

Developing Performance Indicators for the Intelligent Energy Europe (IEE) Programme

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Abstract

The EU has set itself ambitious targets for reducing greenhouse gas emissions, improving energy efficiency and increasing the use of renewables. The Intelligent Energy Europe (IEE) Programme of the EU has a key role to play in this by funding actions within the market place to overcome (non-technological) barriers to both the efficient use of energy and the greater use of new and renewable energy sources, with the overall aim of contributing to the provision of secure, sustainable and competitively priced energy for Europe.

A set of typical project outputs and performance indicators, which are consistent across the programme, have been developed, plus guidance, to assist proposers in selecting meaningful and effective ways to monitor, measure and communicate performance and impacts of IEE projects.

This paper provides an example of the real world challenges of developing an approach and guidance on performance metrics for a diverse range of projects under the IEE programme, and the pragmatic and practical ways in which they were overcome.

Introduction

In this paper, we discuss the background to the IEE, the types of project that are funded through the programme, and the particular challenges that are associated with them. We then go on to review the insights gained from an in-depth review of the M&E system used by IEE between 2007 and 2013. Our proposed new system of indicators is then introduced, including discussion of our justifications for the major changes that were made. Finally, we explain our 5-stage methodology for estimating the long term impacts of IEE projects, as this was identified by previous Project Coordinators as being the biggest challenge they faced regarding M&E, and the highest priority for detailed guidance. Our paper is completed with some summary conclusions from our work, and reflections from the Executive Agency for Small and Medium-sized Enterprises (EASME) on how the new system has been implemented in 2014.

The EU has set itself ambitious targets for reducing greenhouse gas emissions, improving energy efficiency and increasing the use of renewables. The Intelligent Energy –

Europe Programme, now in its second phase (IEE II), has a key role to play in this by funding specific actions within the market place to overcome (non-technological) barriers to both the efficient use of energy and the greater use of new and renewable energy sources, with the overall aim of contributing to the provision of secure, sustainable and competitively priced energy for Europe. In addressing non-technical barriers, the programme complements work being done under the EC Framework programmes and elsewhere to improve energy efficient and renewable energy technologies. The IEE programme and the Energy Efficiency focus area are managed by the Executive Agency for Small and Medium-sized Enterprises (EASME) (formerly the Executive Agency for Competitiveness and Innovation (EACI)).

These projects typically address one of three objectives:

1. To foster energy efficiency and the rational use of energy resources (**SAVE**)
2. To promote new and renewable energy sources and support energy diversification (**ALTENER**)
3. To promote energy efficiency and the use of new and renewable energy sources in transport (**STEER**)

Different projects will have a different focus but each will address at least one of five defined fields of delivery, which are: (1) Enabling policies and strategies (2) Market transformation (3) Changing behaviour (4) Mobilising investments (5) Building skills and capacities. In total, over the period of IEE II more than 200 projects have been funded to date.

The development of performance indicators for IEE projects and the IEE programme is particularly challenging because:

- IEE projects address non-technical barriers, which makes it more difficult to link outputs to impacts because the direct impact is not easily measurable (i.e. the attribution gap)
- Projects vary widely – aims, topics, scope, scale, location
- Many projects have limited impact while receiving IEE support as the projects do not ‘install’ any technologies to save energy etc. they are focussed on long term influencing behaviour; longer term impacts could be significant but are difficult to forecast and there is no post-project monitoring in place
- IEE programme participants find it difficult to define project impacts in terms of the existing Common Performance Indicators (CPIs), these are explained in the next section
- Projects take different approaches to the challenge of calculating outputs and impacts this lack of consistency is a problem for project officers and proposal evaluators
- Diverse impacts are difficult to aggregate at the programme level
- All of the above make programme impacts hard to measure or prove

In the effort to ensure an appropriate monitoring and evaluation of the impacts of the IEE programme, the EACI commissioned AEA Technology plc (Ricardo-AEA Ltd since November 2012) to establish a set of typical outputs and performance indicators for IEE, and develop an application methodology and guide. The contract ran from March 2012 to December 2012.

