Public Perceptions and Bioenergy

Some remarks in preparation of the workshop scheduled for the Thermalnet meeting in Vicenza, October 2008

Patricia Thornley & Wolter Prins

Introduction

The most cited non-technical barriers for the implementation of biomass technologies (internet search) were presented in the Salzburg workshop, March 2007

- Unfavourable economics
- Unreliable support policies
- *Insufficient perception and acceptance*
- Problems in private financing
- Administrative and legal obstructions
- Environmental/sustainability issues.

All of them are included in the prioritised list of barriers made up by the Thermalnet group in the earlier Lille workshop, April 2006.

1. Economics/costs
2. Planning and regulatory issues
3. Emissions/environmental performance
4. Operation/skills
5. Financing/risks
6. *Public perception/lack of knowledge*
7. Fuel supply
8. Contracting arrangements and guarantees
9. Electricity market access and grid connection.

Apparently, public perceptions is a key barrier to bioenergy development in Europe, and this will be the subject matter of the coming workshop in Vicenza, October 2008. In order to go beyond the anecdotal information in this area we must address the following issues:

1. Is there evidence of public perceptions actually being instrumental in preventing bioenergy development?
2. If so, how important a factor is it for different countries and different technologies?
3. Are there any existing strategies or actions plans for dealing with the problem?
4. What role, if any, could the Thermalnet group play in assisting with this?

To establish if there is any evidence of public perceptions preventing development a literature review of the scientific press was conducted. This revealed very limited reports in relation to bioenergy developments and public perceptions, but they are discussed below. Thermalnet members were canvassed to expand this knowledge, which revealed a number of useful country specific publications and issues.

Awareness of renewables and biomass

The European public is generally very aware of climate change and supportive of renewables. However, within the renewables sector the awareness of bioenergy is very low: 2% in a study in Ireland [1] and 8% [2] in one in the Netherlands. A UK study [3] found that 85% of respondents wanted to increase renewables, 72%

supported wind, with only 2% opposed; but only 16% supported biomass with 4.8% opposed – the vast majority just didn't know – or perhaps didn't even know what it meant. Biomass is certainly the least popular form of renewable energy, in this stage likely because people feel least informed on this.

Biomass itself is an umbrella term for a myriad of feedstock materials, technologies, delivery mechanisms and scales which are very distinct. Communication strategies to address this abstract notion will have little chance of success. Any communication has to be easily understandable for the target group addressed. "Bioenergy" is not easily understandable for the general public. And, usually, "people don't want something they don't know anything about".

Does a lack of public support for biomass obstruct development and implementation?
Yes – this is very well documented in the literature and is the focus of most of the papers in the bibliography to this paper. In some cases it has completely prevented development; in others it has led to substantial delays and additional costs.

Is this true in different countries and for different types of plants?
Technologies at household level depend on general awareness of the target groups and their information and understanding. For communication to these groups it is best to focus on tangibles: wood stoves, pellets, bio-diesel etc.

For larger-scale plants there is a need for local information and interaction. Focused activities such as lobbying and networking, influencing of local opinion makers and the establishment of a successful public participation in this regard is much more important.

The bibliography shows that it is a common problems in the UK, Netherlands, Germany, Italy, France, Spain though to a lesser extent in the Scandinavian countries.

What is the real nature of the problem?
Upreti, "Conflict over biomass energy development in the United Kingdom: some observations and lessons from England and Wales, Energy Policy, 2004, 32(6): p785-800
Public distrust is a major barrier to biomass development in Europe
If local people have other sources of earning and no proper understanding of biomass they will not be willing to support a biomass development.
Ad-hoc interest groups organize opposition where they see high degrees of uncertainty from the development or lack understanding of economic and environmental advantages.
When local people feel developers have already made real decisions without consulting them they will not be supportive.
Local people accept the need for renewables but do not accept the need to build locally; yet once the plant operates successfully in their locality they are supportive.
Biomass is relatively new and the public perceives high risk of unfamiliar development in their areas
Their perceptions differ from specialists' view or actual experiences.
Local people evaluate new projects by subjective criteria such as new technology, unknown consequences of potential failure, less perceived local benefits etc.,

Conflicts between the public and developers escalate when

- The development is involuntarily imposed on their locality
- The technology is unfamiliar
- They have no decision making power or
- The development is for corporate profit rather than local benefit

Transportation issues frequently give a focus for local groups to argue against biomass developments.
In conflict over siting of bioenergy plants national policy makers and developers consider that local communities have to accept building of biomass infrastructures because of their environmental advantages. Local people by contrast use rights and moral based arguments to oppose developments: that they must have rights to oppose the development in their locality. It is difficult to resolve conflicts where the rationales differ so drastically. Objective statistical eliminations and sophisticated scientific arguments are often inadequate to allay public fears.

