

Improving energy efficiency in community buildings

1. Introduction

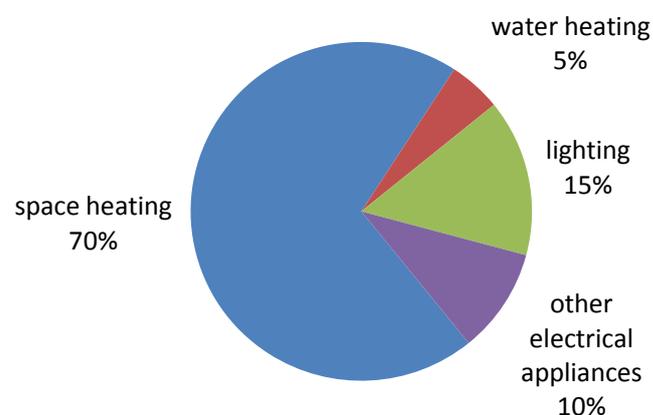
This guidance is designed as an introduction to the issues surrounding energy use in community buildings and to accompany CSE's Energy Survey Pro-forma¹. It will help community groups wishing to improve the energy efficiency of community buildings, such as schools, churches and village halls. As well as reducing energy bills and cutting carbon emissions, if your community building is warmer and more comfortable to use, more people will want to use it – something you're probably keen to see happen.

Changing the way in which people in the building use energy and controls can make a big impact on energy use. Practical improvements to community buildings might include insulation and draught-proofing, upgrading heating systems, investing in energy efficient lighting, fitting heating controls, putting in water saving gadgets, and changing to more efficient means of heating water.

The following pages will explain some of the issues related to energy efficiency in community buildings, take you through practical steps to carry out an energy audit, and provide some guidance on possible improvements and how to fund them.

Every building is different, and energy use in a specific building will depend on a range of factors such as the building fabric, how and when the building is used, and the heating systems and appliances that are being used. In an average building, space heating accounts for the vast majority of energy use, as shown in the chart below. This is worth bearing in mind when you are looking at ways to increase energy efficiency. Improving the way the building is heated is likely to have a far bigger impact than changes made to lighting, appliances or water heating.

Energy use breakdown in a typical community building



¹ CSE Energy Survey Proforma: www.cse.org.uk/thesource/download/an-energy-survey-pro-forma-76

2. Involving the right people

If you have a particular building in mind there may already be a small group of people involved in discussing energy use in the building. It could be worth getting a wider group of people engaged from the start. Involving the right people, and making sure the concerns of your group, organisation or community are represented, will help you to achieve changes. You may want to make this into a project with its own steering group to represent the interests of the wider community and push things forward, one step at a time.

Identifying anyone you're connected with who has relevant expertise could be useful, and it will help if you know of local builders, installers or retailers who can help with your plans, including estimating costs.

You could also begin to publicise ideas right from the start so that there is greater awareness of your plans which in turn could lead to more people wanting to become involved in making it happen or providing donations. For example, if there is a newsletter or local paper you could submit an article. You could get a mention on a local radio station, or maybe there are local groups or meetings where you could give a short talk on your plans. Once you have established these links it will be easier to provide regular progress updates later down the line.

From an early stage, it is essential to involve the building owner and building users. You may also want to talk to council planners if you think that you may suggest improvements which will require planning permission².

3. What improvements can be made in community buildings?

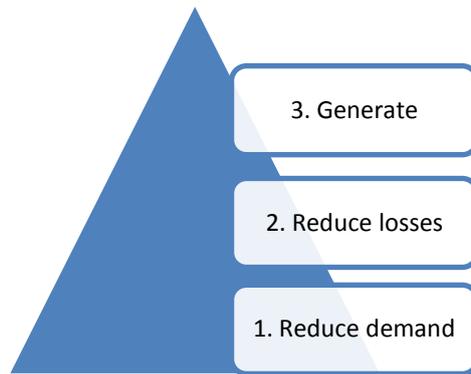
There is often considerable scope for improving the energy efficiency of community buildings, ranging from low cost and simple changes through to larger scale physical improvements which may be complex and costly. There are fewer grants and subsidies available for community buildings than for homes, but ways to fund improvements are discussed later in this guidance. Options can be broken down into the following headings:

- a) Behaviour change
- b) Physical improvements to reduce energy waste (e.g. insulation, efficient heating)
- c) Renewable technologies

It is worth bearing in mind the energy hierarchy. In broad terms this means first reducing energy use as much as possible, then improving energy efficiency, and finally considering renewable energy.

