and Energy and Low Carbon team. It is worth emphasising the entirety of Zero Waste Scotland's work with the public sector does not fall under the RES remit, even where the beneficiary groups are similar, or indeed the same (examples include work on procurement under our circular economy programme, and on resource management via business and household collection services). These elements are thus excluded here.

4.5.2 *Extent of overlap with other RES support*

In 2013/14 several public sector projects were channelled into RESASS in-depth support (and this is reported there). In subsequent years this work was delivered separately (and is reported here). In both 2013/14 and 2014/15 public sector organisation could also contact RESASS for light touch support – and again, the impacts from this are counted under the RESASS section. Work with the construction sector reported under “other private sector” impacts above may include some cases where the actual construction projects in question may include some that are publically funded (e.g. schools).

4.5.3 *Extent of overlap with other government policies and agencies*

The public sector programme has a close fit to other agencies and initiatives. Specific examples include cases where we are identifying savings that organisations will seek to finance under other government support packages (e.g. Scottish Future Trust finance), cases where we are providing expertise to fulfil government requirements (e.g. carbon management plans), and cases where the task of developing best practice has been shared (street-lighting work with the SFT).

In the first case we have not made a significant adjustment to our impact assessment process in the period 2013-15, though the comments relevant to overlap with the EST in the context of RESASS are relevant here. In the medium term, better monitoring coordination between RES and the SFT (or other sources of finance) may improve impact assessment in these cases (e.g. the provision of financing would provide confirmation projects will proceed). In the second case we have followed our standard approach to impact assessment but note that we cannot claim full responsibility for the existence of carbon management plans, or for organisations' willingness to engage. In the final case we have agreed a shared approach to reporting impacts with the SFT; this is a model that may make sense for future areas of overlap as well.

4.5.4 Quantified benefits to date

Both influenced per annum and attributed lifetime impacts are shown below. In addition to the savings here, an additional £12.8 million in cost savings have been identified through work with the NHS but confirmation on whether these will proceed was still pending at the time of impact assessment in 2015. They have therefore been excluded from the table overleaf, and also from discussion of implementation rate, but are expected to generate benefit in future.

Impacts achieved to date	Energy Savings (MWh)	Water Savings (m ³)	Carbon Savings from Energy (t CO ₂ eq)	Biodegradable waste diverted from landfill (t)	Non-biodegradable waste diverted from landfill (t)	Reduction in primary resource use (t)	Waste Prevention (t)	Carbon savings from materials (t CO ₂ eq)	Cost savings (£)
Influenced per annum impacts 2013-2015	81,000	210,000	25,000	120	500	500	11	650	6,100,000
Attributed lifetime impacts 2013-2015 ¹³	660,000	1,500,000	220,000	520	1,300	1,400	47	3,500	60,000,000

Table 4.7 Realised impacts to date from non-RESASS public sector support in the period 2013-2015 by indicator (all numbers rounded to two significant figures)

4.5.5 Implementation rate to date

Appendix 2 provides a summary of implementation from two phases of impact evaluation with public sector beneficiaries (with the distinction being solely one of timing; some interviews were conducted following work in 2013/14, and others at the end of the two year period in 2014/15). The varied nature of this sector and the individual projects that were evaluated means the two waves are not directly comparable¹⁴.

In general terms the percentages of cost savings realised as a proportion of all identified savings ranged between 30% and 70% between the two evaluation phases. Realised carbon and energy savings also ranged from 30% to 70%.

¹³ A couple of projects in this category do not follow our usual time limits on lifetimes. Most notably this includes the work on street lighting (which assumes a 25-year lifespan, and one major resource efficiency audit where the capital invested in is assumed to last its operational lifespan of 15 years. Together these account for over 50% of the lifetime cost savings

¹⁴ Two other pieces of public sector impact assessment were also undertaken (see appendix 1 for detail) but in these cases there is little value in analysing implementation rates as potential savings were less comprehensively quantified in advance, and these are excluded from this discussion.

Notwithstanding the caveat above, implementation in 2014/15 was lower than in 2013/14 across cost, carbon and energy saving measures. A smaller proportion of actions are reported as taken or planned in 2014/15 (48%) when compared to 2013/14 (64%), though the proportion of beneficiaries taking at least one action remained broadly similar.

Across both phases of interviews insufficient funds and too-long a payback period are common reasons for not taking action. Some beneficiaries interviewed in 2014/15 who reported “no plans” suggested they would revisit the recommendations should funding become available at a later date. As per our evaluation of RESASS we did not find any significant differences in overall satisfaction and stated reasons for not taking recommendations forward between years.

Table 4.6 below provides a summary of the status of actions across the two evaluation phases. The proportion of actions taken in full/in part are similar between years, but organisations were less likely to report actions as “planned” and more likely to report actions as “not taken/no plans” in 2014/15 (51%) when compared to 2013/14 (28%). This shift in recommendation status from “planned” to “not taken/no plans” is similar to the two-year findings for RESASS in-depth support (see 4.3.5).