Insights from an in-depth review of the existing M&E system

During 2011, the 56 IEE applicants were asked to estimate Common Performance Indicators (CPIs). Performance indicators aggregate complex information to show planning level trends toward goals [1]. The IEE CPIs were defined by the EACI and it was then up to the applicants to decide how to estimate them. This exercise was completed as part of their application for funding from IEE, and the CPI estimates were only revised at the contract negotiation stage, and not any later in the project. The IEE CPIs were:

- **Investments** made by European stakeholders in sustainable energy, triggered by the IEE programme (measurement unit EUR)
- **Renewable energy production** triggered by actions supported by the IEE programme (measurement unit toe/ year)
- **Energy savings** triggered by actions supported by the IEE programme (measurement unit toe/ year)
- **Reductions of greenhouse gas emissions** triggered by actions supported by the IEE programme (measurement unit tCO₂e/ year).

The CPIs were estimated for both the short-term (by the end of the project) and the long-term (by 2020). A review of the 56 2011 projects' CPI data and methodologies used to estimate the data was undertaken as part of this project.

The review of CPI methodologies helped to inform our thinking on the selection and definition of the new Project Performance Indicators (PPIs), the contents of the guidance document and the way in which PPIs could be aggregated and reported as IEE programme impacts. The review identified specific areas for improvement and the need for:

- **A clearly defined results chain.** The system asked applicants to set specific objectives linked to outputs, and strategic objectives linked to impacts. However, outputs and impacts for each project were not clearly linked. There is a need to define the elements of the results chain in a clear and understandable fashion when providing guidance on setting indicators for projects.
- **Guidance on the attribution gap.** The attribution of savings was the key uncertainty in several of the projects' CPI calculations. Even though fully robust attribution is often impossible, the project should aim at providing 'plausible narrative' on the project's contributions to high level development results [2].
- **Flexible (not mandatory) CPIs.** For some EU-wide policy and market transformation projects, it may not be possible to quantify the impacts except through top-down methods and so it was recommended that the existing CPIs are voluntary for such projects in future. This did not apply to policy projects focused on local or city-level policies or more narrowly defined market transformation projects.
- **Consistent units.** Confusion was caused by use of decimal places and commas, particularly when Excel had been used to calculate a figure that had then been transposed into a Word document. In addition, many projects quoted their final CPI figures using incorrect units, e.g. MWh instead of toe.

Proposed Project Performance Indicators

In reviewing the CPIs of the current system, we considered a number of additional indicators that may be relevant to a proportion of projects, and that would allow projects that find the existing CPIs very difficult, to be able to use other metrics to measure their impact at

a programme level. Specifically:

- It is not always possible for a policy project to develop acceptable PPIs for energy and GHG impacts and so such PPIs should not be mandatory for a project that has policy development as its primary field of delivery. However, projects targeting local policy implementation, such as the uptake of Sustainable Energy Action Plans or Sustainable Mobility Plans can develop such indicators and should be encouraged to do so.
- Projects with other primary fields of delivery (market transformation, preparing the ground for investment, building capacities and skills, and changing behaviour) should all be able to develop reliable or acceptable energy (energy savings and/or renewable energy generation) and GHG PPIs if they follow the guidance that was developed, so these should be mandatory.
- New PPIs considered included
 - **Green jobs created** – the Steering Group could not reach agreement on the definition of a ‘Green Job’. Available definitions were felt to be too loose to capture concrete aggregate data across the programme and so this was not added to the list of PPIs.
 - **SMEs influenced** – again the Steering Group did not feel that this could be accurately defined, and that the measurement of SMEs being influenced was not a priority piece of information for the EACI to be reporting to the European Commission. Suggestions for data measurement included the number of SMEs attending workshops, and participating in the projects.
 - **Innovation** – the Steering Group agreed that this is something that can be assessed at the application stage, but it proved difficult to measure an improvement in innovation across the programme. Suggestions for data measurement included the number of new patents filed, but this was not felt to be something that enough projects would do to be meaningful as an overall measure of increased innovation, as IEE does not have a technology focus.
 - **Increased skills/capability** – this was agreed with the Steering Group to be measureable and meaningful and was therefore added to the list of PPIs. Data measurements would be based on the number of attendees at workshops/training, and feedback captured at the conclusion of these workshops, to indicate increased skills and/or capacity.
 - **Policy makers influenced** - this was agreed with the Steering Group to be measureable and meaningful and was therefore added to the list of PPIs. Data measurements would be based on the number of policies that showed changes attributable to the project. Projects are required to define which policies they plan to influence at the application stage.
 - **Attitudes and behaviour changes** - this was agreed with the Steering Group to be measureable and meaningful and was therefore added to the list of PPIs. Data measurements would be based on structured feedback from project participants.
- Projects have typically assumed that any project impacts persist through to 2020. While this may be reasonable for renewable energy projects and other projects that have an impact on technology deployment, it may be less reasonable for behavioural change projects in the energy efficiency and sustainable transport areas. Therefore we recommended including energy saving and GHG saving PPIs based on both savings in 2020 (which would tie in with the EU’s 20:20:20 targets) and cumulative savings in 2020 (which would take account of different impact profiles from different projects).
- While the idea of aggregating selected project output indicators, such as total days of training provided, would provide interesting metrics on the scope and activities of the

