

Submission to
Energy Green Paper
Towards a Sustainable Energy Future for Ireland



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1 Introduction

The Amergin Centre for Sustainable Energy Development in Tipperary Institute welcomes the opportunity to comment on the Green Paper on Energy. The comprehensive nature of the document from the Department is welcomed and this document seeks to make a construction response to the policy development process.

1.1 Overview of Amergin

Tipperary Institute's first project in the sustainable energy sector commenced in late 1996, before the Institute even opened to students. The Institute's Centre for Sustainable Energy Development was established in 2002, to provide a focus for the Institute's work on the topic. The Centre is a cross-departmental structure, involving staff from the Rural Development Department and the Information and Communications Technology Department. The Centre is also linked to the Tipperary Energy Agency.

The following are areas of focus for the Centre:

- bioenergy
- rural community-led sustainable energy initiatives
- domestic sustainable energy

The Tipperary Institute staff currently involved in the Centre are:

1. Clifford Guest, Programme Specialist, Rural Development Department
2. Kevin Healion, Programme Specialist, Rural Development Department
3. Seamus Hoyne, Programme Specialist, Rural Development Department
4. Eugene Kelly, Programme Specialist, ICT Department
5. Mathew Mather, Programme Specialist, ICT Department,
6. Maureen Ryan, Administrator, Rural Development Department
7. Paul Smyth, Part Time Programme Specialist, Rural Development Department

2 Amergin Response

2.1 Need for Clarity regarding targets and language

Amergin would wish to ensure that adequate clarity is provided when targets are set and communicated. It is important that the use of the term energy is used to replace electricity and vice versa. Targets need to be clear for each of the electricity, heat and transport sectors.

The targets for electricity from renewables and biofuels are clear e.g. 15% of consumption by 2010 etc. However, the target of 5% of heat purchases should be from renewables by 2010 (with 50% from biomass) is particularly ambiguous and it is unclear how it will be measured. It also does not support, for example, solar which has no fuel purchase.

It is unclear how the target for energy efficiency (20%) will be quantified. It may not be fully valid to only use TPER versus GDP and the Energy Efficiency Action should provide further clarity on this.

2.2 Further Ambition

Amergin completed an initial review of the targets for renewables and compared these with the targets in the EU White Paper on Renewables, as shown in the following Table.

% of TPER ¹	Sector	2010 RES Target	2010 RES Target as % of TPER	2020 RES Target	2020 RES Target as % of TPER
33%	Heat	5%	1.65%	10% ²	3.3%
33%	Electricity	15%	4.95%	30%	10%
33%	Transport	5.75%	1.9%	5.75%	1.9%
Cumulative			8.50%		15.20%

Table 1: Review of RES Targets

The EU White Paper set a target of 12% of TPER to come from renewables by 2010. It is clear that with the current targets that this will not be achieved. Increased targets in the field of heat and electricity are possible. The transport sector provides the greatest challenge with the limited production capacity for biofuels in Ireland.

¹ Based on SEI data

² Amergin Assumption

2.3 Responses to Specific Questions

Amergin has attempted to respond to the key questions, where it has the appropriate skills and competence to provide a response.

2.3.1 Ensuring the Security of Energy Supply

In addition to enhancing the contribution of renewable energy, what actions could be taken to further diversify the fuel mix for electricity generation and reduce dependence on oil and gas?

No specific comment.

How can generation and transmission adequacy in the electricity sector be improved?

No specific comment

What actions should be taken to create strategic storage capacity in the gas sector?

No specific comment

What are the challenges to greater participation by new players in the development and operation of power generation plant - and how should they be addressed?

Further information, for renewables, on what is planned post the current Gate 2 process would be beneficial. A long-term plan for the entire network over the next 20 years would be of benefit for all players.

An annual review of the REFIT programme to determine how it is operating from a cost-effectiveness and operational point of view.

How, and over what timeframe, should Ireland pursue greater electricity interconnection with Europe?

No specific comment

What measures could be taken to encourage the exploration and production of indigenous energy resources?

