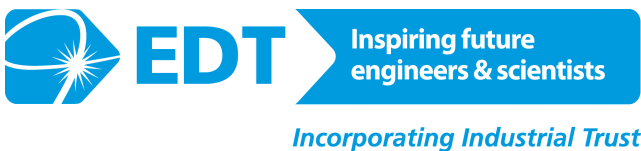




Energy and your school

www.go4set.org.uk



Energy and your school

All over the world, the supply and use of energy is becoming a serious issue. With a growing population, and resources running low we all need to think about how we use energy and how we can become more energy efficient!

We can all find ways to reduce energy usage and even find alternative sources of energy; simple changes at home and in school can make a big difference!



How does your school use energy? What types of energy does it use and how can this be made more efficient? Consider the following:

Energy comes into your school site:

- As electrical energy along mains cables.
- As chemical energy along gas pipes or as liquid fuel brought by tankers.
- As chemical energy in food which will be consumed on the premises.
- As chemical energy in all the non-rechargeable batteries which are used to power electrical equipment.
- As kinetic energy when there is wind.
- As radiant heat energy from the sun.
- As heat energy in the body of each person.
- As sound energy from the surroundings.

Energy leaves your school site:

- As heat energy radiated from the outside surfaces of buildings.
- As heat energy lost by convection from openings in the outside surfaces of buildings.
- As 'used' electrical energy through being used to operate lights and heating systems, IT



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Your challenge is to work with the other members of your team and your mentor to look at ways of saving energy around your school.

Start by thinking about the following:

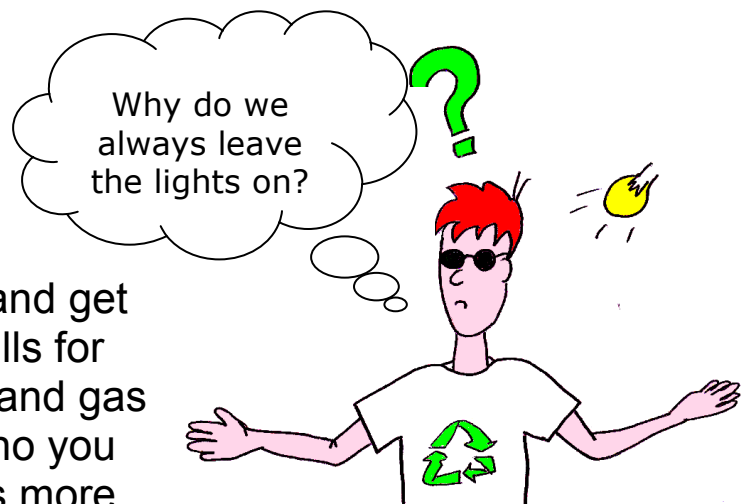
- What is energy? What are the different types of energy?
- In what ways can energy can be changed into different kinds of energy for different uses?
- What is meant by the term 'stored energy' and how can energy be stored?
- What is energy used for at your school and how necessary are these uses? Think about inside the building and in the school grounds.
- What is special about heat energy?
- What determines how quickly buildings lose heat?

You will no doubt come up with many more questions and the answers will help you to create a detailed list to include in your project proposal. This list is called the '*specification*'.

What to do first?

Firstly, you will need to work out the energy use for a building in your school.

The best way to start is to try and get your hands on some energy bills for the school, such as electricity and gas bills; your teacher will know who you need to ask. If your school has more than one building, you will not be able to get separate bills, so you will need to estimate how much energy the building you have picked uses.



Investigate if other sorts of energy are used in the building, e.g. heat. This may lead to ideas for your project, depending on what sort of equipment you have available.

Energy and your school

Then...

Your team will need to come up with a way of **either** using less energy **or** using the same amount of energy for less money, so perhaps by making some of the energy yourself or using different sources of energy.

You will have lots of ideas but for your final presentation it is best to focus on one specific idea or set of related ideas: you will not have time to do more! Your team can present a couple of different ideas, for example, one that costs more money but saves more energy and another that is cheaper but does not save on the energy use, but remember, you only have a limited amount of time to work on this project so try and keep your ideas focussed.

Plan of action!

- Make sure you understand the project brief and find answers to your starting questions.
- Create your specification (the list of features to be included in your proposal). You should try to do this as early as possible, the first week is ideal!
- Create as many ideas as you can which might follow your specification. Decide which main idea, set of ideas, to focus on and develop into a practical proposal.
- Always keep good notes about what you are doing; a team diary of progress is a good idea.
- Write your project report as you go along.



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- **Plan** your work over the few weeks using a Gantt Chart (at the end of this booklet):
 - Make lists of the things that need to be done.
 - Try to organise these things into a suitable order.
 - Try to decide which team member/s will do what things.

Good planning at the beginning of a project means you will be more organised and will make your project more structured. This will give you the ability and confidence to finish on time!