Status of actions	13-14 Public sector	14-15 Public Sector
Taken the action in full/in part	19%	20%
Have definite plans to take the action but have not yet done so	45%	28%
Have not taken the action and have no plans to take the action	28%	51%

Table 4.6 The status of identified actions for Public Sector resource efficiency evaluated in two phases in 2013-14 and 2014-15

4.5.6 Expectation of future impacts

Across RES it is the case that more complex, multi-component sets of recommendation may take longer for organisations to act on – whether this is down to the availability of financing, or simply the longer lead in for set up. We know that some organisations for example may implement specific measures when budget is available, rather than in a single improvement round. In other cases, large amounts of identified savings may be dependent on the availability of finance via a non-RES route. For these reasons, there are a higher number of cases in the public sector programme where we do not yet have confirmation changes will go ahead – conversely this does suggest that there should be some large additional savings realised from work in 2013-2015 that are not yet shown above. We will keep this under active review.

A particular area omitted in impact assessment was a set of projects with the NHS. This included a single large partnership project (addressing a number of distinct sites) with headline identified savings of several million pounds¹⁵. Any impact from this would be additional to the savings discussed above. We also excluded a number of smaller NHS projects where beneficiaries had not had time to act on reports received during 2014/15 at the time of impact assessment fieldwork. In both of these cases we strongly expect future impacts to occur, and will account for these in future impact assessments.

We also identify some of the more generic advice and guidance that has been developed in the period 2013-2015 as a possible source of future impact. In several cases this is only now available or being cascaded. We will measure the impact of this dissemination as a unique activity in future.

Savings for street lighting to date reflect impacts reported to the SFT by local authorities (i.e. there is no accounting for projects in progress but not operational, nor for future plans, unlike in impact assessment of most of our activity). As this is an ongoing programme, significant future benefits are also expected. Some of these may be the result of future work, but some may be a legacy of work to date.

Evidencing qualitative improvements was not an explicit aim of our overall impact assessment, but it is worth highlighting some findings from impact assessment studies over the two years. In particular, respondents frequently stated that they were in a better position to make the case for resource efficiency in their organisation and/or that the report helped them to do this. Frequently we may be giving advice that will become part of a larger decision making process, and be competing for attention against other projects requiring an investment of time or money. In this sector there may be fewer quick decisions, and the nature of our support may be more incremental, shaping the direction of the organisation over a longer time period.

One key example of influencing strategic direction would be some work on carbon management plans (sometimes this related to specific projects, but in other cases it related to reviews of entire plans). Again, time-bounding impacts in the latter case is complicated – some improvements seen in carbon management during 2013-15 may be the result of earlier activity; equally, some changes made in 2013-15 won't necessarily be apparent in performance until later, and improved capability or confidence in developing plans may extend for a long time to come¹⁶.

A second example would be work with the NHS on waste management. Though some delivery pre-dated RES, our programme has worked closely with the NHS to highlight the requirements of, and how to effectively comply with, the Waste (Scotland) Regulations, which will apply to NHS sites from 2016 onwards. Even though impacts from this may not always be additional (given some improvements will be a regulatory requirement) easing regulatory compliance is potentially a clear programme benefit. Quantifying improvements due to our support in waste management within the NHS is exceptionally challenging, as site data was limited, and relevant interviewees have proved difficult to contact. Thus we may be underestimating programme benefits, or see additional change in future, though it seems likely this will remain hard to quantify in a complex operational environment.

¹⁵ We did not obtain a formal interview for these projects in the time available. Informal feedback suggests at least some measures have gone ahead and, equally, that a decision has not been made in all cases. We think it is more meaningful to treat these as "identified" benefits only at present, and to exclude them from calculation of implementation rates.

¹⁶ In terms of quantifying impact we counted specific projects in a similar style to other impact assessments in this report. Where we were felt to have influenced the whole plan, impact was calculated for the period 2013-15, and a qualitative attribution question was asked of beneficiaries. There were also some cases where impact could not be robustly quantified due to data limitations. Our third-party contractor also sense checked for double-counting of carbon management plan benefits as against other specific projects supported by the programme.

The RES public sector team have also facilitated some wider Zero Waste Scotland work with the NHS that is outwith RES scope, most notably a project looking to maximise the re-use value of items in hospitals being decommissioned. Any impacts from this work will not be measurable until 2016.

4.5.7 Sources of uncertainty

Longer lead-in times are the greatest source of uncertainty in this work area. Where organisations have not yet decided to act, or are dependent on financing that is not yet in place, we cannot assign impact. Whilst we would expect this to mean we are understating – perhaps significantly – the ultimate programme impacts, it also creates a source of uncertainty in our standard approach to modelling impacts. To the extent our impacts above factor in “planned” activity (at a rate of 50%) – which is a significant proportion of savings for this work area – this is based on private sector experience regarding ultimate implementation. It may not be an appropriate assumption for the public sector. Another potential source of uncertainty is where we have worked with larger organisations with multiple sites. In some cases we have given advice specifically to several sites, whilst in others organisations have undertaken to cascade information and guidance internally. In the latter cases it can be more challenging to obtain appropriate site-specific contact information for the purpose of impact assessment, and this may limit our ability to assess implementation, though evidence that this was occurring was limited in our impact assessment in 2013/14, which did attempt to specifically follow up on this point. In the case of the Carbon Management Plan support, evidence that support was informing wider initiatives was much stronger, but again, how this is filtered to site-level is outwith our current ability to monitor. Carbon management plans also create two other areas of uncertainty, and these both mean we are almost certainly underestimating impact. Firstly, as organisations are so unique in this context, it was not considered robust to extrapolate from those interviewed to those unavailable for interview (who were thus not counted) and secondly we have preferred the more cautious of the two methods proposed by the third party evaluation team to quantify impacts for interviewees.

