

Identifying potential sources of feedstock for an anaerobic digestion project

This exercise gets the group thinking about local waste streams that could provide feedstocks for an AD project. It assumes that you will take some farm slurry as a starting point, but looks at the range of other wastes that might be available to you and draws up a list of sites that could be investigated further.

You will probably be doing this exercise because you are a rural community with a significant amount of farm waste and the ability to produce silage. Farm-based anaerobic digestion is simpler to manage from the point of view of waste streams. However, if you are an urban community, energy from waste is still suitable for you and this exercise is a very preliminary look at identifying the potential sources of waste (including farms on the outskirts of your town or city) that could contribute to your system. The exercise differs slightly depending on your location.

It's designed to promote investigation and identify the range of waste streams that might be available within a small collection radius, not to give you any accurate figures on the volumes of waste.

It's also important to note that several local authorities, especially in urban areas, have already begun to implement energy from waste programmes and that in those areas much domestic food waste (and potentially other food waste) may already be 'spoken for'. You will need to liaise with your local authority to make sure that what you are doing ties in with and supports any wider waste management strategy.

Anaerobic digestion can seem very complex and offputting because of the regulations on how waste is collected and segregated – proper waste management is required if the digestate product of your system is useable as a fertiliser for agriculture, horticulture and forestry. You are strongly advised to read the Environment Agency publication '*Anaerobic Digestate: The quality protocol for the production and use of quality outputs from anaerobic digestion of source-segregated biodegradable waste*'. We have used Appendix B of the protocol as a basis for the simplified list of waste sources which forms the handout for this exercise.

Time needed

To complete this exercise, you will need 65 to 85 minutes

- Stage 1) Finding a location for the AD plant (15 minutes)
- Stage 2) Identifying farm waste (20 mins) (omit if in urban area)
- Stage 3) Identifying other sources of waste (25 mins)
- Stage 4) Collating results (10 mins)
- Stage 5) Discussion and next steps (15 mins)

Films that accompany this exercise

- 'Energy from Waste: An introduction' (disc 1): required
- 'Things to consider before starting up an anaerobic digester' (disc 1): required

Number of people or groups

The audience should be broken into four or eight groups – try to keep group size fewer than eight people.

This exercise needs one Lead Facilitator and at least one supporter and/or recorder.

Materials needed

- 1) A map of your area

For **rural areas** use a 1:25,000 OS Explorer map showing your community. Note that it may be more convenient to order one that has your community in the centre (from <http://leisure.ordnancesurvey.co.uk>). This costs around £17.00.

For **urban areas** or mixed urban-rural areas use a map at about a scale of 4 inches to 1 mile (this is about 1:16,000 in 'OS speak'), where you can read street names. The most likely place you will get this is from an A-Z style map, which can be ordered from www.a-zmaps.co.uk.

For all maps, if you need to make photocopies make sure that no one takes them away with them, as this would be a breach of copyright.

- 2) Copies of the OS sheet on working out a grid reference (from the reference section of the folder) one for each group.

3) Pieces of string with a mark at every kilometre interval, each being a total length of 4km at the scale of your map (rural).

4) Post-it index tabs (or similar) of the sort used to mark places for signature in a document that you can write on with a ballpoint pen



5) Copies of the handout - 'Likely sources of waste', one for each group

6) A copy of **Table 1**, marked up on a flipchart

7) Blank copies of Table 2, printed at A3 size (or written on flipchart paper), one for each group

Arranging the room

Everyone in their groups at tables big enough to spread their maps and tables out on.

Running the exercise

Stage 1) Identifying where you might have your AD plant

If you are in a rural area, you are almost certainly looking for a farm where the digester will be hosted. In an urban area, you could be looking for somewhere like an industrial estate. There are no hard and fast rules on the distance that an AD plant has to be from homes and businesses, but the Environment Agency recommends 250m for a plant that will be taking food waste (though you can apply for a special licence to have this distance reduced if you can prove adequate odour control).

Your discussion should take the following into account:

- Residential amenity – what visual impact would the positioning of your plant have on homes nearby? How would those residents feel about increased traffic to the site (lorries or vans coming in with waste and leaving with digestate)? What about odour control?
- Landscape and visual amenity – if you are in a rural area, how will the proposed plant fit in with the landscape? Will it be visible from scenic viewpoints?
- Highways and traffic – what are the road connections like to the plant? Are they able to cope with an increase in traffic due to the delivery of waste and collection of digestate?
- Using the heat from the plant – AD plants produce heat as a by-product of the digestion process and of

the generation of electricity. It's not as high a temperature as that produced from biomass CHP, so can't be pumped over very long distances. Where could it be used? Dairy units on a farm? Nearby business units?

