

IEA Bioenergy Task 37

Energy from Biogas

**Psychology of small scale AD:
farmer and policy maker?**

Clare T. Lukehurst OBE

International Energy Agency

Bioenergy Task 37/Task 37 (UK)

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 ?

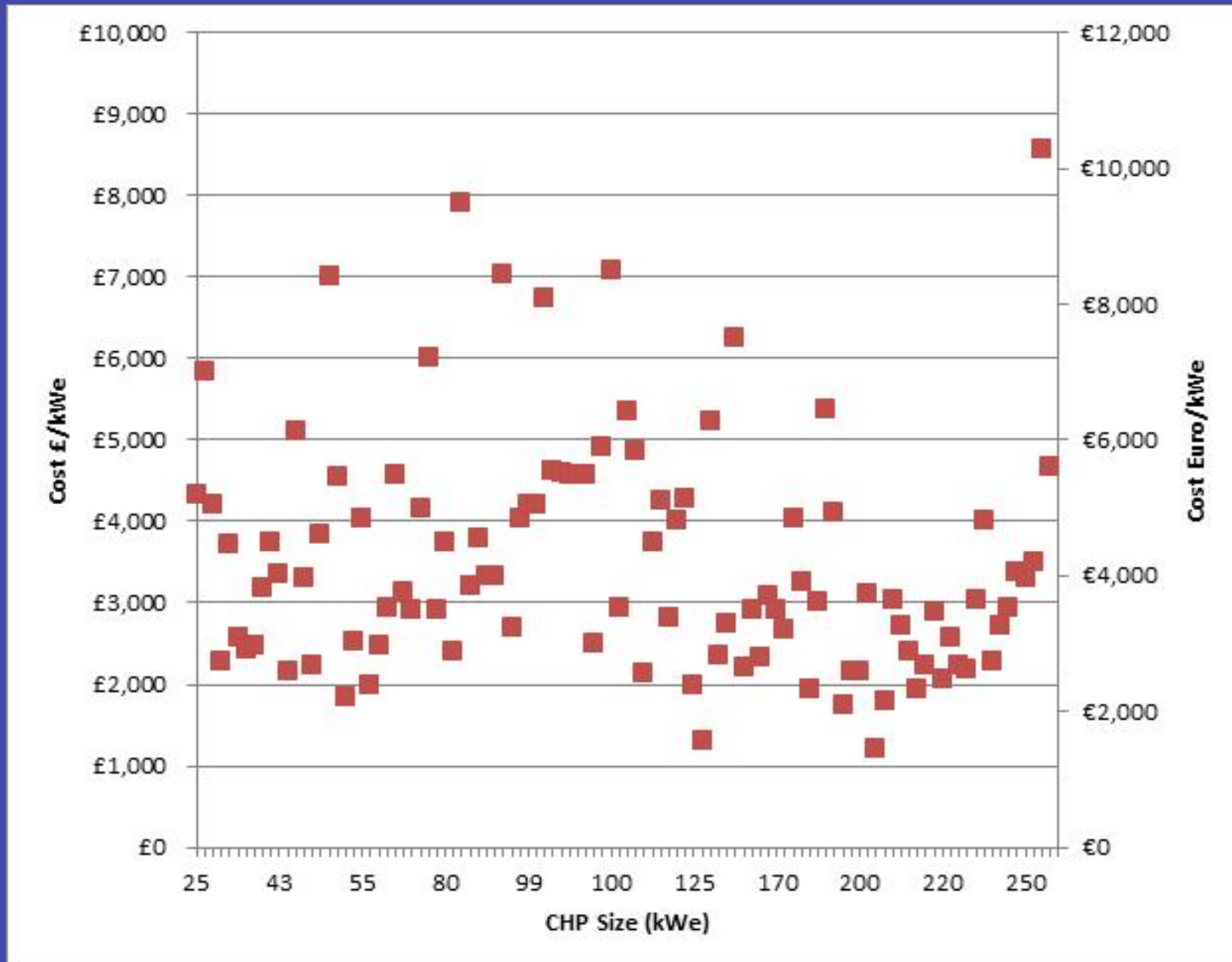
Bank managers?

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)





Part of 33 - farm cooperative

SMALL SCALE?
The real world - family farms in Brazil?
Digester 20m³
supports 10 kWe CHP/
5m³ /hr
biogas upgrading



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**



See Mutzner (2013) Workshop



**The Indian scale
Manure AD
makes money-**

**Surplus gas goes
to market- a cash
commodity**

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_{2eq}
per cow depending on the option used



**Avoided costs and self
sufficiency**

**A key for the farmer?
Thank you!**

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