BioKenaf

Kick off 9 &10 April 2003
Athens

Douwe van den Berg
BTG biomass technology group BV

1. BTG Organisation

2. BTG ‘s role in Biokenaf

BTG existence started at the University Twente in prof. van Swaaij's group of reactor engineering (1979 - 1986)

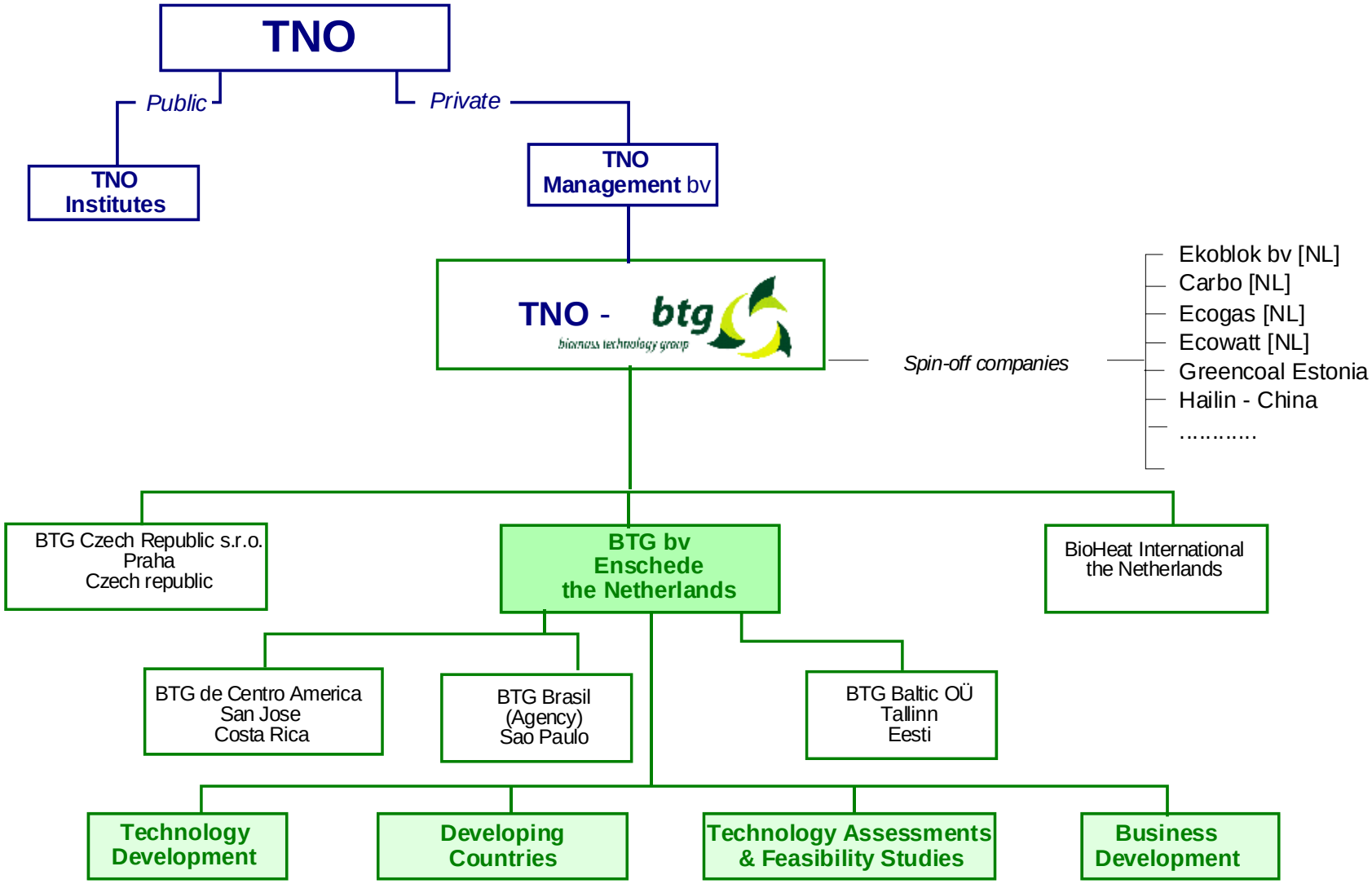
BTG is an independent, private firm which for the past 20 years has specialised in the process of biomass conversion into fuels and energy.

