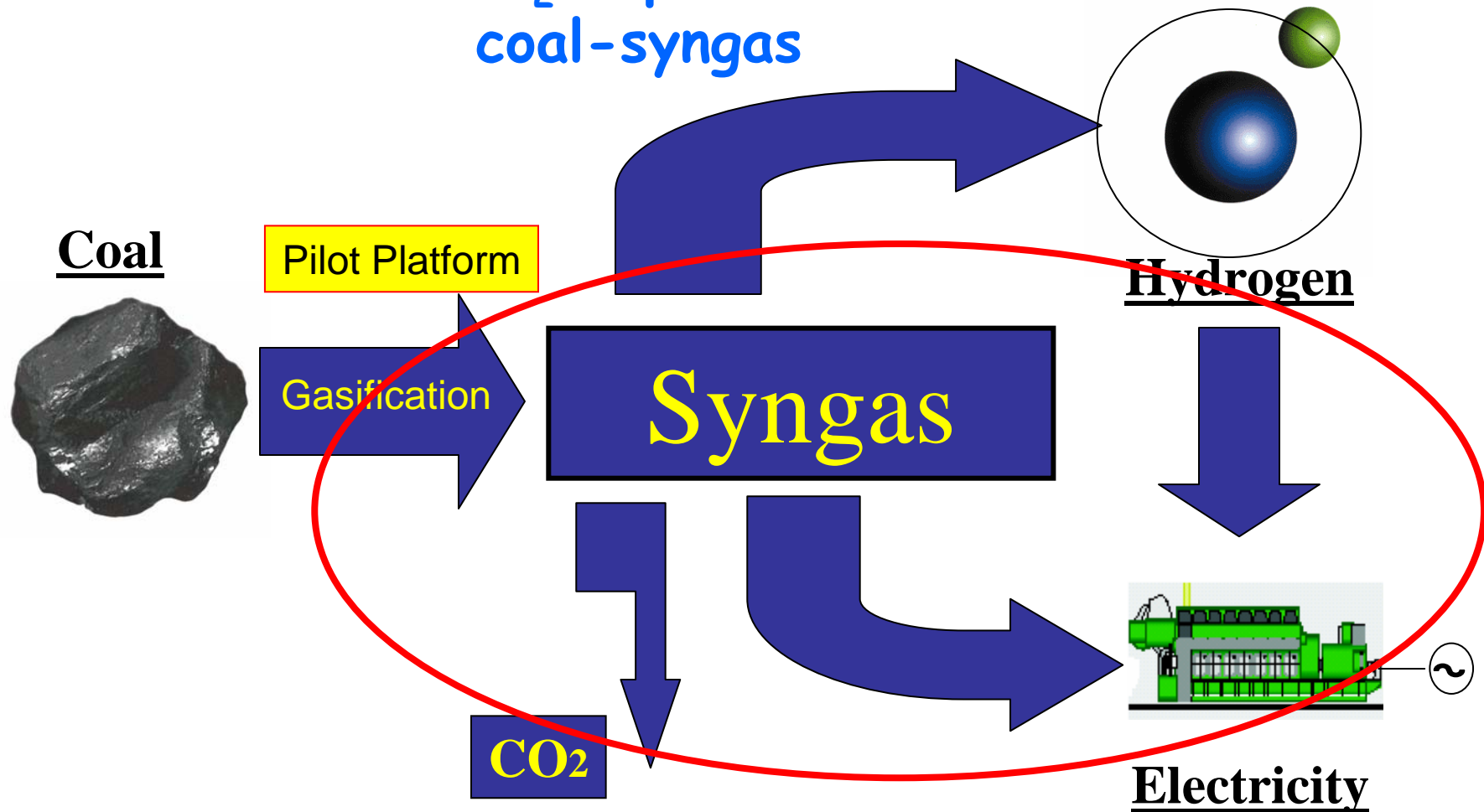


Hydrogen production and CO₂ capture from coal-syngas





COHYGEN PROJECT main data



partners



Università di Cagliari
Dipartimento di Ingegneria Meccanica



Start date: end of 2003

Total cost: 11.5M€

Funding: - European Commission through the Italian Education,
University and Research Ministry (**MIUR**) 65%
- Partners 35%





