AD at abattoir - Feasible?

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Content of interaction

- AD as solution for waste management at abattoir
- ibert Cavalier abattoir biogas system
- Feasibility?
- What are the pitfalls/ most critical issue ?
- Back door
- Reference plants – ibert Cavalier, etc.
- Conclusion
Anaerobic Digestion?

“Product” of natural process of decomposing of organic material in the absence of $O_2$

Biological process that convers carbohydrates, fats and proteins into methane CH4 and CO2
Golden rule of AD

To Act immediately and consistently

BUT

with patience

this will

achieve results
Feasibility game changers

- **Price** of service & energy is critical - MUST move away from cheaper than Eskom - why?
- **Waste processing cost** - gate fee - laws must be enforced - please
- **Green** - **Carbon tax** - must be realized
- **Tri-generation**
  - Electricity sales - reality
  - Heat - 80C - reality
  - Cold - 9-12C via adsorption cooling - chiller plant
  - **Organic compost** - not reality YET !! must become a sought after product
- **Funding period** must be long term 10y +
Most critical operational aspect

Material = fuel
• Consistency – seasonality
• Availability - 365day/y
• Quality - directly linked to gas production
• Stock-pile? JIT

Reality
• It’s all variables !!!!
• Animal size varies, seasonality, peaks & valleys, strikes, draughts

Contracting
• Critical thinking/ planning of all eventualities

Funding
• Ensure funders understand time-lines & flexibility
• Include 1st year operation & maintenance cost !!!
Critical technology issues - effects

- Type & quantity of material – Fuel begin and end
- Operation – skills, back-up NOW not tomorrow
- Workforce – 24/7 – weekends, holidays/ strikes – infrastructure, transport, accommodation, safety, theft, etc. bacteria does not know when its Christmas
- Complexity of technology – Africanize
- Maintenance & break-downs – simple
- End-use - can not only be electricity - tri-gen
Financial of ibertCavalier

Plant
- Process plant AD = 1000m³ process +- 30t/day
- +- 170m³/hr at full output
- CHP’s 135 + 225 kW = 360kW el
- Budget cost phs1 R12,5m actual R16m
- Phase 2 budget R12m actual R12m

Low operation cost >10c/kWh / self usage >6%

Revenue streams
- Gate fee
- Energy sales
- CER - carbon tax possible
- Organic Fertilizer - not realizing
Waste supply
• Every bodies potatoes the larges but reality is different
• Must have alternative feedstock or penalties

Funders
• Keep them close speak to them, make sure they understand what you telling them, the have a different decoders

Take off/ client payments
• Must find workable process must be win-win

Legalities
• Enforce your agreement don’t let it slip - it will bite you
• Spend extra week on definitions and clarity before signing agreement don’t rush - it will save years in long-run
Reference sites South Africa
Plant #1  Meat to Market Jan Kempdorp - 2010

600m³ AD, 135 kW CHP, 15 t/day slaughter waste
Plant #2 Hessequa Abattoir - Riverdale - 2014

400m³ AD, 50 kW CHP, 10 t/day slaughter waste
Plant #4&5  Cavalier Abattoir - Cullinan - 2015/17

2 x 500m³ AD, 360 kW CHP, 35 t/day abattoir waste
Plant #3 No2 Piggeries - Peninsula - Queenstown - 2015

600m³ AD, 190 kW CHP, 35 t/day pig manure
Plant #6 Zandam Cheese & Piggery (W/Cape) 2016

Expanding 2nd digester & CHP 300kW

1 x 400m$^3$ AD, 75 kW CHP, 30 t/day pig manure
Plant #7 Thorny hill KZN - energy crop - 2016

200m3 AD, 16 kW 2,5t/d Napier grass
Conclusion

- AD at abattoir is feasible waste management option
- Critical to select correct technology and operational process *(the devil is in the details)*
- All energy must be utilised - tri-gen most feasible
- Must be partnership - can’t be one sided
- Funding is critical must have some equity but flexible loan conditions - something WILL GO WRONG - plan for it!

Will I do it again? YES, BUT I will spend more time on contracts before I sign !!