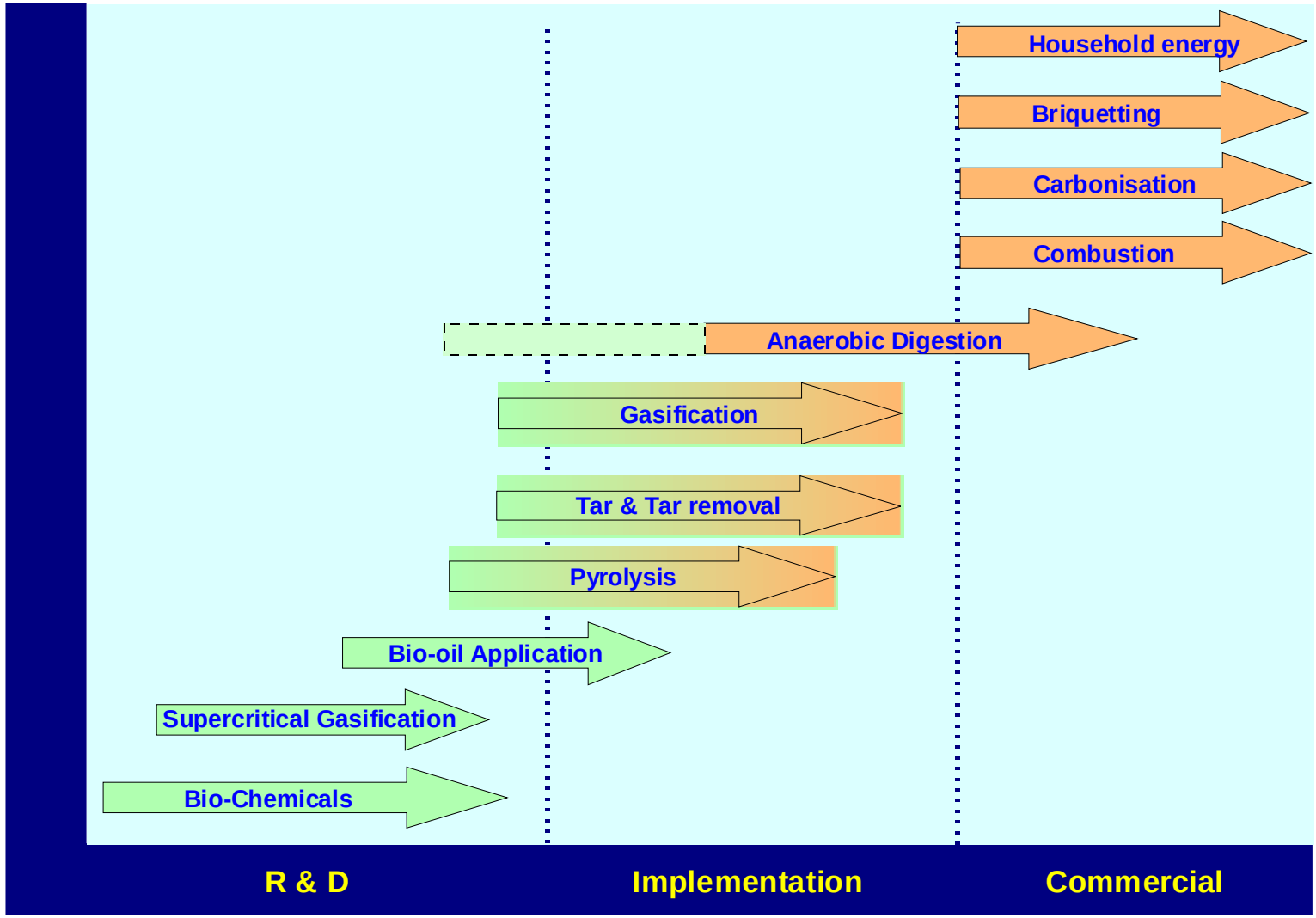
BTG has as its mission the world-wide development and implementation of economic and environmentally sound bio-energy systems.

