

Expert Opinion

Professor Bridges presents his views on the impact assessment for the proposed Rose Energy plant

PROFESSOR JAMES BRIDGES

Emeritus Professor of Toxicology and Environmental Health, University of Surrey; Chair, EU Scientific Advisory Committee on Emerging Health Risks.



The proposal to introduce any new industrial plant into an area understandably produces a reaction among members of the community. Combustion of waste has accumulated a bad reputation because in the past they produced black smoke and caused measurable contamination of the environment. They were also identified as a major source of a family of highly toxic and persistent chemicals known as dioxins. Over the past twenty or so years however, increasingly strict legislation on permitted airborne emissions has been introduced to prevent such pollution. As a result waste to energy plants are now a minor source of dioxins and indeed of other environmental contaminants (called in this report the 'chemicals of interest') in the UK.

A critical issue to consider is whether airborne emissions from the operation of waste to energy plants that comply with the regulatory limits could result in a health risk to the local community.

Frequently concerns about health risks are raised in the popular press because of confusion between the hazardous properties of a chemical and actual risk to the public. It is a fact that all chemicals both naturally occurring and manmade are hazardous but that the exposure determines whether or not they will produce adverse effects on health.

It is also important to recognise that pure air, pure food and pure water do not exist in reality. We are exposed daily to many thousands of chemicals – the majority of which are of natural origin. Thus when considering the impact from a new source such as the proposed plant, the relative contribution to the total exposure to each chemical of interest should be borne in mind.

The chemicals of interest are defined principally by legislation. None of them are uniquely produced by waste to energy plants.

To assess the possible impacts on health of exposure to each chemical of interest one needs to have information on the levels of the chemicals of interest to which the local population could be exposed. For a proposed plant it is clearly not possible, in advance of its operation, to make measurements of actual levels of exposure of the local population to each of the chemicals of interest. Nonetheless the exposure can be gauged by:

- (i) The assessment of the published scientific literature on analytical findings around existing and former incinerators, new waste to energy plants and of studies on the health of members of the local population.
- (ii) Computer modelling of the probable dispersal of chemicals of interest from the chimney stack of the proposed plant, based on the worst case assumption that the plant will continually emit each chemical of interest at the maximum level permitted by the regulations.

Literature and studies

What the published literature tells us about the likelihood of environmental contamination.

Many studies have been published which measure the levels of either metals or dioxins in the vicinity of combustion plants of various types and locations. Measurements have been performed in soil, plants and animals (particularly sources of human food) and in the blood of members of the local population. For modern waste to energy plants, using comparable technologies to the proposed plant that comply with the EU/UK regulatory emission levels, no detectable increases in levels of either metals or dioxins have been found in either humans, in local food or in soil and other plants. The literature also identifies that levels background levels of dioxins and metals in such samples have been falling for a number of years.

What the published literature tells us about the likelihood of adverse effects occurring.

The possibility that individuals who live close to a waste to energy plant may suffer various adverse effects has been investigated by many researchers (epidemiological studies). There is some rather limited evidence that very old poorly performing incinerators in some locations may have caused some adverse effects. However there is no evidence of any adverse effects occurring in populations around modern waste to energy plants. This difference is not surprising when one considers that these old incinerators were emitting dioxins and metals at a hundred or more times the levels currently permitted.

What expert bodies say

Expert committees of various national and international organisations have reviewed the health risks from the operation of modern waste to energy plants. Their conclusions are rather similar that the health risk is anticipated to be small, but that everything is not known. This cautionary remark would of course also apply to the risks from most other human activities. It is noted that recent public inquiries in the UK on proposed similar plants have without exception concluded that there are no important health issues.

