



TECHNOLOGY  
SUBJECTS  
SUPPORT  
SERVICE

# **An Introduction to Building Energy Rating**

## **Notes for Teachers**

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### Introduction.

Changes to Part L of the Building Regulations and the introduction of Building Energy Ratings require that careful consideration be given to the energy efficiency of a building. Improving the energy performance of the building requires detailed planning of a wide range of elements of the building often necessitating improvements in the design of those components and improvements in work practices associated with their installation.

The “An Introduction to Building Energy Rating” power point and these “Notes for Teachers” are designed to assist teachers of Construction Studies in exploring the range of factors that contribute to the energy performance of a building.

Slide No.	Supporting Information	Promoting Learning/Student activity
3	Building energy rating legislation was enacted in Ireland in 2006 as a result of the Energy Performance in Buildings Directive (EPBD) which became EU law in 2002.	
4	Fines up to €5000 and/or imprisonment can be applied to builders or home owners who fail to provide a BER.	What effect do you think a poor rating will have on the value of a house?
5	Approximately 30% of all energy consumed in Ireland occurs in the residential sector.	What could be done to a dwelling built in 1982 to reduce its energy consumption?
6	Good design can be a major factor in reducing energy use in a dwelling. E.g. having the majority of the glazing facing south can provide free solar thermal gain.	What are the current U-values required for, walls, roofs and floors?
7		Calculate the cost difference in primary energy use for a 125m <sup>2</sup> dwelling between 1992 and 2008 using an energy cost of 18 cent /kilowatt hour.
8	A primary aim of the BER is to inform the consumer when buying or renting a dwelling of the potential future energy costs.	Ask the students what is the rating on electrical appliances they have at home such as washing machines etc.
9	In public buildings such as schools the BER label must be displayed in a prominent position.	
10	When the label was devised a house built to standards in Part L on average should achieve a C rating. Factors such as the heating control and orientation of glazing are the main reason for this variation.	Using the graph on slide number five estimate the rating for your own home based on the year it was built?

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11		How much more per year will it cost for energy in a 185 m <sup>2</sup> C2 rated house versus an A2 rated house? Living in the A2 rated house for 20 years how much would you save versus the C2 rated house?
12	Factors such as orientation and the percentage of glass are the main reason that two dwellings built to the same specification can have different ratings.	Why would the rating vary if the same levels of insulation are used in the dwellings?
13	DEAP indicates how the dwelling will perform under standard occupancy conditions and does not factor in lifestyle of the occupants. The advisory report shows how behaviour can reduce energy use.	
14	The advisory report is generated using report generating software which focuses on the systems installed in the dwelling.	
15	Download DEAP form <a href="http://www.sei.ie/index.asp?docID=1073">http://www.sei.ie/index.asp?docID=1073</a>	
16	Refer to the DEAP manual for detailed information on how each factor is dealt with. The DEAP software contains the DEAP manual and can be accessed using the help function in the DEAP software or on line at <a href="http://www.sei.ie/deap">www.sei.ie/deap</a> .	
17	This information is required to calculate the volume of the dwelling that needs to be heated. DEAP calculates the number of occupants using the living area of the dwelling.	Calculate the volume of air in the room you are in?
18	Chimneys and flues cause ventilation heat loss in a dwelling and will reduce the rating. The new building regulations require attention be paid to sealing the dwelling to prevent unwanted ventilation. New dwellings must be tested using a blower door test. This test involves: <ol style="list-style-type: none"> <li>1. Sealing all permanent vents.</li> <li>2. Positive and negative pressurization of the dwelling by pumping air into or from the dwelling.</li> <li>3. Calculating the rate at which the pressure changes due to unwanted air infiltration.</li> <li>4. Detection of the air leaks</li> </ol>	Why would having a porch in a dwelling improve the rating?

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19	Sealing is required for a dwelling to comply with the 2008 building regulations. Particular attention needs to be paid to joints in the thermal envelope such as where window/door frames meet walls. Sealing all joints in the construction will become critical to passing the pressure test in new dwellings.	
20	A standard thermal bridging factor of 0.11 W/m <sup>2</sup> K is used in DEAP for dwellings built to standard construction details. A reduced thermal bridging factor of 0.08 W/m <sup>2</sup> K can be used where accredited details are used. These details are available for various methods of construction at: <a href="http://www.planningportal.gov.uk/england/professionals/en/1115314255826.html">http://www.planningportal.gov.uk/england/professionals/en/1115314255826.html</a>	Where can thermal bridges occur? How can we reduce heat loss at these locations?
21	Solar transmittance is the capacity of the glazed unit to resist the out flow of heat.	Determine the glazed area of the classroom.
22	Typical ventilation requirements are in line with Part F of the building regulations which requires habitable rooms to have a minimum of	
23	The new building regulations require a minimum boiler efficiency of 86%.	
24		
25	The new building regulations require a minimum of 10% of the energy be from a renewable source.	
26		
27		
28	High thermal mass dwellings have a greater capacity to store heat energy within the structure. Thermally light construction allows for faster heating up times but quicker cooling down times in a dwelling.	