Field-experience was gained in more than 80 countries.

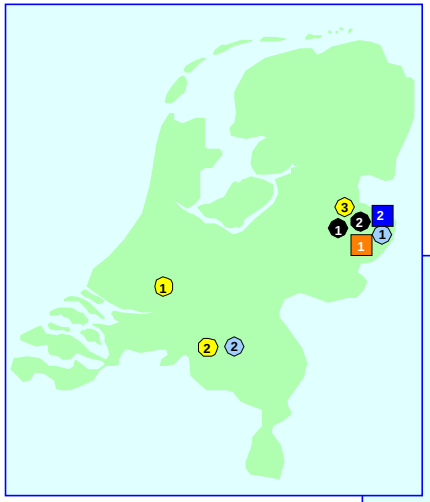
Since 1997 BTG has been fully owned by TNO Management bv

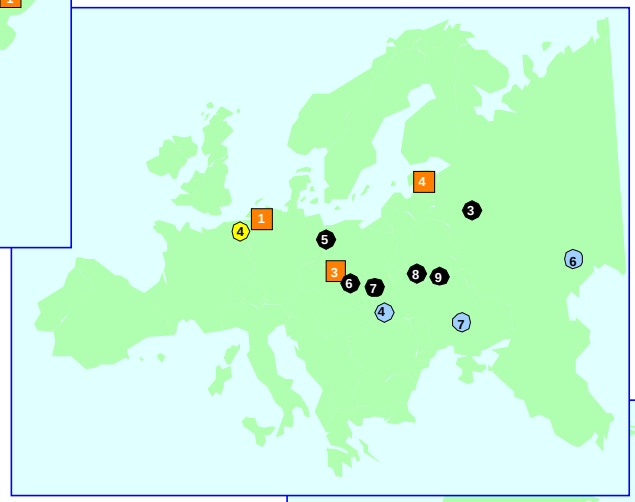
Organisation

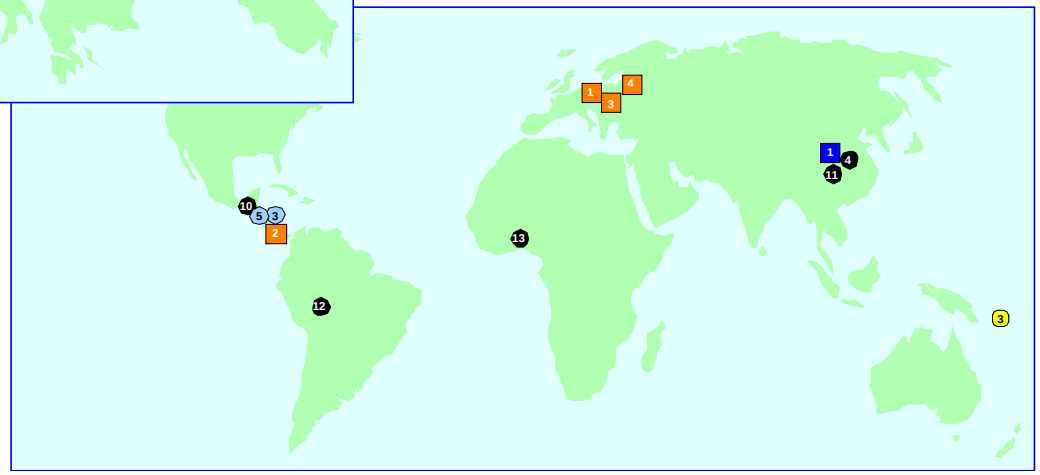



Household energy
Briquetting
Carbonisation
Combustion
Anaerobic Digestion
Gasification
Tar & Tar removal
Pyrolysis
Bio-oil Application
Supercritical Gasification
Bio-Chemicals
R & D
Implementation
Commercial

