

Green Powering Sport

Renewable energy and sport are increasingly viewed as natural partners for a sustainable future. For example Germany has ambitious renewable energy plans for the 2006 World Cup.

"At the 2006 World Cup, the whole world will be watching Germany and so we want to be a good example for environmental protection and give fossil fuels the red card." said legendary German world cup winner Franz Beckenbauer.

"Green Goal is the first environmental concept for a major international sporting event which has ever set quantified targets. That is a 'world first', you might say, and a challenging one at that, because it is measurable."

The main thrust of Green Goal is to set quantified environmental goals in the fields of water, waste, energy, and mobility. Green Goal also takes account of environmental aspects in other areas including stadium construction and the higher-level goal of organizing a climate neutral tournament i.e. ensuring that the World Cup makes zero contribution to global warming. As much of the energy supply as possible will be provided by renewable energy sources such as hydroelectric power, solar power and wood energy.

The World Cup is not the only high profile sporting event to turn to renewable energy. The 2008 Olympics could become the 2008 Green Games - Beijing's successful bid to host the games centred on introducing wind, solar and biomass energy.

A wind power plant, said to be the largest of its kind in Asia, will be built to provide clean energy resources for the Beijing Olympics. Solar energy will be used for space heating, hot water and electricity. Space heating in the stadiums and gymnasiums will be supplied via 160 geothermal heat pumps. In the Olympic Park 90% of the hot water will be produced by solar collectors and to further promote energy solar electricity, 3MW solar cells will be installed in the Olympic Park.

Several large-scale biomass projects are planned including a centralised biogas scheme and to mitigate the pollution induced by transport, athletes and officials will use electric and fuel cell vehicles.

Looking further ahead, New York City's bid to host the 2012 Olympics includes building a renewable powered stadium. The proposed New York Sports and Convention Center as currently planned, will include 25,000 solar collector tubes for solar hot water, 100,000 square feet of solar photovoltaic

panels, and 34 vertical-axis wind turbines. When not serving as an Olympic venue, the stadium will be the new home for the New York Jets, and during football games it will produce over 40% of the facilities electricity consumption and 70% of its hot water from its renewable energy systems.

Closer to home, one of the Premiership's leading clubs, Manchester City plan to make its £130m stadium the first football ground in Britain to generate its own power by using wind turbines.

In a pioneer proposal, up to ten 46ft-high turbines will be installed to supply the energy needed for the whole Sportcity complex, which also includes the English Institute of Sport, Regional Athletics Arena and National Squash Centre. If the project is agreed, the turbines could be in place by the end of next summer.

The club also plans to install geothermal heat pumps for hot water and space heating, with a biomass boiler fed on wood pellets as a back up system.

Carling Cup winners Middlesboro, plan to install a BP Solar 99.36kWp photovoltaic system on the roof of their Riverside football stadium that will provide energy for underfloor heating for the pitch to prevent the postponement of football matches.

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Futuristic look of Manchester City's "City of Manchester" Stadium

Wind Powers Ahead

Following successful conferences over the past five years, Energy from Fresh Air 2004 (EFAA 04), Sustainable Energy Ireland's (SEI) annual wind energy conference visited Dublin in November to discuss, demonstrate and analyse the topical issues in the wind industry in Ireland.

Earlier this summer, the Department of Environment, Heritage and Local Government issued the draft version of the revised wind farm planning guidelines for comment, EFAA 04 provided the ideal opportunity to outline the key changes made since the guidelines were first published and provided delegates with the perfect opportunity to ensure they had been correctly and appropriately interpreted. Declan Bourke, Assistant Principal at the Department and Chairperson of the Planning Guidelines review committee, introduced the guidelines, the process behind their review and summarised submissions made at the draft consultation stage. Declan concluded his presentation by informing delegates that it is intended to release the finalised version before the end of 2004.

Tomás O'Leary of MosArt delved further into the guidelines to identify how planning authorities should best utilise them. It is the responsibility of the planning authority to, as a first step, identify the landscape characteristics within their area of responsibility and to assess the sensitivity of these landscapes with respect to wind farms.

The idea is to 'zone' areas within the county as:

- Strategic: Areas eminently suitable for wind farms
- Preferred: Suitable for wind farms pending specific local planning circumstances
- Open to Consideration: Wind farm applications will be treated on their merits and developers must demonstrate why the proposal should be granted planning permission
- No-go: Areas identified as particularly unsuitable for wind farms

The new guidelines are positive and proactive - in line with Ireland's national energy policy.

Whilst the technical requirements remain primary, once areas are zoned, the guidelines can be used as a tool to ensure that the design of the wind farm, in respect of scale, footprint and size of turbine employed, is appropriate for the particular landscape into which it will locate O'Leary suggested.

A vital step when zoning for wind projects is to identify the wind resource in the area. For example it would be improper to zone areas of low resource as strategic. The Wind Atlas for Ireland and Irish Wind Resource Explorer™ (WRE) developed by SEI are tools to accurately assess the wind resources

around the country. Michael Brower, Principal and co-founder of AWS Truewind LLC, developers of the tools, joined EFAA 04 to offer key information regarding the technical content of the wind atlas and to demonstrate how it should be used by people of different disciplines within the wind energy field.



Brower discussed the accuracy of the wind atlas, between 5% and 7% standard error meaning that over 90% of sites assessed will be within 5% of the wind speed predicted by the WRE. He continued by demonstrating how planning authorities, developers and financiers, should best use the wind atlas.

Cecilio Sarobe Carracas, an electrical engineer with CENER who has been involved with wind energy development in Spain's hugely successful wind industry, discussed the findings of the report that they completed on behalf of SEI. The 'Definition of a Monitoring Programme for Irish Wind Farms' has two distinct areas of operation; initially, there is a best practice guide for the pre-construction stages of a wind farm development. This involves initial wind resource assessment, on-site wind monitoring and analysis and wind farm design or micro-siting.

