EVALOC
EVALUATING LOW CARBON COMMUNITIES

A SIMPLE GUIDE TO: HOUSEHOLD ENERGY USE
MONITORING & EVALUATION

EVALOC PRACTICAL GUIDE 6-1 JANUARY 2015

1. Introduction

This guide has been developed following the EVALOC research study aiming to assess and evaluate the impacts and effectiveness of low carbon communities on household energy use and behaviours. It is aimed at community practitioners and evaluators who wish to undertake monitoring and evaluation of household energy use and behaviours in their community. *It should be read in combination with the EVALOC shared learning resource, 'monitoring and evaluation of household energy use: insights from EVALOC', which is available online.*

1.1 Before you start

When undertaking a monitoring and evaluation (M&E) research study into household energy use, it is vital to plan your survey methods and approach not only in accordance with your aims and objectives (what you are trying to achieve, and how) but also in relation to the resources available. As such, the following outlines three approaches which take this into consideration; from the basic approach which includes all 'resource-low' methods whilst ensuring that all key indicators required to understand household energy use and behaviours are covered, to the advanced approach which uses more technical and specialist survey techniques in order to increase the depth and detail of the case study.

1.2 What size of research study?

The scalability of the approaches, in terms of sample size, is also taken into consideration with recommendations as follows:

- **Basic Approach:** 50 households
- **Comprehensive:** 10-20
- **Advanced:** 5 or fewer

It is felt that the approaches discussed within this guide enable a variety of interested parties to undertake and/or lead an M&E study of household energy use; from community groups themselves (in partnership with academics and specialists) to other practitioners and academic looking for a consistent and robust approach to undertaking M&E on a case study basis.

Key points to remember

Before outlining the different survey techniques and methods involved in each approach, it is important to set out the key aspects of undertaking an M&E study (see Figure 1 below). Further general guidance is given in "A step-by-step guide to monitoring and evaluation", developed by Kersty Hobson, Jo Hamilton and Ruth Mayne as part of the 'Monitoring and Evaluation for Sustainable Communities' research project funded by the Higher Education Innovation Fund at the University of Oxford.