project, this does not give any idea of programme impact. We considered adding aggregated output indicators to the Programme Performance Indicator set, but decided against it, as this would potentially confuse applicants. The new template for indicator submission will allow aggregation of project outputs, but this will require coordination between the project officers to extract the data from the spreadsheets.

- The final set of seven PPIs is presented below in Table 2, along with the units to be used.

Table 2. Programme Performance Indicators for IEE

PPI	Short term (by end of project) Unit	Long term (by 2020) Unit
Additional cumulative investment made by European stakeholders in sustainable energy	€	Additional cumulative €
Renewable Energy production triggered	tonnes of oil equivalent (toe)/year	toe per year AND cumulative to 2020
Primary energy savings compared to baseline projections	toe/year	toe/year AND cumulative to 2020
Reduction in greenhouse gas emissions compared to baseline projections	tCO ₂ e/year	tCO ₂ e/year AND cumulative to 2020
Policy makers influenced	total	cumulative
Number of people with increased knowledge/skills/capability	total	cumulative
Number of people changing their behaviour	total	cumulative

In the existing system, applicants are asked to estimate cumulative investment impacts and in-year RE, energy efficiency, and GHG reduction impacts. The new system asks for both in-year and cumulative estimates, which will take account of the different impact profiles for different types of project.

We recognised that PPI estimates will always be approximate, particularly for 2020 impacts, and easier to estimate for some projects than others. The purpose of the guidance document is to help applicants to estimate the likely impacts of their projects, during the project duration and by 2020, in a logical and sensible way that is appropriate to their project. To make the PPIs more relevant to each project, mandatory and optional choices were proposed for projects in different fields of delivery, this is shown in Table 3.

Table 3. Mandatory and optional PPIs for IEE projects

Field of delivery	Investment €	RE triggered	Energy saved	GHG reduced	Policy maker influence (all levels)	No. of people with increased capability	No. of people changing their behaviour
Enabling policy	O	O	O	O	★		
Market	O	★	★	O		O	

transformation							
Preparing the ground for investments	★	★	★	○			
Building capacities and skills	○	★	★	○	○	★	○
Changing behaviour		★	★	○	○	○	★

★ Mandatory PPI

○ Optional PPI

Proposed new performance indicator system

The final guidance document[3] was designed to be the full version of the guidance, which provides information and support for every step of the new performance indicator system.

The guidance document includes the necessary steps for:

- Selecting typical outputs which are relevant to a specific project,
- Selecting performance indicators which are relevant to a specific project,
- Adapting them to the objectives of that project.

The guidance document is based around the results chain of objectives – activities - outputs - impacts (short-term) – impacts (long-term), and each stage of the indicator-setting process is clearly explained using examples. This means that project indicators can be used to measure both the ‘ends’ (the achievement of the objective) and the ‘means’ (the methods used to achieve the objective) or a combination of the two at any point along the continuum [4]. We also developed a template to be completed by applicants which will capture the chain shown below in Figure 3.

