



**Ensuring Sustainability in School Buildings**

**A**

**Department of Education & Science**

**Presentation**

**To the**

**Oireachtas Joint Committee on Education and Science**

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## Executive Summary

The Department of Education and Science is at the forefront of design with respect to sustainable energy efficiency in school buildings and this performance has been recognised at both National and International level with sustainable energy awards for excellence in Design and Specification.

For the past twelve years the Planning and Building Unit within the Department of Education & Science have been using a process called the DART approach to develop sustainability and energy efficiency in educational buildings. This acronym focuses on four key areas, namely; **D**esign, **A**wareness, **R**esearch and **T**echnology. The policy is informed by the Building Unit Professional and Technical staff, driven by its technical guidance documents and updated by continued energy research and development.

It has been demonstrated that all School's designed and built in line with the above policy and the technical guidance documents can have an energy performance that is more than twice as efficient as International best practice.

The Departments Technical Guidance Documents set the benchmark for sustainable design in school buildings with a clear focus on energy efficiency and they are based on solid energy research projects. The Departments policy is supported by a strong research programme with thirty five research projects at various stages.

Schools in Ireland by their nature present particular limitations from an energy conservation viewpoint. In energy terms they have relatively short operational hours, do not have building management specialists on site and energy conservation is not a core function of a school. This means that all the heating, lighting, power, water, security and communication systems (known collectively as the building services) used in schools must be robust, reliable and relatively simple and automated. These have all been considered within the energy approach and building designs, all new technologies and approaches are tested to ensure compatibility with school design and operational requirements. Successful and repeatable results are then incorporated into all new school designs and policy.

A hybrid approach is taken with respect to sustainable design in schools based on maximising natural resources and energy efficient technologies. Schools are positioned to maximise gain from the sun during the day for passive solar heating and natural daylight. Passive solar design saves 20 % of early morning heating period and adequate natural daylight when combined with automated lighting systems in the classrooms can eliminate the need for electrical light for up to 80% of the schools teaching hours.

Energy efficient boilers and individual digital room temperature controls combined with a strong emphasis on air tight testing (currently twice as good as Irish Building Standards) and insulation levels minimise heat requirements. Water usage is minimised through automatic shut off taps and dual flush toilets, while local water blending valves are provided to prevent scalding and rain water recovery is provided.

The Department have been using test schools to evaluate the suitability of renewable energy options for schools for the past seven years. Over 40% of the research programme features renewable aspects. These renewables include wind generation, solar hot water heating, photovoltaics, rain water recovery, geothermal heat pumps and biomass heating systems. Results have varied with respect to the application in a school environment and research

continues in this area. In the interest of sustainability the potential of renewables should be maximised in school design, it is however critical that renewable applications are properly suited to the application needs and not just applied for the sake of having a renewable tag on a building. It is also critical that we minimise the demand for energy before we invest in renewable energy applications.

The Department is currently conducting a demonstration and research project to evaluate the suitable application and performance and compatibility of biomass systems with school heating requirements in terms of heating demand characteristics, controls, reliability, fuel storage and maintenance and operation. The project comprises the design, installation and monitoring of Biomass heating systems in Primary and Post Primary Schools. The project also includes the development of a good practice guide for the design and installation of biomass heating systems in schools specifically aimed at school design teams and managers and will lead to the development of a suite of case studies on the selected projects.

The programme in recent years has been focusing on existing school buildings to establish appropriate methodologies to improve the energy performance of schools that were built at a time when fuel was plentiful and relatively cheap and technology and material choices were not as advanced as today. Over a third of the research projects have a focus in this area. These include a number of sustainable energy guides for school managers which are at final draft stage and will be published this spring. The Department are also involved with Sustainable Energy Ireland (SEI) on a sustainable energy mentoring programme with schools. This will be open to all schools and will involve a visit to the school by an energy advisor with mentoring and advise specific to the school type and operation.

Planning for sustainable neighbourhoods and not just the physical environment is also very important, the Joint Code of Practice on Provision of Schools and the Planning Process August 2008 will assist greatly with sustainable school provision and sustainable travel patterns.

The Department has developed a project aimed at allowing existing schools to meet the certification requirements of the EPBD within a very short time period and without the need for a costly and time consuming assessor based system. The proposal consists of the formation of a web site that will allow schools to obtain an energy performance certificate for display within their schools. The project has been jointly funded by SEI.