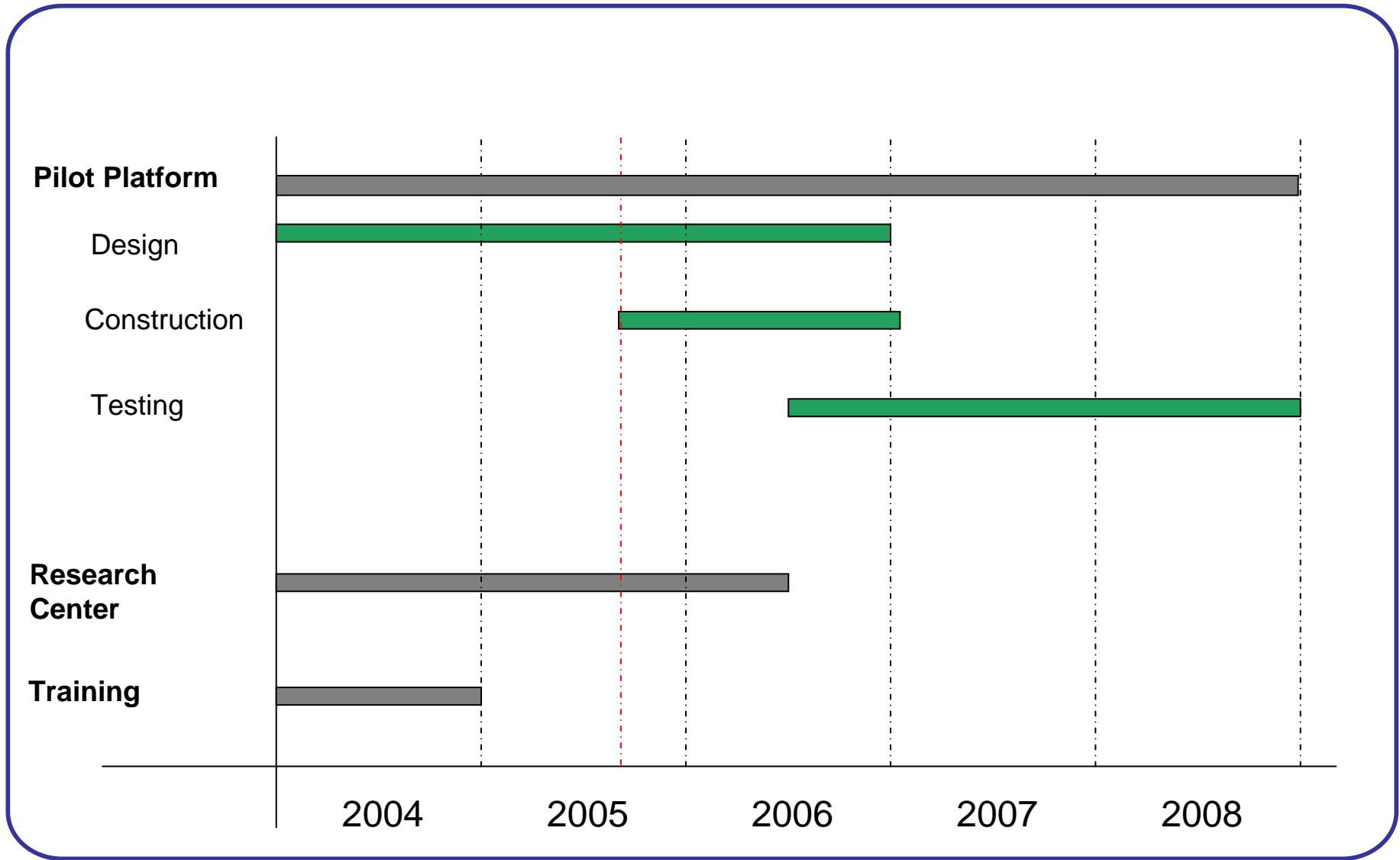
GENERAL OBJECTIVES of RESEARCH PROJECT



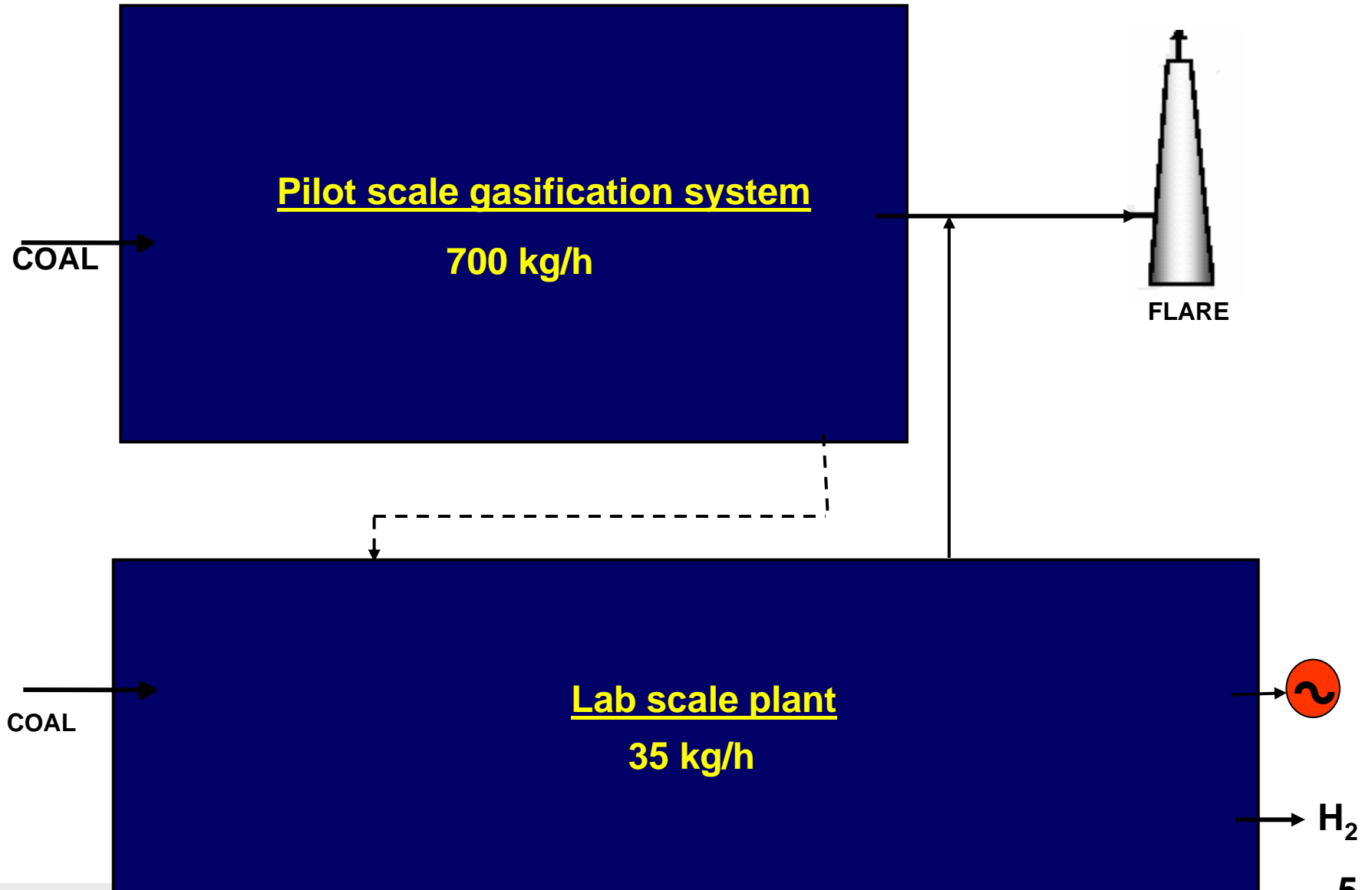
- ➔ Design, construction and testing of PILOT PLATFORM
(76% of total cost)
- ➔ High level researcher TRAINING COURSE
(3% of total cost)
- ➔ Construction of a COAL RESEARCH CENTER
(21% of total cost)