- Is your community the best place for this? In some urban communities, you might struggle to find a suitable location and so decide that this is not a technology to pursue. Alternatively, your research may identify a good location elsewhere (a neighbouring ward for example) and so one of your actions is then to re-define your 'community' and include that neighbouring ward in your engagement plan, with them receiving benefit that is commensurate.

Using the pointers above, facilitate a discussion looking at the maps and having people suggest locations for the digester. Briefly discuss the pros and cons of each site and some next steps to investigate each site. Have a quick vote on the best sites to investigate further and mark up to three locations on the main map with small blobs of blu-tac.

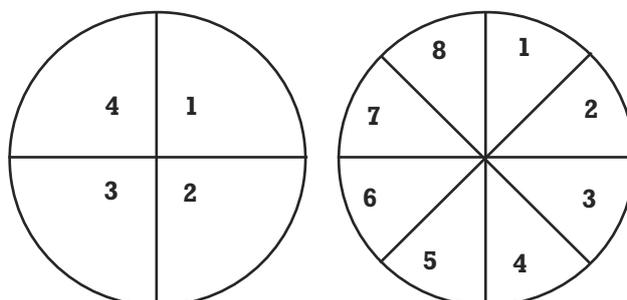
Allow up to 15 minutes for this stage.

Stage 2) Identifying potential sources of farm waste

(NB skip this stage if you are in a large urban area, unless you are on the edge of the city or town bordering agricultural land).

Get everyone in their groups to look at their maps, with one person holding the measuring string so that one end of it is roughly central to the location(s) where you think you might locate an AD plant. Assign a section of the compass to each of the four groups – if you have lots of people, you can do this with eight groups instead, dividing the compass up once more, i.e. for four groups split the compass like the circle on the left, and for eight groups like the one on the right.

They are to slowly work the string around their section of the compass, so for example Group 1 will be starting with the string making a line directly north of the community,



and moving it slowly around clockwise until it points directly east (or north-east if you have 8 groups). Group 2 will do the same, but will cover the quadrant east to south, and so on.

As they go round they should put a sticky index tab on any farms that are within the radius marked out by the string. On the sticky index tab, they should mark with a ballpoint pen, the name of the farm.

Then on their copy of the table they should mark:

- The name or description they have put on the index tab
- The grid reference of the farm (or a street address if using an A-Z map)
- The distance (in km) from your community (estimated from the km markings on the string).
- If they know what is farmed there – dairy, pigs, poultry, arable etc.

Depending on how many farms you have, you should allow between 10 and 20 minutes for this stage.

Stage 3) Identifying potential sources of other wastes

In the same groups, and assessing the same sections of the map, the groups are to now try to identify any places where they know there are likely to be wastes as outlined in the handout.

This requires local knowledge – only in the largest cases are the buildings likely to be named on the map (more so on an A-Z than on an OS map). What the groups need to do here is look at the streets and the buildings on the map and use their local knowledge from driving, walking and cycling around to try to pinpoint where there might be sources of waste. This will include:

- Schools and nurseries
- nursing homes
- hotels
- hospitals
- large restaurants (or areas where lots of restaurants/cafes are close together)
- horticultural nurseries
- food processing plants
- large supermarkets or outdoor markets
- slaughterhouses
- stables
- bio-diesel producers

You might want to write this list up onto a flipchart as a reminder prompt for the groups.

They will need to add sticky index tabs to identify these on the map e.g. 'Lampton House - nursing home' or 'Mariott Hotel'.

Allow 25 minutes for this stage

Stage 4) Transferring the results to the table

Ask all the groups to come and stick their copies of Table 1 next to each other on the wall, and to transfer their sticky index tabs to the same place on your map on the wall (so that you end up with one big map showing all the waste sources identified). Quickly delete duplicate entries for any waste sources that might have overlapped two groups' work and which are therefore on more than one table.

Allow 10 minutes for this stage.

Stage 5) Discussion and next steps

Facilitate a brief discussion about which of those sources of waste look like the best place to start investigating. Make sure you ask for volunteers to form a sub-group to investigate the potential sites for the AD plant as well as these potential sources of waste further – to chat with the owners and managers about the volumes of waste available, what they currently do with it etc.

