

# Energy Audit

## About this project

This guide is for a **12 month Silver Award project**. It is suitable for both **group and individual** volunteering.



Through this project you'll help the National Energy Foundation to meet our aim of improving the use of energy in buildings while making a difference to the people and places around you.

## What does it involve?

An energy audit is an assessment of the energy needs and energy efficiency of a building. This project involves calculating the current use of gas and electricity and carrying out audits to assess the amount of energy used by lights, appliances, heating and hot water and lost through the building fabric in two different buildings. You will then be able to look at your results to find ways to save energy and present your findings to the person who is in charge of energy.

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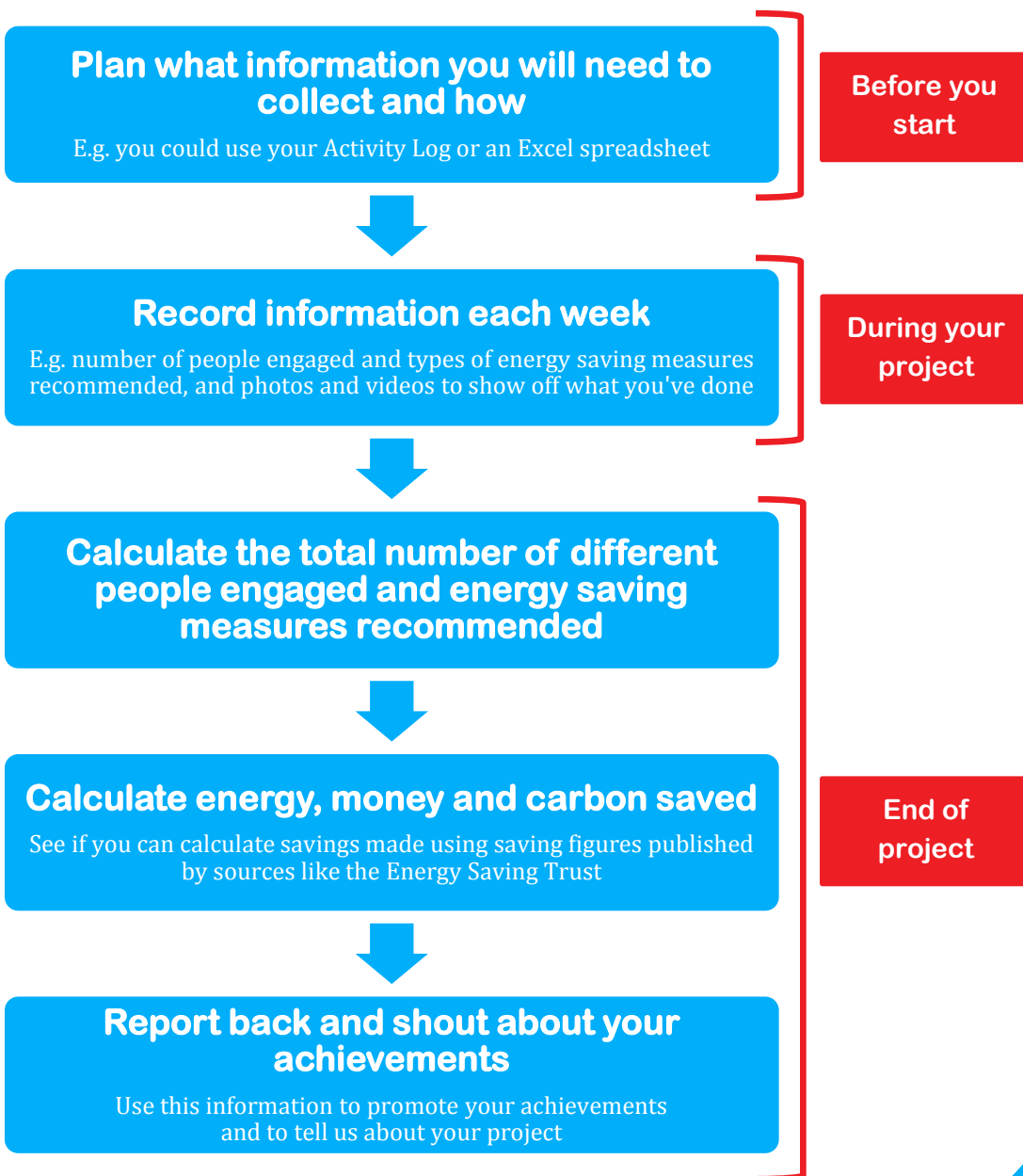