Rohracher, Bogner, Spath & Faber, "Improving the public perception of bioenergy in the EU"
Large scale plants are affected by local dynamics of perception – are there opposition groups, are they well organised, who is the developer, how is the planning process organized?
Local resistance is typically organised by ad hoc groups who feel their local environment is threatened. Conflict then escalates when:

- The development is involuntarily imposed
- The technology is not familiar
- Locals have no decision making power
- The development is for corporate not local benefit

A common issue is trust in the developer. An EU FP 5 project by AEA Technology found that British experiences, where developers are generally private companies, are very different from those in European countries where local municipalities undertake developments.
A common problem is the belief that approval of a facility may subsequently lead to its use for other means.

IEA Bioenergy Task 32
Workshop on "Public Perceptions of Biomass Cofiring"
At Victoria, Canada, August 2004
There has been experience in Australia where NGO's were concerned that native species might be used that would damage habitats and started a campaign against a project, which actually depressed the value of the renewables certificates.
Some experience from CANIMET in Canada is that there has been opposition to biomass use because of past experience of high emissions from outdoor stoves and boilers.

Barker &Riddington, "Attitudes to Renewable Energy", report prepared for COI Communications, Dept of Trade and Industry in Northern Ireland, July 2003
Situation more or less similar to that in the UK. Main public concerns were costs (higher electricity bills), visual impact (large buildings, chimneys) noise, bad odours, emissions, and effect on house prices. People were also concerned that animal waste products might mean carcasses of animals (health risks).

Workshop Non-technical Barriers, Salzburg, March 2007
It was stated, that perception of using biomass as energy source differs significantly from country to country. But it is a fact in every country that nobody wants to have a conversion plant "in his backyard". The latter is not a specific problem of biomass technology but rather a general issue of industrial plants. Biomass technology in some countries is seen as a dirty, polluting and rather old fashioned way to produce energy, in other countries it has the image of being modern, clean and showing the way to the future. The reasons for this seem to be different national traditions and structures.

What are the possible solutions?
Upreti, "Conflict over biomass energy development in the United Kingdom: some observations and lessons from England and Wales, Energy Policy, 2004, 32(6): p785-800
Public in the UK trust environmental NGO's and pressure groups more than government and industry. It is possible to minimise public opposition by proactive risk communication, which facilitates dialogue and allows trust to develop.
In some countries the experts and other stakeholders engaged in societal deliberation processes are helping to diffuse risk and develop public confidence over infrastructure siting.
Siting controversies arise because people do not want to be losers by bearing the costs fo an undesirable development and can be resolved by redistributing some of the gains to those who accept the facility.
In establishing effective communication with local communities one must start from the assumption that all people and their views should be acknowledged, respected and valued. Listen first, then acknowledge, then explain, the consider options.
The main generic reasons of conflict are potential environmental, social and ecologica risks perceived by local people, communication gaps or lack of understanding.

There is evidence that positive experience of bioenergy facilities help: e.g. Rochraer eta al cites a municipal facility in Vienna, which was generally supported only after the Austrian energy agency organised a study tour to a similar operational facility in Scandanavia. There was a similar case with Elean in England, which initially faced opposition in planning, but arranged a similar visit and modified its design proposals in response to local concerns and now enjoys positive relations with its local community.

An AFBNet project identifies factors that help the success of a scheme:

- Support from key local organizations
- Sound finances
- Reliable technology
- A key person/organization within the community driving the scheme forward
- Good communication and recognition of the different aims of different sectors of the community
- Good local partnership and the use of local labour, so income streams flow back into the community
- Local utility as one of the partners

Whereas failure was often associated with:

- Poor economics; poor finance
- Unreliable technology

- Over ambitious schemes
- Indifference or hostility locally
- A feeling of imposition of a scheme by outside developers
- Little or poor track record
- Unbalanced motivation e.g. strong environmental drivers with few economic drivers or strong economic drivers but few society or environmental drivers

Rohracher et al. suggest the following actions:

- Target specific groups with information campaigns e.g. those responsible for giving permits for plants in public authorities
- Get in contact with potential opposition groups e.g. environmental groups at an early stage
- Use established information channels e.g. popular magazines with a technical or environmental focus to disseminate information about new bioenergy conversion technologies
- Guidelines for developers on communication strategies
- Develop and communicate examples of best-practice

Barker &Riddington, "Attitudes to Renewable Energy", report prepared for COI Communications, Dept of Trade and Industry in Northern Ireland, July 2003
This report recommends to take actions with respect to better informing the public while addressing the public's main concerns (e.g. the costs of bioenergy), provide incentives (tax reductions, subsidies), and set up "hard hitting" promotional campaigns.

Workshop Non-technical Barriers, Salzburg, March 2007
It was agreed, that continuous information to the public could help to neutralize and to improve the public perception of biomass technology. Most attendants believe that this is the task of the industry in this field. The information to the public should in any case be based on success stories, on demonstration plants and very important: The information to improve the public perception should be honest, avoid overstatements and "lies".
The workshop attendants unanimously see biomass conversion technologies as environmentally sound and improving the sustainability of the economy. On the other hand they see problems in public awareness of this judgment and at least partly can understand the position of some NGO's building barriers to specific projects.
As a possible measure to avoid environmental and sustainability issues being a barrier to implementation, some attendants advised to "make NGO's to be friends", i.e. to make them understand the advantages of bioenergy plants for the environment ("Global Warming") and for a sustainable development. On the other hand investors (and researchers) of biomass technology in discussions with NGO's can learn new sights on environmental and sustainability issues. This can help to develop new concepts that avoid barriers in these areas.

What is happening already?
There is growing recognition of the problem. All of the groups at the end of this paper are active in some way in working on public acceptability of bioenergy.

In the Netherlands a lot of work was done by the working group Communication under the Action Plan Biomass. Members of this working group were energy companies, the government and NGO's. In general it was concluded that there is just too little information to the general public to expect a proper understanding. Providing consistent information so that the public perception can be made more positive however requires that all stakeholders agree on the boundary conditions and minimum standards under which bioenergy can be applied in a sustainable way. This process was too complicated and not possible, in the end only objective information could be communicated transparently through fact sheets.

What can Thermalnet add?

The question we need to start with is what does Thermalnet have to offer. We are a European network on thermal conversion technologies – combustion, gasification and pyrolysis. What strengths, knowledge and expertise do we have that could be brought to bear? Can the format/nature of the network be used to influence public perceptions? How do we interact with the wider public and could it be improved? How could Thermalnet communicate with the more than 70% of most countries who do not know what bioenergy is?

Thermalnet early responses

1) As regards public perception, I can just remark that in Italy biomass and wastes are often discussed as a whole, and this created the fear that bioenergy plants become incinerators after the installation.
2) In the Netherlands a lot of work was done by the working group Communication under the Action Plan Biomass. In general it was concluded that there is just too little information to the general public to expect a proper understanding. Providing consistent information so that the public perception can be made more positive however requires that all stakeholders agree on the boundary conditions and minimum standards under which bioenergy can be applied sustainably. This process was too complicated and not possible, in the end only objective information could be communicated transparently through factsheets.
3) I think that bioenergy is so well-established in Sweden that public perception is not really an issue here. Since the pulp and paper and timber industries are big industrial sectors consuming wood, Sweden has been used to consuming huge amounts of biomass (which is still less than the annual growth). Bioenergy is also the major fuel in district heating since long. I think the discussions are more to do with how the forests are kept and how much land should be set aside as nature reserves and such questions, than the actual use of bioenergy. However, I don't keep good track of such discussions. There is also a discussion about ethanol as a fuel; CO2 balance and such. Quite a few cars here can use ethanol.
4) The proposed subject is relevant, because it seems that the general public gets more and more aware of the global climate change and get aware that something needs to be done. So, the perception will probably change or be changed already. Unfortunately, this is difficult to measure. In the UK, there was the famous Winkleigh project meant to install a large (30 MWe) gasifier plant. This project faced a lot of public objections. The same is happening in France, where EBV is planning 6 units of 12 MWe each. They have problems in obtaining permits due to public objections. I tried to find out what happened there, but they are not very keen to make this public, which I can understand. There is also a difference regarding the technology. Up to now, combustion is more accepted than "new"

technologies. I remember professor Hofbauer saying that almost all new bioenergy plants in Austria are combustion plants, because people know what they get. Another important point is that of the “bad examples”. In gasification several attempts failed or plants were built but never went into operation (e.g. Arbre). This is not good at all for the general image of the technology.