Material savings have proved challenging to quantify in the public sector – and particularly the NHS. The challenges already identified in this section apply, but so too does a commonly cited lack of waste data at site level, or (again particularly in the NHS) changes in site useage obscuring like-for-like change. As some advice has been cascaded within the NHS (to maximise reach within large and complex organisational structures), identifying and contacting the ultimate beneficiary or decision-maker at site level for follow up has been challenging. This may mean material benefits are being under-reported, but without a significant investment either in improving data in this sector or in obtaining some data-rich site case studies, our ability to quantify this will remain very limited. An alternative approach to calculating impact in the NHS would be to take sector level data on waste management (which has fallen over the two years), and seek to establish our contribution to this; however, without a clearer breakdown of where sector-level data is being aggregated from, and some site-level experiences to scale from, we cannot – currently – do this robustly, and again, do not expect to be in a stronger position in the near future.

4.6 Identified impacts from low carbon heat

4.6.1 *Coverage of service and funding source*

The government's Heat Network Partnership (HNP) is a network of government agencies tasked with the delivery of the government's low carbon heat strategy. Zero Waste Scotland, through the RES programme, provides a secretariat function, has contributed significantly to the evidence base for this work, and has developed some of the scoping and costing tools to support feasibility studies. We are the lead partner for a number of projects, but also provide expertise to projects led by other partners (and vice versa).

This part of the programme is wholly funded by the Scottish Government's Energy and Low Carbon team.

4.6.2 *Extent of overlap with other government policies and agencies*

As described above, Zero Waste Scotland is one of several partners working in this area, and the wider partnership is a key component of delivering the government's low carbon heat strategy. Thus there are many contributory factors to any changes achieved in this area, and these are likely to be synergistic, not additive. We believe that the RES programme has contributed to the entirety of the partnership's work, as have many other partners, as well as to the development of specific projects for which we are the lead. The extent to which impacts should be attributed to RES is more complex, and will be best determined in conversation with other partners – we will have contributed to their projects, and they to ours. To date, most savings resulting from our contribution are identified benefits only (as too little time has elapsed for projects from 2013-15 to be in place on the ground). Thus in this section we only describe the benefits identified by the whole partnership, and those projects we have led, rather than making a claim about final impacts to feed into the programme totals in Table 4.1, or indeed our likely contribution to shared impacts.

4.6.3 *Quantified benefits to date and expectation of future impacts*

The analysis here is based on data held by the HNP in August 2015¹⁷. There is no way within the database to calendarise precisely to 2013-2015, but this is unlikely to confuse the overall message in terms of our involvement.

¹⁷As the database includes projects at an early stage of development, the figures for heat generation capacity and projected carbon savings presented here may be subject to change. A consolidation exercise is underway to update HNP database records as well as to improve system functionality and to put in place suitable procedures for use and upkeep.

The partnership as a whole has identified 262 projects to date. 218 of these have a higher level of detail¹⁸ associated with them, and only these projects are described in this section. Of the 218 projects, 187 have a quantified figure for MWh heat generation associated with them. Carbon savings were estimated for 127 projects in the database¹⁹.

RES has specific responsibility for providing direct support to seven²⁰ HNP projects, all in the development phase. The support provided is in the form of detailed feasibility studies which investigate a range of technological and project layout options. Of these seven projects, five of the HNP database records include an estimate for annual heat generation in MWh and related carbon savings – these estimates will be refined as projects progress through detailed design.

Identified savings from the Heat Network Partnership to date are therefore estimated as follows (on a per annum basis):

Partner	Heat generation opportunities (MWh)	Carbon savings associated with quantified heat generation opportunities (t CO ₂ eq)
All Heat Network Partnership projects with quantified heat generation opportunities	1,400,000	200,000
<i>Of which RES is lead support partner from HNP for...</i>	<i>190,000</i>	<i>31,000</i>

Table 4.8 Identified total per annum savings through to August 2015 for the Heat Network Partnership (all numbers rounded to 2 significant figures)

For the partnership as a whole, connection opportunities for over 28,000 households and 1,600 businesses are included in these identified opportunities, and this is likely to be an underestimate as estimates have not (yet) been made in some cases.

¹⁸ These projects are those with a Unique Property Reference Number (UPRN) field entry (and therefore appear in Scotland's Heat Map project layer). Limiting reporting here to just these projects helps present identified savings consistently. The excluded projects are typically either very small, or are those stalled or abandoned in the development phases.