² Government gateway for planning information throughout the UK: www.planningportal.gov.uk

The energy hierarchy



a) Behaviour change

Probably the biggest difference separating energy efficiency in community buildings from domestic properties is how the building is used. Community buildings are often only occupied for a few hours of the day but by large groups of individuals over the course of a week.

There is therefore significant potential to reduce the building's energy demand simply through ensuring that these people understand how to use the heating, lighting and electrical appliances in the building effectively. This could be as simple as switching off heaters and appliances when not in use, closing doors and windows, or understanding and using controls to manage temperatures and timings effectively.

Raising awareness of these issues could be achieved at little or no cost through things like training sessions, placing signs around the building, and holding public energy awareness days.

b) Physical improvements

Many community buildings have poor insulation, traditional lighting and inefficient heating systems, largely due to their age. The costs of replacing and upgrading these aspects of a building can vary significantly, but most energy efficiency measures will eventually pay for themselves through the saving they generate from the building's reduced energy bills.

Some of the key physical improvements that could be considered are listed below. Please note that some of these improvements may require planning permission.

Insulation and draughtproofing

- Roof insulation
- Wall insulation
- Sealing gaps around windows, doors or floor skirting
- Double glazing
- Floor insulation

Space and water heating

- New boiler/heating system
- New heating controls (e.g. timers, programmers, thermostatic radiator valves)
- Point-of-use water heaters
- Insulation of hot water pipework and hot water cylinder

Lighting

- Slim-line 'T5' tubes in place of fluorescent lights
- Low-energy 'compact fluorescent lamps' (CFLs) in place of standard bulbs
- Timers and motion sensors

Electrical appliances

- Replace old appliances with more energy efficient ones (i.e. A rated or higher)
- Programmable on/off timers
- Energy saving settings on computers

Water use

- Fit water saving devices to taps (e.g. lower flow taps, aerated taps, flow regulators)
- Install dual-flush toilets or put in toilet 'hippos'
- Fix leaky taps and pipes
- Rainwater harvesting

c) Renewable Energy

It's always best to reduce energy use and increase the buildings energy efficiency as much as possible before considering renewable energy. Energy generated from renewable sources will however reduce the building's reliance on importing power and could generate a steady income stream to help cover running costs or pay for other activities. New government initiatives have been set up to provide a financial incentive for the generation of renewable energy, through the Feed in Tariff (FIT) for electricity generation (e.g. solar PV) and the Renewable Heat Incentive (RHI) for heat generation (e.g. biomass boiler).

Some technologies you might be able to consider for heat and electricity generation are:

Electricity

- Solar PV
- Micro-wind

Heat

- Solar hot water (solar thermal)
- Biomass boiler
- Heat pump (ground source, air source or water source)

A note on suitability of improvements

Ventilation:

There is a difference between a draught and ventilation. A draught is unwanted, while ventilation is essential to prevent moisture building up and to let oxygen in, particularly in rooms where fuel is burned and carbon monoxide could be a danger. Therefore there will often be air bricks, vents or extractor fans present which must not be blocked by draught proofing measures.

Excess moisture with nowhere to escape to can build up and lead to damp problems. Energy efficiency improvements such as improving the heating system and installing insulation could help to

reduce damp but some ventilation is always needed. If the damp is a result of a structural issue (penetrating or rising damp) then this will need to be fixed by a specialist.

Night Storage Heaters:

If your community building is heated using electric storage heaters then the building will probably be on an Economy7 electricity tariff. Whilst this tariff offers cheap off-peak electricity overnight, electricity during on-peak hours is very expensive (up to three times the standard electricity tariff rate). With Economy7 the aim should be to use as little on-peak electricity as possible, by better understanding how to use storage heaters effectively and avoiding the need to use override or 'boost' settings or relying on (expensive) convection heaters for additional heat during the day.

4. Carrying out an energy audit in a community building

It may not be obvious which improvements and changes will make the biggest impact on energy use in your community building. An energy audit will help you understand how energy is being used and help you to identify the most effective options for energy efficiency improvements. An energy audit can be carried out professionally or you may choose to carry out your own. The CSE Energy Survey Pro-forma³ can be used as a guide to identifying possible improvements if you do it yourselves.