## How to use this guide

- Follow this step-by-step guide to plan, run and evaluate your very own energy saving project. You might take more or less time than is set out in the guide to complete a step – don't worry, this is your project so you can decide how you use the time available. If you have other ideas that aren't included in the guide, feel free to use them and adapt the guide to meet your own needs.
- Refer back to the [Energy Tutorial](#) to get ideas for energy saving tips you might need during your project.
- Make sure you keep safe. When your project involves activities outside of your home, you should carry out a risk assessment and ensure you have appropriate adult supervision if you're under 18. [Click here](#) to download tips and a template risk assessment form.
- At the end of each week, update your Activity Log to keep a record of what you've done and save any photos, videos or other materials you've produced. Download an Activity Log to fill in by [clicking here](#).
- When you finish your project, complete the [End of Project Survey](#) and send information about what you've done, along with your photos, videos and materials produced, to [energyenvoys@nef.org.uk](mailto:energyenvoys@nef.org.uk) to claim your Energy Envoy Certificate from the National Energy Foundation.
- Remember you must spend a minimum of **one hour per week** volunteering for the time required at your level for it to count towards your Bronze, Silver or Gold Award.

## Tracking your progress

At the end of your project you'll need to report the number of people you've engaged. This will include people given advice about energy, reached by social media, attending events and presentations, and engaged about energy in any other way! You may also be able to calculate the amount of energy, money and carbon saved through your project. Here's what you should do:



## Week 1-3



If you haven't already, make sure you've completed the three week [Energy Tutorial](#) first to get lots of ideas and tips that will help you with your energy saving project.

## Week 4



Start your project by agreeing which two buildings you're going to audit. The first half of your volunteering will be spent auditing one building, and the second half will be spent auditing the other. Discuss your ideas as a group or brainstorm on your own. The buildings could be your DofE centre, your school, feeder primary school or college, a neighbour's house, a community hall or a local business (e.g. a local shop, office or café), but it can't be your own home (otherwise it won't count as volunteering to help your community!). You will need access to the electricity and gas bills for the last year for each building, so consider who you would have to contact to find out whether they will give you permission.

Compare your ideas by considering the pros and cons of each. Factors to think about might include:

- Location – how will you get there?
- Point of contact – who will you need to talk to?
- Access to energy bills – can you get this information?
- Access to the building – can you visit the building to conduct the audit?
- Help during the audit – can someone from the building (e.g. a caretaker) help you during the audit?
- Anything else?

By the end of this week you should have decided which two buildings you're going to audit. Talk to the people who are in charge of the buildings about your project and make sure they are happy for you to complete the project there before the next step. Why not take a copy of this guide with you to explain the project to them? Remember to mention that the purpose of the project is to help them to identify ways they could save energy!

Don't forget to keep a record of what you've done, the number of people you've engaged and the different energy saving measures you recommend, and save any photos, videos or other materials you've produced.

## Week 5 – Building One



Plan the tasks that need to be completed to carry out your energy audits at building one. The audits will include the tasks below, but there might be other things you need to do to collect the energy bill data and to complete the audits.

- Collect electricity and gas bill data for the last year (or three years if possible)
- Analyse the bill data to determine current electricity and gas consumption
- Design audit forms for assessing lighting, electrical appliances, heating, hot water and building fabric (this will be a simple table to fill in, as explained in Week 8-12)
- Visit the building to fill in the audit forms
- Assess the results of the audits and identify ways to save energy
- Write up the results and present your findings to the person who is in charge of energy (either in person or by sending them a written summary)
- Anything else?