If this work is carried out properly from the start, and if warranties and contracts entered into with turbine suppliers are adequate and monitored, it will result in a significant improvement in wind farm performance and may help limit the problems that can be caused by major component failure later on during the working life of the wind farm. The second, related aspect identifies how Irish wind farms should monitor performance throughout the lifetime of the project and how the performance should be assessed against the warranties provided by the suppliers. Ultimately, if the wind farm is working optimally and without unscheduled maintenance interruption, it means more power from green sources and higher revenues for wind farm developers.

Aertech's video presentation 'The construction of Kingsmountain 25MW wind farm' highlighted, in graphic detail, the different phases of work undertaken on route to the successful commissioning of Ireland's largest wind farm. Paul O'Kane narrated as the video displayed the planning, transportation and construction stages and considerations that need to be assessed when installing a power station of such dimensions.

Jacques Quantin, leader of the Local Investment working group of the PREDAC project, joined EFAA 04 to discuss how best practice wind farming across the continent has always involved a level of community interest. Quantin discussed case study projects from a number of our nearby neighbours and outlined, in simple terms, the benefits and returns that communities will wish to see if they are going to be interested in investing in a wind farm project. At a time when wind farm developers in Ireland are investigating finance options, Quantin showed that local investment offers a solution for developers and communities alike.



On the theme of wind farm finance it was timely that Gary Ryan, Director of Sales and Marketing at Energia presented on alternative power purchase options for wind farms. With the AER process under review, and the majority of AER contracts arranged there remains many wind farm projects that have achieved planning permission and now require a contract to sell their electricity. This is vital if the project is to attract the necessary capital from investment institutions. Ryan discussed how Energia engages with wind farm projects and outlined the criteria it would require when entering into negotiations with developers.

To close Energy from Fresh Air for 2004, Graham Brennan, Programme Manager for SEI's Renewable Energy Research Development & Demonstration programme, outlined the success of the programme to date and identified key areas where funding would be directed in the future. Brennan alluded to some successful projects already presented upon during the conference such as the Wind Atlas and Monitoring programme definition as well as the work carried out by the Western Development Commission in their 'To Catch the Wind' (community involvement in wind projects study). Brennan identified improvements in

forecasting techniques and improvements in the modelling of wind generators on the Irish electricity network as key areas of focus to be addressed by the programme.

Proceedings from EFA 04, together with the proceedings from all previous EFA conferences, are now available on the new Wind Energy CD ROM available on the SEI online bookshop. www.sei.ie/reiobookshop.html

New Wind Resources Released

Three new and up-to-date fact sheets are now available from SEI to provide high quality independent information and data about wind farms and wind energy. The brochures offer accurate and objective facts about how wind farms can be developed appropriately in Ireland to increase renewable energy deployment here and addresses the key challenges that a strong wind industry will encounter.

Wind Energy and the Environment identifies how wind farms interact with the environment in which they locate. Local impacts on wildlife and landscape are explained and solutions are offered to ensure that wind farms can be developed in harmony with the environment that they ultimately protect.

Wind Energy Economics displays current facts and trends regarding the breakdown of costs for wind farm development, how the industry is supported

and how wind farms can be developed for the long-term benefit of local communities.

Wind Industry Status and Prospects outlines how Ireland currently deploys wind energy and how this compares with the development of wind energy in other jurisdictions. Information about Ireland's ability to accommodate wind energy and its appetite to do so is included as are realistic targets for wind energy to supply a clean, local, reliable electricity supply.

For free copies please call 023 42193 or download copies www.sei.ie/reio.htm



First Wind Ad Campaign

The British Wind Energy Association (BWEA) recently launched a £100,000 billboard campaign to promote wind power.

The campaign with over 350 posters on display at 120 locations throughout the UK is part of Embrace the Revolution, a national campaign to give a voice to the 74% - who support wind energy.

This is the first time a billboard campaign has focused on the issue of wind energy. The campaign concentrates on locations where there is either an existing wind farm or an application to build one.

BWEA's Chief Executive, Marcus Rand said: "This campaign is intended to challenge people's perceptions of wind turbines. It's saying that not only do they benefit the environment and help tackle climate change they are also stunning. As campaign champion Chris Tarrant (Who wants to be a Millionaire) said they are 'modern day guardian angels'. A common myth is that wind turbines are ugly, a blot on the landscape. We know the public doesn't agree."

The ad features members of the public who love their local wind farms and encourage people to show their support for wind by signing an online petition at www.embracewind.com.

The name of every supporter will go on four new wind turbines to be erected across the UK in 2005.

Russia Triggers the Countdown to Kyoto

Russia's formal ratification of the Kyoto Protocol on global warming clears the way for the environmental accord to come into force in February 2005.

The Kyoto Protocol is an international treaty agreed in 1997 by the Parties to the 1992 United Nations Framework Convention on Climate Change (UNFCCC). Its entry into force is governed by rules agreed on by the UNFCCC Parties. The rules demanded that at least 55 Parties to the UNFCCC ratify the Kyoto Protocol and that those include industrialised countries accounting for at least 55% of CO₂ emissions among industrialised countries in 1990.

Prior to Russia's decision, whilst 127 countries had ratified the protocol, the industrialised countries among them accounted for only 44.2% of CO₂ emissions in 1990. Apart from the US, which accounted for 36.1% but withdrew from the Protocol in 2001, only Russia - accounting for 17.4% - could bring the Protocol into force.

