Psychology of small scale AD: farmer and policy maker?

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Small scale: Perceptions

‘We know it cannot pay’
  ‘Look at the costs’
  £8,000 – £15,000 per kWe

Common knowledge - source of information?
  Who says so?

Consultants as contracted government advisers?
  Bank managers?
  Media accepts

End of discussion – small farm scale manure AD not an option
Too expensive: capital costs < £250kWe?

(Source: IEA (2015) Small scale technical brochure with editor)
SMALL SCALE?
The real world - family farms in Brazil?
Digester 20m$^3$
supports 10 kWe CHP/
5m$^3$/hr
biogas upgrading

Part of 33 - farm cooperative

22 km Gas Pipeline links farms
Norway 20 m³ slurry management System 3,000 t/year

1998 Finland 150 m³ digester CHP Built from recycled materials See Case study

Switzerland manure +crop CHP Grid control to virtual power station www.iea-biogas.net

The Indian scale Manure AD makes money- Surplus gas goes to market- a cash commodity

See Mutzner (2013) Workshop
Farmers – why install AD?

- Financially worth it compared with……? 
- Existing situation – slurry tank, lagoon, etc. 
- Costs money to purchase 
- AD more expensive – is it worth the cost? 
- How do you measure it? 

Against what you have

- Manure/ slurry continuous expense until the storage has to be replaced.

  No income and risk of pollution, fines, flies, human and animal disease and weed seed recycling

But

Nutrient content and return of organic matter to soil
Farmers thinking

- Costs per kWel ??? No?
  Is AD for slurry a new money maker GBP in the bank?

- Money wise I am no worse off than I was before but easier budget forecasts

- AD a loss maker – no financial benefit

- Policy makers - no takers no GHG reduction
The KEY Issues

- Capital cost of the whole plant
- Source and cost of purchase money
- Operating cost
- Quality of feedstock – amount of dirty water

Then

- Sources of income – energy sales, incentives

BUT

- Cash flow – avoided costs as important but but ? taken into account by bank
After 2 yrs operation
Avoided expense  29-39k
New income

7 years later
35-38k
130k-141k

Digester converted from former Heavy duty oil tanker
Heavy duty oil tanker
A key factor

Cash flow – avoided costs as important but ? taken into account by
the bank? finance? Company, policy advisers

Need to maximise non fiscal benefits
Sensitivity to external forces

1. Electricity, fuel oil, kerosene, wood, fertiliser

- Method of approach transferable to farm and national circumstances – replace with own data
- Biogas available for use calculated from t/VS/tDM

- then deduct: Energy used to process the slurry
- Losses through poor insulation ? 40%
- Losses from uncovered digestate store

These lose money – income only from what remains
Sensitivity to external forces

2. Incentives

EU To replace fossil fuel based electricity

- Reasons for incentives:
  - Reduce GHG emissions
  - Other AD benefits usually an unrewarded Brazil to improve water quality, sustainable agricultural, environmental & social well being

See ITAIPU www.cultivandoaguaboa.com.br

- India – sustainable and integrated rural development and land, air and water pollution control

- See for example http://www.snvworld.org for use of Dutch government aid
How does the farmer value?

- Improved animal and farmer health?
- Reduced respiratory disease, improved human and animal productivity
- Reduction in weed seeds and recycling plant disease
- Cushion against volatile fuel and fertiliser prices
- Availability of cleaner air and water

What does the policy maker get?

Between 7.6t CO$_{2eq}$ and 12.5t CO$_{eeq}$ per cow depending on the option used
Avoided costs and self sufficiency

A key for the farmer?

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