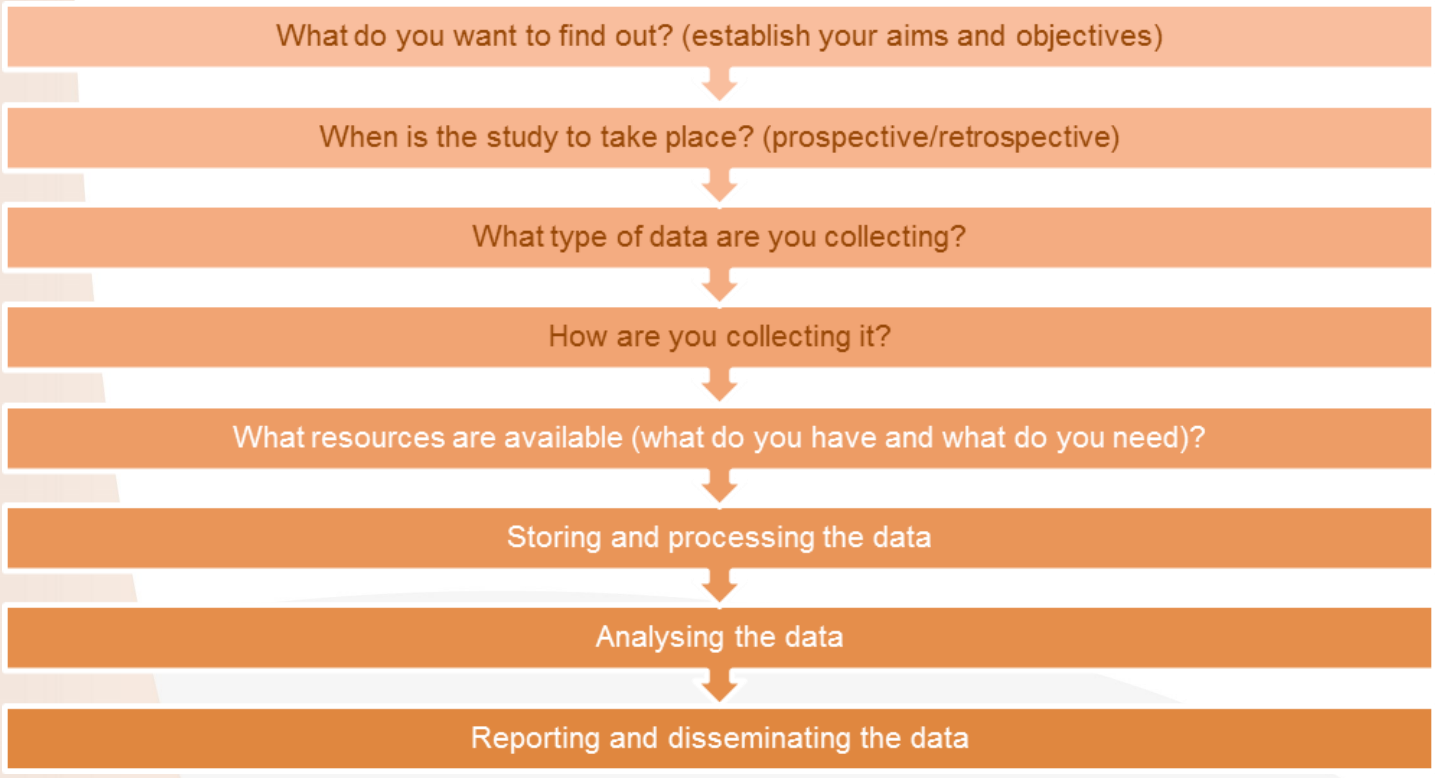


Figure 1. The key points to remember when first establishing your M&E study.

2. The indicators

It is important to ensure that the data gathered and analysed are focused, concise and relevant. As such, the following indicators have been established as relevant to the study of community-led domestic energy improvements:

- ***Ind.1:*** Dwelling (physical) and household (socio-economic) characteristics
- ***Ind. 2:*** Energy use
- ***Ind. 3:*** Energy generation
- ***Ind. 4:*** Dwelling fabric performance
- ***Ind. 5:*** Internal and external environmental conditions
- ***Ind. 6:*** Occupant guidance process
- ***Ind. 7:*** Occupant satisfaction and perception of comfort and control
- ***Ind. 8:*** Occupant behaviours and interactions (household)
- ***Ind. 9:*** Occupancy levels and use patterns
- ***Ind. 10:*** Community engagement
- ***Ind. 11:*** Communication networks

It must be noted that there are many other possible indicators, and some indicators may not be relevant to all research studies, and as such the use of these is at the researcher's discretion.

3. The approaches

Figure 2 outlines the three approaches to M&E. The three approaches enable different actors to choose the survey methods that are most appropriate for their resources, whilst creating a consistent framework for case study work in the field of household energy use. In addition, there is also scope for research studies with a more specific focus, such as performance of the physical fabric, to pick and choose survey methods within those discussed within this document to ensure the research study does not lose its focal point, and unnecessary data collection is avoided.

3.1 Basic approach

Compulsory survey methods and tools to provide in-depth case study evidence on household energy use and impacts of technical/physical and/or behavioural interventions. These are also, generally, methods that require fewer resources.

3.2 Comprehensive approach

This approach involves all the compulsory survey methods and tools (as per the basic approach) as well as additional methods and tools to enhance the understanding of: occupant behaviours, energy profiles, user interaction, environmental conditions and building fabric performance.

3.3 Advanced approach

This approach involves all compulsory and the majority of the comprehensive methods and tools in addition to further enhanced measuring and monitoring techniques to provide more in-depth case studies, and additional verification and triangulation of results. It must be noted that not all the methods and tools listed under the comprehensive approach are to be used in the advanced approach as well; for example, there is no need for environmental data logging if remote monitoring of environmental conditions is in place. Table 1 highlights the survey methods and techniques that are the same within the comprehensive and advanced approaches. Table 1 also outlines all the survey methods and tools in relation to resources, and relevant indicators.