Future use should include specific requirements for producers to provide support to local communities affected by new developments. A clear process for appropriate engagement between developers and local communities to avoid a reoccurrence of the issues with the Corrib field would be important.

Given the existing level of dependence on imported fossil fuels, what needs to be done to enhance contingency measures?

The plan for use of biomass for co-firing in the peat stations is welcomed but Amergin would welcome additional analysis to ensure the cost-benefit of co-firing in a single large site versus more local use. The development of a number of large end users could have a major impact on the price of biomass fuels and will require consider supply chains. Further details on how this capacity is to be supplied is required.

Does the Green Paper generally set out the right policy directions for security of energy supply?

No. Amergin welcomes the Green Paper as a starting point to developing a National Energy Policy in general, but the feels that an even more ambitious vision is required e.g. Swedish Vision of 100% energy from renewables by 2020 (excluding transport). More conviction and true guidance is required. The ForFas Report 'A Baseline Assessment of Ireland's Oil Dependence' clearly identifies the need to move further away from fossil fuels and a faster pace that that indicated in the current paper.

2.3.2 Promoting the Sustainability Of Energy Supply

What can be done to improve the pace and range of development of renewable energy resources for electricity generation on a sustainable basis?

- Further clarity on the electricity grid i.e. longer term plan to integration of renewables and post Gate 2 connections.
- Specific timetable for implementation of Smart Metering building on the CER Discussion document on Micro Renewable connections.
- A more comprehensive support programme is required for anaerobic digestion projects i.e. beyond the current ReFIT supports, to address its additional environmental benefits (waste management, agricultural etc.).
- A strong need to address how the target of 30% co-firing target can be met with a suitable fuel supply system. It is now necessary to move beyond demonstrations of technology and to facilitate the development of such supply chains in a real manner.
- The development of a comprehensive support programme for energy crops is vital and an immediate requirement. There has been considerable delay in delivering a pilot support programme that is proving frustrating for the sector.
- Specific support programmes for wood gasification and pyrolysis projects
- Specific support programmes for micro renewable electricity systems
- Revision of the ReFIT programme with a longer term Programme i.e. 10 year programme with specific targets for renewable energy sectors and annual review of price supports.
- Support for Auto-production projects and addressing administrative and other barriers to such developments
- Local Authorities have ideal sites for developing Renewable Energy projects i.e. high level reservoir sites, on-shore treatment plants, landfills, etc. They also have the demand for the generated electricity. The big constraint is the "use of the electricity grid system" that prevails in this Country. There should be a mechanism in place where Local Authorities could generate electricity on one site and supply another site via the

electricity grid with appropriate charges on the distance between sites. The Renewable Energy Projects would then become viable and sustainable.

- Immediate Research and Development of Smart/net metering technology
- Review of impact of wind turbine supply on industry development with support of local manufacture is possible
- Specific support for development of education and training programmes to meet industry requirements.
- Monitoring and evaluation programmes for all public supported RES-e projects.

In addition to electricity generation, what actions should be taken to develop renewable energy usage in the transport and heat sectors?

Amergin makes the following recommendations:

Heat Sector

- A further target for renewable energy heat should be set for 2020 of 25%
- Support the development and implementation of a Renewable Energy Heat Promotion campaign that can be delivered at a local level through supported actions of Local Energy Agencies.
- Support the roll out of similar projects to the Clare Wood Energy Project to all appropriate Local Authority areas. These should be cooperative projects between LEAs, LEADER Companies, Teagasc, the Forest Service and others.
- Establish Regional Bioenergy Groups to maximise local/regional opportunities and coordinate actions (e.g. MWRA Bioenergy Group and WDC Biomass Group)
- Support and facilitate the development of manufacturing of renewable energy heat plant and appliances – reduce export of investment and capital
- Establish procedures for implementation of EU standards for wood fuels through the NSAI
- Establish testing procedures for renewable energy heating technologies to ensure quality equipment is delivered to the market
- Establish quality assurance standards for installers and providers of renewable energy heating technologies
- Implement the Inspection and Verification and Technical Assessment Procedures under the Greener Homes Scheme.
- Roll out of Community Energy Initiative as piloted in Meath/Cavan/Monaghan/Louth area by Meath and Cavan/Monaghan Leader and Meath and Carlow/Kilkenny Energy Agencies and DKIT.
- Introduce a programme and target date for all Public Buildings to use biomass as a base load for heating buildings, swimming pools, etc – National and Local Authority leadership