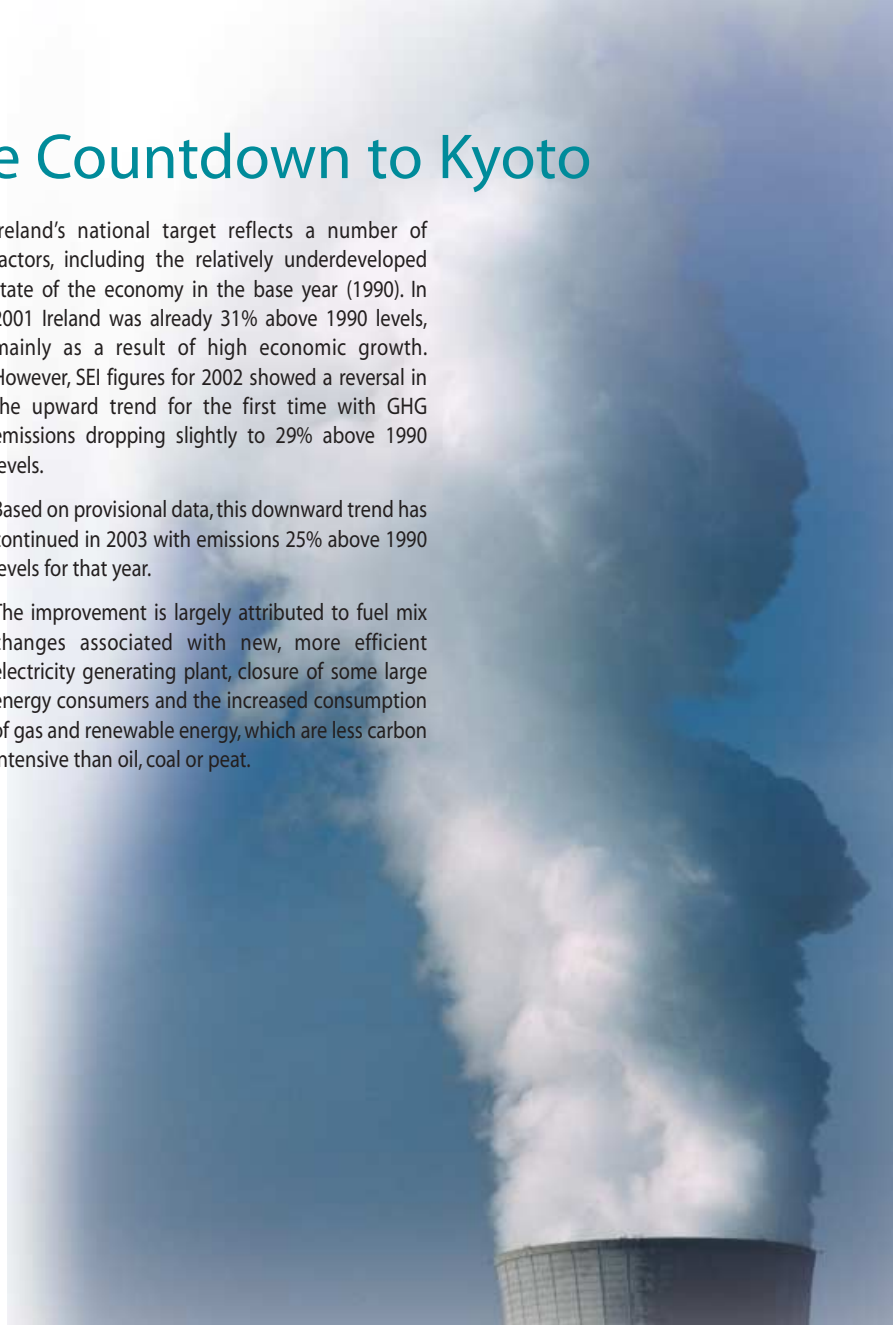
The Kyoto Protocol commits the developed world to take real action to combat climate change. Industrialised countries agreed legally binding targets to reduce their combined greenhouse gas emissions by at least 5% compared to 1990 levels by 2012.

The EU committed itself to an 8% reduction in emissions of greenhouse gases below 1990 emission levels in the period 2008 - 2012. In a subsequent burden sharing agreement between EU Member States, Ireland was allowed to increase its emissions by 13% above its 1990 emissions in the target period (2008 - 2012). This concession was only possible because other EU Member States agreed to achieve reductions of greater than 8%.

Ireland's national target reflects a number of factors, including the relatively underdeveloped state of the economy in the base year (1990). In 2001 Ireland was already 31% above 1990 levels, mainly as a result of high economic growth. However, SEI figures for 2002 showed a reversal in the upward trend for the first time with GHG emissions dropping slightly to 29% above 1990 levels.

Based on provisional data, this downward trend has continued in 2003 with emissions 25% above 1990 levels for that year.

The improvement is largely attributed to fuel mix changes associated with new, more efficient electricity generating plant, closure of some large energy consumers and the increased consumption of gas and renewable energy, which are less carbon intensive than oil, coal or peat.



Portugal Takes Action to Reduce Oil Dependency

by Paulo Santos (Portuguese Energy Agency)

Looking to avert a potential energy crisis in early November, the Portuguese government, as a response to the recent increase of oil prices in the international markets presented an action plan to reduce the country's oil dependency.

Portugal's primary energy consumption relies 64% on foreign oil supply, so with the price of the oil barrel rising above the 50 USD mark, the government put together an interministerial plan in just 60 days. The ministries of Economics, Finance, Environment and Innovation worked together and set up an action plan with an overall objective to reduce by 20% both the energy intensity and the oil dependency by 2010. As a consequence of these reductions, a near 15% reduction in the global energy bill for the country is envisaged.

The action plan follows a sectoral approach focused in four main sectors of the Portuguese economy, namely energy, transport, industry and domestic and services. The energy sector has a dependency on oil, which is more than double the EU average.

The transport sector takes around 42% of the national consumption of oil and derivatives, while industry takes about 29%.

The domestic and services sector also shows concerning levels of oil dependency, although still lower than the average EU energy intensity for that sector.

To come up with solutions, the government looked at what other EU countries have been doing in different related areas and tried to identify opportunities to improve the national situation. A number of measures were agreed for each sector (see Figure1), aiming at specific objectives like:

Energy - increasing energy production from renewables and continuing the liberalisation of the energy markets as means to improve efficiency

Transport - creation of incentives to use public transport, renewing existing fleets of vehicles and improving efficiency of goods transportation by developing multi-modal logistic infra-structures

Industry - increasing incentives to the use of renewables and cogeneration and stimulating the improvement of production process efficiency

Domestic and services - improving energy efficiency and the use of solar energy in buildings and promotion of the use of more efficient appliances.