Computer Modelling

Computer modelling of the dispersal of chemicals from a point source such as a chimney stack is a very common practice, accepted by the UK and other regulatory authorities. The purpose of the model is to predict ground level concentration i.e. those to which people could be exposed. To minimise the possibility of underestimates of exposure the modelling is based on a number of worst case assumptions (that is assumptions that in practice are most unlikely to occur). These assumptions include:

- each chemical of interest is emitted continuously from the chimney stack at the maximum legally permitted limit from that chemical. In practice such a plant would inevitably have many exceedences and would soon lose its licence to operate.

- an individual (described as the hypothetical maximally exposed Individual or HMEI) is assumed to exist in the community that lives outside permanently during the lifetime of the proposed plant and moves around so they are continually exposed to the maximum exposure levels.

For each chemical of interest the worst case predicted ground level concentration has been compared against the established standard or guideline that has been established to ensure a suitable margin for the protection of the health of members of the public. A conservative approach has been adopted that an additional safety margin needs to be achieved beyond simply compliance with the relevant standard (which itself has a safety factor built in).

For all but two of the chemicals of interest the worst case modelled data show that these additional very conservative safety margins are met. In the case of nitrogen dioxide and cadmium further assessments have been conducted that assess both the contribution to background levels of these chemicals in the area and the validity of each of the worst case assumptions. Based on this further assessment it can be concluded that a risk to the health of the local population from airborne exposure to these chemicals is very unlikely.

An additional consideration is whether exposure to a combination of the various chemicals of interest could result in a health risk. Several combinations have been examined and the conclusion is that exposure to the so called cocktail of chemicals is very unlikely to result in an unacceptable health risk.

The possibility has also been examined that emissions might cause some contamination of locally grown food and as a consequence affects local consumers. It is evident that even using worst case assumptions the levels of possible contamination will be extremely small and will not result in a risk to the health of consumers.

OVERALL CONCLUSIONS

Based on both the published scientific literature and also air quality modelling data it is very unlikely that airborne emissions from the operation of the proposed plant would produce any adverse effects on the health of the surrounding population.

Declarations of Support

Over the last month, several groups have publicly supported the project including UFU, NIFDA and NIGTA.

Graham Furey, UFU president said:

"With time running out, the Rose Energy project is the only proposal on the table which will safeguard the future of the poultry industry and the farm businesses which depend on the industry for their livelihoods. Against this backdrop, the UFU has decided to support this proposal so the poultry industry can move forward and meet the challenge of these EU Environmental Directives."

Garth Boyd, President, Northern Ireland Grain Trade Association (NIGTA):

"The future of NI food companies who are European leaders will be at risk should this project not receive approval within the next few months. The NI food industry and the associated jobs depend on a viable solution."

What others have said

Michael Bell, Director, Northern Ireland Food and Drink Association (NIFDA)

"We are strongly supportive of the Rose Energy proposal. There have been suggestions that this project would potentially threaten our agri-food industry, but in fact it is the very opposite – it would only serve to protect it. Why would the industry propose a solution that would threaten its very existence? "Everything that man does on this earth has an impact on our environment, it is unrealistic to expect otherwise. What is important is that we seek to minimise that impact and make responsible decisions for the future of our industry and our society. This project remains the only viable solution for the industry, and I believe it should be supported as such."

Alderman James Currie, UUP, Ballymena Council

"If the Northern Ireland Assembly does not fully support Rose Energy's proposals it will result in the demise of our vibrant poultry industry. We are not only talking about the loss of 7,000 jobs for those directly employed

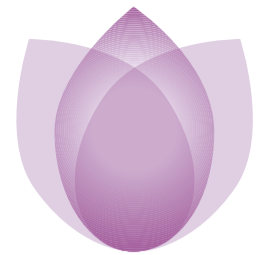
by the industry, but many more thousands who would be indirectly affected. With NI being on the periphery of Europe, and in light of the present economic climate – now is not the time to be losing the industry we have, but to make the most of it."