Transport

- Supports to be provided to Local Authorities to address the fuel supply issues in relation to bio-fuels – enhancing existing LA schemes (e.g. Cork City Council, Galway City Council, Mayo County Council, North Tipperary County Council, Carlow Co Co and others) and facilitating other LA initiatives for demonstration and awareness at the local level.
- Full implementation of MOTR Programme and development of future programme to ensure sustainability of existing and future projects.

- Introduce a National Policy for LA procurement of vehicles – with high (50%) bio-fuel blends or conversion technology engine capabilities
- Training programme on bio-fuels to be delivered to relevant Local Authority staff.

What significant new initiatives could be taken to increase energy efficiency across the economy and in particular in households, businesses, the public sector, the transport sector and the built environment?

Information and Awareness

- Modification of the Power of One Campaign to include local awareness and information campaigns delivered through the Local Energy Agencies

Business Sector

- Specific programmes to target the SME sector who have had limited or no support in relation to energy (e.g. TEA Energy Check in Craft SME Project)
- Expand Energy MAP programme with practical delivery of education and training to commercial sectors.
- A modification of the Greener Homes Scheme for SMEs

Public Sector

- All relevant Government Departments to set energy efficiency measures to feed down to a local level – implementation of the EU Services Directive
- All relevant Government Department funding programmes to be reviewed for inclusion of/increased supports for energy efficiency measures e.g. Dept of Education Capital Grant Aid Summer Work Scheme, OPW buildings and facilities for the decentralisation programme, DoEHLG Central Heating Programme, etc
- Improve all LA buildings and housing, new build and existing to achieve a A-B Energy Rating, as part of the implementation of the EU Energy in Buildings Directive
- Increased promotion and development of PPP for renewable energy power and heat production at LA level, e.g. wind auto-production for water/sewage plants, bio-mass/solar heating to leisure facilities, etc

Built Environment

- Introduction of energy efficiency retrofit programme for existing houses and commercial buildings (rented, owner occupied etc.) to bring all buildings prior to 2002 regulations up to current regulations.
- Immediate ban on use of hollow block construction nationally.

Transport Sector

- Implementation of National Spatial Strategy to reduce transport energy demand reduce commuting distances and increase access to public transport.
- Relocalisation of food production and use to reduce 'food miles'
- Review of public sector expense rates to promote use of smaller sized engines, bio-fuels and public transport. Possible to link to CO₂ emissions per km.
- Expansion of VRT reduction linked to efficiency levels with introduction of increased VRT for inefficient vehicles.
- Development of Rural Bus Schemes (such as www.ringalink.ie in Kilkenny)

What additional policy measures should be introduced to significantly expand energy RTDI and what are the priority areas of research, which need to be targeted? & In light of the Government's Science, Technology and Innovation Strategy, what needs to be done to radically expand the national energy research capacity?

- Elimination of embargo on recruitment within public sector for National Priority areas e.g. energy to allow capacity to be developed in the energy sector
- Specific support programme for FP7 projects with targets for number and quality of projects to be delivered.
- Review and revitalisation of Energy Technology Foresight report and implementation of recommendations as appropriate to expand from focus on biotechnology and ICT.
- National funding to adequately disseminate results of all Research projects
- Support Energy Research Centres, in conjunction with National Universities and Institutes of Technology

What are the key supply and demand questions to be addressed to underpin a fully cohesive National BioEnergy Strategy?

Amergin would urge the Government to implement the recommendations of the reports which have already been completed i.e.

- Bioenergy Strategy Group Report
- COFORD Strategic Study on Wood Energy (Electro Watt Ekono and Tipperary Institute)
- Bioenergy Training Needs Report (Tipperary Institute for Sustainable Energy Ireland)
- Biofuels Strategy Report (Sustainable Energy Ireland)

Do we need to choose between mandatory targets and better incentives for renewable energy and energy efficiency - or is a mix of both the best way forward?