Other energy research projects within the Department include wind generation, solar electrical generation, enhanced insulation, web based operation and maintenance manuals, Dundalk Energy Zone Project and energy workshops for school managers, district heating systems, passive house standard schools and a new schools energy website.

Sustainability awareness in school children is provided through a dedicated program run by Sustainable Energy Ireland and also through the An Taisce Green Flags Program. The latter programme also includes the Green-Schools Travel programme. The Department have also piloted a program where the school can be used to act as a life learning tool. This is operated through an interactive child friendly touch screen linked in real time to the schools building management system.

The sustainable and energy efficient programme of the Department received further endorsements to its approach when a sample school built in 2006 was assessed for a Building Energy Rating (BER); the school which was designed and built in accordance with the Departments Technical Guidance Documents received a top band rating of A3.

## Introduction

For the past twelve years the Planning and Building Unit within the Department of Education & Science have been using a process called the DART approach to develop sustainability and energy efficiency in educational buildings. This acronym focuses on four key areas, namely; **D**esign, **A**wareness, **R**esearch, and **T**echnology. The policy is informed by the Building Unit Professional and Technical staff, driven by its technical guidance documents and updated by continued energy research and development.

Schools that are designed and built in accordance with the Departments Schools technical guidance documents are capable of being more than twice as energy efficient that schools built to best International Practice.

Recognising that the programme should be as much about people and changing cultures while delivering service the approach was developed initially through the four different strands of design, awareness, research and technology. The earlier projects researched individual opportunities and tested them locally. These successes were further developed, trialled and monitored in various all encompassing research projects such as the Gaelscoil an Eiscir Riada in Tullamore, the Generic Repeat Designs and the Rural Schools *the next generation* designs before being incorporated into standard school design guidance documents.

The overall DART Programme won a Taoiseach Public Service Excellence Award in 2008.

The Biomass Research and Demonstration Project (see Project 9 below on current research Projects) was a finalist in the Sustainable Energy Ireland Awards 2008 Renewable Energy Project Category.

The Gaelscoil project has received International and National awards including Environmental Initiative of the Year Award CIBSE London 2004, Excellence in Design or Specification, Sustainable Energy Ireland Awards 2004, Inside Government Merit Award 2004 for Best Project within an Organisation for Innovation through Technology.

Schools in Ireland by their nature present particular limitations from an energy conservation viewpoint. They have short operational hours and lack building management specialists on site and energy conservation is not a core function of a school. This means that all the heating, lighting, power, water, security and communication systems (known collectively as the building services) used in schools must be robust, reliable and relatively simple and automated. These have all been considered within the energy approach and building services designs.

Rather than develop a unique focus on energy design the Planning & Building Unit has taken a more holistic approach and has developed technical guidance on energy efficiency in school designs as an integral part of a suite of technical guidance documents. These technical guidance documents are available on [www.education.ie](http://www.education.ie)