TIMING



PILOT PLANT SCHEME



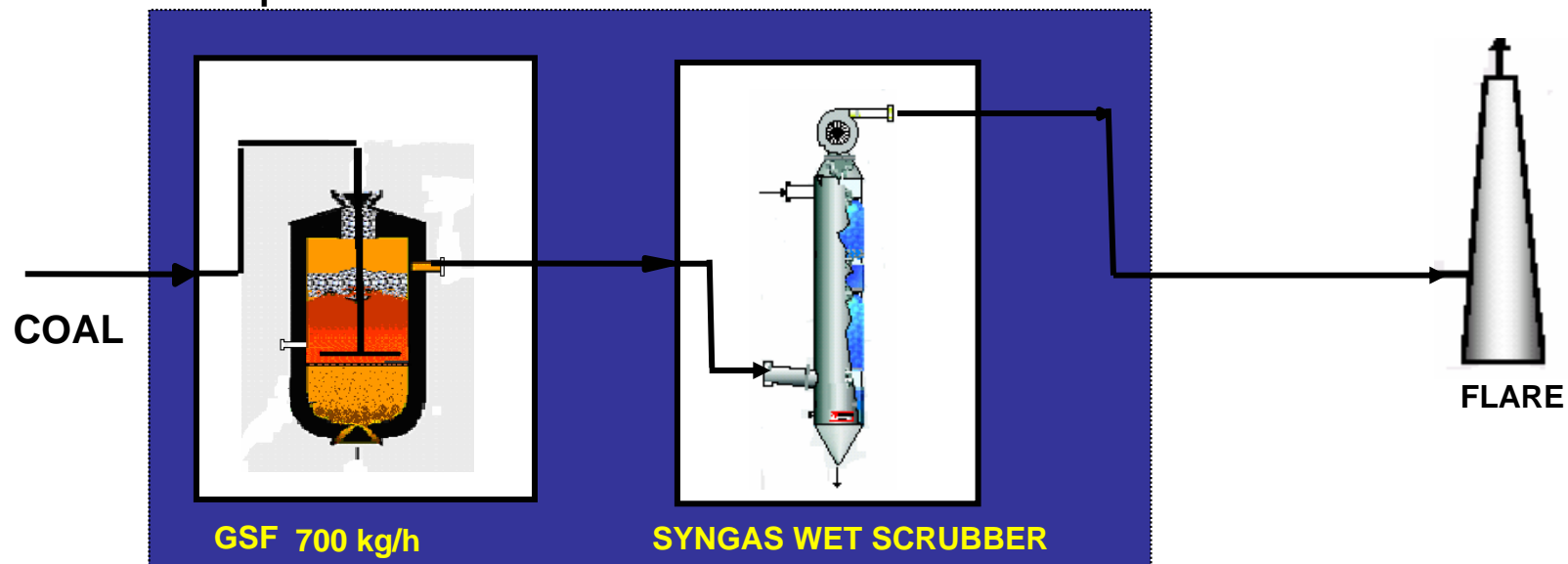
Proximate Analysis		
	Sulcis Coal	South African Coal
	(wt%)	(wt%)
Moisture	11,51	8
Volatile matter	38,56	23
Ash	17,33	15
Fixed carbon	32,59	54

Ultimate analysis		
	Sulcis Coal	South African Coal
Humidity	11,52	8
Ash	17,31	15
Total carbon content	53,22	65,88
Combined hydrogen	3,89	3,71
Nitrogen	1,29	1,5
Sulphur	5,98	0,55
Oxygen	6,75	5,36
Chlorine (ppm)	1000	0,05
Inherent moisture	6,77	2,66
Low Heating value	Mean value (MJ/kg)	Mean value (MJ/kg)
LHV	20,83	24,79

Syngas composition coming out from the gasifier

Composition	% (v/v) dry
CO	28 – 30
H2	14 – 16
CO2	0.8 – 0.9
N2	50- 52
CH4	1.3- 1.4
H2S	1.7
Water content	saturation
Particulate	0.85 kg/h
Tar	1.5 kg/h
Temperature	250 °C
Pressure	atmosferic