Besides targeting several concrete actions that can be performed under each measure, the action plan also makes a quantitative estimate of their contribution to the overall objective, together with a qualitative assessment of its potential impact in terms of the environment, socio-economics, innovation and State's budget.

The plan can now be put to action through different initiatives and programmes in the short term.

Figure 1: Main Measures of the Portuguese action plan to reduce oil dependency and their associated impacts

Energy	Transport	Industry	Domestic & Services
<ul style="list-style-type: none"> • Development of wind energy • Use of the hydro power potential • Use of biomass • Use of biogas • Other forms of energy (H2) • Biofuels production • Reduction of grid losses • Liberalisation and competitiveness 	<ul style="list-style-type: none"> • 15 to 20% increase in use of public transports in the next five years • Improve energy efficiency in private vehicles • Better infra-structures for improved logistics and increased efficiency • Introduction of alternative fuels in public transport vehicles 	<ul style="list-style-type: none"> • Technological innovation and improvement of industrial processes • Creation of incentives to the reduction of oil and NG use and increase the use of alternative energy or biomass 	<ul style="list-style-type: none"> • Increase energy efficiency in buildings • Better efficiency by the final user and the State • Use of solar thermal energy • Integrated pilot projects for "Sustainable Communities"
Oil reduction 1%	Oil reduction 7%	Oil reduction 13%	Oil reduction 3%
Improved efficiency 0%	Improved efficiency 6%	Improved efficiency 8%	Improved efficiency 8%
Energy invoice +3%	Energy invoice -5%	Energy invoice -5%	Energy invoice -6%

Wind Blowing Strongly in Portugal

Portugal burst into prominence on the European stage in 2004. Firstly, hosting the Euro 2004 football championships, whilst at the same time Portugal's Prime Minister Jose Manuel Durão Barroso was elected as the new President of the European Commission.

However, less well known is Portugal's progress in the field of sustainable energy, where they have been chalking up steady and impressive advances, especially in the development of wind power.

The main incentive for Portugal to develop its renewable energy sources has been the target laid down in the European Union's Renewables Directive. This projects that the proportion of renewable electricity in the Portuguese system should reach 39% by 2010.

It was a high figure, partly because Portugal depends to a great extent on large hydroelectric power stations, however, it's very difficult to build new large dams. So Portugal needed to mobilise the other technologies, and wind stood out as offering a unique opportunity.

From a virtual standing start two years ago, Portugal's installed wind capacity at the end of 2003 was close to 300 MW. 2004 promises to be a record year – it is possible that Portugal will double the amount of wind power installed by the end of 2004 – to 600 MW.

By the end of the decade, if a number of elements fall into place, the expectations are that the Iberian peninsula's rising star could be looking at well over 3,000 MW installed. The official government goal is even more ambitious – 3,750 MW of wind capacity by 2010.

The fundamental reason why wind energy has taken off in Portugal over the last few years has been the introduction of a series of laws and regulations giving renewables guaranteed access to the grid backed by sufficient financial incentives. Most important among these was the introduction in 2001, as part of the government's E4 Programme – promoting both energy efficiency and indigenous energy sources - of a tariff payment scheme which recognised that renewables were vital in the battle against climate change.

The tariff is made up from three elements – firstly, the avoided cost in terms of capital investment in a carbon-producing thermal power plant; secondly, the avoided cost in fuel and operations and maintenance from the same plant; and thirdly, an environmental credit for saved carbon dioxide.

The tariff system is very straightforward. In practice, the tariff reduces by stages the more a wind farm operates. For example, the first 2,000 hours of operation the rate is fixed at 9.14 €cent/kWh, but after that it reduces by roughly 1 €cent/kWh for every 200 more hours of annual operation. This means that the gross annual income for a 20 MW wind farm with an output of 60 GWh/year would be about €4.8m, corresponding to an average price of 8.06 €cent/kWh. For a wind farm with a lower output of 50 GWh/year, the gross income would be lower, at €4.3m, but the average price would increase to 8.62 €cent/kWh.





Passive House Ireland 2004 – a Resounding Success

A small revolution is building up in house design and construction in Ireland. First introduced to Ireland in 2002, the passive house concept has today captured the imagination of the Irish public and a few visionary entrepreneurs have taken the lead in making it happen.

The passive house concept was first introduced at SEI's inaugural solar conference See the Light 2002 and it featured again the following year. Such was the interest, that this year to maintain the momentum and interest in advancing the concept, SEI organised a two-day event and dedicated it solely to the passive house concept.

Passive House Ireland 2004 took place during November in Dublin and well over 100 delegates attended a suite of high quality activities, including:

- a training course on the conception and modelling of passive houses
- a study tour to the first passive house in Ireland
- a one-day conference devoted to the passive house concept

Passive houses, comfortable and healthy living without heating

At the heart of the passive house concept is a firmly established standard which requires very high levels of insulation and air tightness of the building envelope, as well as the use of highly efficient heat recovery ventilation. Heat losses have been reduced to such a degree that solar gains as well as internal gains from body heat and appliances are sufficient to maintain cosy temperatures inside. Heat recovery ventilation is based on a ducted system which supplies fresh air to living areas e.g. bedrooms and living rooms and extraction of exhaust air in wet rooms e.g. kitchen, bathroom, toilets. While such a system ensures a continual and controlled air renewal, it also avoids the energy loss generally associated with ventilation by transferring up to

90% of the heat content of the exhaust air to the fresh air.

According to Jürgen Schnieders, building physicist at the Passive House Institute, "since it was first demonstrated in Darmstadt (Germany) in 1991, the Passive House concept has become a resounding market success, with over 10,000 passive houses built in Europe to date. The real breakthrough was that we did away with the need for a conventional heating system, which partly covered the extra cost of energy saving measures, without compromising the comfort of occupants...quite the opposite!"

Johannes Kisslinger, from the architectural practice AH3, is a leading figure in the development of passive houses in Austria. At the conference, he presented one of his latest projects, a kindergarten near Vienna designed and built to meet the passive house standard.

