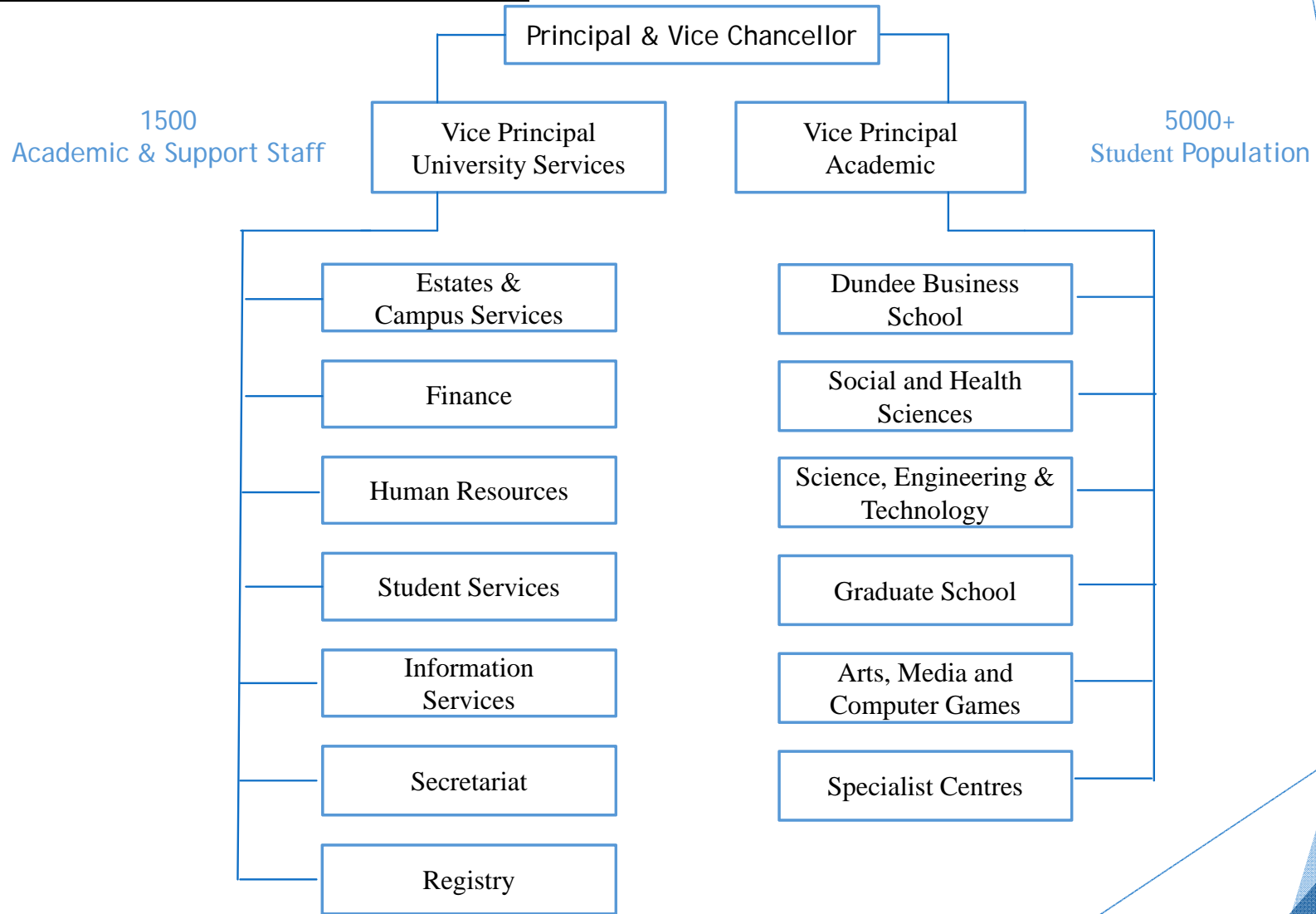


# Sustainable Waste Management System for Abertay University.

Wattala Fernando & Allison Dixon



# Structure of Abertay University



# Why Manage Our Waste?

## **National Level:**

**The UK Government Sustainable Development Strategy  
“Securing the Future”**

**Department for Environment & Rural Affairs 2005 (DEFRA)**

The above strategy demonstrates the government’s commitment to the minimisation of waste and that recycling has been identified as a priority focus.