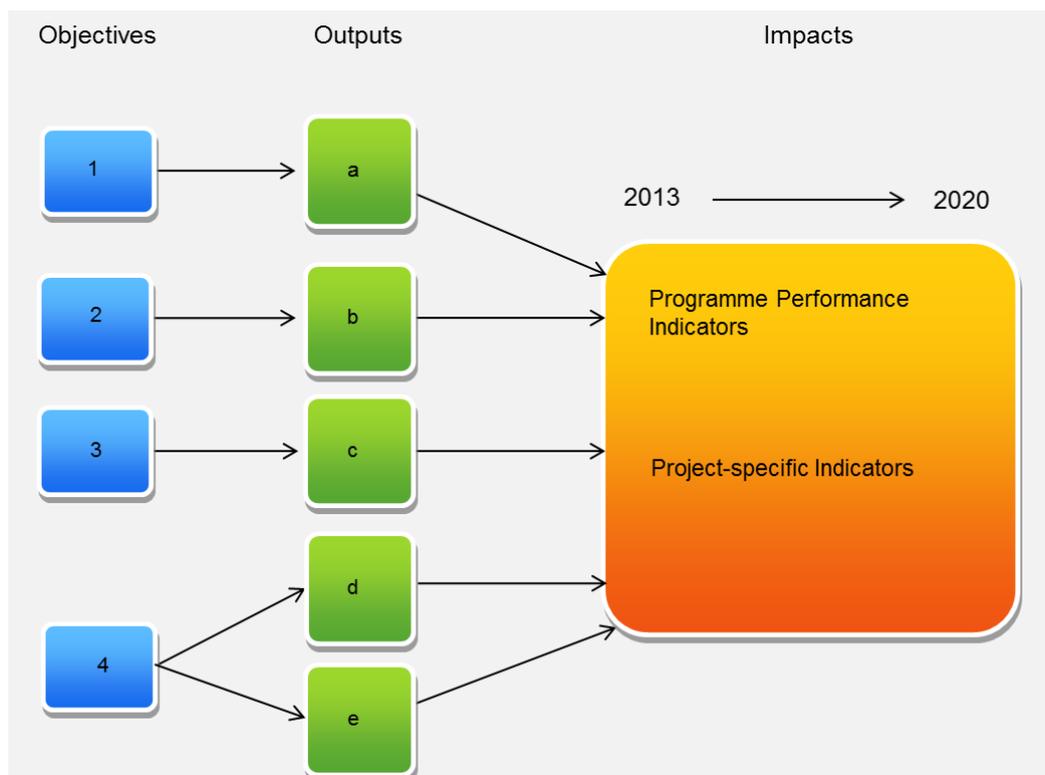


Figure 3. Potential ‘links’ in the chain of objectives to impacts

A number of key decisions were made throughout the development of the new indicator system. Here, we discuss the options that were considered, and the rationale behind the decisions that were made:

1. **Limiting the number of objectives/outputs.** The IEE programme has developed over time and a number of programme evaluations have been carried out, which have made recommendations related to the monitoring of results. For example, one of the key recommendations from the Interim Review¹ was for the number of objectives and indicators at the project level to be reduced to allow for focussed monitoring and reporting during the project lifetime. In practice, this meant limiting the project to selecting no more than 4 objectives, and no more than 5 outputs per objective. This has the potential to limit the activities of a project, but the rationale for making this decision was that it would be beneficial to projects in the long-term so that they were not trying to do ‘too much’ with a limited M&E budget.
2. **Simplifying the existing system of specific/strategic objectives.** In the current system, the outputs and impacts were not linked to each other. Outputs were linked to specific objectives (i.e. objectives within the lifetime of the project) and impacts were linked to strategic objectives (i.e. long-term objectives). This made it difficult to link any project outputs with any longer term impact. We therefore decided to simplify this system, and ask applicants to identify no more than five objectives, bearing in mind that these should be a mixture of short and long term objectives.
3. **Simplifying the results chain.** From the literature review, we identified that there were a number of detailed steps in the results chain (objectives, inputs, activities, outputs, commitments, outcomes, results and impacts). Inputs and activities are covered in the current and new system by budget breakdowns and workpackages. Objectives, outputs and impacts were covered in the current system. Some

programmes use commitment indicators such as the number of energy action plans or mobility plans signed by municipal authorities. Such indicators fall somewhere between output and impact indicators and were explored as an option for the new indicator system.

