

# **Global synergy plants for depuration, biomass production and thermoelectric cogeneration (GSPDPTC)**

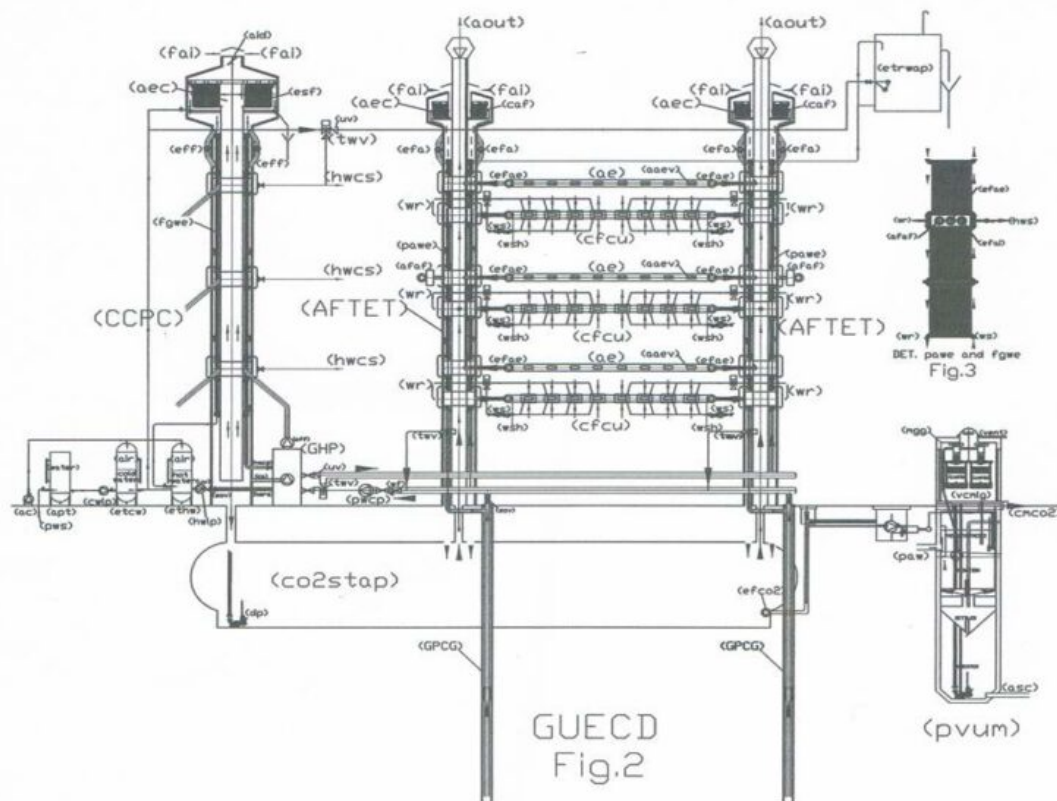
**Global synergy plants for depuration, biomass production and thermoelectric cogeneration (GSPDPTC).**

It is not sufficient that the biological energy does not increase the percentage of CO<sub>2</sub> in the atmosphere, since the reversible chemical reactions of calcium and magnesium that determine the alkalinity of waters and soils do not occur at the same rate of energy production. In fact, the CO<sub>2</sub> fossil or biological, in the atmosphere, only reacts with water vapor. Only a very small percentage of rainwater has the opportunity to meet with calcium and magnesium (in the soils) to counteract the acidification process, which coincides with desertification and global warming. If we had 100% of biological energies, the problem would be reduced but would not be solved. We would never act on transportation with heat engines, but with the facilities that we are proposing could be taken on fixed installations. In industries and cities chimneys must be modified to purify and recover the fumes. Polluted air, including that of chimneys, must be used to oxidize the sewage discharge and the CO<sub>2</sub> contained in it should be neutralized in large or small greenhouses limestone which produces thermal energy (fossil or biological). In fact, in urban centers are possible "mini calcareous glazing greenhouse" (m<sub>gg</sub>) matched to the "mini purifying urban vertical module" (p<sub>vum</sub>) that use biological process. In these processes of urban sewage it can be also incorporated air conditioning equipment, which with external devices, exchange heat with the air / air system, contribute to warm the planet. From them will come out air cooled and purified, semi