World-wide implementation







Offices

1. BTG Head office, Enschede, the Netherlands
2. BTG de Centro America, San Jose, Costa Rica
3. BTG Czech Republic s.r.o., Praha, Czech Republic
4. BTG Baltic OÜ, Tallinn, Eesti

Joint Ventures - Participation

1. Hailin City Biomass Technology Co. Ltd., China
2. Ecogas

Combustion

3. Priozersk, biomass fired heat boiler, 3 MWth, Russia, 2001
5. Jelenia Gora Municipality Works, Biomass Fired heat boiler, 580 kWth, Poland, 1999
6. Hostetin Municipality, Karpathian, Biomass fired heat boiler, 730 kWth, Czech Republic, 1999
7. Zvolen, Biomass fired heat boiler, School forest Enterprise, 580 kWth, Slovakia, 1999
8. Rivne, Biomass heat bolier wood factory, 5 MWth, Ukraine, 1999
9. Malin, Biomass heat bolier wood factory, 2.3 MWth, Ukraine, 1999
10. Honduras, Biomass fired heat boiler
12. Bolivia Rice husk combustor, 2001

Briquetting

1. Ekoblok, 2 t/hr sawdust, Almelo (NL), 1993
4. 1000 t/yr, Hailin, China, 2000

Carbonization

2. Carbo, charcoal 2 t/hr, Almelo (NL), 1999
11. Hailin, charcoal, 1000 t/yr, China, 2000
13. Ghana, charcoal 2000 t/yr, 2001

Gasification

1. CHP Fixed bed gasification, 100 kW_{el}, waste wood, Schiedam (NL)
2. CHP Fluidised bed gasification, 60 kW_{el}, Chicken manure, Bladel (NL)
3. CHP Fixed bed gasification, Vanuatu Fiji islands

Pyrolysis

3. Flash Pyrolysis plant, 10 MW_{th} wood, Almelo (NL), 2002
4. Flash Pyrolysis plant, 5 MW_{th} Sludge, ???? (B), 2002 ??

Anaerobic Digestion (AD)

1. CHP, pig manure, 16 kWel (Farm scale), Denekamp (NL), 1999
2. CHP, pig manure, 30 kWel (Farm scale), Sterksel (NL), 2001
3. 9 AD Waste water coffee industry plants, 1997
4. CHP, sewage sludge, 40 kWel, Hungary, 1999
5. CHP, cow manure, 40 kWel, Sarapiqui (CR), 2001
6. CHP, pig manure, 160 kWel, Elenovka village (Ukr), 2001
7. CHP, cow manure, 80 kWel, Colonita village (MD), 2001

1. BTG Organisation

2. BTG ‘s role in Biokenaf

WP5: thermochemical conversion (month 11 - 40)

Goal Evaluation of suitability of kenaf for thermochemical energy applications.

Milestone 12 Quality characterisitics of kenaf as biofuel for the thermochemical conversion processes (month 39)

Deliverable 12 Technical specifications of kanaf based products for selected industrial uses *(or: quality characteristics and energy potential of kenaf as a biofuel for thermochemical conversion processes)* (month 12 - 40).

In addition BTG will make contibutions to WP 6 (environmental assessment); WP 7 (economic analysis); WP 8 (handbook and booklet)

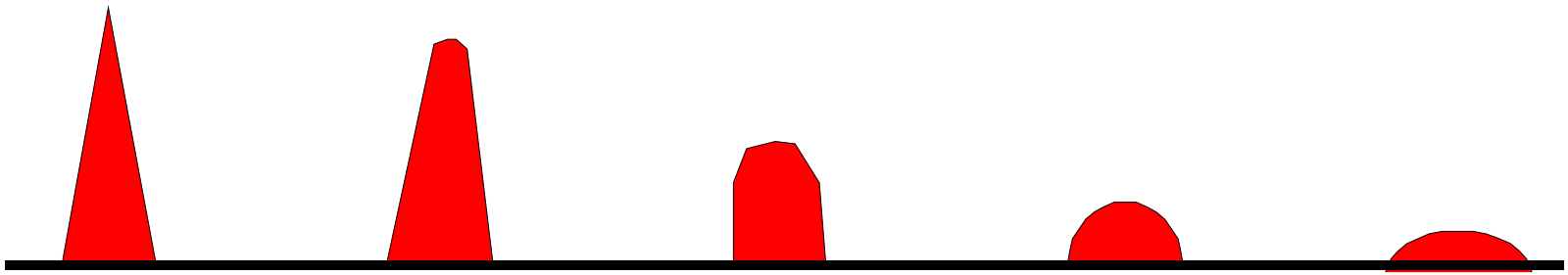
WP5: thermochemical conversion

Equipment (laboratory to bench-scale)