By the end of this week you should have agreed who is going to do what (if you're volunteering as part of a group), as well as planned and agreed a date and time for the audits.

If you're auditing a school, the best time to complete the audits is likely to be during a break time or lunch time when rooms are less busy. If you can, arrange for someone from the building (e.g. a caretaker) to complete the audit with you so they can show you where to find different light bulbs, appliances, heating and hot water controls and building fabric features.

## Week 6-7



It's time to find out the actual electricity and gas consumption of the building.

Collect copies of the electricity and gas bills for the building for the last year (or three years if possible). If your chosen building is a school, the school bursar should have this information.

Energy bills are measured in the amount of kWh (kilowatt hours) used. Energy used is measured in kilowatts (kW), so kWh is the amount of energy used over time. You need to find out the total kWh used per bill (mainly in quarterly bills) and costs for electricity and gas. Write down these figures or record them in an Excel spreadsheet. How do the

electricity and gas costs compare between different quarters and years? Can you think of any reasons why this might be?

Convert the kWh to CO<sub>2</sub> emissions by multiplying kWh by 0.462 for electricity (this is the carbon 'conversion factor' for electricity) and by 0.184 for gas (this is the carbon 'conversion factor' for gas) and record this in your notes or spreadsheet. This provides a CO<sub>2</sub> kg equivalent (1 kg of CO<sub>2</sub> is the equivalent of the amount of air needed to fill 100 party balloons).

You now have the baseline energy figures for the building!

NOTE: Usually buildings use gas for space and water heating, but sometimes another type of energy is used instead. If the building uses electricity for heating, remember to consider the electricity bill data collected previously for the heating and hot water audits.

## Week 8-12



Over the next five weeks, design five audit forms – one each for lighting, electrical appliances, heating, hot water and building fabric. You'll take these with you to fill in during the audit. Your audit forms need to record the date and time of the audit, as well as room numbers, what each room is used for and whether each room is empty or in use when you conduct the audit. Here are some ideas for what to include in each of the forms:

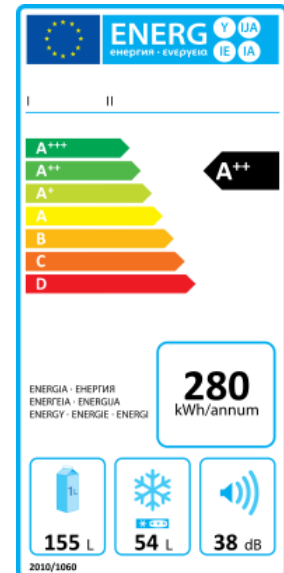
### Lighting

- Total number of light bulbs
- Number of light bulbs switched on
- Number of light bulbs switched off
- Types of light bulb (these vary greatly in size and wattage – the caretaker could help you to identify them)
- Wattage (all bulbs are rated by wattage (W), which is the amount of energy they use – the caretaker could help you to identify this)
- Light level of the room (if you can access a light meter)

### Electrical appliances

- Type of appliance (e.g. computer, printer, kettle, air conditioner, ...)
- Is the appliance switched on or off?

- Is the appliance on standby? There is usually a light to show if the appliance is on standby.
- Is there an energy rating on the appliance? If so, what is the rating? It will look like the diagram opposite. Refer back to the [Energy Tutorial](#) if you need a reminder about EU energy labels.
- Are any of the appliances automatically switched on and off? If so, at what times? The caretaker could help with this question.
- Are any of the appliances manually switched on and off at particular times? E.g. sometimes computers in a school are switched on every day before pupils arrive. The caretaker could help with this question.
- Also include a section for notes about how appliances are being used, which you can fill in based on short interviews or by observing behaviours (refer back to the [Energy Tutorial](#) for ideas for things to look out for and assess)



## Heating

- What type of space heating is used in the building? (e.g. gas, electric, coal, other – the caretaker could be able to help with this)
- Room and corridor temperatures (can you take a room thermometer?)
- Radiator temperatures (can you take an infrared thermometer?)
- Do radiators have thermostatic radiator valves?
- Thermostat settings
- Are any external doors or windows open with the heating on?

