97/01291 Gasification of waste biomass with energy recovery
Iglesias, D. A., Span. ES 2, 086, 262 (Cl. C10LS/44), 16 Jun 1996, Appl. 9, 401, 477, 7 Jul 1994, 13 pp. (In Spanish)
Details a process by which waste biomass is gasified by thermal decomposition and the gases used to produce electrical energy. The excess heat is recovered and used to produce steam and hot water, which can also be used to produce electrical energy.

97/01292 Ground tests of 120 kW (heat) biomass fired gasifier diesel installation
Zyssin, L. V. *et al.* *VTT Symp.*, 1996, 164 (Power Production from Biomass II with Special Emphasis on Gasification and Pyrolysis R&DD), 313–319.
The article concludes that diesel-gasifier power plants could be considered as a main energy source for power production ≤ 1 MW. The article includes data from preliminary tests for gas-diesel installations.

97/01293 IGCC technology and demonstration
Palonen, J. *et al.* *VTT Symp.*, 1996, 164 (Power Production from Biomass II with Special Emphasis on Gasification and Pyrolysis R&DD), 41–54.
Presents a description of the Bioflow integrated gasification combined cycle (IGCC) system, the demonstration plant in Sweden, and experiences from the commissioning and demonstration stages. The IGCC system is suitable for regions with a surplus of biomass, e.g. in connection with the pulp and paper industry, saw and lumber mills, and agriculture wastes.

97/01294 The influence of temperature and heating rate on the slow pyrolysis of biomass
Williams, P. T. and Besler, S. *Renewable Energy*, 1996, 7, (3), 233–250.
Investigates the slow pyrolysis of biomass (pine wood) in a static batch reactor at pyrolysis temperatures 300–720° and heating rates 5–80 K/min. The compositions and properties of the derived gases, pyrolytic oils, and solid char were determined in relation to pyrolysis temperatures and heating rates. The wood and the major components of the wood, cellulose, hemicellulose, and lignin, were pyrolysed in a thermogravimetric analyser under the same experimental conditions as in the static batch reactor. The results are fully discussed and a number of conclusions are drawn.

97/01295 Indirect steam dryers—the Hyperion experiences
Haug, R. T. *et al.* *Proc., Annu. Meet. - Air Waste Manage. Assoc.*, 1995, 88, (16), 95-WP1O6.05.
Details the use of the Hyperion treatment plant for recovery of energy from renewable municipal biosolids using dried digested sludge solids to fire fluidized bed gasifiers and staged combustion systems. Indirect rotary steam dryers were pilot tested for use in combination with high-solids centrifuges; an indirect dryer unit is being tested which produces a dry granular product.

97/01296 Nature-friendly experimental house—Third report from Kaiwaka. Clarification of carbon dioxide after cooking and wastewater by the photosynthesis by plants in the greenhouse
Sakurai, Y. *Taiyo Enerugi*, 1996, 22, (4), 34–37 (In Japanese).
Biogasification of manure generates gas which is used as cooking fuel at the Kaiwaka project. Other outputs, such as wastewater from kitchens, shower rooms, toilets, and gases from cooking must be cleaned or decreased. Treatment is achieved through photosynthesis by plants in a pond. The pond was constructed in the greenhouse and the water passes through a zigzag course in the pond. The flue gas is passed to the greenhouse through an air-duct, the plants receive wastewater and CO_2 at the same time. Although the water did not remain in the system for a long time, because of large amounts of washing machine water, the BOD values in the pond were 125 ppm at the mouth, 117 ppm in the middle and 85 ppm at the exit.

97/01297 Particle concentrations, gas-particle partitioning, and species intercorrelations for polycyclic aromatic hydrocarbons (PAH) emitted during biomass burning
Jenkins, B. M. *et al.* *Atmos. Environ.*, 1996, 30, (22), 3825–3835.
In this study eight types of agricultural and forest fuels, including four cereal crop residues and four wood fuels, were burned in a combustion wind tunnel to simulate the open burning of biomass. The report discusses, in depth, the emission of PAHs during the combustions.

97/01298 Pretreatment of biomass
Hsu, T-A. *Handb. Bioethanol*, 1996, 179–212 (Edited by Wyman, C. E.) Taylor & Francis, Washington, D.C.
A disscusion on state-of-the-art lignocellulosic biomass pretreatment in preparation for enzymic digestion, with emphasis on lignocellulose-to-ethanol production. The techniques are classified by chemical application and type. Various pretreatment reactor designs, reaction kinetics, and engineering constraints and challenges are covered.

97/01299 Process and device for energy production from renewable raw materials
Winkelkoetter, P. PCT Int. Appl. WO 96 32, 460 (Cl. C10L1/00), 17 Oct 1996, Appl. 95/EP1, 365, 12 Apr 1995, 24 pp. (In German)
Details a process for the conversion of vegetable-bound solar energy, for achieving a high degree of efficiency and for creating an ecologically and economically compatible system characterized by the association of product manufacturing and energy production lines.