- ash fusibility test
- (co-)combustion device
- gasifier (fluidized bed)
- rotating cone reactor (pyrolysis)

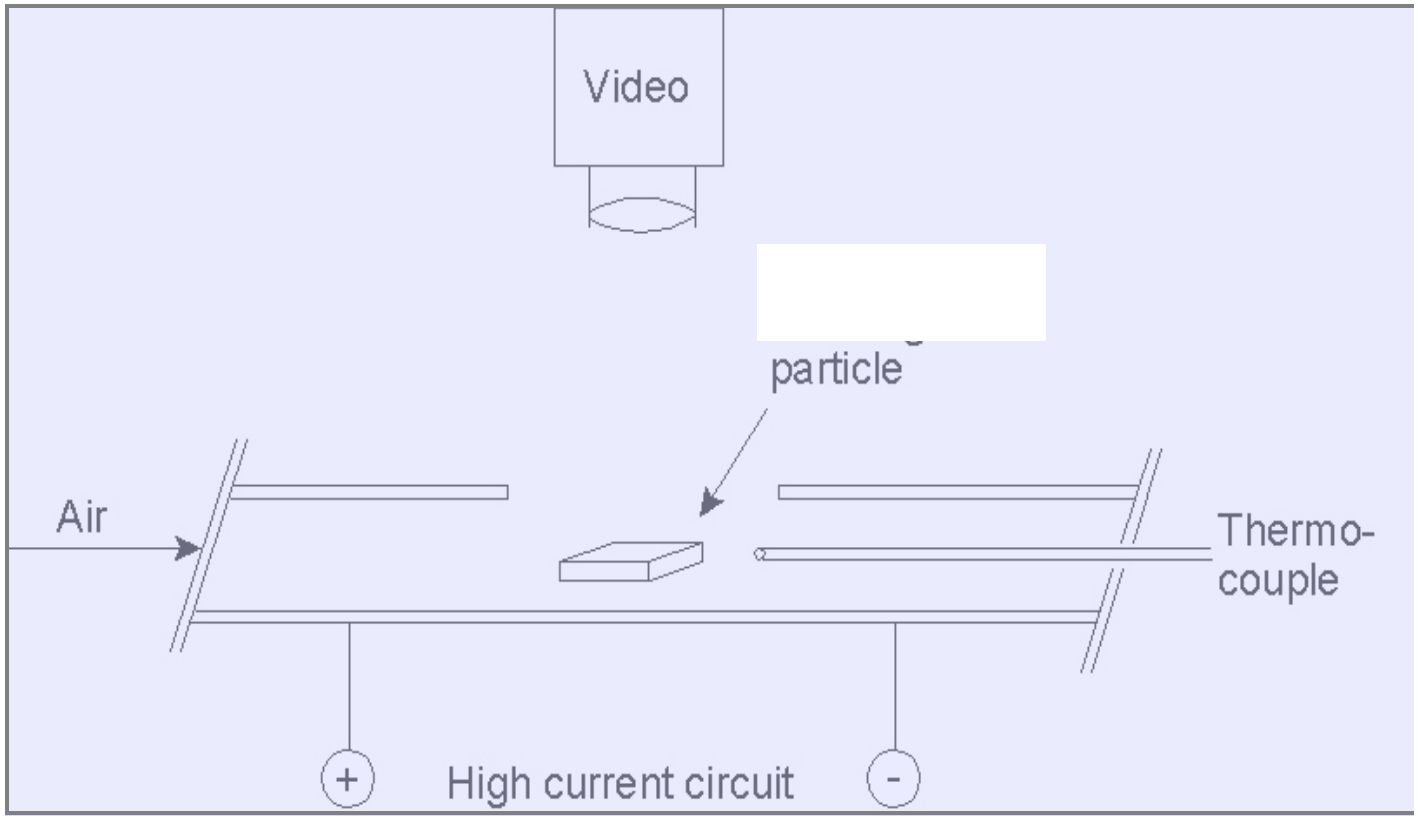
Material

- kenaf whole crop
- core fibre produced after bast fibre removal


IDT
ST
HT
FT
Initial Cone
Initial Deformation Temperature
Softening Temperature
Hemispherical Temperature
Fluid Temperature