**The main objectives of the sustainable energy programme may be summarised as follows:**

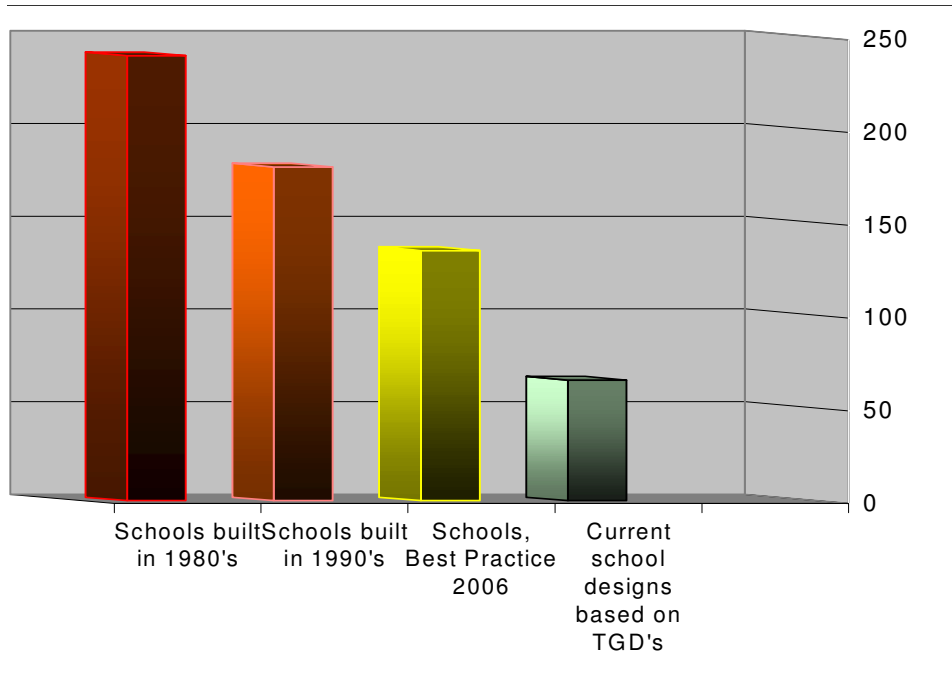
- provide quality educational facility appropriate to its users requirements
- demonstrate exemplar role
- provide a quality internal environment for the occupants of classrooms allowing the occupants to control their own internal environment through the use of natural daylight controls and heating and natural ventilation controls. All rooms are designed to have adequate natural light for 80% of the occupied period which is important as studies have shown that the use of natural light improves the ability of students to learn
- research and encompass reliable low energy design solutions
- identify and maximise new technology potential
- reduce energy consumption in schools
- reduce reduced carbon dioxide emissions in schools
- provide feedback to the Planning & Building Unit Technical Staff on the operation of the school and its systems
- explore the potential of school buildings to act as a life-learning tool that enables the building to be an active learning resource for energy conservation and sustainability for the pupils and teachers
- accumulate monitored data to feed into the design process for the next generation of even more sustainable schools continuously under development by the Department Planning and Building section
- enable school staff and children to learn about the benefits of sustainable design techniques
- to educate schools, designers, and the public in the use of sustainable techniques through public presentations and technical publications
- to allow the contractors involved in the projects to learn about sustainable construction, particularly in the use of air tightness construction and testing requirements. Pre construction, the design teams provide recommendations to the contractors about sustainable building techniques along with a number of walk and talk meetings on the building envelope as it was under construction

**It can be said that our programme is sustainable in more than one way!**

***A summary of the main achievements of the programme with respect to improvement to the quality of services delivered to the public, through a focus on people are as follows:***

- improved quality of school buildings
- improved working environment for teachers
- improved teaching environment for teachers and pupils
- improved learning environment for pupils
- improved running costs for school board of managements
- improved carbon dioxide emissions beneficial to the state and the environment
- quick delivery through the application of an off-the-shelf design option
- improved awareness of the school and energy usage by pupils & teachers
- improved knowledge of energy use and consumption patterns in schools
- on line certification process for compliance with the Energy Performance Building Directive (EPBD) resulting in schools being able to complete their own assessment on line rather than having to employ consultants to do it.
- good cross border co operation
- improved awareness of consultants and contractors in low energy design

**Energy used in Primary Schools kWh/m<sup>2</sup>/year**



*A summary of the innovative use of process, tools and technology in the programme are as follows:*

- Simulation computer modelling to evaluate internal air quality, natural day lighting, natural ventilation
- Interactive operation and maintenance manuals
- Early trialling and demonstration of newest technology and incorporation into general school design
- Air tight testing to reduce air leakage to / from school interior
- Generic repeat designs for quick and cost effective delivery
- Child friendly touch screen educational applications
- Renewable Energy technologies that are suitable for schools and environmentally with lower operational costs
- Web based monitoring and control systems
- Web based central collection of energy consumption in all schools through the Energy Performance Building Directive (EPBD) programme.

### *Life learning tool*



***So how is low energy design incorporated into our schools?***

The incorporation of low energy design has been done on a hybrid basis by maximising natural resources and utilising technologies. Maximising natural resources involves focusing on areas such as passive solar design, day lighting, natural ventilation, and reducing air infiltration.

***Passive solar design*** in school building terms means positioning the teaching spaces facing east, this can produce up to 25% savings on early morning heat up which is a significant portion of the schools total heating requirements.

***Good natural daylight*** in a learning environment is highly desirable. The window design, configuration and locations are designed to maximize available daylight in all classrooms so that for up to 80 % of the occupied period the classrooms will be able to operate without artificial lighting. Computerized modeling is used at the design stage to verify the design targets can be achieved in the school when built.

***Ventilation*** in schools is by natural means provided without draughts through a mix of high and low level open able windows; again this is verify at the design stage through the use of detailed computer simulations.

***Air Infiltration*** is a term used to describe unwanted and uncontrollable air leakage to and from a building. It occurs through unsealed gaps in construction and results in a significant amount of heat wastage. In effect a building that has a high infiltration rate will lose more heat during the day and especially at night (due to lower night time temperatures) and thus requires more time and energy to heat up in the mornings.