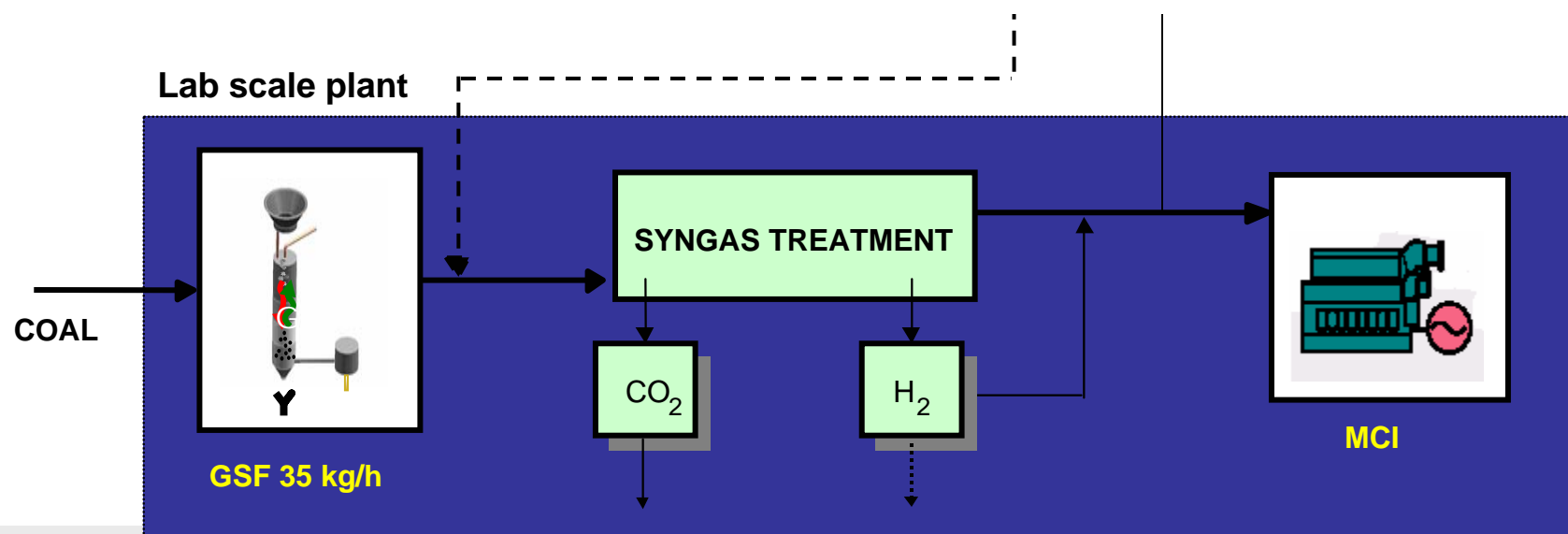
Pilot plant



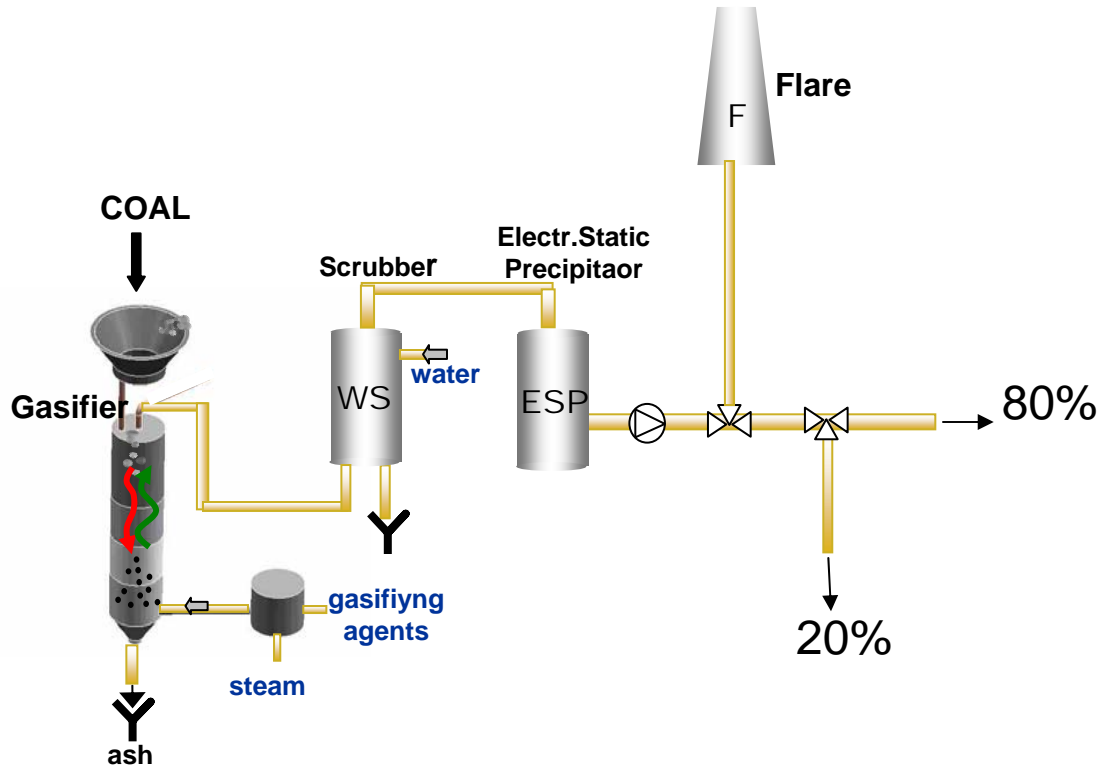
Coal	Kg/h	700
Air	Kg/h	1200
Steam	Kg/h	182
Ash	Kg/h	122
Syngas	Kg/h	2019