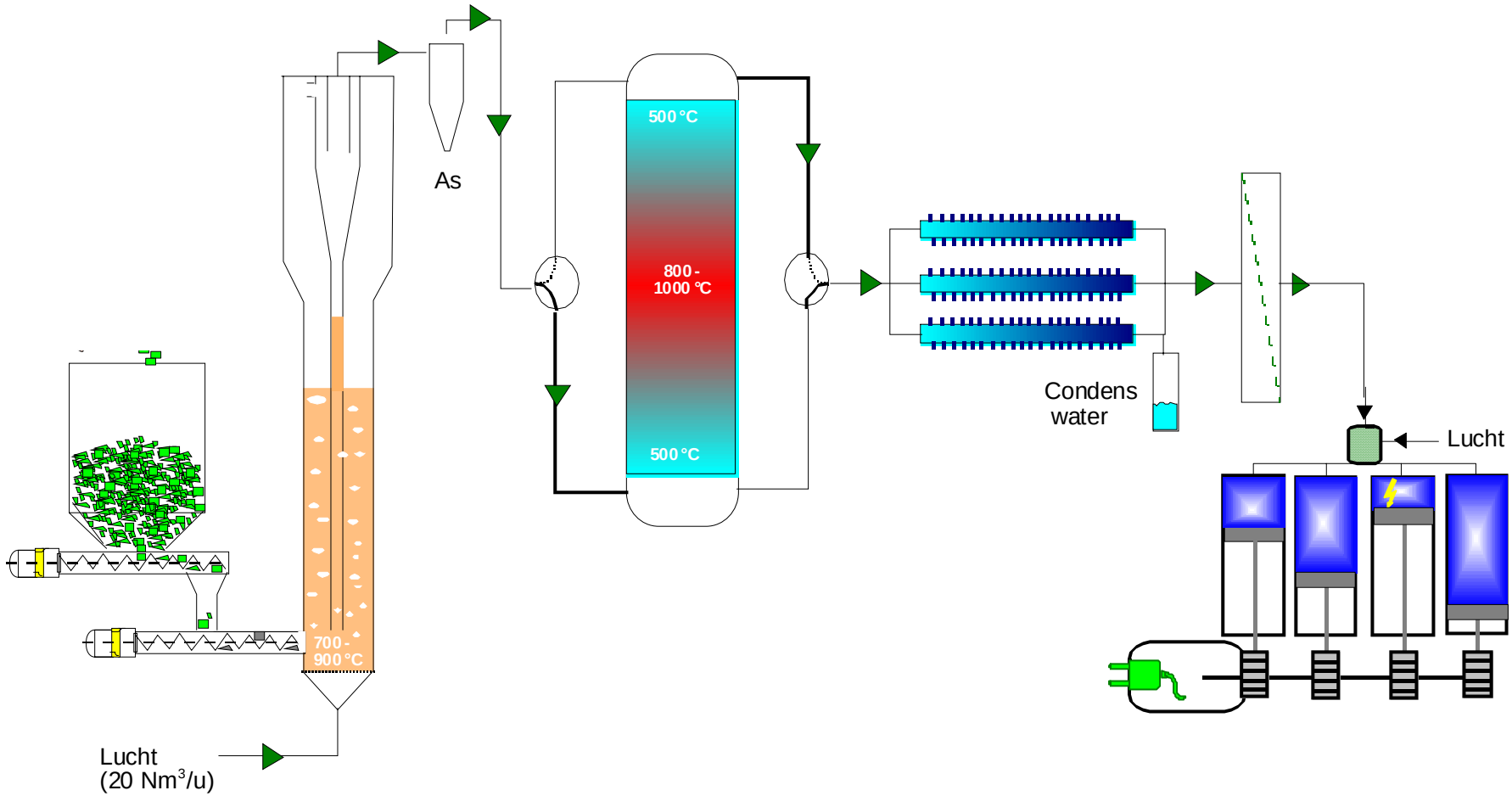
Cone shapes

Combustion



Experimental set-up combustion test

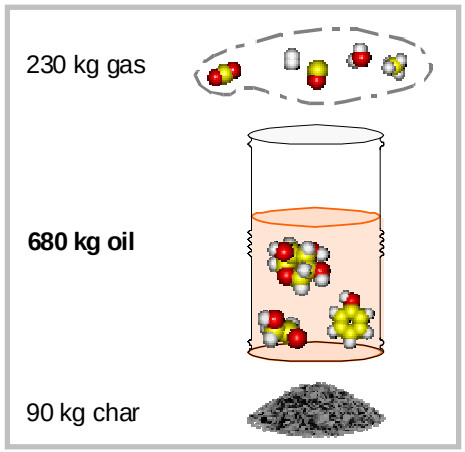
Gasification


As
500 °C
800 - 1000 °C