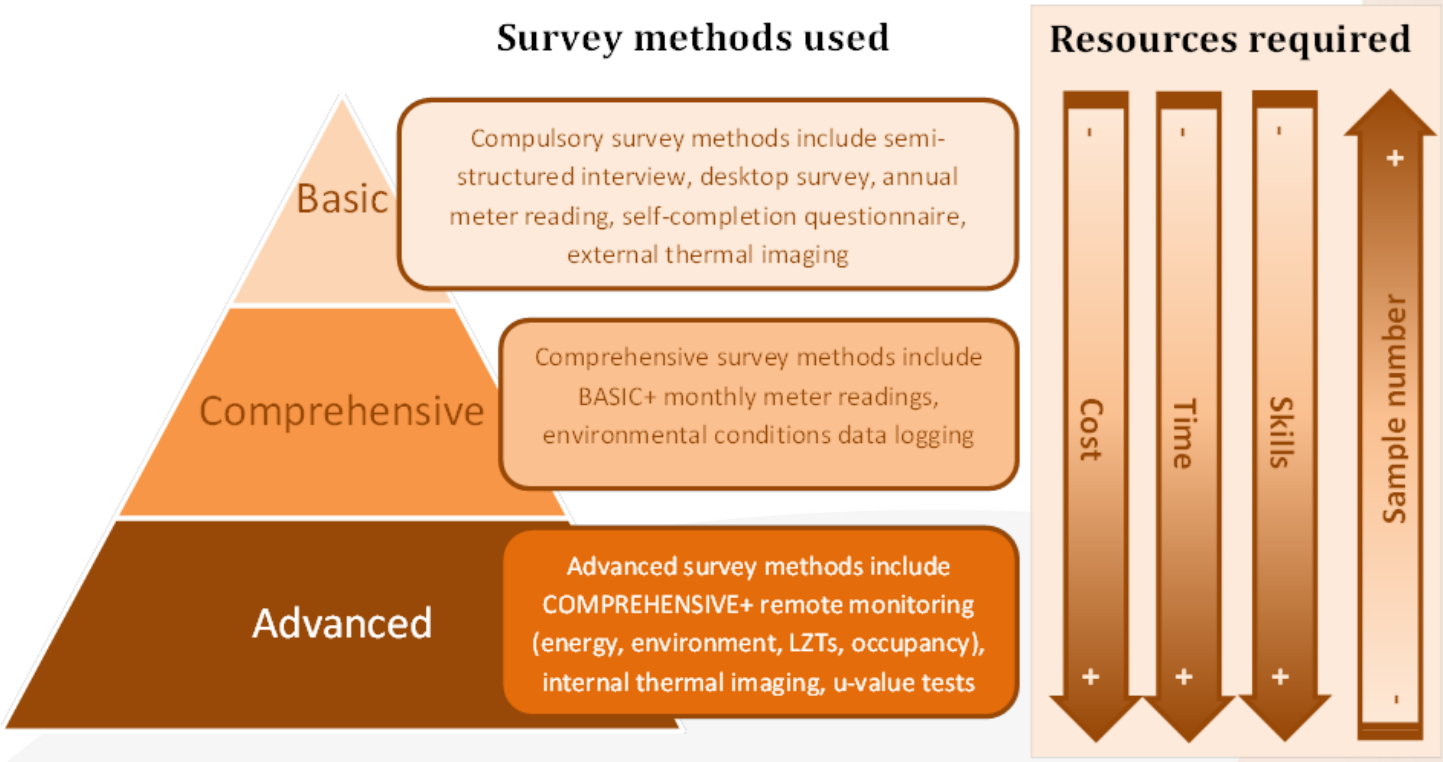


Figure 2. The three recommended approaches to M&E of household energy use and behaviours