¹⁹ Projects not captured in the savings estimations include those where new generation infrastructure replaces old infrastructure of the same technology type (efficiency savings are not captured), energy from waste projects (primarily due to lack of technical definition in the database), projects using heat pumps as the primary technology (these are typically complex, multi-technology projects) and projects with key database fields missing.

²⁰ This refers to the seven projects we directly delivered, though as highlighted in section 3, we supported additional feasibility projects in collaboration with other HNP partners.

Of the 218 projects described above, 118 sites are classified as operational (although some are also subject to further development work). The quantified potential impact of these “operational” sites is estimated as 330,000 MWh and 69,000t CO₂eq (on a per annum basis). As of August 2015 none of the seven projects directly supported by RES are classified as operational.

Lifetime²¹ carbon savings for identified and operational projects are reported in table 4.9, and are of course much higher:

Partner	Identified lifetime carbon savings (t CO ₂ eq)	Operationalised lifetime carbon savings (t CO ₂ eq)
All Heat Network Partnership projects with quantified heat generation opportunities	2,400,000	1,000,000
<i>Of which RES is lead support partner from HNP for...</i>	<i>400,000</i>	<i>0</i>

Table 4.9 Identified and operationalised lifetime carbon savings for the Heat Network Partnership (all numbers rounded to two significant figures)

Most of the projects in the HNP database do not provide any cost savings information, partly due to a lack of cost information relating to the technology that is being replaced. We are therefore not reporting cost savings for the partnership overall. Identified annual cost savings for five of the seven RES-supported projects are £3.2 million; lifetime cost savings are estimated at £42 million. The identified savings are based on feasibility studies and directly related to heat²². We would count these as “actual” cost savings at the point it was confirmed that the project was going ahead. None are counted into RES programme totals at this stage.

4.6.4 Expectation of future impacts

Due to the long lead in times, we do not expect most feasibility projects started in the 2013-15 period to be underway currently, and this is indeed the case. We will continue to follow and support progress on these projects, and will record impacts in future. The progression rate from identified projects to completed ones cannot currently be predicted with confidence.

We have not to date impact assessed light touch support provided under this programme. Part of our work in the 2013-15 period included developing tools to support scoping and feasibility for low carbon heat across Scotland. Some of these have undoubtedly led back to the specific tracked projects above but

²¹ Lifetimes in this case are calculated in line with the Carbon Trust’s Performance Assessment Methodology developed by Salix. See: <https://www.carbontrust.com/media/169026/carbon-trust-performance-assesment-methodology.pdf>

²² In the majority of cases however, heat-related savings are entangled within the wider project financial analysis and are difficult to extract in isolation. Additionally, a number of project scenarios are often modelled using various layouts and energy sources, each with their own financial profile – for simplicity, an approximation of the annual project cost savings for the most promising scenarios is reported.

it may also be the case in future that they spur additional studies and projects, which might fall outwith the partnership umbrella. We will aim to track the extent to which this occurs in our next business plan period.

4.6.5 Sources of uncertainty

The main sources of uncertainty here are the extent to which identified changes will be realised in the future. Given the close working relationship within the Heat Network Partnership, it may also always be somewhat arbitrary how impacts are allocated to different partners. Our view on this is that the delivery logic requires a partnership approach, and thus impacts from specific partners, including ourselves, are not purely additive but synergistic. We will discuss the best approaches to assigning impact in future with government and partners.

5 What have we learned?

Different questions have been asked in different impact assessments over the two year period, but the messages from these have been broadly consistent. These are summarised in sections 5.1 and 5.2 below.

5.1 Where did organisations find our help most valuable?

Feedback from organisations on the value of support is almost always strongly positive. At the most superficial level, this relates to willingness to recommend the service, crediting the knowledge of those giving advice, and the perceived credibility of the advice given.

In more concrete terms advice is frequently credited with identifying ideas, prioritising actions, accelerating changes that were being considered, or providing confidence to proceed. Perceived credibility and impartiality were often identified in qualitative comments as being one of the key ways in which RES achieves this. Selected quotes from the impact assessments give a good insight into how organisations feel they have benefitted, and the ways in which RES is influencing changes:

“Excellent service on offer. The person doing the audit was most helpful and offered help in the future to deliver the business case to higher management. They offered things that the company would not be aware of otherwise” (RESASS, Multi-day)

“We knew ourselves anyway the issues to deal with them anyway, but it certainly wouldn't have been as much of a priority without the audit” (RESASS, Half-day visits)

“It was a lot quicker to take the actions and we were able to talk to someone who knew what they were talking about and were impartial” (RESASS, Half-day visits)

“We had the overall idea that we had to be more energy efficient but the support was able to drill that down and gave some ideas that we possibly wouldn't have thought of, for example external lighting” (Public Sector 2013/14)

“It helped give some sway to management to implement the recommendations as the information had come from an expert” (Public Sector 2013/14)

“We didn't have the specialist knowledge in that area but the consultant did” (Public Sector 2013/14)

“It gave us clarity on what would be going ahead, where and how much it would cost and the payback period” (Public Sector 2013/14)

It is apparent both from feedback and from the quantified impacts in previous sections that engaging organisations on energy savings is easier than engaging them on material efficiencies. This clearly reflects market demand – energy is often the most effective “hook” to engage businesses, and energy measures are also more likely to be taken than other recommendations. Beneficiaries seeking out support are most likely to have been initially motivated by energy concerns. A partial exception was in 2013/14 when the advice line had a significant number of queries motivated by the introduction of the Waste (Scotland) Regulations.