500 °C
Condens water
Lucht
700 - 900 °C
Lucht
(20 Nm³/u)

100 kW_{th} test facility

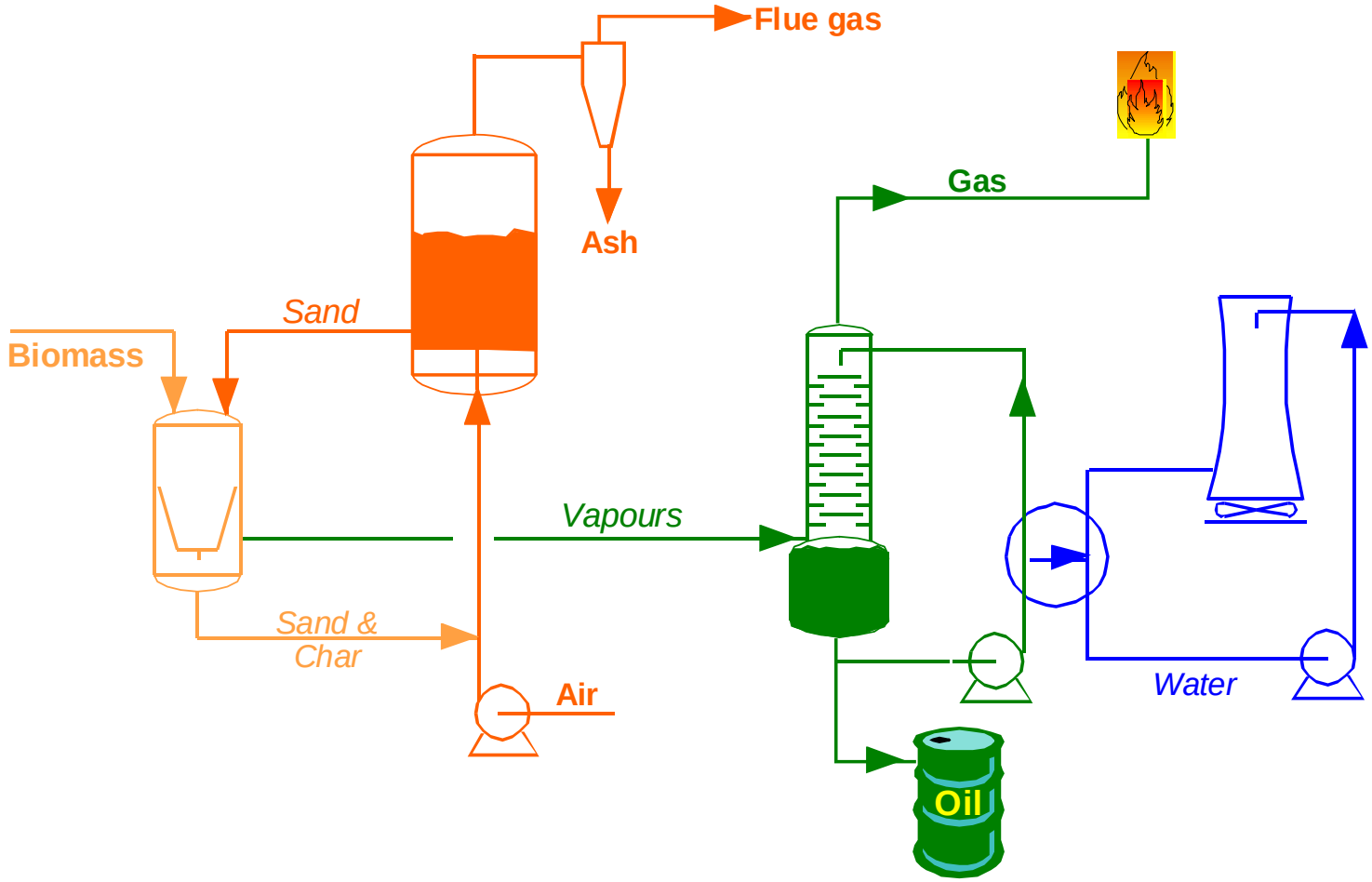
900 t/year chicken manure gasification plant (Bladel, NL)