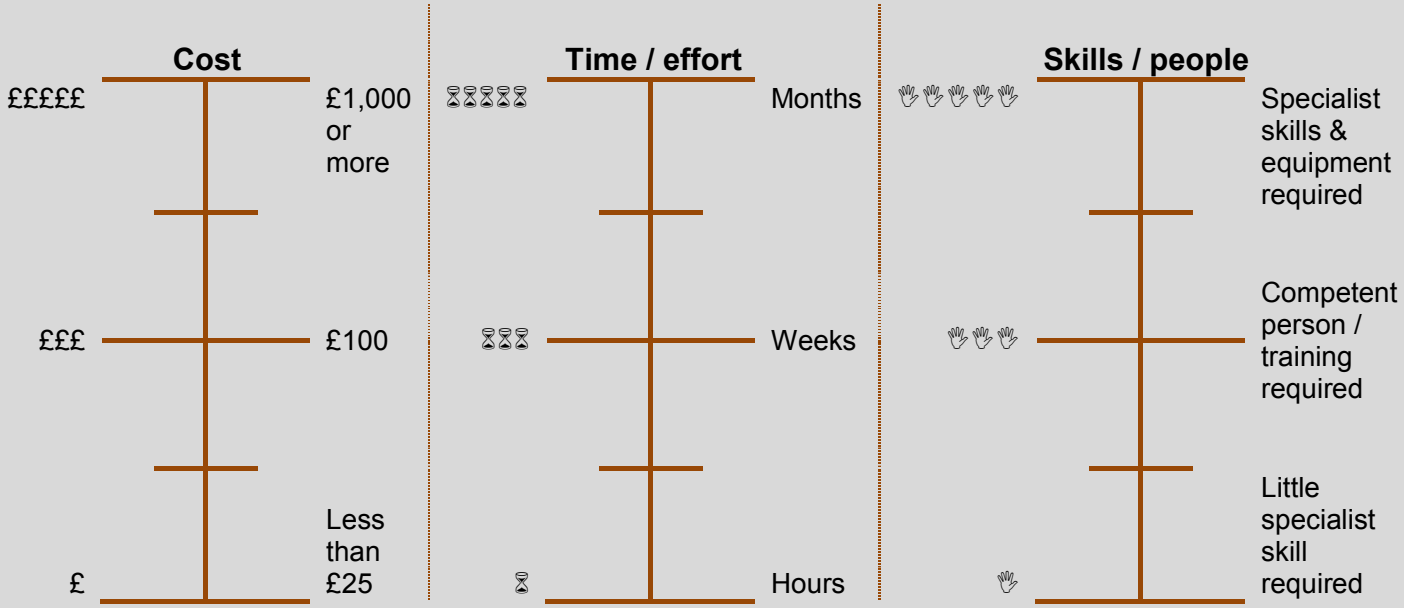
	Indicators											Resources		
	1	2	3	4	5	6	7	8	9	10	11	Cost	Time	Skills
Basic approach (compulsory survey methods)														
BUS questionnaire							■	■	■			££	⏳⏳	🖐🖐
Desktop survey	■											£	⏳	🖐
Heating control questionnaire		■										£	⏳	🖐🖐
Metered energy readings (annual)		■										£	⏳	🖐
Photographic survey	■	■		■			■	■	■			££	⏳	🖐🖐
Self-completion questionnaire	■	■				■	■	■	■			£	⏳	🖐🖐
Semi-structured interview	■	■	■	■		■	■	■	■	■	■	££	⏳⏳	🖐🖐
Spot measurements					■							£££	⏳	🖐🖐
Thermal imaging (external)				■								£££££	⏳⏳	🖐🖐🖐🖐
Comprehensive approach (additional survey methods)														
Activity logging sheets*		■					■	■	■			£	⏳⏳	🖐🖐
Data logging (environmental)					■							£££	⏳⏳	🖐🖐
DomEARM survey*		■	■					■	■			£££	⏳⏳	🖐🖐🖐
Metered energy use & generation (monthly)*		■	■									£	⏳	🖐
Remote visual inspection*				■								££	⏳	🖐🖐🖐
Social network analysis*										■	■	£	⏳	🖐🖐🖐🖐
Thermal comfort diary*							■					£	⏳⏳	🖐🖐
Walkthrough*	■			■		■	■	■	■			£	⏳	🖐🖐
Advanced approach (optional survey methods)														
Air permeability test				■								£££	⏳⏳	🖐🖐🖐🖐🖐
Assessment of guidance material						■						£	⏳	🖐🖐
Co-heating test				■								£££££	⏳⏳⏳	🖐🖐🖐🖐🖐
MVHR performance measurement		■			■							££	⏳	🖐🖐🖐
Observation of user induction						■						£	⏳	🖐🖐
Remote monitoring (energy use)		■							■			£££££	⏳⏳⏳⏳⏳	🖐🖐🖐🖐🖐
Remote monitoring (environmental)					■							££££	⏳⏳⏳⏳⏳	🖐🖐🖐🖐🖐
Remote monitoring (LZTs)		■	■						■			££££	⏳⏳⏳⏳⏳	🖐🖐🖐🖐🖐
Remote monitoring (occupancy/interact)									■			£££	⏳⏳⏳⏳⏳	🖐🖐🖐🖐🖐
Thermal imaging (internal)				■								£££££	⏳⏳	🖐🖐🖐🖐
U-Value tests				■								£££££	⏳⏳⏳	🖐🖐🖐🖐🖐
Video diary						■	■	■				££	⏳⏳	🖐🖐

*** Survey methods that should be also be used within an advanced approach, in addition to all basic approach methods.**

Table 1. Survey methods in relation to indicators, resources and level of approach.

For key to resources, refer to Page 4 of this guide.

Key to Table 1:



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The EVALOC project seeks to assess, explain and communicate the changes in energy use due to community activities within six selected case study projects under the Department of Energy and Climate Change's (DECC) Low Carbon Communities Challenge (LCCC) initiative, a government-supported initiative to transform the way communities use and produce energy, and build new ways of supporting more sustainable living.

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