This was an achievement in itself as a kindergarten has very challenging requirements in terms of layout, winter and summer temperatures, ventilation... in addition to a tight budget. It was obvious from Kisslinger's presentation that he had created a wonderful space for the children, but his brief went further. "We also minimised the ecological footprint of the building, starting with the construction material that we chose carefully from the point of view of energy content, global warming potential, harmful emissions and chemical pollution. Also using locally available materials like straw bales, wood cladding, recycled aluminium, clay plasters, etc."

Mario Bodem, architect from Germany, presented another award winning project consisting of the renovation of a classified industrial building into an attractive low-energy living space. Bodem explained, "The developer got a surprise when he found out that costly decontamination work had to be carried out even before the renovation work started. I managed to persuade him that by

adopting a strong ecological strategy, he could turn around the negative image of the site and increase the attractiveness of the final product to future buyers. Sustainable energy was a strong point of our strategy which was based on the use of passive house components as well as a highly efficient heating system including solar thermal panels for hot water. As a result, the energy requirement of the building was reduced from 250 to 60 kWh/m² per year. The ecological concept and the promise of low energy bills proved very popular with the buyers and the developer is very pleased with the project."

The conference programme also included three practitioners from Ireland. Each has made strides at implementing the passive house concept here. Tomás O'Leary, from MosArt Associates, gave the delegates a colourful account of the "joys and pains" of building his family's passive home in Wicklow. His home, the first passive house in Ireland, will be the subject of a monitoring programme funded by SEI. (See Page 8 for Passive Housing – A Practical Case Study)

Lars Peterson, based in Galway but originally from Sweden, has been manufacturing low energy timber-frame houses for the Irish public for the last 13 years. He explained, "Our emphasis is energy-efficiency and here our Swedish building methods and traditions play a large role. High levels of insulation and an air-tight building envelope in conjunction with ventilation heat-recovery systems and triple glazed low-emission argon filled glass are important factors. Our most popular model achieves an energy rating of 27 kWh/m²/year. Offering houses meeting the Passive House standard (15 kWh/m²/year) was therefore considered as a natural step for us and we are delighted to see the response that this concept is receiving here."

Gerard McCaughey and his colleague Jonathan Jennings from Century Homes, a well-known Irish timber-frame company, presented their Formula One construction concept which comes close the passive house standard while keeping an active heating system. "Our objective is to offer a construction system that has a low energy demand using indigenous solutions. We believe that the Irish market deserves something the time not in compliance with even the poor standards demanded by the current building regulations. Our Formula One concept should reach the 15 kWh/m² per year target but by preheating the ventilation air through an active solar air system, we were able to relax certain requirements of the Passive House standard in insulation level as well as trade-off some of the need for direct solar gains through glazing.

This should give us more flexibility in design and a more responsive environment."

Franz Beyeler, CEO of Minergie in Switzerland, gave the final presentation of the day on the power of labelling for the promotion of low energy houses and passive houses. Minergie is a voluntary building standard based on a low energy demand which is becoming very popular in Switzerland. The key to its success is that it is supported by professional marketing and consistent branding emphasising the comfort benefits of Minergie houses. According to Beyeler, "There are over 3500 Minergie buildings in Switzerland and our Minergie-p label (passive house standard) is now becoming popular too.

Part of our success is based on the establishment of a very strong network of partners across the local authorities and politicians. Minergie is really changing the phase of the building industry in our country."

Proceedings from Passive House Ireland 2004 are now available from SEI. Please call REIO on 023 42193 or email renewables@reio.ie for further details.

NÖ Landes Kindergarten, Austria (source: J. Kisslinger, AH3)



Passive Housing – A Practical Case Study

Landscape Architect Tomás O'Leary is building Ireland's first passive house – in short – a house that is so well insulated that it does not require any heating or cooling systems.

O'Leary first heard of the passive solar concept in 2002 at the See the Light conference organised by SEI. He was so motivated that he rang his wife, Mairéad, to say "we're going to move and build a passive house". Having seen a presentation about a terrace of Swedish houses which had no heating system, he was so convinced the system would work in Ireland, he went out and bought a site in County Wicklow.

"From that day onwards I started researching and looking for a site and here we are two years later with a house well under construction," says O'Leary standing beside his future 4000 square feet, two storey home, close to Wicklow town.



Tomás O'Leary pictured outside his passive house.

Designed with his business partner at MosArt, the house adheres to the underlying principle of passive solar standards - providing comfortable living without active central heating and cooling systems.

Key features are compact form with excellent insulation and air tightness, southerly orientation to capture natural sunlight and heat, massive heat storage, heat recovery ventilation, solar hot water and energy-saving household appliances.

O'Leary decided to use simple and conventional building materials so the house will be easily replicable. The walls are made of one layer of concrete blocks with a layer of insulation on the outside to maximize effectiveness.

"We're gluing over a foot of polystyrene insulation to the house and then that is plastered with an acrylic plaster." There is 40-50 cm of cellulose insulation in the roof and the roof truss has been adapted to allow 24 cm of insulation around the wall plate. This ensures that the U-value of the house's exterior shell is 0.10 W(m²,K) which is three times better insulation than current building regulations require.

To ensure air tightness with air leakage through unsealed joints of less than 0.6 times the house volume per hour. O'Leary explained: "You have to be obsessive about getting the detail right."

He opted for Austrian-made triple-glazed windows, which include argon and crypton gas in one layer. "This means the windows take in more heat on a cold day than they let out," he says. The window frames are also thermally-broken with a layer of

aged cork between the outer oak frame and the inner pine frame. True to passive solar design O'Leary's house has good southerly aspect.

Tall, large windows on the south-facing wall maximise solar gains in the winter. In the summer the overhanging roof, which extends 750 mm on the southside, and a balcony serving the first floor bedrooms, help prevent heat build up. "The sun on summer afternoons is high in the sky so it can't actually shine into the rooms directly," added O'Leary.