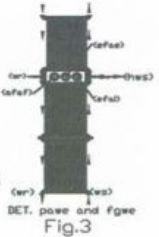
purified water, which circulate in the current sewers along with the rainwater (rrpwl), while the sludge will be extracted from the lower and will travel in a parallel anaerobic line (asc), pressurized with submersible pumps (spas ). Both lines, of water and sludge, arrive at the same plant, which is simultaneously the producer of biological energy (or fossil), water and air purifier. This plants is based on the synergy and characterized by the fact that it expands the functions of thermoelectric power plants fueled with bio or fossil fuel (TEPbio or fos ) with new sections: capture cooling purification chimneys (CCPC), plus vertical synergic building (VSB), plus linear manufactured digesters dehydrators composters (LDDC). In these expanded plant functions where the fumes produced by "TEPbio or fos" are sent to chimneys (CCPC) that do not emit them into the atmosphere but filter them with electrostatic filter (esf), mix them with air in flue gas expansion chamber (fgec) and cool them recovering part of the heat, by heating water in a flue gas water heat exchanger (fgwe). Subsequently, the fumes by electric fans for fumes (eff), are conveyed in vertical sections covered mechanized limestone greenhouse (vcmlg) of VSB, where they are stored calcareous wheeled hanging baskets (cwhb); the warm waters are retrieved by hot water covered basin (hwcb) and hotwater and fumes channel (hwfc) and pumped by hot water lift pump (hwlp) into the pipe bundles (hwp) that heat before the digesters (dg) of the buildings (LDDC) and then sections (vcmpg) of VSB and finally, used in conjunction with other surface waters (rainwater, river, purified by final biological covered vertical pond (fbcvp) to create an artificial rain by water overflow tray (wot) in (vcmlg) that realizes a natural ion exchange between water, CO<sub>2</sub> and calcareous material, which conveys the carbonates in the basin of the water to alkalize (wba). Using for the circulation of water pumps with dual supply inlet (caipds) and mini turbines (htva), we can produce hydroelectric energy instead of consuming it while raising the waters that produce artificial rain. Agricultural biomass and sludge produced by the plant are digested along with the

biomass produced in the building (LDDC), dehydrated and turned into compost. The liquid digestate produced by this building is conveyed to the water basin to be purified (wbp) from where it begins purification that goes vertically through the biological ponds vertical (bcsvp ) and ( fbcvp ) that discharge treated water. If the water does not exceed the quality control setpoints, it is recycled through the recirculating water valve (rwv), basin (wddr) and overflow trays (wot), through the sections (vcmlg ) feeding again the basin of water to be alkalized (wba) and to be purified (wbp) that are linked by water softened supply (wss) and alkaline water supply (aws); (GSPDPTC) is supplied by clean water from "global urban environmental depuration (Gued)", through the line recovery rainwater and purified water (rrpwl) and the line "water supply (ws)" that arrives from upstream water body (upwb). It is fed by waste water by the line arrival sewer (as), agricultural wastewater (agrw) and all that arrives at water basin to be purifier (wbp). Its section (dg) of ( LDDC) is fed by sludge of "anaerobic sludge collector (asc)", that is fed by "global urban environmental depuration (GUED)"

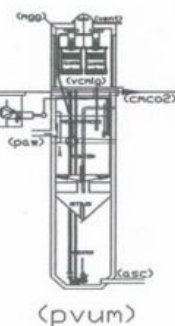




GUECD Fig.2



DET. pawe and fgwe Fig.3



(pvum)

GUECD (GLOBAL URBAN ENVIRONMENTAL CONDITIONING AND DEPURATION) SCHEME FOR FUMES DEPURATION, CAPTURE CO<sub>2</sub>, AIR CONDITIONING, HEATING WATER CONSUME BY GAS HEAT PUMP AND LOW GEOTHERMAL ENTALPY. PLUS WATER OXIDATION WITH ALKALINIZATION, SLUDGE SEPARATION AND CO<sub>2</sub> NEUTRALIZATION.