Several light touch RESASS support recipients stated that they would have preferred a face-to-face service, and typically face-to-face support saw more positive feedback – but this may simply reflect the fact it is also more memorable and a more in-depth engagement. In contrast, in the public sector, the reports were sometimes valued more than the visits – this may reflect the fact that the report provides evidence for a wider organisational decision making process over a longer period.

We did not systematically collect feedback from stakeholders beyond direct beneficiaries (such as partners, trade bodies, or sector bodies). Nonetheless, ad hoc feedback has been received over the programme period, which has been extremely positive. A selection of quotes from stakeholders is available as appendix 3.

5.2 What are the biggest challenges?

This section briefly sets out barriers to business engagement, the challenges to our programme in maximising quantified impacts, and the challenges we have identified to date in monitoring and impact assessing the programme.

5.2.1 *Barriers to businesses taking action*

Barriers to taking resource efficiency action are broadly consistent across sectors. While RES may reduce these, it has not eliminated them. Common factors meaning actions were not taken identified in impact assessments include:

- Insufficient funds (or unwillingness to seriously consider capital intensive investments)
- Payback periods that were considered too long
- Organisational capacity (either skills or time)
- Technical or practical constraints (such as space on site, plans to change site, leased premises, etc).

Time was a recurrent theme, with several beneficiaries awaiting internal decisions, planning permissions, or financing. Additionally, firms need time simply to consider the recommendations in reports – at least one organisation was explicit that they had not yet had time to look at the report²³. Some of these cases may yet produce future impacts, but equally, this may be the stages at which intentions to act become stalled. Some examples illustrating this uncertainty include:

“Some of the measures could be done while schools were open whereas others would need to wait until the schools are closed.”

“We are going to implement... we just need the capital to do so.”

It is important to remember that in most cases RES reports will become part of an internal decision making process within an organisation, and resource efficiency gains (and even cost) may not be the only factor in play. Occasionally there was evidence that some decision makers were less willing to buy in to more “innovative” solutions, e.g.

“...Some people didn't have confidence in the biomass and upgrading the gas boiler was the easy thing to do.”

There was also some limited evidence that while reports may convince the direct recipients within an organisation, they may not always convince the ultimate decision-maker. This is perhaps worth considering in writing reports – the immediate customer may not be the only target audience.

Unsurprisingly low-cost “quick win” measures are most likely to be implemented (e.g. draught proofing, lighting, insulation). Longer term measures with significant investments of time or money are more likely to be “planned” (though this will also be a reflection on the relatively short follow up period employed in our impact assessment). This may also reflect a degree of short-termism in some business environments, and some qualitative comments seem to suggest this.

²³ Specific sectors may have specific issues in this regard – for example, the peak period for hospitality firms is the summer, and recommendations (or impact assessments) occurring at that time will receive far less attention.

All of the above feedback strongly aligns with previous evidence reviews on barriers to resource efficiency in Scotland and beyond.

Occasionally the RES service was felt not to have provided advice at the right level – either the specific solution suggested for a site was felt to be unsuitable, or, rarely, advice was felt to be either too generic, or too complex. Comments to this effect were however very limited.

The main suggestion from beneficiaries for improving the service related to a desire for additional follow up support to assist implementation. Whilst this desire is undoubtedly genuine, it is worth noting that this was a greater focus of the RESASS in 2014/15, but does not always lead to additional actions being taken – so while implementation support can push organisations to take steps, it is not guaranteed.

It is apparent from conducting the impact assessment that monitoring of waste and material consumption data is typically poor in both the private and public sectors. This may well mean it is less visible to organisations, and less likely to be seen as a priority for action. Improvements in waste management may only generate cost savings if they are sufficient to change waste management arrangements and contracts, and this may be an additional complication compared to the immediate benefits of reduced energy consumption. Similar challenges can also occur around water and energy, depending on the way sites monitor, manage, and are billed, for these items.

5.2.2 Challenges around maximising impacts

There will always be a tension between maximising SME engagement and maximising total tonnage/financial/energy savings, given that savings opportunities, and particularly savings opportunities per engagement, are disproportionately distributed throughout Scotland's business population. This needs to be factored into impact expectations at both programme and activity level.

It is clearly easier to engage on energy saving, and most organisations are more likely to act on energy saving advice. This probably reflects a market preference, and simply means change on material use will always be harder to leverage in most contexts (there may also be fewer companies that provide large savings opportunities for materials).

Sometimes delivery logic means our delivery is dependent on other actors (e.g. technical studies leading to financing routes managed by others in the public sector). In future this may become more common and a clear approach to: a) what the dependencies are; b) what they mean in terms of likely implementation timelines; and c) at what stage RES counts/reports impacts (and how these are described by other partners) needs some thought, both to maximise delivery and to improve the cost effectiveness of monitoring and evaluation.