A mix of both measures will compliment the national targets for abatement of emissions. Both measures be strengthened within the current arrangements and framework, assisting the promotional and implementation efforts at ground level.

Does the Green Paper generally set the right policy directions for energy sustainability?

No. Amergin welcomes the Green Paper as a starting point to developing a National Energy Policy in general, but the feels that an even more ambitious vision is required e.g. Swedish Vision of 100% energy from renewables by 2020 (excluding transport). More conviction and true guidance is required. The ForFas Report 'A Baseline Assessment of Ireland's Oil Dependence' clearly identifies the need to move further away from fossil fuels and a faster pace that that indicated in the current paper.

2.3.3 Enhancing the Competitiveness of Energy Supply

In the context of liberalisation of the Irish energy market, what further actions should be taken to develop more fully competitive electricity and gas markets and what specific barriers need to be overcome?

No specific comment

What policy measures and targets should be introduced to reform institutional arrangements and market structure, particularly in the electricity and gas sectors?

No specific comment

While a significant proportion of our energy prices are determined by international oil and gas prices, what actions should be taken domestically to reduce the cost of electricity and gas to consumers?

No specific comment

State-owned enterprises (e.g. ESB, BGE, BnM) have played a central role in the development of the energy sector. How should the role of State-owned energy enterprises respond to the challenges of meeting our energy needs in the future?

No specific comment

What further action should be taken to alleviate fuel poverty?

Develop a specific retrofitting programme targeted at both landlords and tenants which targets specific housing in which fuel poverty is relevant.

Does the Green Paper generally set the right policy directions for enhancing the competitiveness of the Irish energy sector?

No. Amergin welcomes the Green Paper as a starting point to developing a National Energy Policy in general, but the feels that an even more ambitious vision is required e.g. Swedish Vision of 100% energy from renewables by 2020 (excluding transport). More conviction and true guidance is required. The ForFas Report 'A Baseline Assessment of Ireland's Oil Dependence' clearly identifies the need to move further away from fossil fuels and a faster pace that that indicated in the current paper.

3 Conclusion

Amergin welcomes the Green Paper as an initial step towards a National Policy framework and looks forward to the final document, incorporating the comments and input of the wider community.

Appendix 1 Tipperary Institute Profile



Profile of Tipperary Institute

The Tipperary Institute is an integrated education and development institute established by the Irish Government. The institute links education, community and business within the context of sustainable rural development. It began operation in 1997 and opened to students in September 1999. It is located in a rural region of Ireland (County Tipperary) and has campus buildings in two towns (Thurles and Clonmel), about 50 kilometres apart. The institute has a strong technology focus with a high speed computer network linking both campus locations, and state of the art video conferencing technology. The institute has a staff of 130 people. 700 students attend the institute, undertaking Certificate and Degree courses in sustainable rural development, renewable energy, business or computing. The lecturing staff spend up to 40% of their time involved in outreach or external work as part of their contracts. There is an institute-wide commitment to the principles of sustainability, partnership, inclusion and innovation. There is strong inter-departmental co-operation.

The Rural Development Department has a staff of 20 people, offers Degrees in Sustainable Rural Development (Ordinary and Honours), and undertakes outreach work, project work and research. The Director of Rural Development is Mr. Ciarán Lynch. This Department heads up the work within the Institute in the area of sustainable energy. The Rural Development Department is also active in the areas of community development, adult and community education, personal development, environmental resource management, strategic planning, Integrated Area Planning and conference organisation (the Thurles campus includes a 180 seat custom-built conference centre). The Institute was awarded the contract in 2004 to act as the Irish LEADER Support Unit.



Tipperary Institute, Thurles Campus

The Business Department work on e-commerce, product development, marketing, change management, project management, tourism development, business support and international business. The Information and Communication Technologies Department are involved in the design and management of computer networks, multimedia and web development, software

design and development, computer-based training, technology support to business and community, and management of distance learning and training programmes.

Profile of Centre for Sustainable Energy Development.

