Anaerobic Digestion (AD)

Andy Bull
Senior Project Manager
Severn Wye Energy Agency
Wales Office, Builth Wells

Energy 21 – ‘Community Energy Transition’ Seminar
August 16-18, 2008, CAT, Wales, UK

http://www.inforse.org/europe/seminar08_Energy21.htm

An “Intelligent Energy for Europe” project
7 promoting regions
Experienced partners from Germany and Austria

The BBC journalist’s version:-

Homes in a new Pembrokeshire eco-village could be fuelled by cow dung.

The plans to pipe methane gas from a dairy are part of the winning design for the Lawrenny Eco-Village Project near Pembroke Dock.

The designs were selected earlier this week after a competition to build a carbon-neutral village.

The news will also be welcome relief to local people after the 35% rise in British Gas prices announced on Wednesday.

The proposed 30 homes will be supplied with gas from a huge vat which will collect the cattle's waste.

While it takes just 30 cows to produce a tonne of dung a day, the village plans will see the village's existing cow herd double to 350 to ensure enough end product.

The reality is a little more complicated!

Think of the “huge vat” as an artificial stomach. It likes:-

• A balanced diet
• Warm even temperatures
• Constant feeding
• Care and attention

And it isn’t all about Cow Muck
(as anyone who listens to the Archers will tell you (apparently))

Huge range of feedstocks with a huge range of gas yields.

Any readily bio-degradable material:-
• Agricultural residues
• Energy crops (including grass silage)
• Food industry residues, including some abattoir wastes
• Source-segregated food waste
• Grass cuttings

But NOT
• Woody waste
• General garden wastes – stones and soil

Needs to be balanced to get digestion process right and digestate usable

waste products may also attract a “gate fee”
Handout of presentation on community biogas by Andy Bull, SWEA, UK

Feed-in
Little and often
System will again depend upon the feedstock – could be largely automated

The Digester
• Huge vat
• Stirrers of one sort or another
• Gas storage
• Emergency flare
• Often more than one tank

"Retention Time"
Depends upon feedstock
Typically 25-60 days
It is an average time as the digester is trickle fed
Critical to calculations

Pasteurisation
Necessary where food-waste is involved – “Animal Bi-products Order”
It is a reaction to the Foot and Mouth outbreak but catches veggies too!

Using the Gas
• Some heat is required for the process
• “Normal” solution is electricity generator
• Heat should be used wherever possible
• Bio-methane for vehicles
• Mains feed-in

Don’t throw away energy
It is really difficult – especially in the UK it seems – but dumping energy is scandalously inefficient
Handout of presentation on community biogas by Andy Bull, SWEA, UK

The digestate

- Liquid. Direct replacement for NPK fertiliser – need 6 months storage capacity
- Solid. Soil improver
- PAS110

Pretty much fully automated

The plant will run itself for much of the time but someone must be close at hand all of the time

Is it a “community” technology?

- Well – that inevitably partly depends upon your definition of “community”

YES – it is ideal for communities

- Working at its best when feedstocks are extremely local
- Can supply heat to the neighbourhood
- Feedstock quality control could be higher if the community has a direct interest
- Reliable technology with good income (double ROCs)
- Part-time but always available labour requirement
- Local use of digestate

NO – it doesn’t suit community development at all

- High(ish) capital costs
- Income uncertain in the medium/long term
- Difficulty of securing longer term contracts
- Complex (ish) regulatory procedures
- Planning process might divide communities?
- “Big boys” will join the party and try to squeeze out the smaller players
- Requires skilled and competent operators
Handout of presentation on community biogas by Andy Bull, SWEA, UK

**BIOGAS PLANTS DEVELOPMENT FOR INVESTMENT**

**QUICK CHECK – K.O. CRITERIA**

1. Is the long-term availability of minimum 2000 t/a of substrates ensured? ________
2. Is there enough area of land available to spread/use the digestate, or is it permissible to outsource on a bulk basis? ________
3. Is it possible to connect the biogas plant to the energy (power and heat) networks on reasonable terms? ________
4. Is there a commitment to inform the general public who might be affected by the project before the development is submitted for planning permission? ________
5. Can the expected conditions to launch the biogas plant be fulfilled and the necessary licenses be obtained? ________
6. Is it likely the planning permission will be granted – eg. Am the vehicular access and nearby public highways adequate for the safe transfer of feedstocks into the site? ________
7. Does the site have near neighbours that are likely to object to the smell or noise? ________
8. Is it a suitable location for a bioenergy development? ________

Note: If “NO” to any of the above criteria, then the viability of the project is questionable.

---

**Do we have a scheme?**

**The key determinants.**

**Can we get enough feedstock?**

2k tonnes or a leap into the unknown (ish)

**AD is a fantastic technology**

**BUT**

If you think that you can get the feedstock (and keep it coming for at least 10 years) – only then start looking for a site!

**It isn’t for the faint-hearted**

A biogas plant isn’t only for Christmas!

---

Cwmharry Land Trust
collect food waste for Powys CC

If you think that you can get the feedstock (and keep it coming for at least 10 years) – only then start looking for a site!

The site will often almost self-select – but will the planners agree?

We are here to help! especially if you are in Powys, Monmouthshire, Gloucestershire or Wiltshire