The EACI felt that the inclusion of terms such as commitment, results and outcomes would add too much complexity to the system. The literature review supported this view, in that there is no clear definition of when outputs become results/outcomes and where they then become impacts. The terminology varies between programmes, with many favouring “results” or “outcomes” to bridge the gap between outputs and impacts. It was agreed to continue using an optimised results chain of objectives – inputs – activities – outputs - impacts (short-term) - impacts (long-term).

4. **Creating a standard set of output indicators.** The option faced for output indicators was whether to provide a very prescriptive set of indicators for applicants to use vs. a high degree of flexibility supported by detailed guidance. The advantages of providing a standard set of indicators include; an increase in consistency between projects, improved identification of indicators for applicants especially where they have little time/budget to complete the indicator section of the application, and the increased ease of aggregation of outputs to programme level. The disadvantages of this approach include; missing output options due to the wide range of IEE project types, and encouraging a ‘box-ticking’ mentality. We decided to opt for standard output tables that are to be used as guidance, and not be mandatory. This allows applicants to review their outputs, be guided on the best way to frame those outputs, but still be free to express the innovation in their projects.
5. **Flexible guidance on short term and long term project impacts.** In looking at prescriptive sets of project impact indicators, we decided that although this would improve consistency between projects, the very nature of these projects mean that they all have very different impacts. The idea of IEE is to effect a range of impacts, with the goal that these project-specific impacts are then measurable through energy efficiency, renewable energy generation and therefore reductions in GHG emissions. We decided that it would be more useful for projects to have a list of examples of the types of project-specific impacts to guide them when formulating their own.

Methodology for estimating impacts

A 5-stage methodology for estimating PPIs was then developed (described in Figure 5). The methodology was tested during the analysis of the 2011 CPI data, where it was found that most projects had used bottom-up approaches. A key recommendation is that projects use bottom-up approaches wherever possible, and support their conclusions by using top-down methods to verify the estimations.

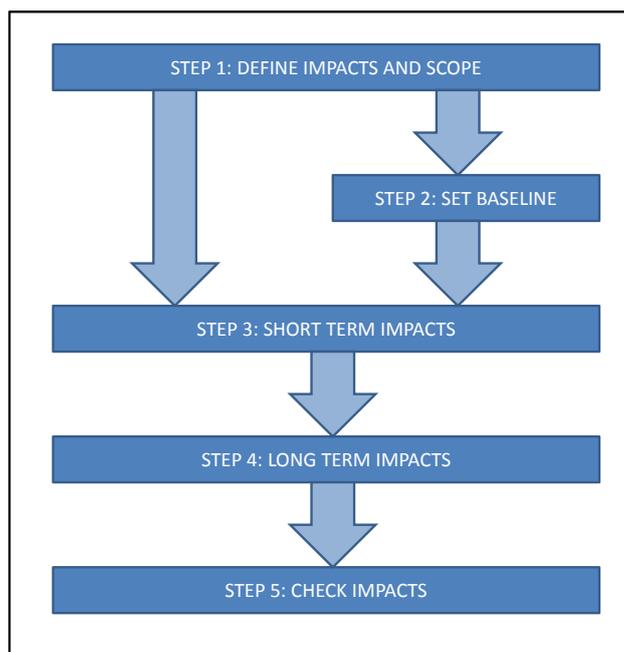


Figure 5. Process flow diagram for the 5-stage methodology for estimating PPIs

Step 1: Define the impacts and scope

The first step is to establish which of the expected project impacts can be related to energy savings, renewable energy, GHG reduction and/or investment in sustainable energy. Projects can then estimate the impacts. There are two ways of doing this:

- Method 1: Work out the impact of each unit of project output (e.g. energy audit, company sustainability plan, local authority biofuels policy) and multiply it by the number of units that are expected to be achieved.
- Method 2: Estimate the likely percentage uptake of a technology or reduction in energy consumption by looking at the results achieved by similar past projects.

If using Method 1, you do not define an overall baseline as such, although the estimation of unit impacts should take account of factors such as deadweight where possible. Therefore for Method 1 you should move straight to Step 3.