All new schools and extensions greater than 1000 m<sup>2</sup> are air tight tested to a standard, twice as good as the current building regulations.

***Technologies.***

With regard to utilising technologies a number of areas have been focused on including heating, lighting and water efficiency. Boiler selection to maximise efficiency is encouraged in the technical guidance documents, in addition to this more energy efficient heating controls are promoted. Each teaching space has its own individual temperature sensor that allows the teacher to adjust room temperature control within a temperature band.

To maximise the potential of natural daylight, lighting specifications for schools are based on the most energy efficient lighting available with automatic dimming / off controls.

Research by the Department has shown that young children only used the cold taps in school for ablution as they were afraid of the hot tap, associating it with the hot water taps in their homes where there would have been no anti scald provisions. Supplying a blended reduced temperature to the hot tap made no difference in their behaviour. In answer to this the Department has adopted a single tap solution to all wash hand basins where the hot and cold water are mixed at the tap intake with anti scald protection, thus all water outlets for ablution are single taps giving a blended safe water supply. Water usage is also minimised through automatic shut off taps and dual flush toilets.

### **Current Research Projects**

	<i><b>Project</b></i>	<i><b>Status</b></i>
<b>1</b>	<p style="text-align: center;"><b>Gaelscoil an Eiscir Riada &amp; Raheen National School</b></p> <p>The first project to feature the comprehensive DART was Gaelscoil an Eiscir Riada in Tullamore, the school was developed by the Planning &amp; Building Unit's Professional staff and successfully encompassed all of the above natural resources and also trialed new technologies.</p> <p>These included lighting and heating controls and also the use of a geothermal heat pump.</p> <p>Part of the project was to assess the suitability of the heat pump with under floor heating system for future schools; the high energy performance of the heat pump has not been matched in areas such as reliability of the system, controllability and responsiveness of the heating for a school environment.</p> <p>The school is also contracted to a wind generator electrical supply company for green electricity and has a rainwater collection system.</p> <p>The Gaelscoil project has received International and National awards including Environmental Initiative of the Year Award CIBSE London 2004, Excellence in Design or Specification, Sustainable Energy Ireland Awards 2004, Inside Government Merit Award 2004 for Best Project within an Organisation for Innovation through Technology.</p>	<p>Completed with monitoring on going.</p>
<b>2</b>	<p style="text-align: center;"><b>Energy Challenge 1997 Energy Efficiency &amp; awareness in Secondary schools.</b></p> <p>This project was a cross border project in partnership with the Southern Education and Library Board in Armagh. It focused on improving energy efficiency in secondary schools. It received funding under the Interreg 11 programme</p>	<p>Completed</p>
<b>3</b>	<p style="text-align: center;"><b>Energy Challenge 1998 Energy Efficiency &amp; awareness in Primary schools.</b></p> <p>This project was a cross border project in partnership with the Southern Education and Library Board in Armagh. It focused on improving energy efficiency in primary schools. It received funding under the Interreg 11 programme</p>	<p>Completed</p>

4	<p><b>Energy Challenge 1998 - Application of Demonstration Photovoltaic power generation units in Post Primary schools.</b></p> <p>This project was a cross border project in partnership with the Southern Education and Library Board in Armagh.</p>	Completed
5	<p><b>Tory island wind project</b></p> <p>The project involved the supply and installation of two 6 kW wind turbines in 2002 to provide electrical energy to serve the existing community facility and proposed Vocational School situated on Tory Island.</p> <p>A feasibility study was conducted to examine the various options and alternatives to harness this renewable energy source and to utilise it within the buildings.</p>	Installed and commissioned and under management of the VEC Donegal.
6	<p><b>Interreg solar hot water heating projects</b></p> <p>This is a cross border project in partnership the Southern Education Library Board and the Western Education Library Board. The project was successful in its application to Interreg for funding. This Department's element comprises the installation of four solar thermal systems in four rural national schools in the border area. The systems were installed in schools that had no previous hot water systems and a monitoring programme commences in September 2007 to review the viability of such systems in national schools.</p>	Installed and operational, monitoring ongoing
7	<p><b>Third Level Colleges Energy Efficiency Programme 1997</b></p> <p>This programme was undertaken in partnership with the Sustainable Energy Ireland and provided design and awareness advice to third level institutes of Technology. It culminated in the development of a set of sustainable design guides and an energy workshop for the Institute's Building Officers.</p>	Completed
8	<p><b>Dundalk energy zone project</b></p> <p>Sustainable Energy Ireland (SEI) has identified an area in Dundalk that it plans to develop as a sustainable energy zone. The intention is to develop a community which acts as a showcase for technologies and practices that will be needed to develop sustainable communities in future.</p> <p>O Fiaich College is a Post Primary facility located within that area and has approximately 700 pupils. The existing two storey school building was erected in 1969 and houses 500 pupils. It is managed by Louth VEC.</p> <p>The project involved a total upgrade of the building envelope. Full</p>	Building energy upgrade works completed.

