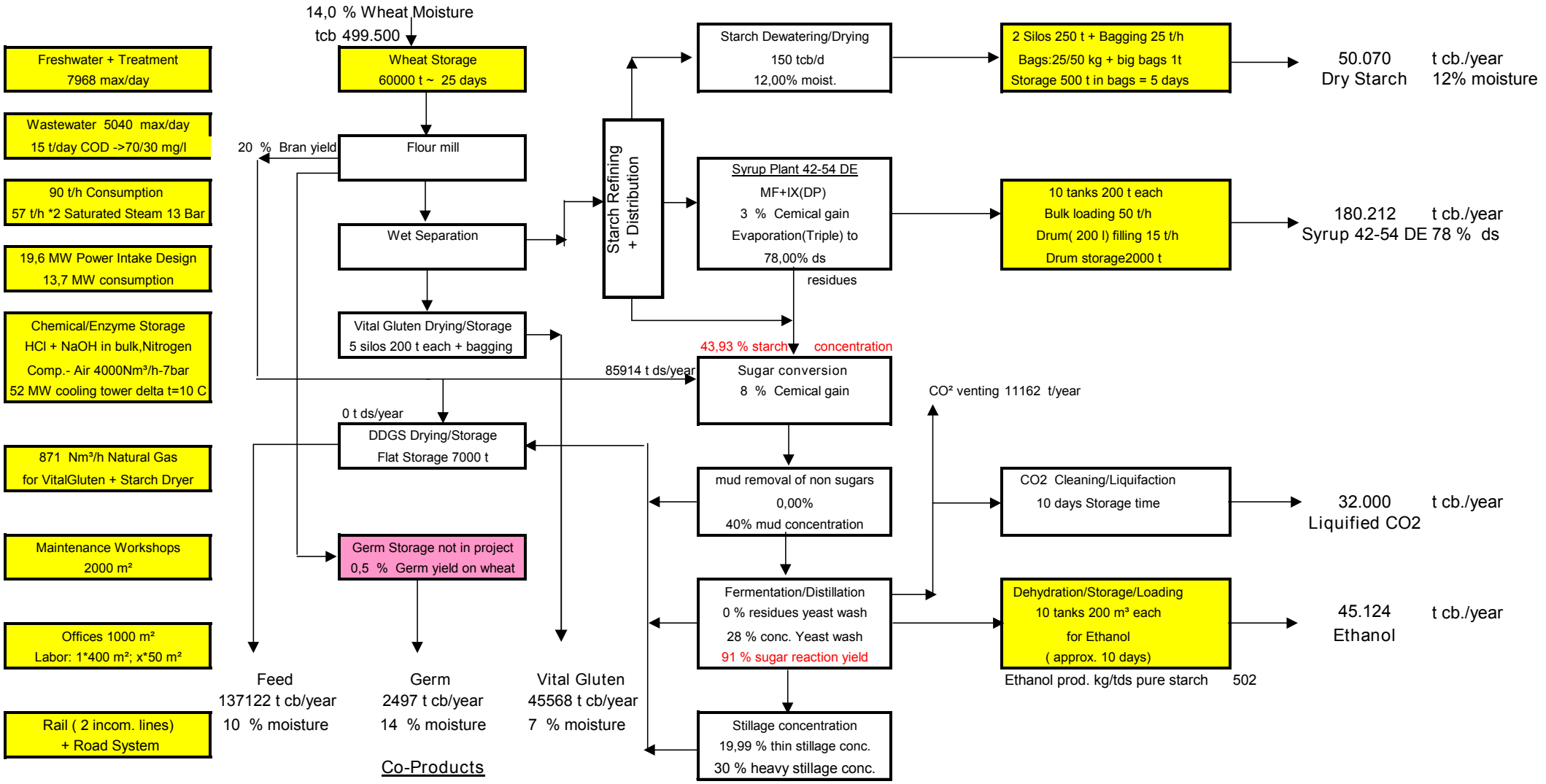
Ethanol from Wheat

Ethanol production t/year	45.124	180.212	Syrup (42-54 DE) t/year	78,0% ds
Ethanol production 000 hl/year	568		Chemical gain	3,0%
Vital Gluten production t/year	45.569	50.070	Dry-Starch t/year	88,0% ds
DDGS production t/year	137.123	2.498	Germ t/year	86,0% ds
Protein in DDGS as dry matter	19,51%			
Fat in DDGS as dry matter	7,01%			
Wheat consumption t/year	499.500			
CO^2 production after cleaning t/year	32.000	43.162	Total CO^2 volume t/year	
Process:flour mill +vital gluten			Vital Gluten moisture	7,00 %
			DDGS moisture	10,00 %
Ethanol production t/h	5,6462			
Wheat/Flour processing t/day	1500	1492,5	Flour for wet/ethanol t/day	
Working time days/year	333		All analysis as dry matter	
Wheat plant			Convertable starch	64,00 %
Starch in wheat (as CH) on ds %	64,00		Protein	13,50 %
Starch recovery %	98,34		Fat	2,20 %
Wheat t/h at wheat moist.	62,50		Ash	2,10 %
Bran yield on ds % direct to DDGS	0,00	20,00	Bran yield	Fiber 2,60 %
Bran Volume ds t/h direct to DDGS	0,00	10,75	Bran Volume ds t/h	Others 15,60 %
Vital Gluten yield on ds %	9,87		Others = not convertable Sugars	
Vital Gluten vol. at product moist..t/h	5,70		and Pentosanes	
			Wheat moisture	14,00 %
Starchy material from wheat plant: ds t/h	48,18			
Concentration ds %	30,00			
CH as starch to ethanol plant equiv.conc.on ds %	43,93		Starch in Bran	18,5 % ds
Starch includ. Syrup and Dry Starch ds t/h	33,83		Germ Yield	0,500 %
Non starches ds t/h	14,35		Fat in Germ	20,0%
			Starch in Germ	15,0%
Sugar conversion before Fermentation:			Protein in Germ	40,0%
Concentration in sugar conversion ds %	30,00		Prot.Recovery Rate	57,00 %
Chemical gain %	8,00		Protein in Vital Gluten	78,0 % ds
CH as sugar ds t/h	12,14		Starch in Vital Gluten	10,0 % ds