PILOT PLANT PLATFORM SCHEME

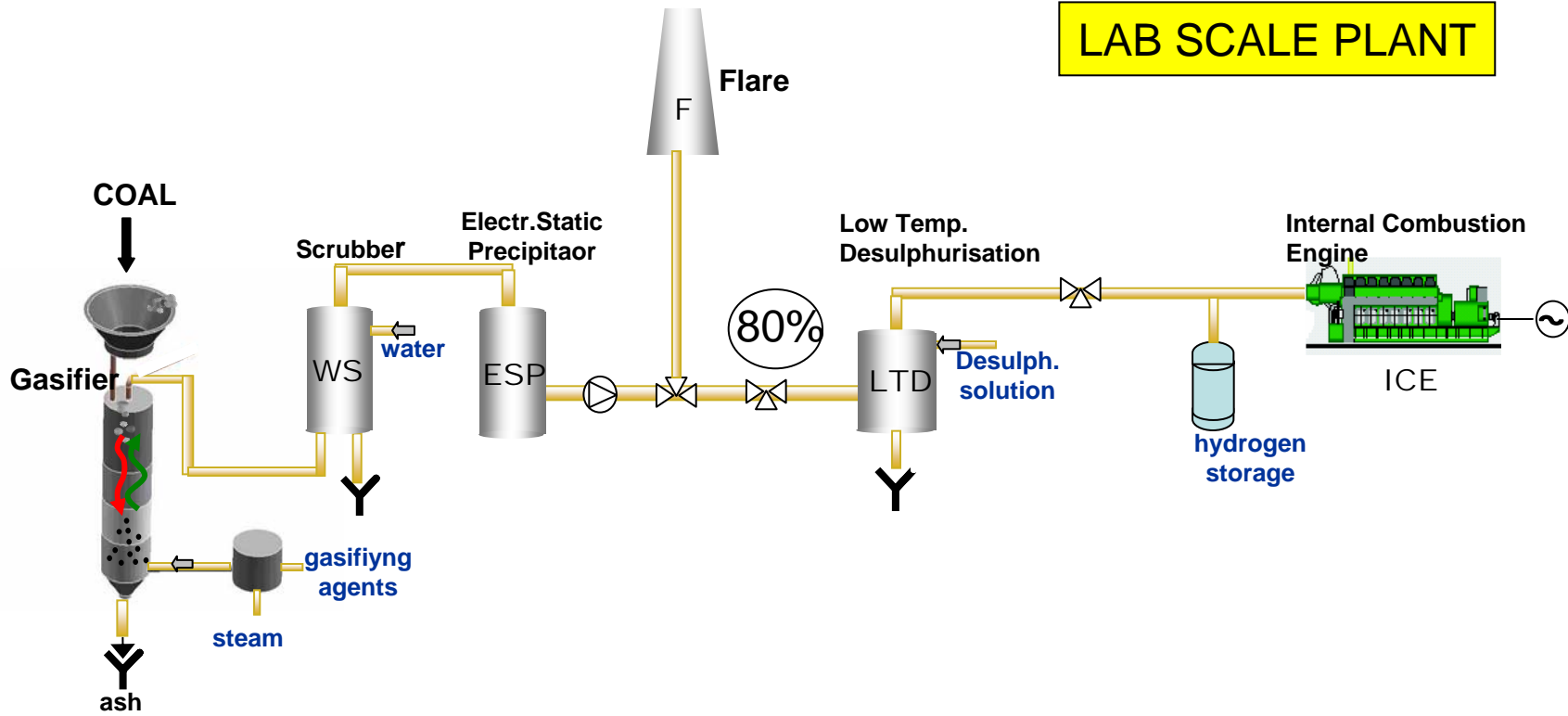
Coal	Kg/h	35
Air	Kg/h	63
Steam	Kg/h	9,1
Ash	Kg/h	6,13
Syngas	Kg/h	100,97