	<p>computer modelling on the proposed enhancements was developed.</p> <p>In conjunction with this an energy upgrade of the mechanical and electrical services was included to maximise the energy saving potential of the façade upgrade. A post contract monitoring programme is also proposed.</p> <p>Energy savings on the project have been incredible with a reduction of 54%.</p> <p>In addition to the above the Department through Louth VEC and the school are partners with Dundalk Institute of Technology and the HSE in a Biomass district heating project.</p>	District heating scheme at tender stage
<b>9</b>	<p><b>Biomass wood pellet / wood chip boiler projects</b></p> <p>This project comprises the design, installation and monitoring of Biomass heating systems in Primary and Post Primary Schools.</p> <p>The objectives of the project are to evaluate the suitable application, performance and compatibility of biomass systems with school heating requirements in terms of heating demand characteristics, controls, reliability, fuel storage, maintenance and operation.</p> <p>The project will also include the development of a good practice guide for the design and installation of biomass heating systems in schools specifically aimed at school design teams and managers and will lead to the development of a suite of case studies on the selected projects.</p> <p>Early results and good practice guide due May 2009.</p> <p>This Biomass project was a finalist in the Sustainable Energy Ireland Awards 2008 under the Renewable Energy Project Category.</p>	<p>Fifteen systems installed.</p> <p>Monitoring underway</p> <p>Tender stage</p>
<b>10</b>	<p><b>Interactive operation and maintenance manuals</b></p> <p>When a building is completed, a set of operating and maintenance (O&amp;M) manuals is provided to the client that describes how the building is operated. A set of building drawings is also provided to the client. These manuals and drawings are traditionally prepared by the contractor on completion of the building and are often poor quality and usually very technical in content.</p> <p>A technical set of manuals is not suitable for use by a school principal due typically, to the lack of technical skills required to interpret the documents. The documents are usually very large and can appear intimidating due to the large amount of manufacturers' literature they contain.</p> <p>This project involves the production of a set of generic set of O&amp;M manuals in an electronic format for a typical school, which can be</p>	Interactive operation and maintenance manuals competed and under demonstration.

	<p>customised as required for the specific school.</p> <p>The manuals are specifically designed for a non-technical user and are easily navigated.</p> <p>In addition to providing information on the building systems, the manual provides the service of a building logbook.</p> <p>The benefits of this system in energy terms are as follows:</p> <ul style="list-style-type: none"> <li>• Quality information on school energy saving advice is provided.</li> <li>• Advice on how to compare energy use with benchmarks is provided.</li> <li>• Systems are more likely to be correctly maintained (reducing energy wastage)</li> <li>• Misunderstanding of how to operate controls is one of the largest causes of energy wastage in schools and the provision of clear advice will reduce this wastage.</li> </ul>	
<p><b>11</b></p>	<p><b>Special needs schools energy auditing and benchmarking project</b></p> <p>This project comprises an energy audit on 25 Special needs schools to evaluate the energy use in these schools and to provide a benchmark for energy usage in Special needs schools. This benchmark will allow an evaluation of the level of funding for operation of these schools in energy terms to be conducted.</p> <p>The project involves a paper and walk through energy audit of the Special needs schools (selected based on their size and location to ensure a representative selection) and the presentation of a report on the findings.</p> <p>The report will focus on areas such as floor area / student ratio, operating temperatures in the spaces, boiler rooms and associated plant and controls, domestic hot water generation and use, low temperature hot water (LTHW) heating distribution and emitters, electric heating, water usage, lighting, insulation levels, windows, walls, doors, roofs, catering and computers and building energy demand profiles and costs.</p>	<p>Audit complete, final report due this year.</p>
<p><b>12</b></p>	<p><b>School self certification &amp; energy benchmarking to comply with new Energy performance of buildings directive (EPBD)</b></p> <p>The Energy performance of buildings directive (EPBD) is a European Union directive that requires all member states to take certain actions to reduce the energy use in buildings within their countries. This directive came into force in January 2007 although some sections of the directive, such as the energy labelling aspect, will not be enacted immediately.</p>	<p>Project at final verification and commissioning stage. The website will be live in March 09.</p>