A key priority in achieving sustainable development is to consider the management of waste including the recyclable resources embodied in that waste and with society’s perception of waste changing from unwanted to an unused resource, the UK is moving in the right direction.

# Why Manage Our Waste?

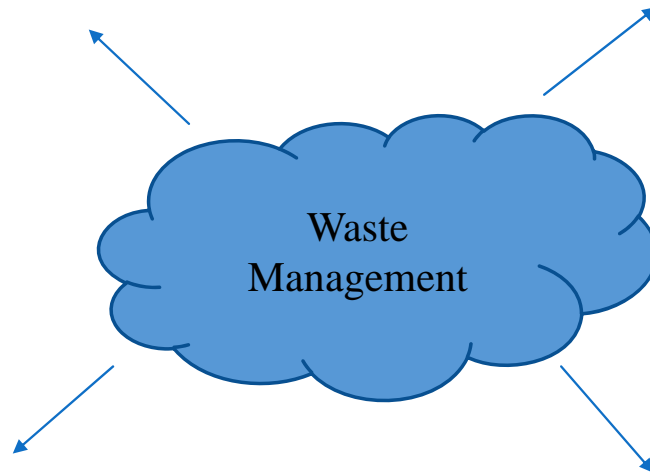
## Local Level:

### Education

- Cleaning ops gain competence with SVQ qualifications
- Staff encouraged to minimise waste and recycle
- Students in residences educated in recycling initiatives

### Clean Work Space

- Boost morale for existing staff
- Improved university reputation
- Minimises waste disposal costs