Where we are dependent on dissemination of advice or recommendations by other partners (e.g. sector bodies, or large public sector organisations) for specific sites or organisations that we are not in direct contact with to replicate, then clearly the dissemination mechanism is important – not just to ensure advice really is passed on, but also to ensure that advice is suitable for the end user, as well as at a strategic level. Better monitoring of dissemination routes would improve our ability to impact assess them, and will be a focus, where appropriate, going forwards.

5.2.3 Challenges around measurement and evaluation

This section briefly highlights what we have learnt from measuring and evaluating the RES programme over this period.

The optimal period for follow up is not clear for some activity – we've followed up in the summer following the financial year advice was given for most activity to date, though in some cases we've followed up later. This may understate the impact of activities that take longer to happen (as reflected in the barriers section above). In future, greater scope to identify expected implementation times and tailor follow up accordingly might aid both implementation and impact assessment, but there will always be significant uncertainty. In 2016 we would like to undertake some longer term follow up with

earlier RES beneficiaries to test the extent to which longer term implementation does or does not take place to inform future impact assessment.

Light touch support seems to provide large benefits but more work would be needed to better understand our additionality in this area, and how it compares with in-depth support. This is discussed in the findings section. Another area where there is significant uncertainty around our impacts is from more qualitative or capacity building interventions – work to smooth regulatory compliance or build confidence and capacity in resource efficiency more generally may well have medium and long term quantified impacts, but we currently have no way to quantify these robustly. A narrow focus on quantified benefits only may miss some of the important impacts of our programme.

Based on the two years of evaluation to date, we propose to review the cost effectiveness of our evaluation approach to focus interview resource towards areas of greatest impact or greatest learning. We also propose to review the way in which identified savings are recorded by consultants to provide a closer fit to the way in which they are considered in impact assessment. Currently inclusion of multiple options, or of secondary reports designed to spur implementation, can mean “identified savings” figures recorded in the programme database are not wholly robust.

One constraint largely outwith our control is where sites have little or no monitoring data. This has proved particularly challenging for water savings, where we have often been able to confirm measures have taken place, but been unable to obtain an estimate of the resulting savings (and have undoubtedly lost out on the ability to quantify impacts as a result). The often limited data on waste and material costs is also a constraint, and even with energy measures (where monitoring and measurement is most likely to be in place and have a direct link to billing) sites struggle to quantify savings beyond consultant initial estimates. This has not just implications for monitoring and evaluation but also for sites ability to manage efficiency savings well, or indeed awareness of, and willingness to engage with, savings opportunities that may be available.

We will review our approach to monitoring and evaluation for this programme in early 2016 (our current inherited impact assessment contract is now closed).

Appendix 1: Activity List and Method Summary

This table briefly summarises activities that have fed into this report, where they are classified and counted, and a brief description of how they were impact assessed. Greater detail on methodology can be shared with government on request where already available, though not all elements will be written up until November. Where separate contributory reports or studies exist these can also be shared on request.

Top level activity in this report	Sub-category in this report	Delivery / impact assessment category	Impact assessment approach
RESASS	RESASS in depth support 13/14	Telephone audits 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
		Multi-day support 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
		One-day technical support 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
		Half-day site support 13/14	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Technical advice and EST loan 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
		Technical advice and EST loan and other support 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	RESASS light touch support 13/14	Hub advice (phone and email) 13/14	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Events/Training 13/14	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Online tools 13/14	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		RESASS in depth support 14/15	Large Savings Potential Projects 13/14 & 14/15

	Multi-day support 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	One-day technical support 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	Half day site support 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	Telephone audits 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	Implementation / follow up support on earlier RES advice 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
	Implementation / follow up support on earlier non-RES advice 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Technical advice and EST loan 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
RESASS light touch support 14/15	Hub advice (phone and email) 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Events 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Savings finder 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Green Champions Training 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Resource Efficiency pledges 13/14 and 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
	Webinars 14/15	Standard "impact model" fieldwork by third party contractor – assessment

			interviews based on sample of beneficiaries scaled up
Other private sector support	Additional benefits in the food and drink sector 2013-15 ²⁴	Scottish Bakers Resource Efficiency App 14/15	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Supply Chain Risk Audit 14/15	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Fish refrigeration projects 14/15	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up
		Retail retrofits for Energy Savings 13/14 and 14/15 (<i>single organisation</i>)	Standard “impact model” fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
		Courtauld 3 Voluntary Agreement 13/14 and 14/15 (<i>packaging and supply chain impacts only</i>)	Impact data provided by WRAP. WRAP record sector change based on signatory data submissions. Attribution interviews (on the same basis as those in the standard “impact model” fieldwork) with signatories are used to assign influence to the agreement. Actual data for 2015 is not yet available, but indications are that this agreement is on track to meet targets, and this is assumed for impact reporting here. The nation split is based on employment data for the sector. Impacts started pre-2013, and we have arbitrarily divided them over the three years of the agreement, reporting two years here. Consideration of overlap with other Scottish work has been made, but we believe there is no overlap. Consumer food waste prevention impacts are not counted for RES as main beneficiary is householders, and other non-Courtauld activity also contributes significantly to these outcomes.
		Federation House Commitment 13/14 and 14/15	Impact data provided by WRAP. We have taken the data for change from 2014, (though the agreement has been in place since 2007, so some change may be a legacy of earlier work) and split this over the lifetime of the agreement, crediting two years to

²⁴ It was intended to assess “5th Quarter Meat projects”, and “Water Use in Dairy” projects separately here but due to the small population and actual response rate achieved it was felt more robust to place these project back into the wider RESASS set (as multi-day support) for the purpose of scaling, and any impacts are thus included in estimates for the RESASS.