Windows on the north side have been kept small to allow natural daylight into the house while avoiding heat losses.

Heat storage is generally provided by the mass of building elements such as masonry walls or concrete floors. "We've got a huge thermal mass," says O'Leary. "Inside we've got concrete floors everywhere. They soak in the free heat, store it during the day and radiate it back out at nighttime."

Given the building's air tightness a good mechanical ventilation system is essential. "It takes the waste warm moisture-laden air and passes it through a heat exchanger so the cool air coming in is heated by the warm air going out." This ensures a heat recovery rate from the outgoing air of over 80%. I've been in houses with mechanical ventilation and there's a freshness about them all the time. If necessary you can also open the windows," explained O'Leary.

Twelve square meters of solar panels will supply ample hot water and there are plans to build a hot splash pool for the children to play in.

As part of the whole philosophy of the house, low energy appliances are being fitted and they are signing up to Airtricity for a green electricity supply. O'Leary estimates his house is costing 10% more to build than a conventional house, the windows and the insulation being the main cost.

It is also necessary to buy a mechanical ventilation system at approximately €10,000 which balances the money saved on not needing a heating system.

The passive house meets the environmental goal of a very low impact house, in addition to providing a home which is light, spacious and fun for all the family. He is also committed to sharing his experience.

The house is also a research project. SEI are funding the involvement of the Passive House Institute in Germany and the Energy Research Group in UCD.

"We'll have temperature sensors in all the rooms and sensors on the solar panels. The energy performance of the house will be monitored on an ongoing basis.

The main benefits of the new home, are a comfortable living space, low CO₂ emissions and no heating bills," concluded O'Leary.

The Passive House Institute was founded in 1996, by Dr. Wolfgang Feist. For further information www.passiv.de

Ireland's First Sustainable Energy Awards



Left to Right: Charles Chapman, CEO ESB Customer Supply, Martin O'Connor, Pfizer, David Taylor, CEO SEI

With energy costs continuing to increase, greater energy efficiency is now an issue of competitiveness and a business imperative for all companies in Ireland. That was according to David Taylor, Chief Executive of SEI, speaking at Ireland's first Sustainable Energy Awards in Dublin in November.

According to Mr. Taylor, the political crisis in the Middle East has once again raised issues about security of supply and the implications for our overall economic competitiveness, as the price of crude oil exceeds the \$50 dollar-a-barrel mark. "Ensuring that we remain competitive is essential to safeguarding the continued economic growth of this economy and the maintenance of our current levels of employment for our people. Sustainable energy management and energy efficiency will have an important role to play in this," he said.

Organised by SEI and sponsored by ESB Customer Supply, the Sustainable Energy Awards encourage, recognise and reward excellence in energy management in the industrial, commercial and public sectors. The awards focus on the individuals and groups who demonstrate a commitment to introduce energy management as an integral part in the operation of their business and provide an opportunity for organisations, regardless of size, to gain public recognition for their achievements in reducing energy use and emissions.

Mr. Taylor continued, "The Sustainable Energy Awards are all about recognising tangible improvements in energy efficiency, reductions in energy consumption and a consequent reduction in the level of CO₂ emissions. For all of us greater energy efficiency is now an imperative. We hear a

lot of talk about the 'triple bottom line' – people, planet, profit – and nowhere does that apply more than in terms of energy consumption and sustainability.

Achieving more sustainable usage and production of energy is increasingly becoming an issue about our competitiveness and the competitiveness of the economy as a whole."

In an address to the award attendees, Mr. Noel Dempsey, Minister for Communications, Marine and Natural Resources, said, "Never has there been a greater imperative for co-operation, particularly between Government and the business sector. Robust energy management practices provide a valuable opportunity to reduce energy emissions and continue to be encouraged through awards schemes such as these. We are all too aware also of the increasing costs of energy and its impact on business cost.

However, as we see from the award winners, a new strategic approach and commitment from senior management is emerging and is key to successful energy management."

In total, eighteen Sustainable Energy Awards were presented across seven categories:

Coordinated Energy Management Programme; Electrical Energy Project; Thermal Energy Project; Energy Awareness Campaign; Energy Service or Supply Company; Excellence in Design or Specification; Energy Manager. Over 250 entries were received across all the categories.

The awards scheme will be relaunched for a second year, in February 2005.

Large Industry Energy Network

Some of Ireland's leading companies have been to the forefront in the drive to reduce energy costs and, by improving their energy efficiency, the level of emissions of harmful greenhouse gases such as Carbon Dioxide (CO₂).

Collectively, the member companies of the Large Industry Energy Network (LIEN), whose annual report was presented to Mr. Noel Dempsey T.D. Minister for Communications, Marine and Natural Resources, account for 42% of Ireland's industrial sector's Total Primary Energy Requirement (TPER) which is 9% of the total national energy requirement.

Established eight years ago by SEI, the LIEN is a voluntary networking initiative, aimed at improving the management and efficient use of energy in industry. Launching the LIEN report SEI announced that savings of almost €7m and reductions in emissions of CO₂ of 44,000 tonnes were achieved by participating companies in 2003. It is estimated that €60million in energy costs have been saved by members since the programme was launched. The corresponding reduction in CO₂ emissions was 450,000 tonnes.

Commenting on the report, Mr. David Taylor, said; "The LIEN report demonstrates how a strategic partnership can deliver greater energy efficiency, reduce greenhouses gas emissions and ultimately contribute profit to the bottom line of companies. The achievements of the LIEN members continue to contribute to the competitiveness of the economy as a whole.

Speaking at the launch of the report, Minister Dempsey T.D. said: "By working together in this manner, the largest industrial energy users in the country, in collaboration with a state agency, have both reduced greenhouse gas emissions and contributed to Ireland's competitiveness."

Minister Gives the Green Light



Mr Noel Dempsey's T.D., Minister for Communications, Marine and Natural Resources, signalled the government's commitment to developing Ireland's vast sources of renewable energy resources in announcing fresh government support for the construction of an additional 235 MW of new green electricity generating plant.