The Institute established the Centre for Sustainable Energy Development (CSED) in 2002 and this focuses the work of the Institute in this area. Members of the CSED are:

- Mr. Clifford Guest, Programme Specialist, Rural Development Dept.
- Mr. Kevin Healion, Programme Specialist, Rural Development Dept.
- Mr. Seamus Hoyne, Programme Specialist, Rural Development Dept.
- Mr Mathew Mather, Programme Specialist, ICT Dept.
- Mr Eugene Kelly, Programme Specialist, ICT Dept.
- Ms Maureen Ryan, Administrator, Rural Development Dept.
- Mr Paul Smyth, Part Time Programme Specialist, Rural Development Dept.

The Mission of the CSED is

TO PARTICIPATE IN THE DEVELOPMENT AND IMPLEMENTATION OF SUSTAINABLE ENERGY POLICY AND PRACTICE IN ORDER TO ACHIEVE ENVIRONMENTAL, ECONOMIC AND SOCIAL BENEFITS AND TO CONTRIBUTE TO THE OVERALL MISSION OF THE INSTITUTE

Amergin Activities

Education and Training

Advanced Certificate in Renewable Energy:

The CSED runs, through the Rural Development Department, a Tipperary Institute Certificate in Renewable Energy. The course is aimed at those interested in developing a renewable energy project, and those working at a strategic level in local authorities and other state organisations. The course is the first of its kind in Ireland. It is held one night a week for one academic year. 85 students have successfully completed the course since 2001.

Advanced Certificate in Domestic Sustainable Energy

The programme deals with domestic renewable energy heating systems, small-scale renewable energy electricity systems and passive solar and sustainable building design. The course is aimed at homeowners, prospective homebuilders, as well as architects, electricians, engineers, builders or anyone interested in sustainability and the environment. It is held one night a week for one academic year. The first full cycle of the programme commenced in September 2005. One of the three modules in the programme was piloted in September 2004, and has subsequently been franchised out.

Degrees in Rural Development

Members of the CSED contribute to the Ordinary and Honours Degrees in Rural Development. Specific content on sustainable energy is included in the following modules:

- Natural Resource Management
- Sustainable Rural Development, 1 & 2
- Current Issues in Rural Development
- Introduction to Environmental Management

Renewable Energy Training Courses

The CSED has held a number of training courses off the TI campus. Training courses have been run in Kilkenny (funded by Barrow Nore Suir Rural Development and in conjunction

with Carlow-Kilkenny Energy Agency), Newcastle West (funded by West Limerick Resources) and Carlow (funded by Carlow LEADER Rural Development Company). CSED staff have also contributed to courses in Clare (funded by Eiri Corca Baiscinn) and Galway (for Galway Energy Agency).

Outreach and Projects

The CSED is involved in the provision of a range of services in the Sustainable Energy Sector. Clients include community groups, SME's, individuals etc. Services provided include:

- resource assessment (at national and local levels)
- policy advice and input (for example, via the Government's Bioenergy Strategy Group)
- feasibility studies

The CSED has a particular strength in the field of biomass and bioenergy. This is reflected in the extensive list of EU and national projects which have been completed in this field (over 10 EU-supported projects completed since 1998). It has also been involved in organising a number of important conferences and events in the sustainable energy area.

Consultancy

The CSED has completed a range of consultancy work. This includes work at a national, regional and local level. The work has been focused primarily in the area of bioenergy to date.

Research and Development

The CSED established a 0.1 hectare research and demonstration plantation of willow coppice on the Thurles campus, laid out according to a scientific protocol to allow statistically valid yield measurements to be taken. This site is being used to demonstrate the crop to interested parties and also complete research with regard to yield rates.

The CSED is researching the potential for the installation of a separate wood fuelled heating system which, in conjunction with a range of energy management measures, would move the campus to being an example of sustainable energy in practice.

Policy Development

The CSED has been involved in the establishment of the Irish Bioenergy Association (IrBEA) and continues to play an active role in its management. It is also a member of the Irish Wind Energy Association, Irish Solar Energy Association, Irish CHP Association and Meitheal na Gaoithe. It has contributed to a range of policy documents and made submissions to Government on particular issues.