## Hot water

- What type of water heating is used in the building? (e.g. gas, electric, coal, solar thermal, other – the caretaker could be able to help with this)
- Temperature of hot water cylinder thermostat. How much insulation is there around the hot water cylinder (in millimetres)? You must be supervised by the caretaker or another responsible adult when assessing the hot water cylinder.
- Is water heating controlled by a timer so that water is only heated at certain times of the day? If yes, at what times during the day is the water heated? If you're auditing a school, is the water heated during school holidays? Make sure you're supervised for this part too. The caretaker could help to answer these questions.
- Number of hot taps dripping or leaking

## Building fabric

- Walls
  - Does the building have cavity walls or solid walls?
  - Are the walls insulated? The caretaker could help to answer this question.
  - Number of cracks or gaps in the walls inside and outside.
- Roof/loft
  - Is the roof/loft insulated? What is the thickness of the insulation (in millimetres)? The caretaker could help to answer these questions.
- Windows and doors
  - Does the room have single, double or triple glazed windows and external doors?
  - Can you feel any draughts of air coming in around the window or door frames?

You might find it useful to revisit the [Energy Tutorial](#) for a reminder of how to answer some of these questions. The Tutorial might also give you ideas for other things to include in your audit forms.

Once finished, print off all your audit forms ready to fill in during the audits over the next five weeks. Think about what you'll need during the audits and take these things with you.

## Week 13-17



Complete the audits for lighting, electrical appliances, heating, hot water and building fabric during these five weeks, filling in your audit forms as you go. If you're volunteering as part of a group, you could do this in pairs or small groups.

If you're using a room thermometer for the heating audit, leave the room thermometer in the middle of the room for a minute or so to accurately record the temperature. To use infrared thermometers to record radiator temperatures, point the infrared thermometer at the radiator and press the button.

Keep your eyes peeled and double check your audit forms to make sure you don't forget anything.



## Week 18-22



Well done for completing your energy audits! You will now be able to look at your results to find ways to save energy.

Use these five weeks to go through your five audit forms to identify how energy could be saved in each room and in the building as a whole. Revisit the [Energy Tutorial](#) to get ideas for energy saving tips and recommendations.

Write a list of energy saving tips for each room and for the building as a whole.

## Week 23-24



Now you're ready to share your findings with the person who is in charge of energy for the building to help them save energy. You might have already planned everything for this already, but if not, decide whether you will present your findings in person or by sending the relevant person a written summary of your observations and energy saving tips. This might involve arranging a meeting with the relevant person or arranging to give a presentation.

Think about how you're going to communicate your findings. Use these two weeks to prepare materials that you will use to communicate your findings, such as a PowerPoint presentation or a written report. How will you explain the reason for the tips you have chosen? How will you persuade the person who is in charge of energy to follow your recommendations?

Facts and figures are a good way to persuade people to save energy. Can you calculate the amount of energy, money and CO<sub>2</sub> emissions they could save through carrying out your energy saving tips using figures published by sources such as the Energy Saving Trust?

Make sure you have made a note of your key points and print off anything you need to take with you.

## Week 25



This week you will share your findings with the person who is in charge of energy for the building. You could be giving a presentation, having a meeting or sending a written summary with an explanation of your recommended energy saving tips. Good luck!

## Week 26



Congratulations on completing your audit of building one! This is a reflection week. Reflect on how the audit went and the findings you presented. What went well and what will you do differently next time? Make notes in your Activity Log.

## Week 27 – Building Two



Using everything you've learnt so far and reflecting on your experience of auditing building one, plan everything that needs to be done for the energy audits at the second building you've arranged to audit. Refer back to Week 5 for a reminder of the tasks.

By the end of this week you should have agreed who is going to do what (if you're volunteering as part of a group), as well as planned and agreed a date and time for the audits.

Once you've completed your audit of building two, you'll share the message about your project with your wider community (e.g. by giving a talk, using social media or by contacting your local newspaper). You might want to start making arrangements for this now.