97/01300 Remote sensing-modelization approach for diurnal estimation of burnt biomass in the Central African Republic savanna
Moula, M. *et al.* *J. Atmos. Chem.*, 1996, 25, (1), 1–19.
Proposes a combined remote sensing/modelling approach to establish the diurnal distribution of the amount of biomass burning in Central African Republic savanna fires.

97/01301 Risk in bioenergy crops: ameliorating biological risk by using biotechnology and phytochemistry
McCown, B. H. *et al.* *ACS Symp. Ser.*, 1996, 647, 220–228.
Discusses the use of biotechnology and phytochemistry for the amelioration of biological risk in bioenergy crops. By engineering poplars with BT genes, pest-resistant selections have been created. The problem of deployment of these trees in plantations without incurring the additional risk of the catastrophic emergence of pest populations resistant to the engineered controls must be solved. Possible approaches are suggested.

97/01302 Southern company tests of wood/coal cofiring in pulverized coal units
Boylan, D. M. *Biomass Bioenergy*, 1996, 10, (2-3), 139–147.
Tests were conducted to evaluate the impact of cofiring wood waste with pulverized coal on plant performance. Over a three-day period, 11 full load performance tests were conducted, five with coal and six with wood/coal mixtures. A total of 125 tonnes (19% moisture) was burned. The wood waste was a mixture of sawdust and ground tree trimming waste. Wood percentage in the fuel averaged 11.5 wt.%. for the cofire tests. At medium and high oxygen levels, boiler efficiency with wood cofiring was within 0.2–0.4% of boiler efficiency with coal alone. Other effects caused by cofiring are also discussed.

97/01303 Spatial and temporal effects in drying biomass for energy
Liang, T. *et al.* *Biomass Bioenergy*, 1996, 10, (5/6), 353–360.
Presents an evaluation of the impact of the moisture content of biomass on thermal efficiency and relative boiler size which directly represent the economic merits of biomass drying. The spatial and temporal effects on the value of biomass were found to be important factors for various sites in the study area (tropical Hawaii). The methods for quantitying the merit of biomass moisture management proposed in this paper demonstrate how GIS modeling can lead to appropriate decision-making capability in bioenergy.

97/01304 Special issue: a collection of papers presented at an alternative energy Conference—liquid fuels, lubricants and additives from biomass, held in Westin Crown Center, Kansas City, Missouri, 15-18 June 1994. [In: Bioresour. Technol., 1996, 56, (1)]
Dale, B. E. *et al.* Editors: Elsevier, Oxford, UK, 1996, 130 pp.

97/01305 Supercritical fluid extraction of algae
Balaban, M. O. *et al.* *Supercrit. Fluid Technol. Oil Lipid Chem.*, 1996, 247–266 (Edited by King, J. W. and List, G. R.) AOCS Press, Champaign, Ill.
Presents a review on the importance of algae, accounting for almost half of the world's organic mater, and on the studies for commercial utilization of algae for production of biomass fuels.

97/01306 Thermal decomposition of algae bloom biomass
Cebula, J. *et al.* *J. Therm. Anal.*, 1996, 46, (5), 1467–1471.
Describes the physicochemical and thermal analysis of biomass of algae bloom collected from the Rybnik Reservoir, Silesia, Poland.

97/01307 Use and co-combustion of straw in Denmark
Poulsen, J. S. *VTT Symp.*, 1996, 164 (Power Production from Biomass II with Special Emphasis on Gasification and Pyrolysis R&DD), 183–193.
A discussion of the use of straw as a fuel in Denmark. Today five straw-fired combined heat and power plants in Denmark are in commercial operation. Three of these plants exclusively use straw as a fuel, one uses both straw, wood chips and natural gas, and one straw and coal. These five combined heat and power plants, having a total annual consumption of straw of approximately 200,000 tons, supply district heating to five medium-sized towns. Two new plants are under construction and co-combustion with straw is being installed at an existing coal-fired power station. In addition, two large plants are under consideration. With the two plants under construction and with the co-combustion plant, the straw consumption is expected to increase to 430,000 tons of straw per year.

97/01308 The use of water purification sludges in desulfurization of biogas
Depner, H. and Hedden, K. *GWF Gas-Wasserfach: Gas/Erdgas*, 1996, 137, (6), 279–282. (In German)
Presents an investigation into the addition of wastewater sludge with a high content of $Fe(OH)_3$ to anaerobic biomass fermenters in order to reduce the H_2S content of the resulting biogas. Investigations from a wastewater treatment plant and plants for the fermentation treatment of pig and cattle excrement are described. The addition of wastewater sludge had no effect on the fermentation process, but reduced the H_2S-content in the resulting biogas significantly.