Strategic Partners

The CSED has a strategic partnership with the Tipperary Energy Agency (TEA) Ltd. The TEA (www.tea.ie) is an SME established by North and South Tipperary County Councils and Tipperary Institute to implement best practice in the sustainable energy sector. The TEA is particularly focused on the area of energy management in Local Authorities and SME's, implementation of renewable energy projects and energy rating of buildings. The TEA and CSED work together to provide a comprehensive set of services.

Examples of Relevant Projects

- “**Bioenergy** Training and Education Needs Study” Client: Sustainable Energy Ireland.
- “Country Representative for the Republic of Ireland on IEA **Bioenergy** Task 29.” Client: Sustainable Energy Ireland. Ongoing.
- “**Biogas** Centre of Excellence – BIOEXELL”. Part-funded by the EU Altener programme (contract number 4.1030/Z/01-045/2001). Co-ordinated by the University of Southern Denmark. Partners in Austria, France, Germany, Greece, Ireland, Italy, Northern Ireland and Spain. See <http://websrv5.sdu.dk/bio/bioexcell.htm>.
- “COFORD Strategic Study: Maximising the Potential of **Wood** Use for Energy Generation in Ireland”. Tipperary Institute subcontract to Electrowatt-Ekono (UK) Ltd. Client: National Council for Forest Research and Development (COFORD). Completed 2003.
- Secretariat to the COFORD **Wood for Energy** Strategy Group. Client: National Council for Forest Research and Development (COFORD). Completed 2003.
- “European **Bioenergy** Networks - EUBIONET”. Part-funded by the EU (contract number 4.1030/S/01-1000/2001). Co-ordinated by VTT Energy (Finland). Partners in 14 EU Member States. Tipperary Institute was the National Co-ordinator for the solid biofuels and gaseous biofuels elements. See <http://eubionet.vtt.fi/>. Completed 2003.
- “Implementation, Development and Transfer of **Biomass** Expertise by the Tipperary Rural and Business Development Institute”. Part-funded by the EU Altener programme (contract number XVII/4.1030/Z/98-372). Partners: Tipperary Institute (Co-ordinator), Teagasc, University of Southern Denmark (formerly South Jutland University Centre) and the Swedish University of Agricultural Sciences. Completed 2001.
- “Targeted Actions in **Bioenergy** Networks – AFB-net Phase V” (Agriculture and Forestry Biomass Network). Part-funded by the EU Altener programme (contract number XVII/4.1030/Z/99-593). Co-ordinated by VTT Energy (Finland). Tipperary Institute was the National Co-ordinator for Ireland, and participated in the 100% RES Communities task (led by Keith Richards, then with AEA Technology). Completed 2000.
- “Waste for Energy Network (WfE-net)” - **Biogas**. Part-funded by the EU Altener programme (contract number XVII/4.1030/Z/98-213). Co-ordinated by the Bioenergy Department of the University of Southern Denmark. Tipperary Institute was the National Co-ordinator for Ireland. Completed 2000.
- “Creation of a Community-based **Biomass, Education, Training** and Support Unit in Tipperary”. Part-funded by the EU Altener programme (contract number XVII/4.1030/AL/71/96 IRL). Partners: Tipperary Institute (Co-ordinator), **Teagasc** (Irish Agriculture and Food Development Authority), South Jutland University Centre (Denmark) and the Swedish University of Agricultural Sciences. Completed 1998.



The Waste for Energy Network (WfE-net), in which Tipperary Institute was a partner, won the prize for Best International Renewable Energy Partnership at the first European Commission “Community Awards for Renewable Energy Sources”.