<p>This directive is part of Europe's strategy to meet their commitments to the international Kyoto protocol which took the form of an agreement to limit emissions of green house gasses.</p> <p>As a requirement of the EPBD it will be necessary for all school buildings to be issued with an energy performance certificate and to display it in a visible location.</p> <p>The purpose of this certification system is to raise awareness of energy usage in buildings and to encourage building managers to improve the energy performance of their buildings both through improved energy management and the implementation of appropriate building and system modifications.</p> <p>This certification system should not only provide information on the schools actual energy use and environmental emissions but should display the schools energy performance relative to that of other school buildings in the form of an energy rating.</p> <p>In addition to fulfilling the practical requirements of the directive, this proposal fully embraces the purpose of the directive by using the certification mechanism to encourage energy management and assisting in the creation of a support structure that assists schools in providing energy awareness programs for children. SEI have provided 50% funding for this initiative.</p> <p>Work on this web project commenced in November 2005. A report was submitted to Sustainable Energy Ireland (SEI) outlining a proposal to set up a system to allow existing schools to meet the certification requirements of the EPBD within a very short time period and without the need for a costly and time consuming assessor based system.</p> <p>The proposal recommended the formation of a web site that will allow schools to obtain an energy performance certificate for display within their schools. A comprehensive strategy to address the certification requirements of the EPBD for school buildings was outlined, including the benchmarking, auditing, data analysis, and reporting tasks that will be required to produce an accurate and reliable certification system.</p> <p>The objectives of the project were in addition to meeting the incoming directive to</p> <ul style="list-style-type: none"><li>• Obtain energy benchmark figures for school buildings of various types and ages.</li><li>• Produce accurate energy certificates for school buildings and making this service available within a reasonable timeframe.</li><li>• Provide a system of auditing the scheme and verifying both its accuracy and reliability.</li></ul>	
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	<ul style="list-style-type: none"> <li>• Provide a method of reviewing the system during its first years of operation and utilising the data that the scheme will generate, ultimately providing a national database of school energy use and emissions and energy benchmarks.</li> <li>• Providing a method of supporting the certification schemes aims by directing schools towards school energy saving methods and encouraging them to enhance energy awareness amongst their students.</li> </ul>	
<b>13</b>	<p><b>Rural schools initiative carbon neutral schools</b> <i>Next Generation of low energy schools</i></p> <p>Work on the design of the next generation of low energy schools is underway via the Rural Schools Project. This project involves the development of a design for rural schools which can be repeated on various sites. The energy objectives of this project is to improve further the low energy design ethos of the Department and also that the schools will only use carbon neutral energy.</p> <p>The design process is evaluating enhanced insulation and air tightness testing criteria, rain water recovery, automated window controls linked to CO<sub>2</sub> monitors, biomass boilers and green electricity along with extensive monitoring of heating, power and lighting, hot and cold water and sewerage flow rates and energy consumption.</p>	<p>First school is being issued to tender to commence on site this year.</p>
<b>14</b>	<p><b>Touch screen environmental educational programme</b></p> <p>On the basis that the children of today are the decision makers of tomorrow, promoting the environment and energy efficiency to school children is being explored. These children are also uniquely placed to influence the adults of today.</p> <p>One scheme that the Department has developed and are presently piloting is using the school building to act as a life-learning tool.</p> <p>A child friendly interactive touch screen display is linked to the Building Energy Management system. This provides the children and visitors to the building with energy and environmental information relating to the building. A cartoon character called <i>Eddie the Grasshopper</i> is used on the screen to encourage the children to learn about the school construction and its day-to-day energy use. The systems can also be interfaced with the schools I.T network which allows the teachers to use it within the classrooms as a real time learning tool.</p> <p>Sustainability awareness in school children is also provided through a dedicated program run by Sustainable Energy Ireland and also through the An Taisce Green Flags Program.</p>	<p>Two systems installed, monitoring ongoing</p>