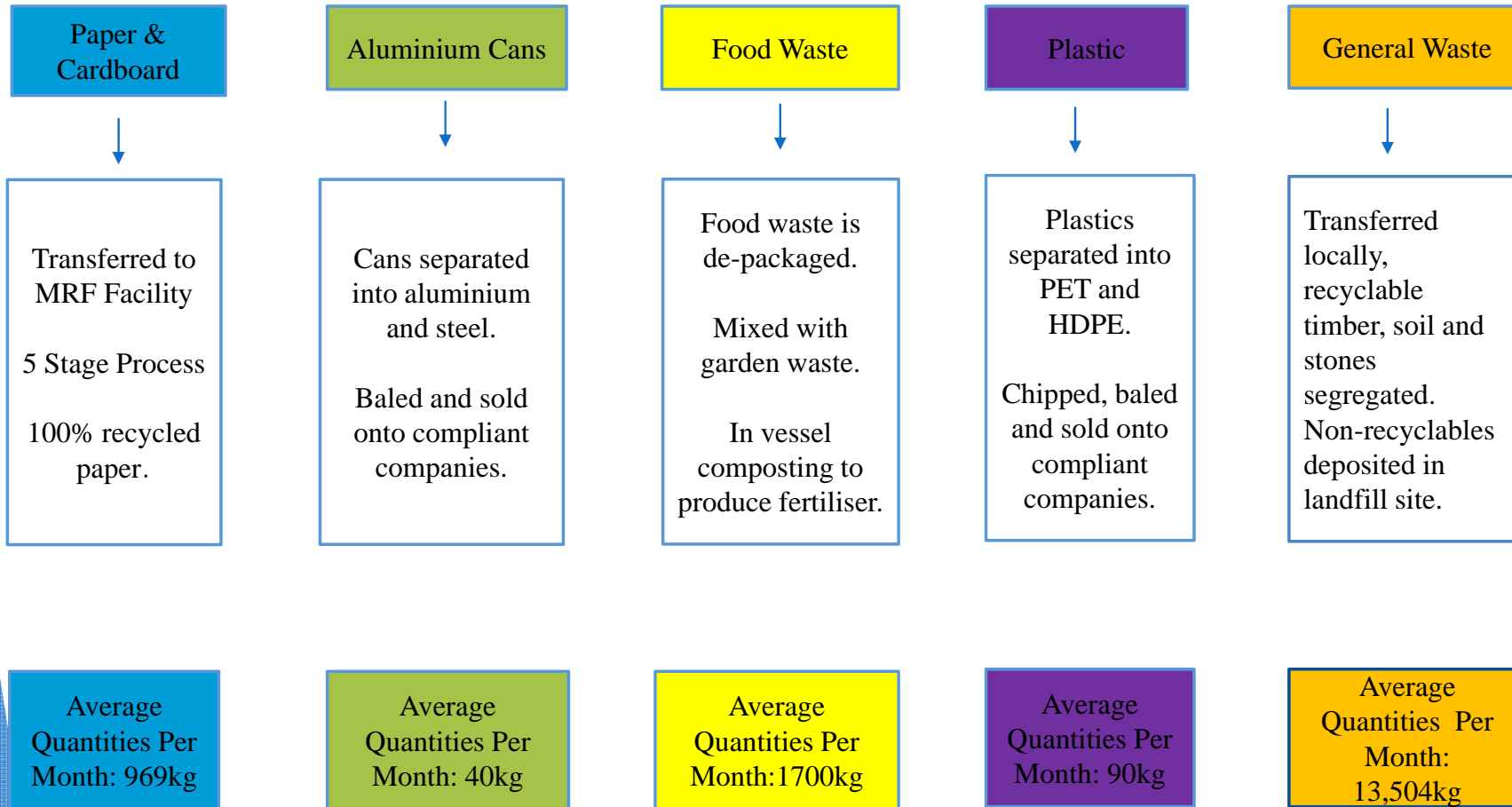
### Legislation

- The Waste (Scotland) Regulations 2012
- The Environmental Protection(Scotland) Regulations 2014
- The Special Waste Amend(Scotland) Regulations 2004

### Landfill Tax

- The Landfill Tax(Scotland) Act 2014
- Tax devolved to Scottish Government on 1 April 2015
- Standard rate currently set at £82.60 per tonne

# Where Is Abertay's Waste Going?



# Recycling Facilities at Abertay University



## Waste Compound at Abertay University

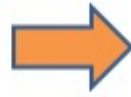


# Waste Processes

## PLASTICS



PLASTIC



Saicanatur Recycling Vehicle empties the containers and takes all the material back to a local recycler, Materials Recycling Facility (MRF) in Fife.



Loose bottles are segregated into PET and HDPE. They are then chipped and baled along with the other collected plastics.

All plastic is placed in the Mixed Recycling Eurobin for collection. These containers are collected every Tuesday.



The separated material is baled and sold onto fully compliant companies to make recycled or partially recycled products





# Aerobic Digestion

## The Process:

A proportion of Abertay University's food waste is mixed with garden and fish processing waste and turned into fertiliser in the world's largest in vessel composting plant. The biodegradable waste is placed into carefully controlled heat and PH chambers containing microbial activity which activates the process.



## The Outcome:

Following 8 days within the in vessel chamber under controlled conditions, a premium grade fertiliser (BSI Pass 100 accredited) is produced which is sold onto farmers (95%) and landscapers (5%).

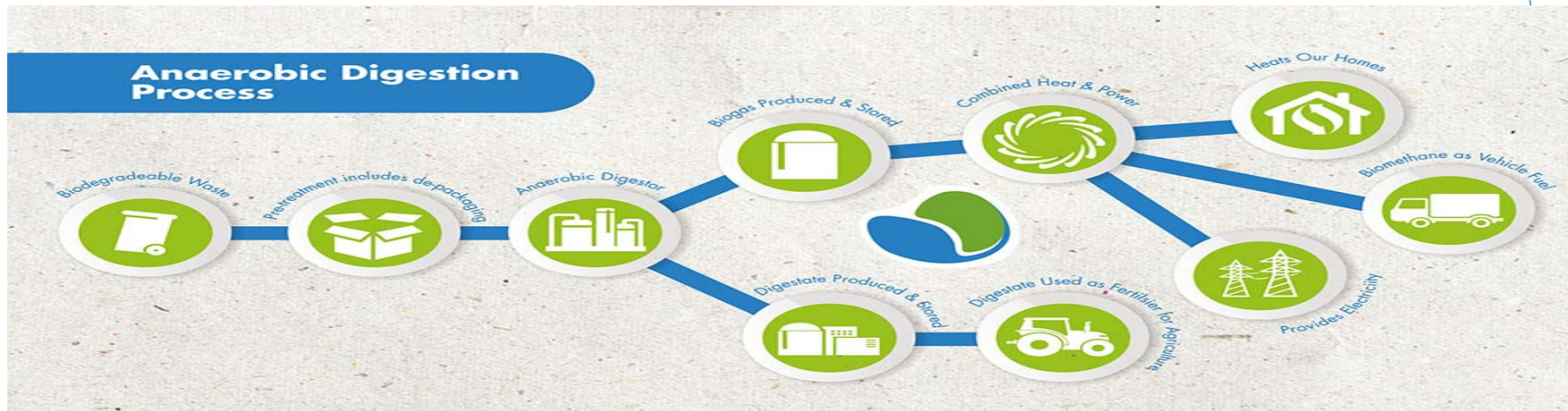
Advantage for farmers – fertiliser can be used throughout the seasons.