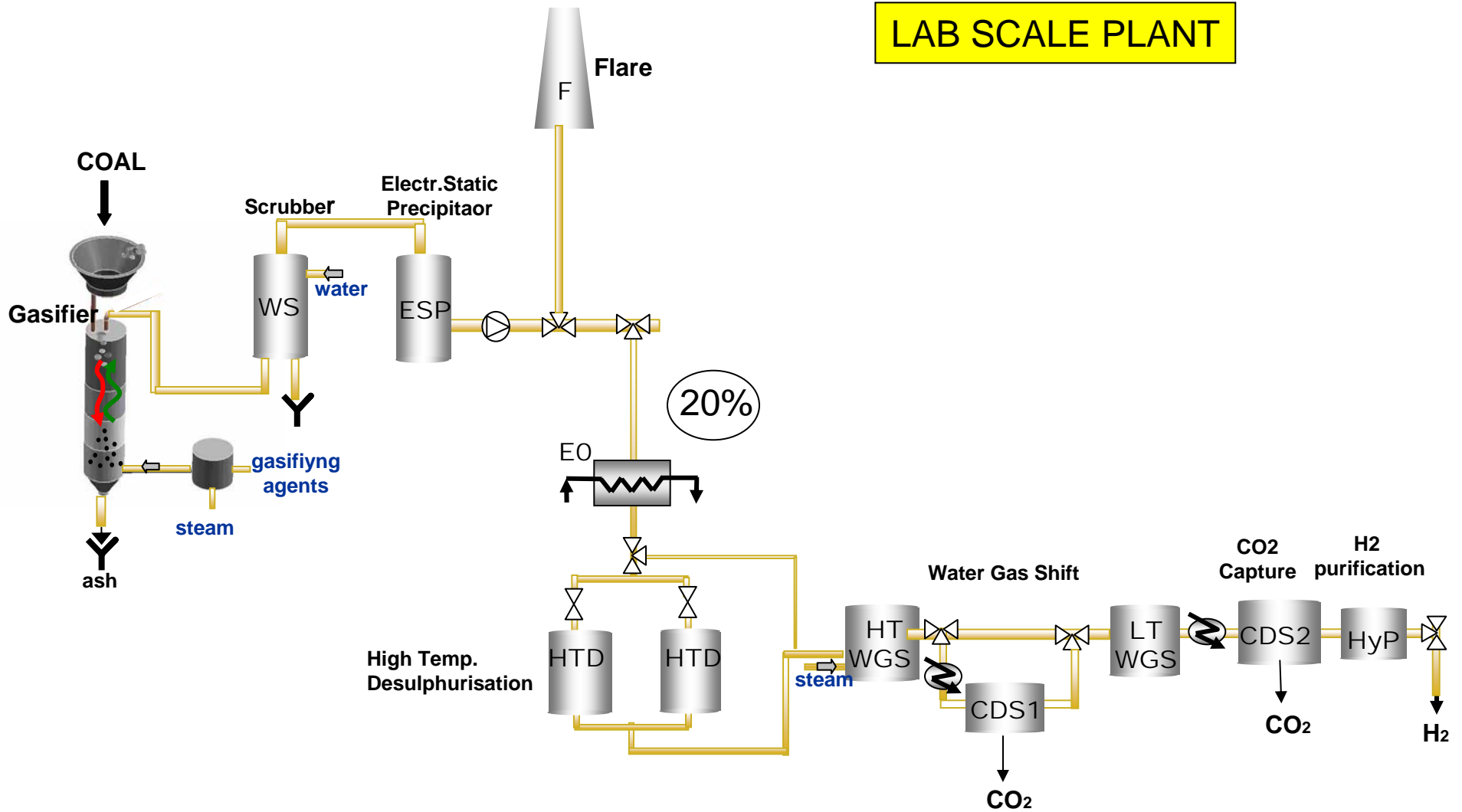
LAB SCALE PLANT