<p><b>15</b></p>	<p><b>Solar panels for electrical generation</b></p> <p>The project will evaluate and test the use of Photovoltaic for electrical generation in a Post Primary school.</p>	<p>Stage 2 design</p>
<p><b>16</b></p>	<p><b>Solar panel hot water heating special needs school</b></p> <p>This project comprises the installation of a large solar thermal system in a special needs school currently under construction. The system performance and hot water consumption profiles shall be monitored to establish usage patterns and evaluate the viability of hot water solar systems in this sector.</p>	<p>Completed and monitoring commenced.</p>
<p><b>17</b></p>	<p><b>Grant scheme to improve thermal insulation in schools</b></p> <p>This programme will allow schools to apply for funding on a one off basis to upgrade the fabric insulation in the external façade of their school buildings.</p> <p>Typically the works would involve attic insulation and injection of insulation into external wall cavities where appropriate.</p> <p>The Planning and Building Unit will establish a technical and administration Guidance Document that will provide School Authorities with the necessary criteria and generic specifications to implement the scheme. Case studies will also be provided. It is envisaged that the scheme would be managed directly by the School Authority without external consultants and that a minimum of three quotations would be sought from reputable installers with a sign off report done by a qualified professional for a set fee.</p> <p>As a condition of partaking in the scheme the School Authority will have to provide as part of their application, fuel bills for the previous three years. These will be entered in the Department's energy database. A further condition of funding will be an undertaking by the school Authority that they sign up to the Department's new energy website and submit via that site their fuel costs for future years. This automated system will then allow the Department to evaluate and monitor the implementation success of the scheme.</p>	<p>Pilot scheme to be done in spring 2009.</p> <p>Documentation preparation commenced</p>
<p><b>18</b></p>	<p><b>School energy workshops</b></p> <p>With respect to the second strand of DART i.e. Awareness, it is considered that there is a void within the educational sector on energy awareness and knowledge by school operators both on day to day operation and on low energy school design.</p> <p>The educational energy awareness program will be proactive and allow the demonstration of up to date energy awareness and energy design intent for schools. It will also present the opportunity to receive feedback that could help to ensure our energy programmes focus in the most appropriate areas. The attendees would gain</p>	<p>Planning commenced with pilot to be run early this year.</p>

	beneficial practical advice on energy awareness and energy saving techniques appropriate to schools.	
19	<p><b>Building Research Establishment Environmental Assessment Method (BREEAM)</b></p> <p>This project involved assessment of the environmental analysis programme BREEAM for suitability on Irish Schools. It was tested on Archbishop Ryan National school. The project conclusions were that the BREEAM method of assessment is currently not suitable and has limited application value for schools in Ireland, this may change in the future if the assessment was refined to take the Irish market into account.</p>	Completed
20	<p><b>Energy presentation to schools /design teams at Tullamore launch meetings</b></p> <p>This involves an energy presentation to school managers and Principals when they attend Tullamore for information days regarding the various schemes such as devolved grants, projects going into Architectural Planning, small schools scheme etc.</p>	Ongoing
21	<p><b>Biomass District Heating Schemes</b></p> <p>Biomass district heating schemes are schemes comprising large centralised boilers using wood chip as their energy source. A flow and return district heating system then conveys the centrally heated hot water in pre insulated pipes recessed below ground to end users via an individual metered supply. These are viewed as economical and sustainable forms of heating as the wood chip is derived locally from forest thinning and short rotational coppice crops.</p> <p>The Department is currently participating in a demonstration district heating system in the Dundalk Energy Zone in conjunction with SEI and other partners in the area.</p>	Tender stage on Design build and operate system with external partners
22	<p><b>Energy use in sewerage systems</b></p> <p>Information from a Primary school that is being monitored for energy use has highlighted that of the total school electrical load approximately one third is being used by the school sewage treatment system.</p> <p>This project will investigate the type and sizing criteria for sewage treatment systems in schools and what the impact would be on energy use and capital cost if the criteria can be tightened.</p>	School Project at tender stage, due to go to site 2009.
23	<p><b>Colaiste Choilm Tullamore</b></p> <p>Colaiste Choilm CBS in Tullamore is a new build project on the existing school grounds. It has been selected for development as a sustainable research project for Post Primary Schools.</p> <p>Over 21 different sustainable design aspects will be reviewed for</p>	Stage 2 of design programme.