Energy Audit Breakdown

These are some of the different elements you may want to consider when carrying out a basic energy audit of a community building:



- a) Baseline data: look at records of energy use; monitor energy consumption and compare temperatures in the building. Look at how and when the building is used - and by whom. This will give you some clues as to when the peaks and troughs are in energy use and whether there are obvious things to address such as timers, controls and how they are used. Here are some of the types of data you could collect:
- Gas and electricity meter readings and bills (which will help you analyse energy use patterns)

³ CSE Energy Survey Proforma - <http://www.cse.org.uk/thefsource/download/an-energy-survey-pro-forma-76>

- Feedback from building users
 - Logs of temperature, humidity, dampness at different times, in different weather conditions and in different parts of the building
 - Other sources of information such as air tightness testing; thermal imaging
- b) Walkaround audit: use an energy audit checklist⁴ to survey the building, noting observations about heating, lighting, insulation, which parts of the building use the most energy and where energy is being lost. A good checklist should cover:
- Insulation and draughtproofing
 - Space and water heating
 - Lighting
 - Electrical appliances
 - Water use
- c) Assess options: based on the information collected, potential improvements and changes can be identified. These could be free / low cost / high cost options and their relative costs, carbon savings and anticipated fuel bill reductions can be calculated to help with prioritisation. You will probably need to obtain quotes for any physical improvements you'd like to make to the building.
- d) Action planning: options can be prioritised depending on the main reasons for carrying out the audit and the resources available to you. For example, you may wish to prioritise the cheapest option, the quickest payback period, the easiest and least disruptive actions, improvements that will make the biggest difference to the building's comfort and warmth, things that will reduce running costs, changes that will have a big visual impact, or improvements that will result in the greatest carbon savings.
- e) Make changes: based on the priorities you've identified, write an action plan and use it to allocate responsibilities and timings to implement improvements to the building. You can identify short term / medium term / long term actions depending on your capacity and resources, but it is worth planning for some 'quick wins'.
- f) Monitor and review: it's unlikely that all the changes you'd like to see will be possible at once so the action plan should be regularly revisited and updated. To see how effective your changes have been, regular and ongoing checks of energy use data are really important.

⁴ CSE Energy Survey Pro-forma: www.cse.org.uk/thesource/download/an-energy-survey-pro-forma-76

5. Writing an action plan

Writing an action plan will help to structure your project and break down the process into small achievable goals. Your action plan could be based on your priorities and should also factor in what is actually possible given time and resource constraints. However, just because something is daunting don't let that put you off. You might be able to recruit more support locally to help with tasks in the action plan, and attract interest from funders or sponsors to help to pay for improvements.

Your plan will have a set of actions or targets, resources needed (i.e. cost in £ and time in days), dates (which could include milestones on the way) and responsibilities. Other factors that you may want to consider in your plan:

- Will you carry out any marketing and publicity to promote what you're doing?
- Are you planning an energy awareness campaign (e.g. with building users / owners) as part of your work?
- Have you explored options for raising money for improvements?
- Do you have permission from any relevant individuals or bodies to go ahead with the measures you've proposed (e.g. building owner, co-users, statutory planning permission)
- Who will review the plan, and how often?

6. Funding

Here are some options you could look into to fund improvements to your community building.

Building owner or management committee

Is there already a budget allocated for improvements or maintenance to the building? Can you make recommendations for improvements that could be paid for using this allocation? Demonstrating the expected cost savings over time could help to justify investment.

Bank loans and other loan funding

Because energy efficiency improvements generally pay for themselves over time through the savings they generate on energy bills, a loan may be a sensible option to consider. There are various low interest loans specifically for energy efficiency improvements, examples being:

- SALIX finance is DECC funded and supplies zero or low interest loans to public sector organisations.
<http://www.salixfinance.co.uk/>
- The Carbon Trust also offer low interest loans both to the public and private sector to fund improvements in building energy efficiency.
<http://www.carbontrust.com/>
- The Rural Community Buildings Loan Fund is managed by Action with Communities in Rural England and provides loans of up to £20,000 for measures that increase energy efficiency of community buildings.
<http://www.acre.org.uk/our-work/community-assets/rural-community-building-loan-fund>

Alternatively, a standard bank loan⁵ could also fund the project, but either way you will need to convince them that that you will be able to repay the loan. This will most likely require a robust business plan as well as a legally recognised body to manage to project and be held accountable should anything go wrong.