ac (air compressor); ae (air extraction); aec (air expansion chamber), afaf (addizional fan an air filter); AFTET (air filtration and thermal exchange tower); aid (air inlet dampers); aout (air outlet); apt (atmosferic pressure tank); asc (anaerobic sludge collector); caf (central air filter); CCPC (capture cooling purification chimney); cfcu (channelled fancoil unit); CO<sub>2</sub>stap (co<sub>2</sub> storage tank at atmospheric pressure); cwlp (cold water lift pump); etrwap (expansion tank and refill of water at atmospheric pressure); dp (drainage pump); efai (electric fan for air inlet; efae (electric fan for air extraction); eff (electric fan for fumes); esf (electrostetic filter) ethw ( expansion tank for hot water); etcw (expansion tank for cold water) ew (external wall); fai (fresh water intake; fgwe ( flue gas water exchanger) GHP (gas heat pump); fcu (fan coil unit); GPCG (geothermal pit coated with gres); gwrp (geothermal water circulation pump; hwlp (hot water lift pump) hws (hot water recovery suooly); hwcs (hot water consume supply); paw (pu rified alkalized water; pawe (purified air water exchanger); pcws (public cold water supply); PVUM (purifyng vertical urban module); pwo (purifying water output); rp (return pipe); uv (unidiretional valve); pwcp (principal wa ter circulation pump; wr (water return) wsh (wate supply for humidification)

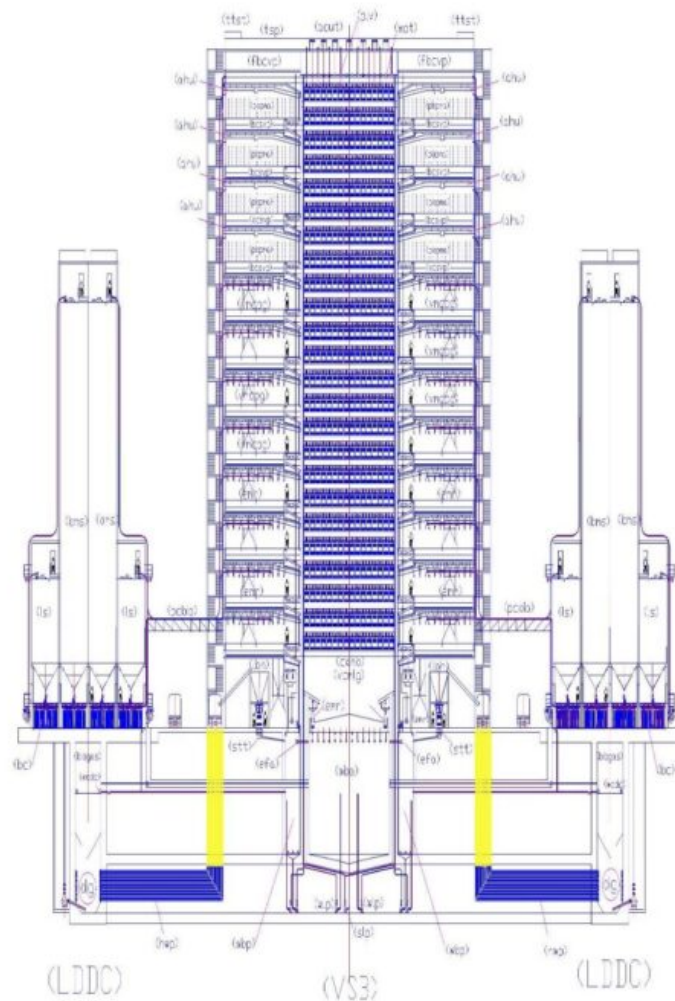


FIG. 4

CROSS SECTION IN LINEAR SEDIMENTATOR COMPOSTER DEHYDRATOR,  
OVERLAPPING BIOLOGIC PONDS AND LIMESTONE GREEN HOUSE TO  
CONSUME CO<sub>2</sub> PRODUCING ALKALINE WATER

#### LEGEND

LDDC (linear digester dehydrator compost); ebco<sub>2</sub> (electroblower for CO<sub>2</sub>); ls (lime silo); bc (clogged compost); wdc (water overflow and drainage channels); ans (biomass silo); oih (digester loading hopper); hwp (hot water pipes); VSB (vertical synergetic building); anu (air handling units); wba (water basin to be alkalized); wbp (water basin to be purified); bcsvp (biological covered superhooped ponds); vcmg (vertical mechanized covered production greenhouse); plpra (photobioreactors for the production of microalgae); bcvp (fine biological covered vertical pond); ttst (transit tank of sludge to be thickened); pdv (purified water drain valve); rrv (recycle water valve); wp (water lift pump); sip (sludgelif pump); wt (water overflow tray); efa (electric fan for air); enr (equipped motorized rock); vcmg (vertical covered mechanized limestone greenhouse); cwhb (calcareous wheeled hanging baskets); cut (air outlet); pv (pluvial for water rain); pcbio (pneumatic conveying biomass)