Step 2: Set the baseline (Method 2 only)

The baseline should be estimated for the time period from the beginning of the project to 2020. Here the aim is to establish what the renewable energy generation, energy consumption and/or GHG emission would be for the relevant sectors, organisations, cities or regions in the absence of your project. The starting point for the baseline calculation will typically be historical EU, national or regional energy consumption statistics. This base year energy consumption can then be projected forward to 2020 using growth projections, by extending historical growth rates or by making other reasonable assumptions. Where the information is available, other influences such as existing or planned policies and market transformation due to voluntary industry actions should also be taken into account.

Step 3: Estimate the short-term impacts

Method 1: Estimating short-term impacts from project outputs

First estimate the on-the-ground impacts of the project, such as the amount of different energy efficient technologies deployed or the modal shift achieved, and then work out the corresponding energy impacts in the short-term (i.e. by the end of the project). It may be helpful to map this out in a diagram that links outputs to impacts to PPIs along the lines of Figure 3. For example, a project aimed at training energy auditors could have as outputs more and better trained energy auditors and as impacts more or better energy audits undertaken, more energy and carbon savings identified and ultimately more energy and carbon savings achieved. It may also have impacts around job creation (auditors and others), investment and skills capacity building.

Then follow the causal links from the left to the right of the diagram making assumptions at each step, and documenting these assumptions as part of the application. It is important to have a full explanation of the method used, the data sources and the evidence behind the assumptions. This provides supporting evidence for plausible linkages between outputs and impacts, and therefore supports the bridging of the attribution gap.

Method 2: Estimating impacts by comparing with previous projects/schemes

With this method, one estimates the likely impacts of a project from the impacts achieved by similar projects in the past. This is likely to be a good method to use where similar activities have been undertaken before, perhaps a pilot project or a programme at national or regional level, and there is a good evidence base on their impacts (such as robust ex post evaluations). However, care must be taken to ensure that the comparative project really is similar to the reference project/s and that their impact assessments were done well, e.g. sound methodology for measuring impacts, appropriate sampling, before and after surveys. There may also be challenges in interpreting ranges of impact, e.g. some non-technical measures have been reported as having saved between 1% and 25% of energy – is it reasonable just to take the mid-point of such a wide range as the basis of your estimate?

The impacts of the project (e.g. renewable energy deployment, energy efficiency improvement, modal shift) are estimated from the baseline situation in the countries, regions, cities, sectors or organisations that the project will address (from step 2) and the percentage change that is anticipated due to the project (based on data from past projects). Then the PPIs can be estimated from these project impacts in a similar way to Method 1.

Step 4: Estimate the long-term impacts

Long-term impacts should be expressed as a range where:

- Minimum impacts in 2020 are those (energy, carbon, investment) that can be directly attributed to the project, e.g. a continuation of auditing programmes in the companies involved or a continuation of sustainable mobility planning in the cities involved. This implicitly assumes that none of those impacts would have been achieved in the absence of the project, the additionality claim in the project proposal was valid.
- Maximum impacts in 2020 assume that the influence of the project spreads and its activities are replicated in other sectors, regions, countries or stakeholder groups. For example, more companies or industry sectors start auditing programmes or more cities adopt sustainable mobility planning.

To estimate the minimum long-term impacts one should consider what is likely to happen in the years between project completion and 2020. Will the organisations involved want to continue with the activities supported by the IEE programme? Will they reduce, maintain or increase funding for these activities if the project is successful. Will the relevant stakeholders be required to make commitments during the project that will make future long-term impacts more likely?

To estimate the maximum long-term impacts one should consider the scope for replication of the project to other organisations, regions, sectors or groups, and what might realistically be achieved in the years between project completion and 2020.

Long-term impacts should be estimated against a 2020 baseline, so some assumptions may be different from those that were used when calculating short-term impacts. For example, there will be a lower emissions factor for electricity in 2020 for the EU and most Member States in 2020 due to the increased penetration of renewable energy. The average efficiency of a car will be higher in 2020 too, due to stock turnover and the introduction of tighter CO2 standards for new cars.

Step 5: Check long-term impacts

The final step is to check the PPIs that have been estimated. There are three simple checks that should give greater confidence that the calculations are accurate and that assumptions are realistic.