		RES. Monitoring data is at organisation/site level, and is submitted by signatories. Attribution interviews (on the same basis as those in the standard “impact model” fieldwork) with signatories are used to assign influence to the agreement. The nation split is based on information on site location and site-specific usage data.
Additional benefits in the hospitality sector 2013-15 ²⁵	SME implementation fund 14/15	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up.
	Quality Tourism Advisor Support 13/14	Independent third party impact assessment, on a similar model to the standard “impact model” fieldwork.
	Quality Tourism Advisor Support 14/15	Impacts modelled in-house based on 13/14 impact assessment.
	Tailored support to SME hotels 13/14	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up. Some activity may have commenced pre-RES, but all impacts are counted here.
	SME Cluster Support 13/14	Standard “impact model” fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up. Some activity may have commenced pre-RES, but all impacts are counted here.
	Hospitality and Food Services Voluntary Agreement 13/14 and 14/15	Impact data provided by WRAP. Monitoring data is not yet available for 2015, but indications are that the agreement is on track to meet targets, and this has been assumed here. Monitoring data is provided at the company level by larger signatories only – and only impacts for larger signatories are included in this total. Attribution interviews (on the same basis as those in the standard “impact model” fieldwork) with signatories are used to assign influence to the agreement. The nation split is complex. There is a possibility performance in this sector is differential across nations (given the influence of the Waste (Scotland) Regulations), but this cannot be seen directly in the data

²⁵ It was intended to assess Green Hotels Leadership projects separately here but due to the low response rate achieved it was felt more robust to place these project back into the wider RESASS set (as multi-day support) for the purpose of scaling, and any impacts are thus included in estimates for the RESASS.

(which is company level, with most companies operating across the border). Therefore a split has been made by site and/or UK performance for the signatory is assumed to be constant, but it is likely this may understate Scottish impacts. Differences in Scotland may also change the appropriate assumption around attribution – Zero Waste Scotland as a whole, and Resource Efficient Scotland in part, have played a key role in both informing the design of the regulations and publicising them to business. No specifically Scottish evidence is available on this point, and the UK factor has therefore been applied. It is possible this may understate Scottish impacts. Numbers reported here will also reflect the legacy of pre-2013 preparatory work. We do not believe there is any overlap with other RES projects in the impacts calculated here.

	Additional benefits in other sectors 2013-15	Crichton Carbon Centre Funding 13/14 and 14/15	In-house analysis of CCC project reporting used CCC's project reporting and assigned a share of this to RES proportional to our funding share.
		Construction Sector Support 14/15	Contracted-in support to interview beneficiaries. General approach similar to standard "impact model" fieldwork, but bespoke analysis needed as measures taken and replicability very diverse.
		Zoo Resource efficiency project 14/15 (single organisation)	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up
Other public sector support	Public Sector support 2013-15	Resource Efficiency Audits 13/14	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up.
		Resource Efficiency Audits 14/15	Standard "impact model" fieldwork by third party contractor – verification interviews based on sample of beneficiaries scaled up. A single large multi-site project was not available for interview and has been taken out of the overall analysis to avoid skewing the results. This is described in the main text.
		Lighting Masterclass Workshops 14/15	Standard "impact model" fieldwork by third party contractor – assessment

		interviews based on sample of beneficiaries scaled up.
	Building Management Systems Workshops 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up.
	Waste Smart Training to the public sector 14/15	Standard "impact model" fieldwork by third party contractor – assessment interviews based on sample of beneficiaries scaled up.
	Carbon management plan support (independent of other support streams) 13/14 and 14/15	Independent third party impact assessment, on a similar model to the standard "impact model" fieldwork.
	Street Lighting Programme (with SFT) 13/14 and 14/15	Data provided by SFT – actual savings in local authority street lighting bills in 14/15 (minimal realised impact on the ground prior to this). After discussion with the SFT we also adopted their approach to attribution, claiming 33%.
	Large project with bespoke follow up 14/15 (single organisation)	Contracted-in support to interview one large complex project. General approach similar to standard "impact model" fieldwork.

Table A.1 RES activity categorisations across impact assessment and reporting in 2013/14 and 2014/15 fieldwork and in-house analysis

Appendix 2: Implementation Rates

Implementation rates can be calculated in a number of ways. The following two tables for RESASS and RES-Public Sector are based on identified actions directly followed up on and analysed in the two phases of impact assessment. The first two columns from the left are based on a count of actions. The final column is based on quantified savings (sufficient data is only available for some indicators, due to the nature of sampling in the impact assessment). The final column is based on the total savings that have been realised and will be realised by beneficiaries (not just those savings that they credit us with influencing – i.e. it is a measure of whether measures happened or not).