	incorporation on the project. It will also involve extensive automated monitoring systems to establish profiles of energy consumption and user patterns for future projects.	
<b>24</b>	<p><b>Dissemination</b></p> <p>The work of the Unit and the DART process has been published in a number of Journals in Ireland and England. An article on the Department's energy policy featured in a recent issue of the OECD publication "PEB Exchange". The Department has presented its research findings and policy at numerous conferences over the past years.</p>	Ongoing
<b>25</b>	<p><b>Annual report on energy policies</b></p> <p>Submissions for inclusion in the Department's annual report with respect to energy policies - prepared and submitted since 2002.</p>	Yearly
<b>26</b>	<p><b>Energy Efficiency Guide for school managers</b></p> <p>This involves the publication in web format only of a guide aimed specifically at energy management in schools from the basics of explaining electrical tariffs and how to read an electrical bill to how to put in place an energy management programme within the school.</p>	Under draft, to be issued in Spring 2009
<b>27</b>	<p><b>Energy website</b></p> <p>As mentioned earlier, there is a void within the educational sector on energy awareness and knowledge by school operators both on day to day operation and on low energy school design. The establishment of a schools energy website relating to all energy aspects of schools and showcasing success and case studies and our projects to date would provide major benefits to the Department and our Clients.</p>	Under construction launching May 2009
<b>28</b>	<p><b>Generic repeat design (GRD)</b></p> <p>The Planning and Building Unit recently developed a two storey primary school design for 8, 12 and 16 classroom schools which is generic in nature and is repeatable on various sites. The design also allows for the eight and twelve classroom versions to be expanded in the future if needed with minimal disruption to the existing school thus allowing the day to day functions of the school to continue.</p> <p>In addition to the excellent low energy consumption, the benefits of the GRD projects include the development of a considered educational model, extendibility and future-proofing potential of the core model, optimum standardisation of educational facilities at primary level, reduced professional fees, optimum land use and usability on restricted sites, improved internal comfort environment, use of durable materials resulting in lower maintenance and lifecycle costs, quick delivery through the application of an off-the-shelf option and greater certainty in budget projection and programming within the overall capital programme.</p>	Initial schools completed with monitoring ongoing and additional schools under construction and planning.

	<p>Over 57 repeats are currently in the process with a number built and occupied, under construction, at planning permission stage and at site suitability stage.</p> <p>The GRD project received a merit energy award for excellence in Design or Specification at the Sustainable Energy Ireland Awards 2007.</p>	
<b>29</b>	<p><b>Rainwater Recovery</b></p> <p>A number of test projects the first in 2004 have been completed to establish the opportunity and associates issues with eth use of rainwater recovery systems in schools. Following the evaluation of these schemes rain water harvesting systems is provided in all new schools and large extensions currently at design stage where it was feasible to provide them.</p>	<p>Department Policy is to provide rainwater recovery in new schools and large extensions</p>
<b>30</b>	<p><b>Air Tightness Energy Performance in Schools TGD</b></p> <p>A Technical Guidance Document for Air Tightness Energy Performance in Schools aimed at designers, contractors and school managers shall be developed.</p>	<p>Final draft stage.</p>
<b>31</b>	<p><b>Passive House school accommodation</b></p> <p>Research has commenced on potential for passive huas standard school accommodation.</p>	<p>Commenced</p>
<b>32</b>	<p><b>Sustainable material Review</b></p> <p>This project involves a review of material used in standard school construction to evaluate potential for substitution with more sustainable materials.</p>	<p>Planning</p>
<b>33</b>	<p><b>Replacement of single glazing with double glazing in existing frames.</b></p> <p>This project will examine the feasibility and issues around upgrading existing single glazing with low e double glazing in existing hardwood window frames.</p>	<p>At tender stage, site completion May 2009</p>
<b>34</b>	<p><b>A guide to energy efficient and cost effective lighting for schools.</b></p> <p>SEI currently have a general design guide for energy efficient and cost effective lighting, in conjunction with this guide they have produced separate guides aimed at the retail and office sectors.</p> <p>They have agreed following our request to do an additional separate guide aimed at schools and include it as part of the above suite of guides.</p> <p>The distribution of this will be aimed at school designers, managers</p>	<p>Final Draft stage, completed document to be published March 2009</p>

	and specifiers. It will focus also on energy efficient options of replacement of exiting fittings.	
<b>35</b>	<b>Mentoring Programme with schools</b>  This is a mentoring project that will be led by SEI under the Public Sector Programme with technical input provided by the Planning and Building Unit. It will be open to all schools and will involve a visit to the school by an energy advisor with mentoring and advise specific to the school type, operation and support / advise post visit.	Planning underway with roll out this year.

**END**