Tom Elliot, MLA (UUP)

"The Nitrates Directive will have a huge impact on the Northern Ireland agri food industry in the coming years. The intensive agriculture sector, including the poultry enterprise, requires an early resolution. It is vital that this resolution will not only save that industry, but will also be a positive contributor to the Northern Ireland economy and environment."

Trevor Clarke, MLA (DUP)

"what must be remembered is that poultry farmers and the associated processing industry sustains thousands of jobs across NI and puts millions of pounds into the industry" "...there is a strong argument to suggest that dealing with poultry waste in this way could actually help reduce the levels of pollution found in Lough Neagh."



RoseEnergy News



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Professor Jim Bridges: Expert opinion on our proposals

Rose Energy – Landscaping Plan

As part of our planning application, we have submitted a plan for the site at Glenavy, which would involve the planting of over 10,000 plants in the surrounding area. The purpose of this plan is to ensure that the visual impact of the plant is minimised and to provide a noise shield in order to cause the least possible intrusion to surrounding neighbours.

The site

One of the advantages of the proposed site is that it is located on gently sloping ground. In fact it sits at about 22m below the level of the Ballyvannon road at the main entrance to the site. The agricultural landscape surrounding the site contains strong hedgerows with mature trees that provide a sense of enclosure and significantly restrict views, which gives the site an initial advantage before any further planting takes place.

The plan

The objectives for the development of the planting plan are to:

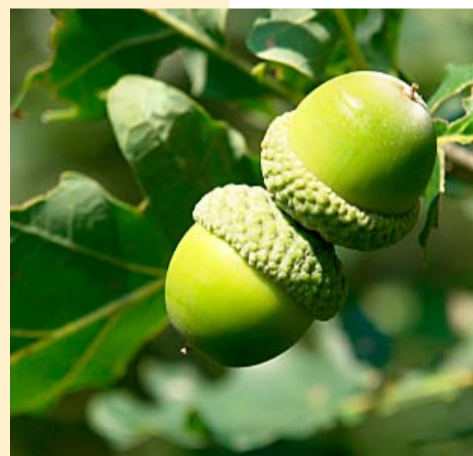
- Monitor the condition of existing trees and hedgerows
- Reinforce existing boundaries and visual /noise shields using planting mixes with a suitable native diversity of species
- Integrate the scheme into its surroundings
- Put a long term management plan in place

Planting belts along the southern and western boundaries of the proposed site will include mature trees and earth mounds to help reduce the scale of the proposal and to introduce it to the surrounding rural landscape.

To ensure early development of the visual screen planting it is intended to begin planting at the first available planting season following granting of planning permission. This means the plants and trees will act as a shield from construction noise as well as a visual shield.

Trees and plants

The planting species chosen will be native to boost biodiversity and the local wildlife. We would also welcome feedback from local residents on what kind of plants and trees they would most like to see around the site. The planting plan includes roughly 4700 woodland and 4650 ornamental



specimens, including over 1000 oak trees and 1500 pine trees.

Oaks are large deciduous trees – probably the most common tree in the UK. They grow to around 40 m high and can be around for several hundred years.

Pines are evergreen and resinous trees, with the majority of species reaching between 15 - 45m tall. Pines are long-lived, typically reaching ages of 100 - 1,000 years.

Ash is a large deciduous tree growing to 20 - 35m tall with a trunk up to 2m in diameter, with a tall, domed crown.

Ornamental plants include Sweetbox, St John's Wort, Broom and Viburnum, amongst others.

The full planting plan is available to view online under the planning application, landscape section at www.roseenergy.co.uk



Osvaldo Mauro-Hun
Chief Executive, Rose Energy Ltd

Welcome to the second edition of Rose Energy News

It has been a very busy period since our last newsletter, during which we have continued to meet with interested groups to present our proposals and answer questions. In August we began filming for a DVD production which provides expert commentary on our project and looks at the personal experiences of people who have knowledge of similar plants in the UK. We also began a series of meetings with Councils, farmers and other groups.