Green Deal

The Non-domestic Green Deal could also help fund improvements, more information on this can be found in CSE's PlanLoCaL Green Deal and Energy Efficiency resource pack.

Local fundraisers

Depending on the amount of money you need to raise to implement your plans, you may be able to generate some or all of it via local fundraising. This could include donations from members of the public, sponsorship from local businesses, fundraising activities such as village fetes, cake sales, sponsored runs, benefit gigs and so on. If you also apply for grant funding, showing that you have already raised some of the money yourselves may help.

Grants and other funding

There are a range of web based databases which can be used to identify potential sources of funding. These include:

- Fundfinder is a web-based finding database: www.funderfinder.org.uk. You may need to pay to use some of this resource, unless accessed from your local library.
- Directory of Social Change, Trust Fund listing: www.trustfunding.org.uk. You have to pay access this list of trust funds.

Other examples of grant and funding schemes which could cover energy efficiency improvements include:

- Your local Council for Voluntary Service should be aware of local grants. You can find your local CVS at www.navca.org.uk/directory
- The Charities Aid Foundation lists funds: www.cafonline.org
- Big Lottery funding may also be suitable – for example Awards for All: www.awardsforall.org.uk

Please note that all these funds are subject to changes and it's always worth researching funding options at the time.

Renewable Energy

Recent government initiatives such as the Feed In Tariff⁶ and the Renewable Heat Incentive⁷ mean that if you install renewable energy technologies to generate electricity or heat, you will qualify for payments which mean that over time the up-front cost of the installation will be recovered and you could generate an income for the building. The PlanLoCaL website (www.planlocal.org.uk) contains a range of information and resources on renewable energy technologies, community engagement, project planning and case studies. There is also a series of short videos on a range of topics including funding and finance.

⁵ PlanLoCaL video, 'Traditional bank finance'

<http://www.planlocal.org.uk/videos/videopages/traditional-bank-finance.html>

⁶ For more information on the Feed In Tariff visit: www.fitariffs.co.uk

⁷ For more information on the Renewable Heat Incentive visit: www.rhincidentive.co.uk

Crowd funding

There are more and more web based funding mechanisms which can be used to attract donations or investments from individuals or organisations. It can be easier than traditional fundraisers (mentioned above) to promote via the internet and easier to manage since payments are usually made electronically. However, success relies quite heavily on access to wide networks of people. There are a huge number of crowd funding 'platforms' which can be broadly categorised into equity-based, lending-based, reward-based and donation-based. A few examples are:

- Crowd Funder www.crowdfunder.co.uk
- Peoplefund www.Peoplefund.it
- Solar Schools www.solarschools.org.uk
- Indiegogo www.indiegogo.com
- Abundance www.abundancegeneration.com

Share issues

Establishing a community owned legal entity and raising equity through a share issue is becoming more and more common. So much so that the government has established a team and a website to provide support: www.communityshares.org.uk

Specialist grants

Some grants, or other types of other financial support, are available for specific types of buildings or locations. Here are some examples:

Churches and faith groups

- QPSW Sustainability Grants are intended to provide support to Quaker, or Quaker supported, projects focused on sustainability: www.quaker.org.uk/sustainability-grants
- The Churches and Community Fund (CCF) gives grants to community projects run by parish churches, deaneries, dioceses and other bodies connected to or working in partnership with the Church of England: www.churchandcommunityfund.org.uk
- The National Churches Trust aims to protect and support the built heritage of churches, chapels and meeting houses throughout the UK: grants@nationalchurchestrust.org

Schools

- Again, if there is a budget allocated for school improvements or maintenance costs you could make a strong case for monies to be allocated to making energy efficiency improvements.
- Loans such as SALIX loans (see above) are an option to pay for improvements and pay back over the longer term.
- Schools may also be able to raise a significant proportion of the money needed to install improvements through fundraising activities and donations from the school community.

Village Halls

- Start by contacting your local council to see if they offer any local grant funding schemes for the measures that you mention.
- If your area has a Local Action Group or a Rural Community Council, they may have a small grants scheme you can apply to.