## Week 28-29



It's time to find out the actual electricity and gas consumption of building two. Collect copies of the electricity and gas bills for the building for the last year (or three years if possible). If your chosen building is a school, the school bursar should have this information.

Record the total kWh used per bill (mainly in quarterly bills), costs for electricity and gas, and CO<sub>2</sub> emissions (CO<sub>2</sub> kg equivalent). How do the electricity and gas costs compare between different quarters and years? Can you think of any reasons why this might be? How do the figures compare with those for building one?

You now have the baseline energy figures for the building!

## Week 30-34



Over the next five weeks, design five audit forms, like you did last time – one each for lighting, electrical appliances, heating, hot water and building fabric. Refer back to Week 8-12 for a reminder of what to include. Is there anything you could add to the forms this time, given your experience of auditing building one? Will you make any other changes? Try to add extra or different things to audit, referring to the [Energy Tutorial](#) for ideas.

Once finished, print off all your audit forms ready to fill in during the audits over the next five weeks. Think about what you'll need during the audits and take these things with you.

## Week 35-39



Complete the audits for lighting, electrical appliances, heating, hot water and building fabric during these five weeks, filling in your audit forms as you go. If you're volunteering as part of a group, you could do this in pairs or small groups.

If you're using a room thermometer for the heating audit, leave the room thermometer in the middle of the room for a minute or so to accurately record the temperature. To use infrared thermometers to record radiator temperatures, point the infrared thermometer at the radiator and press the button.

Keep your eyes peeled and double check your audit forms to make sure you don't forget anything.

## Week 40-44



Well done for completing your energy audits! You will now be able to look at your results to find ways to save energy.

Use these five weeks to go through your five audit forms to identify how energy could be saved in each room and in the building as a whole. Revisit the [Energy Tutorial](#) to get ideas for energy saving tips and recommendations.

Write a list of energy saving tips for each room and for the building as a whole.

## Week 45-46



Now you're ready to share your findings with the person who is in charge of energy for the building to help them save energy. You might have already planned everything for this already, but if not, decide whether you will present your findings in person or by sending the relevant person a written summary of your observations and energy saving tips. This might involve arranging a meeting with the relevant person or arranging to give a presentation.

Think about how you're going to communicate your findings. Use these two weeks to prepare materials that you will use to communicate your findings, such as a PowerPoint presentation or a written report. How will you explain the reason for the tips you have chosen? How will you persuade the person who is in charge of energy to follow your recommendations?

Facts and figures are a good way to persuade people to save energy. Can you calculate the amount of energy, money and CO<sub>2</sub> emissions they could save through carrying out your energy saving tips using figures published by sources such as the Energy Saving Trust?

Make sure you have made a note of your key points and print off anything you need to take with you.

## Week 47



This week you will share your findings with the person who is in charge of energy for the building. You could be giving a presentation, having a meeting or sending a written summary with an explanation of your recommended energy saving tips.

## Week 48-49



Now it's time to share your achievements with your wider community. You might have already started planning this, but if not, decide how you will share the message about your project and with who. You could use the school newsletter, social media, give a talk for your community or contact the local newspaper. Remember to get permission from the building owners to share the data collected from the energy bills and audit forms if you want to include this information.

Use these two weeks to prepare materials for this and to make any necessary arrangements. Make sure you have made a note of your key points and print off anything you need.

## Week 50-51



During these two weeks you will share your achievements with your community. You could be giving a presentation, promoting an article you've written or using social media to spread the message about your project. Try to share your achievements as widely as possible!

And finally, don't forget to thank all the people who have helped you with your project.

## Week 52



Congratulations on completing your energy saving project! It's time to evaluate your project and reflect on your achievements by filling in the End of Project Survey. To claim your Energy Envoy Certificate from the National Energy Foundation, please fill in the survey by [clicking here](#) and send your photos, videos and other materials produced to [energyenvoys@nef.org.uk](mailto:energyenvoys@nef.org.uk).

Thank you for volunteering with us!