In September we were advised by the Planning Service that Article 31 designation has been applied to our scheme. This decision recognises the scope and significance of our proposals, locally and to the whole of Northern Ireland. Article 31 designation gives the Planning Service scope to consider various procedural options. We are currently gathering consultation responses which will all be taken into consideration as part of the planning application process. This is a responsive and ongoing process where we listen to all parties involved and make adjustments to our plans to ensure that we are proposing the best possible solution for everyone.

We have been greatly heartened by the increasing support for our project. Notably, The Ulster Farmers Union, the Northern Ireland Food and Drink Association and the Northern Ireland Grain Trade Association have all made public declarations of support for our project, recognising it as a vital solution to the EU Nitrates and Integrated Pollution Prevention and Control Directives.

This newsletter aims to provide you with a project update, answer further queries and provide independent views on our project. We hope you continue to find it useful.

Project Update



Our DVD

In August and September we travelled to Thetford and Eye in East Anglia and Westfield, Fife to interview people with first-hand experience of plants similar to Rose Energy's proposal.

Their insights have been used in two DVD productions; one featuring scientific experts giving their views on our proposals based on their experience, and another interviewing residents and local councillors who live in close proximity to existing biomass power stations in Great Britain. Interviewees include Professor Jim Bridges, Chair, EU Scientific Advisory Committee on Emerging Health Risks; Bob McCracken, former NI Chief Veterinary Officer; Prof. Cecil McMurray, former NI Chief Scientific Officer;

representatives from the farming community and a number of residents.

The main purpose of the DVD is to address any fears and misconceptions that may be held about our proposals by providing facts and scientific evidence. As part of our consultation process we have presented the programmes to audiences at council and public meetings.

The DVD is available to view on our website www.roseenergy.co.uk under news, dvd interviews.



Meeting the farming community...

O' Kane Poultry

On the 27th August, over 200 of Northern Ireland's poultry farmers attended the O' Kane poultry farmers' conference in Ballymena to hear a business update from O'Kane's, and listen to presentations from Aileen Lawson, UFU and Rose Energy executives.

Farmers recognised that whilst poultry litter is at present a valuable commodity due to rising fertiliser prices, using it as a fertiliser is not a long term option. The current and future restrictions that will be placed on the use of the material mean that its disposal could present an added cost to farmers, unless solid plans are progressed soon. The Rose Energy plant presents a cost-neutral solution for farmers.



Willis Mackey and Tony O'Neill of O'Kane Poultry, Mike Alcorn of Rose Energy and UFU's Aileen Lawson.



Back Row: Willis Mackey and Tony O'Neill of O'Kane Poultry and Osvaldo Mauro-Hun of Rose Energy. Front Row: poultry farmers James Dorman and Celine Magill, Aileen Lawson of UFU and Peter Morgan of O'Kane Poultry.

Moy Park

We met with over 250 poultry farmers from Moy Park over the course of three weeks to discuss our proposals and their implications for Northern Ireland's agri-food industry.

Issues raised by farmers included the question of government support and it was highlighted that several had made contact with their local representatives regarding the project. A main concern raised by members of the farming community was the need to safeguard their primary source of income and provide security for their families given the huge investment most have made in their farms.



Moy Park Growers Committee - Philip Toner, Joan Murphy, Fred Maxwell, Gilbert Fletcher, Sinton Kerr along with Eric Reid and David Gibson of Moy Park and Osvaldo.

CBI Annual Lunch

Rose Energy's chief executive, Osvaldo Mauro-Hun and chairman, Tony O'Neill attended the annual CBI lunch at the Culloden Hotel in September. CBI Chairman Brian Ambrose, who spoke at the lunch along with First Minister Peter Robinson, outlined plans to boost Northern Ireland's future prosperity and well-being, urging 'decisive action and leadership' from the Executive in order to improve the economy and build business confidence. The Rose Energy project offers substantial economic benefits to Northern Ireland and remains a key issue needing decisive action and support from those in decision making positions. Pictured with the chairman are guest speaker, First Minister Peter Robinson along with Bank of Ireland's Stephen Kirkpatrick and Osvaldo.