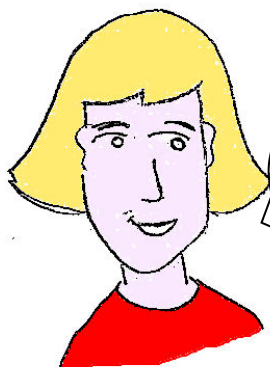
- Evaluate the outcome of your project; how well does it satisfy your specification? How effective is your model?
- Costs—You will need to show how your design can save money. To do this you need to think about how much your design will cost to begin with and how much it could save over a period of time.
- Give yourself a team name and allocate roles depending on what each member of the team is good at, for example Managing Director—The boss!, Design Engineer—good at ideas and drawing, Finance director—in charge of how much money is being spent / saved etc.
- The following websites might be useful:

www.energysavingtrust.org.uk/

www.biggreenswitch.co.uk/

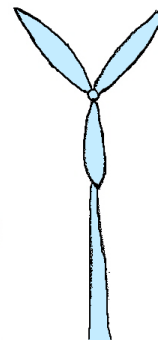
www.carbontrust.co.uk

www.energysavingsecrets.co.uk/



Yes, but how much did it cost?!

This wind turbine will reduce our energy bills by £5,000 per year!



What you need to produce

The end of your project is your Celebration and Assessment Day (CAD) where you will present what you have done to professional engineers. The assessment has **four stages** that must be ready by the day:

1. A model of your project

Your model can be built with any materials available and should visually demonstrate how your project would work and look.

2. A display

This is a written and visual method of communicating your project to the assessors, who will visit and question you at the stand. Try not to clutter your board; think of what looks good and best demonstrates your project to a passer by. Maybe you could take photos of you all at work throughout your project, or could draw a logo for your team?



Anything you need to stick things to the board, you will need Velcro pads; ask your teacher to get these. Your teacher will also have the dimensions of the board.

3. A five minute presentation and questions

You may want to use PowerPoint or could just use your model and display but you need to talk about how your model works and how it saves energy. Also, you should talk about how you went about coming up with your ideas and how you overcame any problems.

Make sure every member of the team speaks during the presentation and that you know enough about your project to be able to answer questions about it from the engineers.

Remember, practice makes perfect!



What you need to produce

4. A written report

You need to hand in a professional report **one week** before the CAD so the assessors can read through this before your presentation: you will also need to bring copies on the day that are printed on A4 paper and bound as a professional report. Your report should include the following information:

- Say something about yourselves; the team members, your teacher and your mentor and their company.
- Explain what thoughts you all had when you were first presented with the challenge.
- Describe any research you had to do to understand the challenge
- Explain how you planned your project, how you decided when to do things and who would do them.
- Describe how you developed your first ideas into a main proposal.
- Describe any problems your team had and say how you dealt with them.
- Describe how you presented your proposal and how you built your model
- Say how successful your proposal is and why.
- Try to say how your proposal might be useful in other situations, such as in the developing world.
- Personal Appendix: half a page on each individual student and your contribution, tasks and what skills you have learned during the project.

Try to think of suitable titles for each section. Consider putting some of your diagrams and graphs into a special section at the end, called 'Appendix', so not to clutter the main report.



Make a front cover for your report. You will need to state the names of your team, school, teacher(s), company mentor(s) and company.

Get your mentor to check your report a few days before the submission deadline; the quality of the report (spelling, grammar etc.) will be considered during the marking process so you may need time to edit the report. There is more guidance in the scheme Handbook; your teacher has a copy.

Timetable

Launch	Meet with your mentor and arrange when you are going to do the project in school. Also begin to plan your company visit.
Week 1	Choose a building to make more energy efficient and get the energy bills for that building. Identify things that use energy and research websites for ideas.
Week 2	Decide what you are going to do to save energy and draw up some possible ideas. Remember to keep notes!
Week 3	Choose from your ideas and decide how you are going to build your chosen design. Explain why you chose your solution in your report and think about what materials you will need
Week 4	Begin work on your model. How can you best represent your idea? What materials will you need for your model. Ask your teacher how to get them.
Week 5	Work on your model
Week 6	Work on your model. Your design may alter as you build your model. Keep a note of this and explain it in your presentation.
Week 7	Work on your model and start writing the report.
Week 8	Carry on with the report and the model.
Week 9	Get your report checked by your mentor a few days before the submission date to allow for edits. Make sure you meet the submission deadline!
Week 10	Put the finishing touches to your model and presentation
CAD	Present your work to professional engineers.

Timetable

The table below is what engineers call a **Gantt chart**. You should use this to plan how long you need to spend on different tasks throughout the project. Fill out the weeks, as in the example, to decide when you plan to do a task. Remember to allow for holidays!

		Week Number																			
		1	2	3	4	5	6	7	8	9	10										
Tasks	Example																				
	Specification of problem																				
	Company visit																				
	Research																				
	Generation and evaluation of ideas																				
	Design ideas and evaluation																				
	Prototyping and testing																				
	Manufacture and production																				
	Final evaluation & modification																				
	Writing report																				
	Producing presentation																				

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Go4SET Regional Contact:

Company Mentor Contact:

Project Report Submission Date:

Date and location of CAD