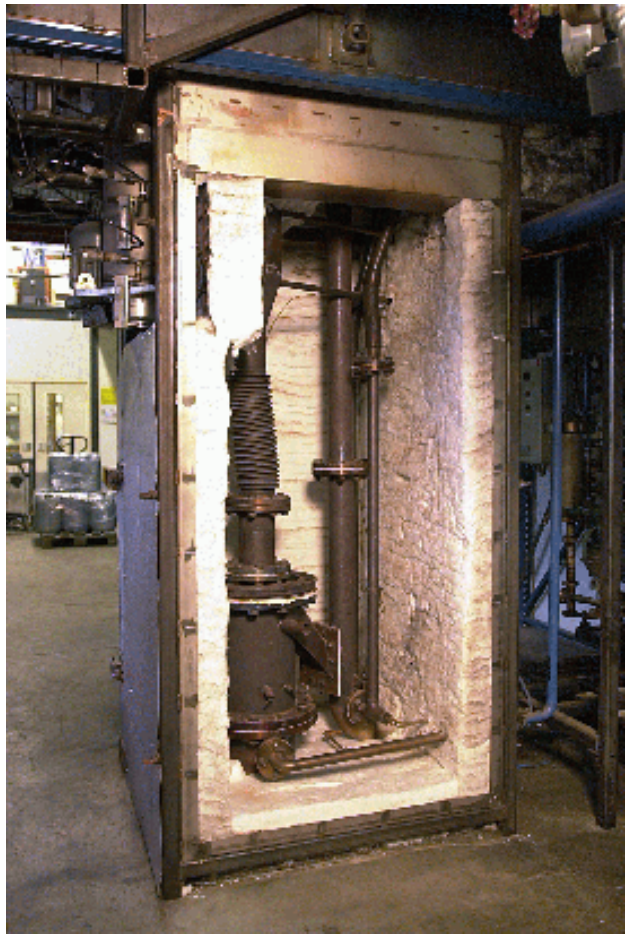
Pyrolysis



Pyrolysis

- Thermal decomposition of organic material in absence of oxygen
- Main product: bio-oil
- Applications
  - Co-firing
  - Boilers - stand-alone
  - Diesel-CHP
  - Micro-turbine
  - Syn-gas
  - Hydrogen
  - Transportation fuel - upgrading


Flue gas
Ash
Gas
Sand
Biomass
Vapours
Sand &
Char
Air
Water
Oil
Pyrolysis
reactor
Char
Combustor
Bio-oil
Condensor
Water
Cooler



1 MW_{th} pyrolysis pilot - plant

Design 10 MW_{th} pyrolysis Demonstration - plant