Council Meetings

Over the past few months we have continued to meet with several local councils, including Lisburn, Antrim, Ballymoney and Craigavon to present our proposals and discuss the facts and issues surrounding the project. We welcome and greatly appreciate the interest and support that has been shown to us by the majority of councillors at these meetings.

In August we invited **Antrim Borough Council** representatives to visit the proposed site in Glenavy to view the area and find out more about our plans. Following this site visit, the council then met on 17th August and voted in favour of supporting combustion as a viable way of disposing of poultry waste and creating electricity. Following its meeting on 10th September, **Lisburn Council** called for a public inquiry on the grounds of local concerns. **Craigavon Council** recognised the merits of our proposals and its key importance for poultry producers in the area. **Ballymoney Council** indicated a strong show of confidence in our project with an overwhelming majority of councillors voting to fully support our proposals.



Members of Antrim Borough Council along with Rose Energy representatives at the site near Glenavy.

Alternative Technologies

STANDARD ANAEROBIC DIGESTION

- The high ratio of nitrogen to carbon in poultry litter makes the material unsuitable for anaerobic digestion.
- Conventional anaerobic digestion requires the material to be in the range of approximately 10-15% dry matter – in other words, it needs high water content. The material to be used in the project will have an overall average of 60% dry matter, four times drier than the maximum recommended.
- Dilution with water or pig manure is not an option due to the high volumes required:
 - To dilute the poultry litter with water would require **1 million** tonnes of water, which is five times the volume of initial material.
 - To dilute the poultry litter with pig manure would require **1.5 million** tonnes of pig manure which is more than seven times the volume of litter. In fact there is not sufficient pig manure in Northern Ireland to allow for this.
- Once the process is complete the remaining material will contain the same quantities of nitrate, phosphate and potassium that were present in the poultry litter. The issue of the disposal of a material rich in nutrients not required in Northern Ireland still remains.

SOLID ANAEROBIC DIGESTION

- The high level of nitrogen in the material is still an issue as it inhibits the digestion process.
- No installation can use poultry litter as sole feedstock and as a consequence it must be mixed with further material – the resulting volume of digested material to be disposed of is therefore higher.
- As with standard anaerobic digestion the resulting product still contains the original levels of Nitrogen, Phosphorous and Potassium, so the initial issues remain.

AUTOCLAVING

- Autoclaving is a sterilization process generally used for the pre-treatment of domestic waste. There are no known applications for the treatment of poultry litter.
- Autoclaving is an expensive process that requires high volumes of steam – steam that will need to be generated by the combustion of fossil fuels.
- As with anaerobic digestion, autoclaving does not remove the nitrates and phosphates from the poultry litter.

MUSHROOM COMPOST

- Only 20% of poultry litter could be used by the mushroom industry.
- Disposal of mushroom compost remains a critical unsolved issue.

PELLETISATION

- A pelletised form of poultry litter cannot compete as a fertiliser product against chemical fertilisers due to high processing costs and the relative low levels of nitrogen when compared with other fertilisers in the market.
- Currently this product is only used by a very specialised market.
- A plant making pellets in the USA is still only working at 70% of its capacity, due to unsuccessful attempts to develop its market, in spite of continuous efforts over the last seven years.

PYROLYSIS

- A very expensive thermal process that has not been developed at industrial scale.
- Coupling this process with autoclaving makes the process even more expensive and unreliable.

GASIFICATION

- Technology is not reliable and processing costs are very high.
- Germany has led the way in terms of gasification plants, but the majority of projects are facing extreme financial difficulties.

