



biomass technology group

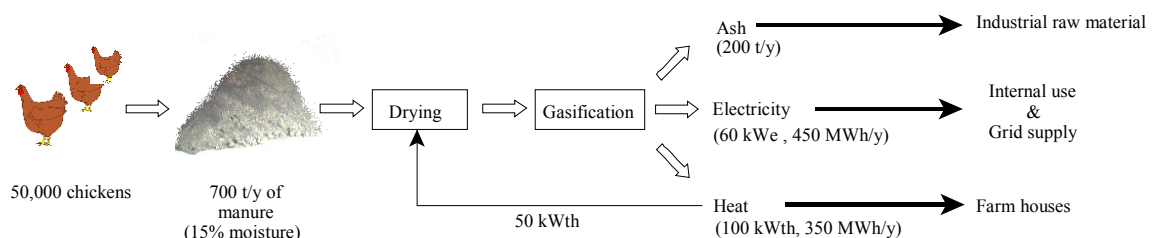
Biomass consultants, researchers and engineers

BTG Biomass Technology Group BV is a private firm of consultants, researchers, and engineers, operating worldwide in fields of sustainable energy production from biomass and waste

P.O. Box 217 > 7500 AE Enschede > The Netherlands > Tel +31 53 486 1186 > Fax +31 53 486 1180 > Email office@btgworld.com > Site www.btgworld.com

## ENERGY FROM POULTRY LITTER

In 2002, new legislation came into force for the disposal of poultry litter. Farmers had to sign contracts for the guaranteed and sound disposal of their litter. This resulted in increasing manure disposal costs and accelerated efforts to develop and implement alternatives for manure disposal. In close co-operation with poultry farmer Duis v.o.f., BTG developed a farm-scale gasifier system including novel gas cleaning technology and mineral bookkeeping system for the conversion of poultry litter into heat and power.



*Route for the conversion of poultry litter on a typical poultry farm.*

### Advantages

- Cost effective solution for the farm scale conversion of poultry litter
- No mineral duties payable; no manure transport; no disposal contract necessary
- Sales of electricity (to grid) and ashes (road construction or fertiliser industry)
- Production of sustainable energy and a contribution to the CO<sub>2</sub>-reduction
- Savings on gas and electricity bill
- Spread of ammonia, methane, odour, disease and infection is avoided.
- Independence
- Potential application for several organic (waste) streams
- Good potential for scaling-up

## **Process description**

Fresh manure (ca. 900 ton per year) is dried in batches of 3 m<sup>3</sup> to 85% dry matter. The dried manure is discharged in a storage vessel from where the manure is transported to a dosage system above the gasifier reactor. At a temperature of 700°C the dried manure is converted in a bubbling fluid bed gasifier. The gasification process yields a combustible gas called 'producer gas' contaminated with particles, HCl, H<sub>2</sub>S, ammonia and higher hydrocarbons also referred to as tar. Fly ash is produced as a residue.

The gas cleaning system consists of three stages i.e. a rotating particle separator (RPS), a thermal catalytic Reverse Flow Tar Cracker (RF<sup>®</sup>TC) and a gas cooler. Due to the use of additives the RPS is capable of removing not just particles but HCl and H<sub>2</sub>S as well. The (RF<sup>®</sup>TC) tar cracker is capable to fully remove ammonia and tar from the gas stream.

After cleaning the gas is cooled down to about 40-70°C in an air cooler and a water cooler respectively. The hot air is used in the manure drier while the hot water is stored in a boiler.

The gas is now suited for combustion in a CHP engine. Electricity is mainly used on-site; the surplus is delivered to the power grid. Heat of the CHP unit is supplied to the boiler. The boiler is capable to deliver (if needed) heat to the manure drier, two farmhouses, the egg storage hall, the gasifier house and an eel fish cultivation. Disposed fly ash can be re-used for road construction or as a slow release fertiliser.



Manure gasification plant in Bladel, the Netherlands

## **Typical performance**

Capacity:	60 kW <sub>e</sub> + 100 kW <sub>t</sub>
Overall efficiency:	30%
Annual manure consumption:	900 ton (40 % moisture)
Annual electricity production:	450 MWh

## **Economics**

The economics of a farm-scale gasifier for poultry litter disposal can be positive due to the avoidance of disposal and transport on the one hand, and the production of heat, power and fly-ash on the other hand. However, the high investment costs of the 'first-of-its-kind' installation in Bladel (€ 450,000) resulted in a relatively long payback period of 7 years. Scaling-up, replication and further optimisation will bring this down to an expected payback period of less than five years.

## **Information**

For more information please contact:

Ir. G.J. Buffinga  
BTG biomass technology group B.V.  
P.O. Box 217  
7500 AE Enschede  
The Netherlands

Tel: +31 (0)53 489 28 97  
Fax: +31 (0)53 489 31 16  
E-mail: [buffinga@btgworld.com](mailto:buffinga@btgworld.com)  
Web: [www.btgworld.com](http://www.btgworld.com)