Source: [www.Kennanrecycling.co.uk](http://www.Kennanrecycling.co.uk)

# Anaerobic Digestion

## The Process:

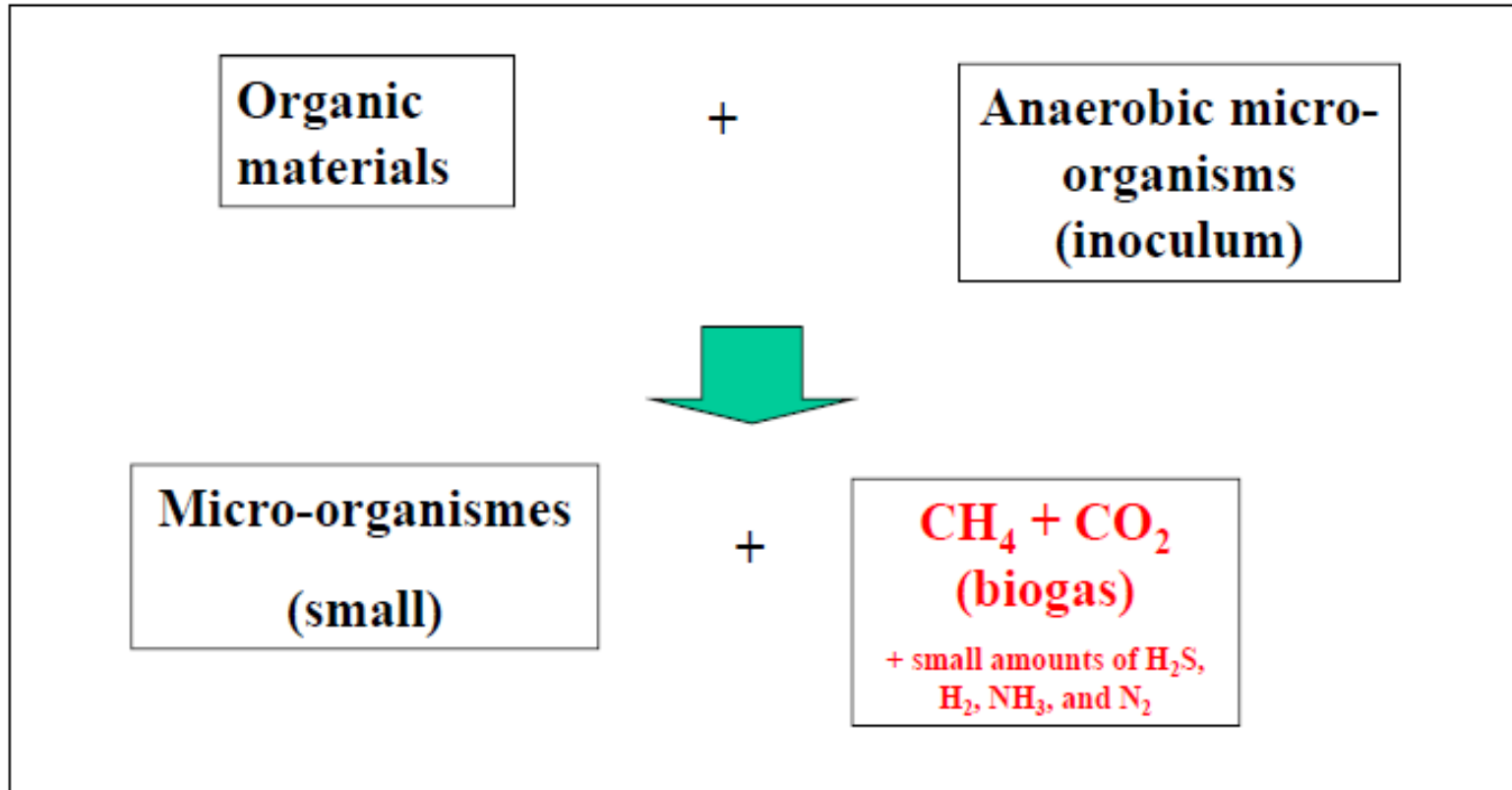
A proportion of the university's food waste is transferred to a state of the art anaerobic digestion facility which handles 30,000 tonnes of food waste annually.