1. Firstly, compare the minimum long-term impacts with the short-term impacts. Is it realistic to expect a level of increase with the few years between the end of the project and 2020? Has the possibility that activities may slow down once IEE funding ends been allowed for? Has time been allowed for implementing actions, e.g. for organisations to take up energy audit recommendations or for city authorities to implement transport measures?
2. Secondly, compare the ratios between short-term impact, minimum long-term impact and maximum long-term impact for each of the PPIs. One would expect the ratios to be very similar for energy saving, GHG reduction and investment for most projects, though not quite identical because of changes in the baseline. So, for example, if the minimum long-term energy saving impact is five times the short-term energy saving impact and the long-term GHG reduction impact is eight times the short-term GHG reduction impact then there has probably been a mistake in the calculations.
3. Finally, compare the maximum long-term impact estimates with the overall energy consumption or carbon emissions associated with sectors or end-uses that the project will address. For example, if the project will lead to energy savings in the retail sector in six countries, check what the total energy consumption is currently for these six countries, and if data are available, how much of this energy consumption is associated with the retail sector. Then compare the maximum long-term impact estimate with the total energy consumption from the sector – is it really realistic to expect the project to reduce total sector emissions by 10% or 50%? Or perhaps the likely long-term impact has been underestimated. There is no right or wrong answer here as it will depend on the project and the sector, and so it is a matter of judgement on behalf of the proposer and the assessor of that proposal. This is also a good way of checking whether the project is likely to make a significant difference to the energy

and environmental performance of the target group or region or sector. If not then there may be scope to redesign the project to increase its impact.

Conclusions and recommendations

The key overall conclusions and recommendations that can be made from this project are:

IEE is a unique programme. There are no other programmes delivering the same breadth and mixture of projects as IEE. This makes it uniquely difficult to assess the impacts of the programme using only a small number of comparable metrics. The key metrics (CPIs) used in the current system are highly important, and are complimented by the new PPIs, which allow measurement of impact for those projects that particularly struggle to measure energy, carbon, or investment impacts in a reliable manner. The PPI data is vital to the programme, for understanding the programme's impact, and to justify its existence.

It takes time and effort to calculate reliable impact indicators. This means that estimations of the PPIs at the application stage should not be evaluated, although it is reasonable to take into account how well the applicant has thought through their proposed indicators.

Although the guidance document produced for this project is designed to be a full guide, able to support applicants in completing each step of their performance indicators, it was felt that the effort required to reliably calculate impacts, especially long term impacts, would be a heavy burden at the application phase. It was evident in the review of Call 2011 CPIs that most projects amended their CPI estimations during contract negotiation. A two phase approach is sensible, as it allows applicants to focus on determining the most appropriate indicators for their project at the application stage, and then utilises a dedicated work package at the start of the project to fully calculate the impacts of the project.

It is important to recognise that some projects will not be able to reliably calculate their impact. There will be certain projects, especially pan-European policy projects for which it is not possible to reliably calculate any impacts. The best efforts that can be made will ultimately always result uncertain impacts. However, these policy projects often have the largest potential impacts if they influence policy in the intended manner. This is an acceptable situation, as indicators should be appropriate to the project aims and objectives and not be governed by how measurable they are.

Use of the results of the project

The guidance documents and the new set of indicators elaborated within this project were adopted for the adjustment phase (February-June 2013) of the actions recommended for funding within the IEE Call 2012. The utilization of the [guidelines](#) was in particular useful to refine the project indicators and the corresponding targets during the adjustment phase of the technical part of the action.

The proposers of the IEE Call 2013 (deadline for submission of proposals 8th of May 2013) had the opportunity to use the above mentioned guidance document during the preparation of the proposals to be submitted; a significant number of the applicants used the additional guidance provided by EASME. In general, this allowed having a more uniform

approach in the elaboration of the indicators and on their quantification (i.e. targets); finally the documents have been used again during the adjustment phase and in the first phase of the running projects to further elaborate the performance indicators and their quantification. The call 2013 was the last one of the second IEE programme;

For the Energy Efficiency focus area of Horizon 2020, despite the new framework and – in some cases – the different type of projects to be funded, in the case of the energy topics with a strong market oriented component (CSA – Coordinated and Support actions) the set of indicators and part of the guidance document have been adopted in the templates used by the applicants for the submission of proposals within the 2014 Call.

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