Non sugars ds t/h	14,35		Fat in Vital Gluten	0,7 % ds
			Vital Gluten Yield	9,87 % ds
Fiber/mud remov.of non sugars %	0,00	20 % to 75 %		
Fiber/mud(100%fib.recov.) to feed ds t/h	0,00			
Fiber/mud conc.(to feed) ds %	40,0			
	0,00			
Fermentation+distillation/dehydration:				
Supply sugar purity on ds %	45,83			
Sugar to ethanol utilisation yield %	91,00	88 % is normal		
Ethanol t/h	5,65			
Carbondioxid t/h	5,40			
Residues from Yeast wash % of Ethanol	0,00	0 % to 5 %		
Residues from Yeast wash to feed ds t/h	0,00			
Residues Concentration (to feed) ds %	28,0			
Stillage bleed out ds t/h	15,44			
Stillage bleed out ds concentration %	19,99			
Stillage separat. split solid/total on ds %	0,00			
Solid Concentration ds %	40,00			
Solid ds t/h	0,00			
Liquid ds t/h	15,44			
Stillage waterevaporation t/h	25,78		Syrup Waterevaporation	
Conc. stillage (to feed) ds %	30,00	25	Supply ds. % after H2O adding	
Ethanol prod. kg/tds pure starch	502	47,8	Waterevaporation t/h	
DDGS dryer:			Starch Dryer:	
DDGS Production (Feed) t/h	17,16	55	Supply ds. %	
Waterevaporation t/h	34,31	3,8	Waterevaporation t/h	
			11. Jul 09	Gansäuer

Timbuktu Project Plant Structure

first working scope

Head-Products



Remarks:

Evtl addition of a Biogas production if the organic load of waste water is higher

CHP plant still open because no energy source fixed yet (evtl GT)

All utilities and consumptions are estimated for the time being! (not calculated)

Total manpower: approx. 100

The Oil-production from wheat should be considered again, because high efforts in the milling proc

Working time days/year 333

Bran directly (dry) to DDGS should be considered

wheat analysis dry basis wheat has to be bakery quality!

Convertable starch	64,00 %
Protein	13,50 %
Fat	2,20 %
Ash	2,10 %
Fiber	2,60 %
Others	15,60 %

11. Jul 09 H. Gansäuer