Given the very real challenges of climate change and the excessive national reliance on imported fuels (that currently stands at around 89%), Ireland's dependency on fossil fuels is unsustainable in both environmental and economic terms. Increasing the deployment of renewable energy resources, which include wind, hydro, biomass and solar energy, is recognised as a key component of sustainable development, at both national and EU level. Realising the potential of national renewable

energy resources has strategic importance as a means of improving security of supply and protecting the economy.

Wind energy is the country's most plentiful renewable energy source and most of the new capacity will come from onshore wind projects. In addition the Minister confirmed offers of contracts to two offshore wind demonstration projects and three biomass combined heat and power projects. Other technologies include landfill gas and anaerobic digestion plants.

The new capacities now confirmed included:

- (1) Onshore wind energy (over 5 Megawatts) 177.1 MW
- (2) Onshore wind energy (under 5 Megawatts) 57 MW
- (3) Biomass (landfill gas) 3.273 MW
- (4) Biomass Anaerobic Digestion 0.795 MW

Commenting on his announcement the Minister said "The benefits of this announcement are:

- Secure clean eco-friendly indigenous electricity for 200,000 homes
- A reduction of over 600,000 tonnes of greenhouse gas emissions,
- Reduced dependency on imported fossil fuels by more than 1.6 million barrels of oil every year

- Improved national trade balance by over €45m annually by redirecting money previously spent on importing energy back into the Irish economy
- This redistributed money will facilitate the creation of 140 new long-term jobs in renewable energy equipment operation and maintenance, and over 600 full time construction jobs over the two year building phase

As regards the future of the renewable energy sector, the Minister added, "The Renewable Energy Development Group established earlier this year is chaired by my Department and comprises relevant experts from the administrative, industry and scientific sector. The Group will advise on future options on policies, targets, programmes and support measures to develop the increased use of renewable energy in the electricity market to 2010 and beyond. The Group's report is due by the end of 2004 and its recommendations will form the basis of a new policy to further increase the penetration of renewable energy technologies in the electricity market."

This announcement follows on from an initial announcement of results in a competition referred to as AER 6 and will support a further thirty projects and replaces projects which could not proceed for a variety of reasons and the new projects following EU Commission state aids clearance for an additional 140 MW above the previous target.

TABLES OF ADDITIONAL PROJECTS

Large Scale Wind Category (over 5 megawatts)		
Company	County	Size (MW)
Tradewinds Energy Ltd.	Limerick	10.00
Taurbeg Ltd.	Cork	26.00
Moneenatieve Ltd.	Roscommon	7.65
Waterfern Ltd.	Leitrim	6.80
Beam Wind Ltd.	Donegal	14.00
SouthWesternForestry Services (Bandon) Ltd.	Cork	9.35
Booltiagh Wind Ltd.	Clare	19.50
Everwind Ltd.	Kerry	6.80
Enerco Energy Ltd.	Cork	7.00
Meentycat Ltd.	Donegal	22.50
Green Energy Co. Ltd.	Cork	47.50
Biomass (Landfill Gas) Category		
Company	County	Size (MW)
Irish Power Systems Ltd	Kildare	1.273
Biomass Anaerobic Digestion (AD)		
Ballyshannon Farms	Wexford	0.100

Small Scale Wind Category (under 5 megawatts)		
Company	County	Size (MW)
Teevucher Limited	Meath	4.50
Redwind Energy Ltd.	Donegal	2.55
Redwind Energy Ltd.	Donegal	2.55
Compower Ltd.	Mayo	2.55
Aeolus Ltd.	Tipperary	2.55
Vincent Callaghan	Donegal	4.95
Bearna Gaoithe Teo.	Wicklow	2.55
Mukdar Ltd.	Cork	4.25
Tadhg O'Cobhthaigh	Cork	4.25
Greenoge Ltd.	Carlow	2.60
Kilvinane Windfarm Ltd.	Cork	4.50
Saporito Ltd.	Donegal	1.20
West Clare Windfarm Ltd.	Roscommon	4.50
Western Power Ltd.	Mayo	2.55
Lahanaght Hill Windfarm Ltd.	Cork	4.25
N.W. Power Ltd.	Mayo	1.70
Douglas & Linda Wilson	Wicklow	5.00

2004 European Barometer of Renewable Energies

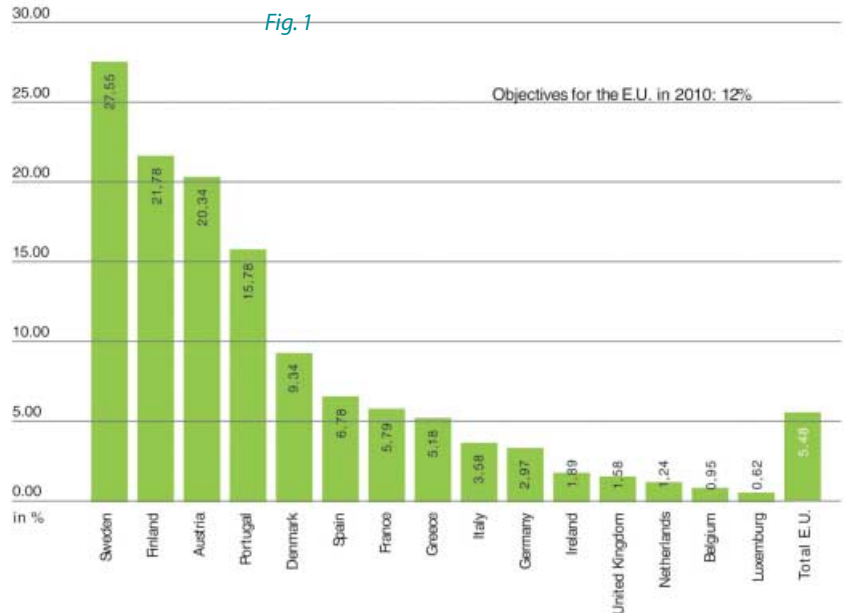
The European Barometer on renewable energy sources provides rapid and reliable feedback on the progress being achieved in relation to the European targets which have been set for renewable energy by the year 2010 namely, 21% for green electricity, 5.75% for biofuels and 12% for the total inland consumption.