Journal/Paper References

[4-26]

1. Landsdowne_Market_Research, *Attitudes Towards Wind Farms and Wind Energy in Ireland*. 2003.
2. Kaif, R., *Presentation for Euroforum*. 2002, Projectbureau Duurzame Energie.
3. Stoer, D. and K. Yang, *Who's for Renewable Energy and Why? Answers from a sample survey in Reading, Newbury*. 2003, TV Energy and University of Reading.
4. *97/04741 Environmental externalities and social optimality in biomass markets: waste-to-energy in the Netherlands and biofuels in France : Vollebergh, H. Energy Policy, 1997, 25, (6), 605-621.* Fuel and Energy Abstracts, 1997. **38**(6): p. 411-184.
5. Berndes, G., M. Hoogwijk, and R. van den Broek, *The contribution of biomass in the future global energy supply: a review of 17 studies.* Biomass and Bioenergy, 2003. **25**(1): p. 1-28.
6. Domac, J., K. Richards, and S. Risovic, *Socio-economic drivers in implementing bioenergy projects.* Biomass and Bioenergy, 2005. **28**(2): p. 97-106.
7. Hall, D.O., *Biomass energy in industrialised countries--a view of the future.* Forest Ecology and Management, 1997. **91**(1): p. 17-45.
8. Iniyan, S., L. Suganthi, and A.A. Samuel, *A survey of social acceptance in using renewable energy sources for the new millennium.* Renewable Energy, 2001. **24**(3-4): p. 657-661.
9. Madlener, R., *Innovation diffusion, public policy, and local initiative: The case of wood-fuelled district heating systems in Austria.* Energy Policy, 2007. **35**(3): p. 1992-2008.
10. McKay, H., *Environmental, economic, social and political drivers for increasing use of woodfuel as a renewable resource in Britain.* Biomass and Bioenergy, 2006. **30**(4): p. 308-315.
11. Midilli, A., I. Dincer, and M. Ay, *Green energy strategies for sustainable development.* Energy Policy, 2006. **34**(18): p. 3623-3633.
12. Mullet, E., et al., *Risk Perception and Energy Production.* Human and Ecological Risk Assessment, 1998. **4**(1): p. 153-175.
13. Pankhurst, E.S., *The prospects for biogas--A European point of view.* Biomass, 1983. **3**(1): p. 1-42.
14. Prasertsan, S. and B. Sajjakulnukit, *Biomass and biogas energy in Thailand: Potential, opportunity and barriers.* Renewable Energy, 2006. **31**(5): p. 599-610.
15. Qin, T.-L., *Some aspects of energy policy and programs in China.* Energy, 1981. **6**(8): p. 745-747.
16. Raison, R.J., *Opportunities and impediments to the expansion of forest bioenergy in Australia.* Biomass and Bioenergy, 2006. **30**(12): p. 1021-1024.

17. Richardson, J. and T. Verwijst, *Sustainable bioenergy production systems: environmental, operational and social implications.* Biomass and Bioenergy, 2005. **28**(2): p. 95-96.
18. Roos, A., et al., *Critical factors to bioenergy implementation.* Biomass and Bioenergy, 1999. **17**(2): p. 113-126.
19. Rosch, C. and M. Kaltschmitt, *Energy from biomass--do non-technical barriers prevent an increased use?* Biomass and Bioenergy, 1999. **16**(5): p. 347-356.
20. Sinclair, P. and R. Lofstedt, *The influence of trust in a biomass plant application: the case study of Sutton, UK.* Biomass and Bioenergy, 2001. **21**(3): p. 177-184.
21. Thornley, P., *Increasing biomass based power generation in the UK.* Energy Policy, 2006. **34**(15): p. 2087-2099.
22. Troncoso, K., et al., *Social perceptions about a technological innovation for fuelwood cooking: Case study in rural Mexico.* Energy Policy, 2007. **35**(5): p. 2799-2810.
23. Upham, P. and S. Shackley, *The case of a proposed 21.5 MWe biomass gasifier in Winkleigh, Devon: Implications for governance of renewable energy planning.* Energy Policy, 2006. **34**(15): p. 2161-2172.
24. Upham, P. and S. Shackley, *Local public opinion of a proposed 21.5 MW(e) biomass gasifier in Devon: Questionnaire survey results.* Biomass and Bioenergy, 2007. **31**(6): p. 433-441.
25. Upham, P., S. Shackley, and H. Waterman, *Public and stakeholder perceptions of 2030 bioenergy scenarios for the Yorkshire and Humber region.* Energy Policy, 2007. **35**(9): p. 4403-4412.
26. Upreti, B.R., *Conflict over biomass energy development in the United Kingdom: some observations and lessons from England and Wales.* Energy Policy, 2004. **32**(6): p. 785-800.
27 Barker &Riddington, "Attitudes to Renewable Energy", report prepared for COI Communications, Dept of Trade and Industry in Northern Ireland, July 2003
28 Actieplan Biomassa, a dutch report of SenterNovem published in 2006, http://www.senternovem.nl/mmfiles/Actieplan%20biomassa%20-%20eindrapport_tcm24-199813.pdf