Tipperary Institute is a partner with North Tipperary County Council and South Tipperary County Council in the **Tipperary Energy Agency**. The agency was established with the support of the EU SAVE II programme. Examples of work completed by the Tipperary Energy Agency include:

- “Domestic **Wood Pellet Heating** Systems: An Implementation Plan for Ireland”. Part-funded by the EU Altener programme (contract number 4.1031/C/00-017/2000). Tipperary Energy Agency (Co-ordinator), Donegal Sligo Leitrim Renewable Energy Group, LEV (Styrian Energy Agency), University of Southern Denmark. Completed 2002.
- “**100% RES Communities** in Larissa (Greece) and Tipperary (Ireland)”. Part-funded by the EU Altener programme (contract number XVII/4.1030/Z/99-028). Completed 2001.
- “Feasibility Studies of Potential for **Anaerobic Digestion** Development, Wind Energy Development and **Wood Fuel Enterprise Development** in Templederry, Co. Tipperary”. For Templederry Community Group. Part-funded by Tipperary North Riding County Enterprise Board. Completed 2000.
- “Renewable Energy Development Through **Community** Ownership and Partnership (REDCOP)”. Part-funded by the EU Altener programme (contract number XVII/4.3010/98-515). Co-ordinated by the Tipperary Energy Agency. Partners: Styrian Energy Agency, Strohmalm, WIND Consult, Brian P Connor & Associates, National University of Ireland Maynooth and Rachel Bevan Architects. Completed 2000.

Examples of Training and Education Delivered

- “Certificate in Renewable Energy”. Developed by TI, and delivered on-campus in Thurles. One evening per week for one academic year (26 weeks), plus six one-day field trips. Four cycles delivered, with a fifth cycle commenced in September 2005. About 70 students have graduated from the course. The External Examiner on the course was previously Mr. Paul Kellett of Sustainable Energy Ireland’s Renewable Energy Information Office, and is now Dr. Steve Lo of University of Ulster.
- “Renewable Energy Training Course”. Developed by Tipperary Institute, and delivered off-campus in Newcastle West, Co. Limerick. One day per week for five weeks, plus one one-day field trip. 10 students completed the course in 2003. Client: West Limerick Resources Ltd.
- “Renewable Energy Training Course”. Developed by Tipperary Institute, and delivered off-campus in Kilkenny City. One night per week for five weeks, plus three half-day field trips/workshops. Two cycles delivered. About 30 students completed the course in 2003. Client: Barrow-Nore-Suir Rural Development Ltd.
- “Introduction to Renewable Energy course”. Developed by Tipperary Institute, and delivered off-campus in Carlow. One night per week for five weeks, plus three half-day field trips/workshops. 20 students completed one cycle. Client: Carlow LEADER Rural Development Co. Ltd.
- “Renewable Energy Training Course”. Developed by Wexford Organisation for Rural Development (WORD), Teagasc and Tipperary Institute. Delivered off-campus in Enniscorthy, Co. Wexford. Tipperary Institute delivered two sessions and a one-day field trip, on biogas. About 40 students completed the course in 1999. Client: WORD.
- Sustainable energy (including bioenergy) is a core topic in the “Current Issues in Rural Development” subject in the Tipperary Institute Honours Degree in Rural Development. Two cycles of the subject have been delivered, with about 20 students.
- Tipperary Institute have also delivered about 10 half-day or one-day training sessions on various aspects of bioenergy, to a number of clients.

Examples of Workshops and Conferences Organised

Tipperary Institute has been involved in organising five major events relating to bioenergy. These are listed below.

- “Ireland’s Transition to **Renewable Energy**”. Thurles, 31st October, 1st and 2nd November 2002. Organised by the Foundation for the Economics of Sustainability (FEASTA), Sustainable Energy Ireland and Tipperary Institute.
- “Opportunities for Farmers in **Bioenergy**”. Dublin, 26th October 2001. Organised by the Irish Bioenergy Association (IrBEA) and Tipperary Institute. Sponsored by FBD (Farm Business Development) Trust.
- “**Wood for Heat**”. Thurles, Co. Tipperary. March 2000. As part of the AFB-net project.
- Tipperary Institute organised an international conference in conjunction with National University of Ireland Galway in November 1999 on the opportunities and solutions presented by **anaerobic digestion** technology, as a joint AD-NET / WfE-net action.
- “Community-based Development of **Bioenergy**”. Cashel, Co. Tipperary. December 1998. As part of the AFB-net project.