MECHANICAL BIOLOGICAL TREATMENT (MBT)

- MBT covers a range of technologies designed to deal mainly with municipal waste. It is not a separate option but a combination of the technologies assessed above.
- It consists of two stages: a mechanical recovery of a fraction of recyclable material and/or size reduction, and a biological stage where the waste is composted or digested. In some cases the biological stage precedes the mechanical recovery, in those cases the process is referred to as BMT.
- In the case of poultry litter, mechanical recovery fills no purpose as there is no fraction of material that can be recovered or recycled by mechanical means. As a consequence there is no reduction in the volume of the waste to be treated, one of the main purposes of the mechanical stage.
- Composting or digesting poultry litter, the second stage of MBT, is not technically and/or financially viable as explained above.
- MBT does not offer a solution to the treatment of poultry litter as it is based on technologies that have already been examined and considered inappropriate for that application.

CONCLUSION

Anaerobic Digestion, MBT, Autoclaving and Mushroom Composting are unsuitable for the treatment of poultry litter as they will not change the nature of the material (high nitrogen and phosphorous content) nor the volume of material that is to be disposed of. Pelletisation, Pyrolysis and Gasification are not economically viable and the technology involved in Pyrolysis and Gasification is currently unreliable and requires many years of development.

Combustion of chicken litter in order to generate electricity stands as the only economically and technologically viable solution. This process removes the nitrogen from the litter and reduces the final volume to less than 15% of the original material. Furthermore, combustion is the most effective way of eradicating the issue of botulism.

Your questions answered

Q: Will the plant be noisy?

A: The choice and positioning of plant, site arrangement and acoustic bunding and fencing have been designed to reduce any potential noise. The Noise and Vibration Report submitted as part of our planning application has concluded that the predicted change in noise levels at the nearest dwelling on the Ballyvannon Road would not be significant. During the period of construction and during operation, noise levels will be contained within suitable buildings, where appropriate, and otherwise restricted to ensure that they do not exceed the target levels.

Q: How would a Public Inquiry impact upon the project?

A: A Public Inquiry would not uncover an alternative approach; it would add unnecessary time and cost the Northern Ireland taxpayer millions of pounds in the process. The time it would take to set up and conduct such an inquiry is time that our agri-food industry does not have. Rose Energy's plans remain the only viable solution on the table. Our planning application, which is over 4,000 pages long, has been submitted and is subject to the full scrutiny of the Planning Service. We are confident that proven technology and robust scientific evidence will be the ultimate determinants in the success of our application.

Q: When would Rose Energy need to apply for an IPPC permit?

A: The permit is only required for the operational stage of the plant not the planning period and determination of an application would only take around six months so there will be adequate time once planning permission is granted for the IPPC application. The permit application can be affected by local planning conditions and so it is correct procedure for a company to wait until it has as much local information as possible before applying for an IPPC licence.

NI Energy Conferences

29th & 30th October International Renewable Energy Conference

The theme for the conference was Global Challenges – Community Solutions... focussing on the potential contributions to the global challenges that face us all, through the development and implementation of community solutions in renewable energy. Markus Bolhar-Nordenkamp from Austrian Energy, the company behind a biomass power plant in Holland similar to the Rose Energy project, delivered a presentation on the topic of fluidised bed combustion of biomass fuel. He pointed out that as traditional biomass fuel sources such as woodchips are increasingly hard to secure, it will be necessary to further develop alternative sources such as poultry bedding in order to meet future renewable energy obligations.

13th November NI Energy Forum

Now in its sixth year, the NI Energy Forum focused on the most important aspects of energy policy and latest developments from across the sector. With rising energy costs and EU targets to meet, developing a sustainable and successful renewable energy strategy is crucial for Northern Ireland and industry has a key role to play. Rose Energy chief executive, Osvaldo Mauro-Hun spoke at the NI Energy Forum, delivering a paper focussing on the contribution of biomass generation to Northern Ireland's targets for Renewable Energy.