- ACRE (Action for Rural Communities in England, www.acre.org.uk) runs a Village Hall Information Service. They can flag up funding specific to your area and run the Rural Community Buildings Loan Fund mentioned above.

Landfill Communities Fund

- Landfill Operators are obligated to pay a tax for waste disposed of on landfill sites. Some of this can be put towards a fund for local environmental projects to help to offset the negative impacts of living close to a landfill site.
- Funding could be available through a Distributive Environmental Body (DEB) or direct from the Landfill Operator. LCF is regulated by ENTRUST and more information and a directory of funds is available at www.entrust.org.uk/home/lcf

7. Energy auditing information and resources

Centre for Sustainable Energy (CSE) - The Source highlights our favourite resources – from reports to videos – produced specifically to help and inspire community energy projects across renewable, energy efficiency, demand reduction and fuel poverty. Information specifically aimed at the improvement of community buildings can be accessed through the following link:

www.cse.org.uk/thesource/browse/using-less-energy-11/in-community-buildings-15

Energy Survey Pro-forma - this CSE document provides an energy audit checklist combined with guidance notes on energy saving measures and information about calculating carbon savings.

http://www.cse.org.uk/downloads/file/energy_survey_enabled.pdf

Energy saving measures - the Carbon Trust website www.carbontrust.co.uk provides more information about energy saving measures for buildings, and a range of publications and good practice guides are available for download if you sign up as a member.

The **Energy Saving Trust** website gives some basic advice on energy saving measures in the home, many of which are also applicable for community buildings www.energysavingtrust.org.uk. They also have some community pages with case studies and good practice guides for running community projects.

Carbon conversions - for the most up to date information and guidance on CO2 conversion factors, look at the online resources from Defra and DECC:

<http://www.defra.gov.uk/environment/economy/business-efficiency/reporting/>

Estimating energy demand - this exercise from the Plan LoCaL suite of community renewable energy resources (www.planlocal.org.uk) provides guidance on estimating energy demand of a community building. <http://www.planlocal.org.uk/downloads/view/exercises/6>

Energy advice - you may also find the information sheets available on the CSE website useful. See www.cse.org.uk/adviceleaflets. These include guidance on loft and cavity wall insulation, draught proofing and how to read gas and electricity meters.

PlanLoCaL – this resource has a huge amount of information and guidance on all the renewable energy technologies that you might consider for a community building, together with guidance for starting a project, videos and case studies. www.planlocal.org.uk

Installer certifications

If you decide to pay for physical changes to the building, it is important to ensure that the installers you use are certified. This is a list of recognised bodies involved in certification / accreditation / guarantees of energy efficiency and renewable energy products.

The Green Deal: could provide a means of financing improvements to your community building, working with organisations listed on the Green Deal Oversight and Registration Body website. www.greendealorb.co.uk

The National Insulation Association is a trade body for the insulation trade (covering cavity wall, loft, solid wall and floor insulation, as well as draught proofing). www.nationalinsulationassociation.org.uk/householder

The Insulated Render and Cladding Association is a trade body covering the external wall insulation trade. Members are listed so you can find an installer near you. www.inca-ltd.org.uk/homeowners.htm

The Gas Safe Register (formerly known as CORGI) is a list of all accredited gas engineers. www.gassaferegister.co.uk

Microgeneration Certification Scheme. In order to qualify for financial incentives offered for generating your own power (the Feed in Tariff or the Renewable Heat Incentive) you must have your system installed by a Microgeneration Certification Scheme (MCS) installer. You can find local installers of any of the technologies on the MCS website. www.microgenerationcertification.org

The Cavity Insulation Guarantee Agency (CIGA) provides independent 25 year guarantees for Cavity Wall Insulation fitted by registered installers in the UK and Channel islands. www.ciga.co.uk/

The Solid Wall Insulation Guarantee Agency (SWIGA) provides technical guidance and an independent 25 year Guarantee for External and Internal Solid Wall Insulation systems fitted by approved installers in the UK. www.swiga.co.uk/

Federation of Master Builders is the UK's largest trade association in the building sector. www.fmb.org.uk/

Solar Keymark Scheme was created to certify solar thermal products of high quality at European level. www.estif.org/solarkeymarknew/

Renewable Energy Association is a trade association representing British renewables. www.r-e-a.net/