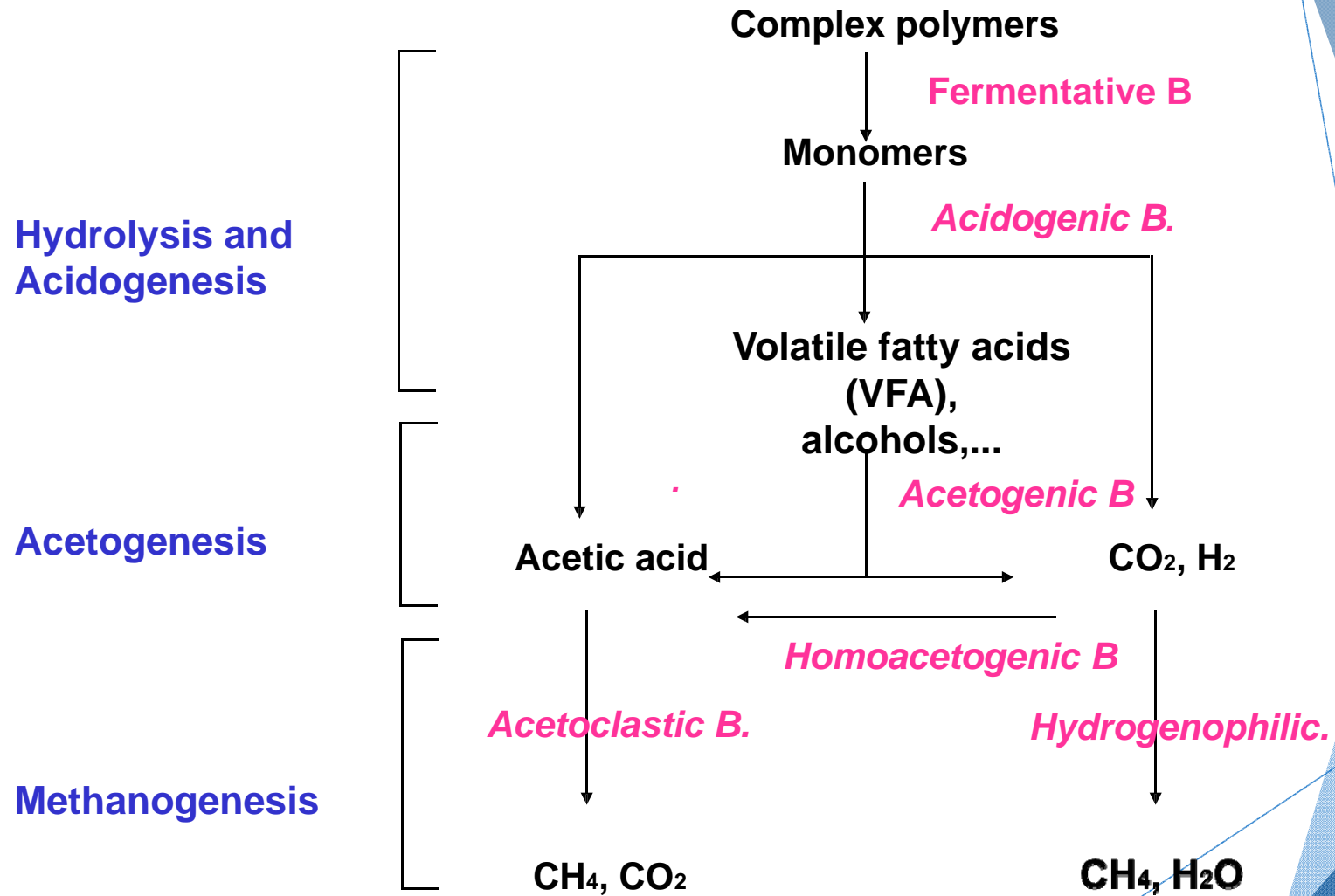
## The Outcome:

The anaerobic digestion process produces a biogas which can be used in a Combined Heat and Power Plant to produce electricity. This can be sold to the national grid and heat which may be used for district heating systems in the local area.