RESASS

Activity	% of all actions recommended that were/will be taken	% of all beneficiaries taking at least one action	% of available quantified savings realised/expected to be realised
13-15 Large savings projects ²⁶	31	58	Cost savings = 36 Carbon savings = 50 Energy savings = 23
13-14 Multi day support	67	87	Cost savings = 52 Carbon savings = 49 Energy savings = 52
14-15 Multi day support	52	78	Cost savings = 45 Carbon savings = 47 Energy savings = 38
13-14 One day technical support	72	100	Cost savings = 78 Carbon savings = 79 Energy savings = 75
14-15 One day technical support	48	71	Cost savings = 55 Carbon savings = 25 Energy savings = 31
13-14 Telephone audits	63	79	Cost savings = 55 Carbon savings = 48 Energy savings = 59
14-15 Telephone audits	43	62	Cost savings = 70 Carbon savings = 67 Energy savings = 44
13-14 Half day support	n/a	82	n/a
14-15 Half day support ²⁷	40	100	Cost savings = 83 Carbon savings = 100 Energy savings = 100

²⁶ Due to small interview sample achieved in the 13-14 evaluation we have combined beneficiaries over two years to provide a more robust picture of implementation

²⁷ Indicative only, very small base (N=7) and interview (n=2) population

13-14 Loans only ²⁸	81	100	Cost savings = 100 Carbon savings = 100 Energy savings = 100
14-15 Loans only	95	100	Cost savings = 100 Carbon savings = 100 Energy savings = 100

Table A.2 RESASS implementation from two phases of impact evaluation, expressed as the proportion of total actions implemented, the proportion of all beneficiaries taking at least one action and the proportion of identified cost, carbon and energy savings realised/expected to be realised

Public Sector

Activity	% of all actions recommended that were/will be taken	% of all beneficiaries taking at least one action	% of available quantified savings realised/expected to be realised
13-14 Public Sector Site audits	64	76	Cost savings = 71 Carbon savings = 65 Energy savings = 73
14-15 Public Sector Site audits	48	69	Cost savings = 30 Carbon savings = 34 Energy savings = 35

Table A.3 Public Sector implementation from two phases of impact evaluation, expressed as the proportion of total actions implemented, the proportion of all beneficiaries taking at least one action and the proportion of identified cost, carbon and energy savings realised/expected to be realised

²⁸ “Loans only” refers to where the consultant identified savings limited to the proposed loan measure (e.g biomass boiler). Implementation for those receiving loan advice plus additional identified savings (i.e. other measures not related to the loan) is lower and more typical of the other forms of in-depth support (e.g. 55-66% for quantified cost savings).

Appendix 3: Selected Stakeholder Feedback

Although partner and stakeholder feedback was not systematically collected for the purpose of this impact assessment, over the past two years, significant amounts of unsolicited feedback have been received, and give some indication into how we are perceived to fit into, and make contributions within, the Scottish delivery context:

“The support provided by Zero Waste Scotland has been critical to the success in rolling out successful recycling and supporting increased material recovery across Scotland. It has provided expert advice and allowed us to evaluate options to raise standards with respect to food waste collection and recycles. Support in putting in place colour coded containers in line with ‘recycle on the go’ has enabled clear messaging supporting staff and visitors.” (NHSS Waste Management Steering Group)

“Our experience dealing with RES has been very positive and the team made the process of seeking support, and having it provided, very easy. We have had a range of support and advice over the last two years delivered with professionalism and this has assisted driving down our utility costs and carbon emissions.” (Scottish Government)

“Our recent energy awareness session for school janitors was facilitated for us by Resource Efficient Scotland. The janitors were shown exactly how much energy their school uses, how much it costs and how in many cases simple changes can result in savings. The knowledge and expertise RES brought to the event has meant that our janitors are now spreading our energy efficiency message across all schools in Moray.” (Moray Council)

“The support of Resource Efficient Scotland has been key to our success in implementing the training for around 100 Energy Champions and identifying energy saving measures. They have been amazing in their support and we genuinely could not have met financial targets and reduced our environmental impacts without them.” (Glasgow Life)

“I would definitely recommend Resource Efficient Scotland and I’ll be calling on their services again whenever I can. These savings will go a long way to help with future improvement and expansion. Overheads are now paramount in our industry, and if savings can be made then it is better for us, our customers and the environment.” (Ardlui Hotel)

“A responsible approach to waste and energy management also makes good business sense and has saved us £209,000 over four years. We want to lead the way in the hospitality sector and strive towards optimising our resources and reducing our environmental impact.” (Fairmont St Andrews)

“The Resource Efficient Scotland loan made the critical difference in allowing us to invest in a biomass boiler and upgrade the plumbing and electrical works in the main house ensuring we increase energy efficiency for the whole business and make use of our own wood resources on the estate. We hope to cut our energy costs by 20% per annum.” (Traquair House)



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