In rural areas where you will be taking a lot of farm waste, it's likely that the farmers will collect the digestate themselves. If you're in a totally urban area and will not be including any farm waste, you'll need to think about who else will collect the digestate, or who you will sell it to instead. Think about organisations with fertiliser needs – horticultural businesses, the local authority parks department etc.

Remember to stress that this exercise is really very preliminary, and is meant to give a sense of the range and number of waste producers in any given area. Quite a lot more work will still need to be done to check the acceptability of all the identified waste producers, and to work out the logistics of bringing in the waste and taking away the digestate.

Allow 15 minutes for this stage

The original Forestry Commission spreadsheet that CSE adapted for this exercise can be found at www.forestry.gov.uk/forestry/INFD-7TJKPC under the section 'How much woodland do I need to heat my building?'

Table 1

1	2	3	4	5
Potential location for AD plant	Grid reference or street name	Pros	Cons	Notes and next steps?
Rose Lane Industrial Park	Rose Lane	Not near any homes Probably can use the heat on site	Not really in our community – right on the edge, so would need to include next ward	Find out who is the landowner and contact
Land behind the NCP car park, Prince's Street	Prince's Street	Has been wasteland for years, local eyesore, needs re-developing. Can nearby offices use the heat?	Traffic on that road very bad in rush hour. Might be problems if we add to that? Deliveries to be restricted to outside those times?	Find out who is the landowner and contact
Harcourt Farm	233781	Not near any homes Could use the heat for the barns?	Would people in the village object to the delivery lorries?	Contact Liz Samuel, the farmer

Table 2

1	2	3	4	5
Name of waste producer	Grid reference or street name	Distance from our project	What waste might they have?	Notes and next steps?
Harcourt Farm	233781	2km	Dairy slurry, pig manure, silage	This is a proposed location for the AD plant
Scotts Farm	224651	2km	Poultry litter, chicken carcasses?	Need to check with the AD Quality Protocol if carcasses are allowed?
Harrisons Artisan Cheeses	236792	3km	Oils? Waste Cheese?	Call to discuss
Lampton House nursing home	432897	2km	Food waste	Call to discuss
Green Lizzy Garden Centre	433834	4km	Green waste	Call to discuss
St John's Catholic Secondary School	431881	3km	Food waste	Need to check if the council is already collecting this, then call to discuss

Handout 1 Likely sources of waste

The sort of process that the waste might come from	Allowable waste
<i>Hunting, fishing and fish farming</i>	Primary processing animal and fish tissues
	Waste from food washing
<i>Agriculture</i>	Green waste, plant tissues, sludge waste from washing vegetables
	Primary processing animal tissues
	Animal faeces, droppings including straw that is collected with it * (cow slurry, pig manure, horse manure, poultry droppings)
	Waste milk
	Waste animal feeds
	Husks and cereal dust etc from processing arable crops
	Residues from commercial mushroom cultivation
<i>Horticulture</i>	Green wastes, plant tissue
<i>Forestry</i>	Green wastes
<i>Food production, baking etc</i>	Primary wastes (vegetable peelings, some animal tissue wastes** etc)
	Sludge from food washing processes
	Glycerol (left over when waste food oils are used to make biodiesel)
	Residues from making potato or corn starch
	Residues from making molasses
	Residues from making oilseed rape
	Out of date foodstuffs
	Residues from the canning process
	Residues from tobacco factories
	Residues from processing tea, coffee or cocoa
	Residues from sugar production
	Residues from jam and conserve production
	Sludge from gelatine production
	Kitchen waste
<i>Alcoholic and fruit drinks production</i>	Fermentation and brewing waste
	Leftover grain and fruit pulps
	Alcoholic drinks and fruit juices past their use-by date
	Sludge from wine making
<i>Institutional wastes (schools, hospitals, restaurants, nursing homes etc)</i>	Kitchen and food waste
	Out of date foodstuffs
	Cooking oil and animal fats
<i>Shops and markets</i>	Out of date foodstuffs
	Waste vegetable and plant materials from markets (which must have been separated from all other wastes at source).

* Unless restrictions have been placed e.g. because of foot and mouth outbreak

** Need to check regulations 13 & 14 of ABPR regulations – but assume at early stages this includes rendered fats and meat waste

This handout summarises waste products that could be available to a community anaerobic digester and that should also meet the requirements of the Quality Protocol on digestate.

Note, an exhaustive list of waste types can be found in Appendix B of the Quality Protocol (downloadable from www.planlocal.org.uk). This handout doesn't include sources of waste from large operations like water treatment works or urban kerbside collections.