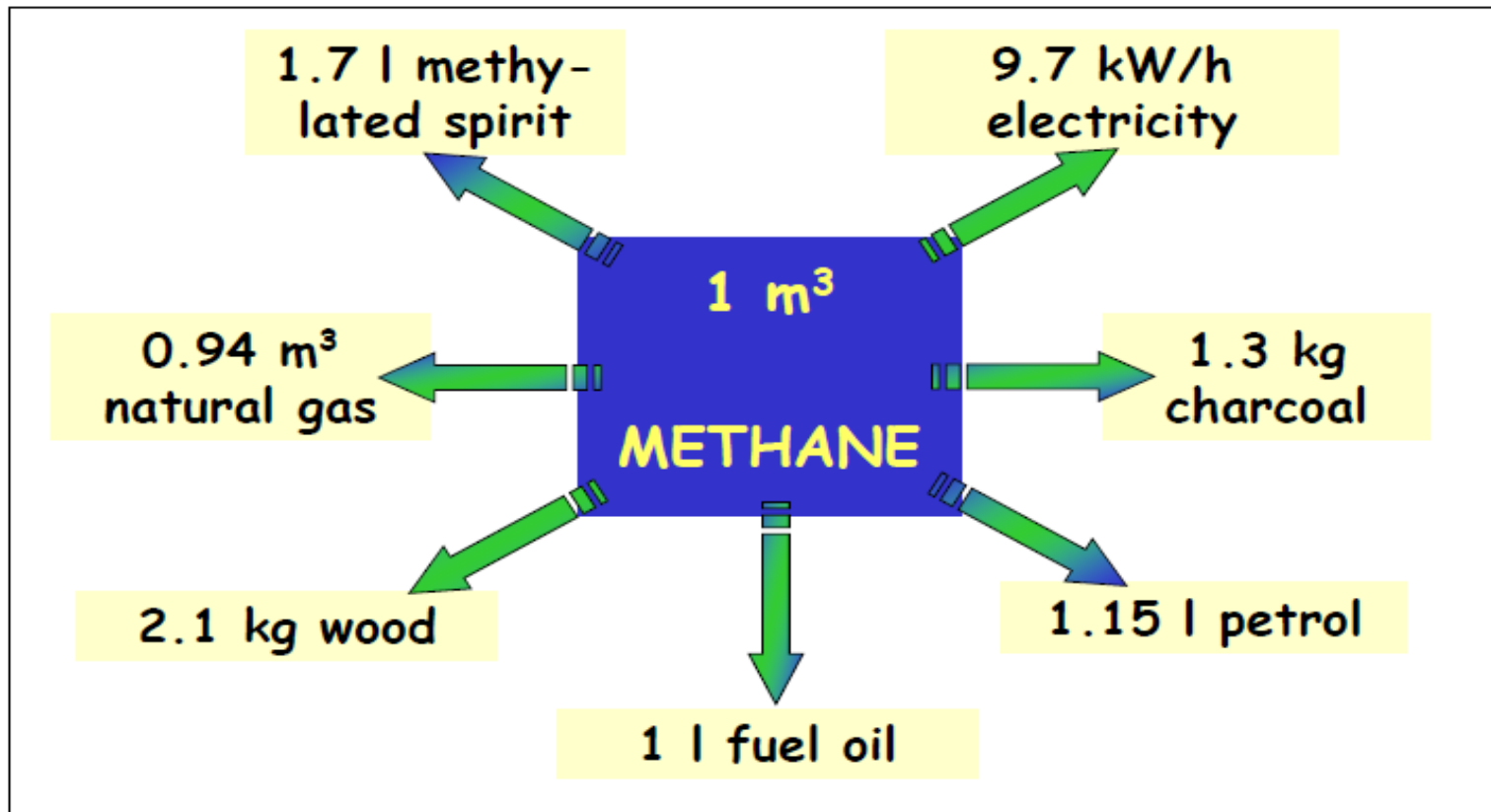
## Major Components of AD Process



# Reaction Sequence Of AD Process



**Energy equivalent of 1 m<sup>3</sup> methane gas**  
[Calorific value of methane gas: 39.8 MJ/m<sup>3</sup> at STP]



## Future Proposals

- Small Scale Anaerobic Digester & Combined Heat & Power Plant
- Abertay University working collaboratively with local schools & colleges.
- Collection of food waste from sites with transfer to a local farmland area.
- Anaerobic digester sited remotely alleviates legislation and odour problems.
  - Radically reduce current carbon footprint
- Advantageous pay back period - electricity sold to National Grid / exported
  - Feed in tariffs estimated at 0.11p



**Any Questions?**