1. Public and stakeholder perceptions of 2030 bioenergy scenarios for the Yorkshire and Humber region
Energy Policy, vol 35, issue 9, Sep 2007-07-04 Paul Upham, Simon Shackley & Holly Waterman

2. Local public opinion of a proposed 21.5 MWe biomass gasifier in Devon (questionnaire results)
Biomass and Bioenergy, volume 31, issue 6, June 2007-07-04
P. Upham and S. Shackley

3. Energy from Biomass – do non-technical barriers prevent an increased use?
Biomass and Bioenergy, vol 16, issue 5, May 1999, pgs 347-356
Christine Rosch & Martin Kalschmitt

Other activities/programs addressing this issue:

IEA Bioenergy Task 29 – Socio-Economic Drivers in Implementing Bioenergy Projects

This project deals wit the following issues which are particularly linked to the theme of public perceptions: stakeholder involvement, local income, public acceptance, NGO involvement, long-term support, technology diffusion, distribution of benefits, policy aspects, education and capacity building, (http://www.iea-bioenergy-task29.hr/about_task29.htm)

Bioprom – aims to "overcome the non-technical constraints of the realisation of bio-energy projects in densely populated urban areas and to bring bioenergy projects on their way by establishing a network of actors and stakeholders of the bioenergy sector in five Euroepan regions."

www.bioprom.net

Project ends at end Aug 2007 – key findings are that information deficits are second most important barrier for bioenergy in urban regions. Specific issues in all regions are the location of the plant and the emissions.

Project Create Acceptance – Cultural influences on Renewable Energy Acceptance and Tools for the development of communication strategies to promotE ACCEPTANCE among key actor groups

The current understanding of social processes affecting the (non-)acceptance of renewable energy and rational use of energy technologies is limited. Project managers often assume that stakeholders will adopt and adapt to their innovation without resistance. In practice, however, stakeholders such as users, NGOs, neighbours or local public authorities often have different (and possibly conflicting) visions about the innovation and the future world in which the innovation should fit. If these diverging views are neglected, the project might face severe social resistance in the implementation phase. There is a need for empirically based research to understand the complex interactions between stakeholders, the ways these stakeholders block or facilitate the adoption of alternative technologies and, the (institutional) contexts favourable to the acceptance of technological innovation.

www.createacceptance.net

"Improving the public perception of bioenergy in the EU" – a report commissioned by the Euroepan Commission to integrate existing knowledge and studies about the public perception of bioenergy in Europe and draw conclusions from this knowledge by proposing a range of activities for the European Commission

http://ec.europa.eu/energy/res/sectors/doc/bioenergy/bioenergy_perception.pdf

Global Bioenergy Partnership – Following the 2005 Gleneagles plan of the action the G8 plus Brazil, China, India, Mexico and South Africa decided to launch a Global Bioenergy Partnership to support wider, cost effective biomass and biofuels deployment, particularly in developing countries. The GBEP provides a forum to

- Suggest rules and tools to promote sustainable biomass and bioenergy development
- Facilitate investment in bioenergy
- Promote project development and implementation
- Foster R&D and commercial bioenergy activities

The short term activities of GBEP include establishing mechanisms for raising awareness and dealing with issues of international relevance (e.g. environmental standards, food security, trade) and gaps in technology and policy. GBEP brings together public, private and civil stakeholders. Members include IEA, World Council for Renewable Energy and European Biomass Industry Association as well as member states.