Example Publications and Presentations

- **Guest, C., Healion, K. and Hoyne, S.**, 2003. “Bioenergy Education and Training in Ireland – Experience and Future Priorities”. In: *Proceedings of the Workshop Socio-Economic Drivers in Implementing Bioenergy Projects: Education and Promotion*. IEA Bioenergy Task 29, Energy Institute, Zagreb, Croatia.
- **Guest, C.**, 2002. “Back to the Future. From Food Production in Irish Agriculture to a Return to the Production of Food, Fibre and Fuel.” Paper presented and subsequently published in; *Rurality, Rural Policy and Politics in a Nordic-Scottish Perspective*, Danish Centre for Rural Research and Development, Esbjerg, Denmark.
- **Guest, C. and Da Costa Gomez, C.**, (2004), “Current Progress and Practice in the Adoption of Anaerobic Digestion in the European Union” at the Biogas in Society Conference, Enniskillen, Northern Ireland, 21-23 October
- **Guest, C.** (2005), “Social Change and the Development of Innovative Renewable Energy Projects in Rural Ireland”, Proceedings of Nordic-Scottish University Network for Rural and Regional Development Annual Conference, September 22-25, 2005 Akureyri, Iceland. University of Akureyri, Iceland, ISBN 9979 834 52 8.
- **Healion, K.** and J. O’Carroll, 2002. Using Wood for Energy Generation. In: Irish Timber Growers Association, 2002. *Irish Timber Growers Association Forestry Yearbook 2003*. Dublin.
- **Healion, K.**, 2002. *Wood as a Renewable Source of Energy*. COFORD Connects leaflet. National Council for Forest Research and Development (COFORD), Dublin. Available online at http://www.coford.ie/bookshop/Wood_As_Energy.pdf
- Van den Broek, R., S. Teeuwisse, **K. Healion, T. Kent**, A. van Wijk, A. Faaij and W. Turkenburg, 2001. Potentials for Electricity Production from Wood in Ireland, in: *Energy*, 26 (2001), pp. 991-1013.
- **Healion, K.**, 2001. Bye-bye Irish Energy Pie (A Critique of Irish Energy Policy). In: Douthwaite, R. and Jopling, J. (Eds.). *FEASTA Review, Number 1*. Foundation for the Economics of Sustainability, Dublin.
- **Hoyne, S.** and A. Thomas, 2001. *Forest Residues: Harvesting, Storage and Fuel Value*. National Council for Forest Research and Development (COFORD), Dublin.

- **Healion, K.**, 2001. Community-based Actions in the Sustainable Energy Sector. Paper presented at the *Rio+10: Achievement and Challenge* conference, September 2001, University College Dublin.
- Irish Bioenergy Association, 2000. *Strategy for Anaerobic Digestion (AD) Development in Ireland*. Produced by **Clifford Guest** (TI), Vicky Heslop (Methan O Gen Ltd.) and **Seamus Hoyne** (TI).
- Irish Bioenergy Association, 2000. *How Bioenergy Can Help Prevent Climate Change*. Cahir, Co. Tipperary. Leaflet. Text by **Kevin Healion**, Tipperary Institute.
- Irish Bioenergy Association, 2000. *Fire Away with Domestic Wood-Fuelled Heating Systems*. Cahir, Co. Tipperary. Leaflet. Text by **Seamus Hoyne**, Tipperary Institute.
- **Guest, C., Healion, K. and Hoyne, S.** 1999. *Community-based Development of Bioenergy: Survey and Workshop*. National Council for Forest Research and Development (COFORD), Dublin.
- **Kent, T. and S. Hoyne** (Eds.), 1998. *Forest Residues in Ireland - Harvesting, Logistics and Markets*. National Council for Forest Research and Development (COFORD), Dublin.
- Van den Broek, R., A. Faaij, A. van Wijk, **T. Kent, K. Healion**, W. Dick, G. Blaney, and M. Bulfin, 1997. Willow firing in retrofitted Irish peat power plants, in: *Biomass and Bioenergy*, Vol 12, No 2, pp. 75-90.

Tipperary Institute have also produced numerous reports as part of the projects listed previously. In addition, Clifford Guest, Kevin Healion and Seamus Hoyne have had significant inputs to submissions made by the Irish Bioenergy Association.