Figure 1 illustrates the situation for the share of renewable energies in primary energy consumption of the countries of the European Union in 2003.

The estimate for all member countries is 5.48% against an objective of 12% for 2010. The first observation that clearly stands out is that of a stagnation of renewable energy sources over the last three years. This ratio was estimated at 5.6% in 2001, and then at 5.08% in 2002. Renewable energies therefore did not do any better than simply defend their position without gaining any ground in terms of relative share. It's therefore obvious that, at this rate, the European Union will not reach its objective of 12%.

For a full copy of the "European Barometer of Renewable Energies 2004" please log on to:
[://europa.eu.int/comm/energy/res/publications/barometers_en.htm](http://europa.eu.int/comm/energy/res/publications/barometers_en.htm)

Source: EurObservEr 2004



BIOMASS RESOURCE PACK

SEI have selected the best bioenergy publications to form a comprehensive biomass resource pack. The pack contains a compilation of SEI conference and study tour material on all aspects of bioenergy and is an essential tool for anyone with a professional interest in bioenergy, as it offers both an introduction to the technologies and a valuable information reference source.

The pack includes:

- A Best of Biomass resource CD on all biomass covering anaerobic digestion, landfill gas recovery, liquid biofuels and wood energy. Includes case studies and overviews of each biomass area.
- A compilation CD from the SEI/COFORD Wood Energy conferences 2002-2004 and Study Tours 2001-2003. A wealth of information from experts on wood fuel development.

- The Wood Fuels Basic Information Pack - a publication from the BENET Bioenergy Network, Finland - covering all aspects of wood fuel production and combustion.
- * Biomass Co-firing and Combustion - IEA publication on combustion technology and fuel supply chains, for biomass-to energy applications ranging in size from domestic to industrial scale.
- Wood Pellet Production Study - full colour printed copy of a study conducted by SEI on wood pellet production in Ireland. Full overview of pellet production technology.
- Wood Energy Revue magazine from the European Institute for Wood Energy (ITEBE). Latest issue on developments in wood energy and market reviews

The resource pack is available online at www.sei.ie/reio/reiobookshop.html

Cost: €75



A Strategy for the Deployment of Heat Pumps in Ireland

Arsenal research, a large Austrian research centre, was commissioned by SEI to carry out a study to define a strategy for the deployment of heat pumps in Ireland. After identifying the barriers and opportunities for heat pumps, they analysed policies and measures implemented in other European countries with a strong market development. On that basis, arsenal research recommended an action plan for the next five years which would:

- aim at achieving annual sales of 5,000 units within the next ten years;
- establish high standards of quality through the education and certification of professionals, and the labelling of equipment;
- undertake a comprehensive marketing campaign;
- offer financial incentives to consumers to overcome high initial investment barrier;
- set up a trade association with initial government support to undertake quality and PR initiatives.

To download the report go to www.sei.ie/erdd/heatpump

Geothermal Resource Map of Ireland

During 2004 SEI Commissioned four studies including one that will:

- Identify potential resources of geothermal energy in Ireland
- Create geothermal models of Ireland and gather the necessary thermal, geological, structural and hydrodynamic data to facilitate modelling
- Produce a GIS-linked geothermal database and using the models, create a series of geothermal maps of Ireland
- Review the current status and utilisation of geothermal energy resources in Ireland
- Present recommendations on the future potential exploitation of the geothermal resource in Ireland in the context of International Best Practice

In order to map the subsurface temperatures, all available borehole data in the Republic of Ireland was gathered. The study compiled data on warm springs and groundwater temperature trends. The results of this review indicate that Ireland is particularly well suited for the utilisation of ground source heat pumps, due to its temperate climate and rainfall levels which ensure good conductivity and year round rain-fall recharge.

To download the full study go to:

http://www.sei.ie/content/content.asp?section_id=1289

Co-firing with Biomass

SEI commissioned Electrowatt-Ekono to investigate co-firing with biomass in existing coal fired and new generation peat fired power stations – Moneypoint, Edenderry, Lough Ree and West Offaly. The study was completed in May 2004. The key finding was that co-firing was technically feasible in all cases without modifications, particularly for the peat plants. The availability of wood residues at economic cost was more problematic, although a 10% level of co-firing in the peat plants was viable under existing cost regimes. Applying notional CO₂ costs up to €30 / tonne indicated that greater levels of co-firing were realistic. The study can be downloaded from the SEI website: www.sei.ie/reio.htm



Recommended Events 2005

18-20 February 2005

Self-Building Extending & Renovating Homes Show,

The King's Hall, Belfast
www.selfbuild.ie

2 - 4 March 2005

The World Sustainable Energy Days 2005

Stadthalle, Wels, Austria

This event offers a unique combination of events including:

European Pellets Conference ,

Stadthalle, Wels, Austria

<http://www.esv.or.at/esv/index.php?id=1276=1>

Wood pellets are a CO₂ neutral and convenient fuel with a rapidly growing market share, and are a key technology for increasing biomass use. Building upon the success of last years event, the conference will provide information on technology, innovation and market trends.

Innovative Public & Commercial Buildings,

Stadthalle, Wels, Austria

<http://www.esv.or.at/esv/index.php?id=863=1>

Cost pressure and increased energy requirements present challenges in building construction and renovation/retrofitting. The conference will present innovative technologies and outstanding examples from all over Europe.

Energy Sustainable Communities

Stadthalle, Wels, Austria

<http://www.esv.or.at/esv/index.php?id=880=1>

Local and regional communities, municipalities and regions have a decisive role in making sustainability in the energy field happen. The conference provides a forum for discussing strategies for energy efficiency and renewable energy.

7-8 April 2005

Irish Wind Energy Associations Annual Conference

The Fairways Hotel, Dundalk

www.iwea.com

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