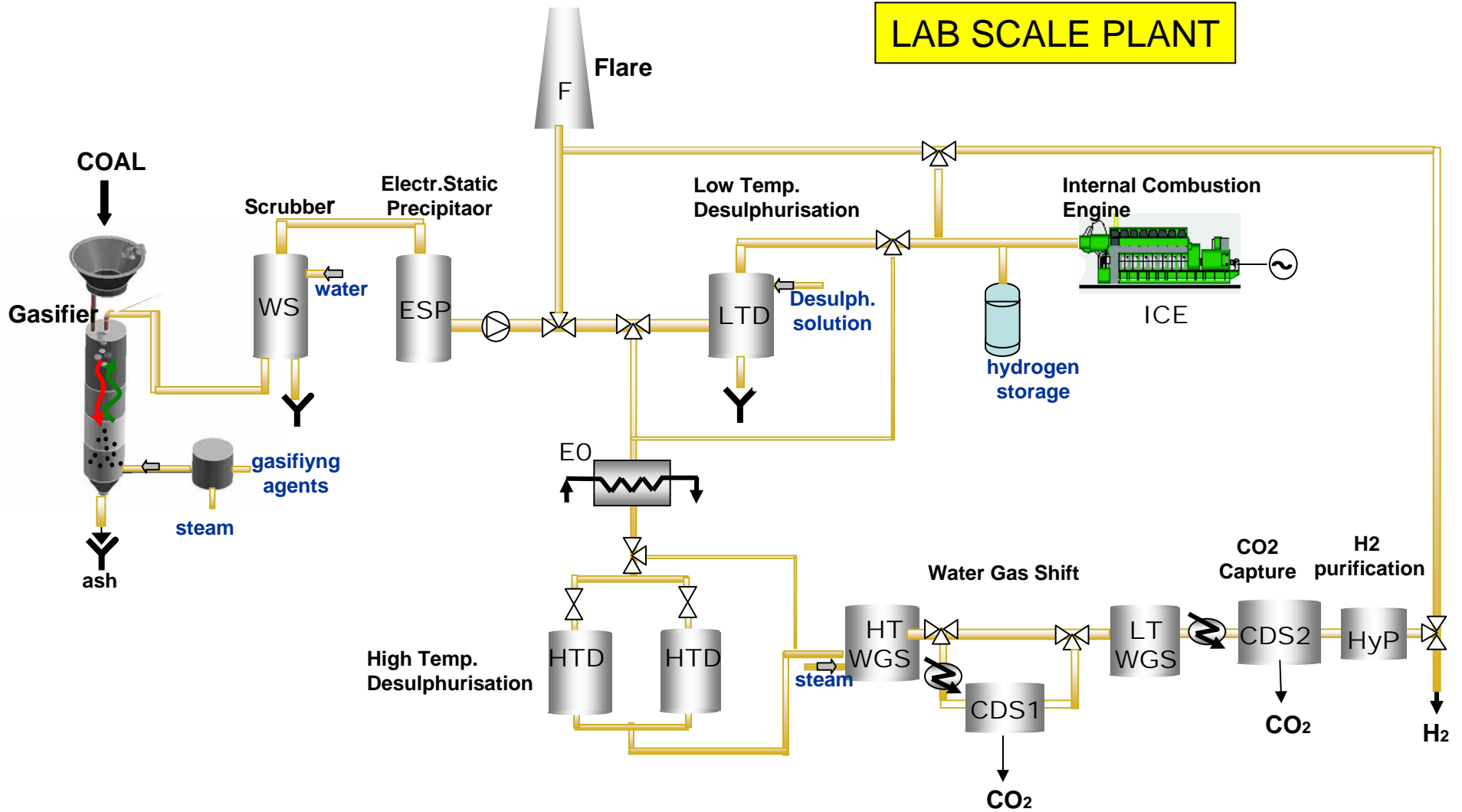
LAB SCALE PLANT



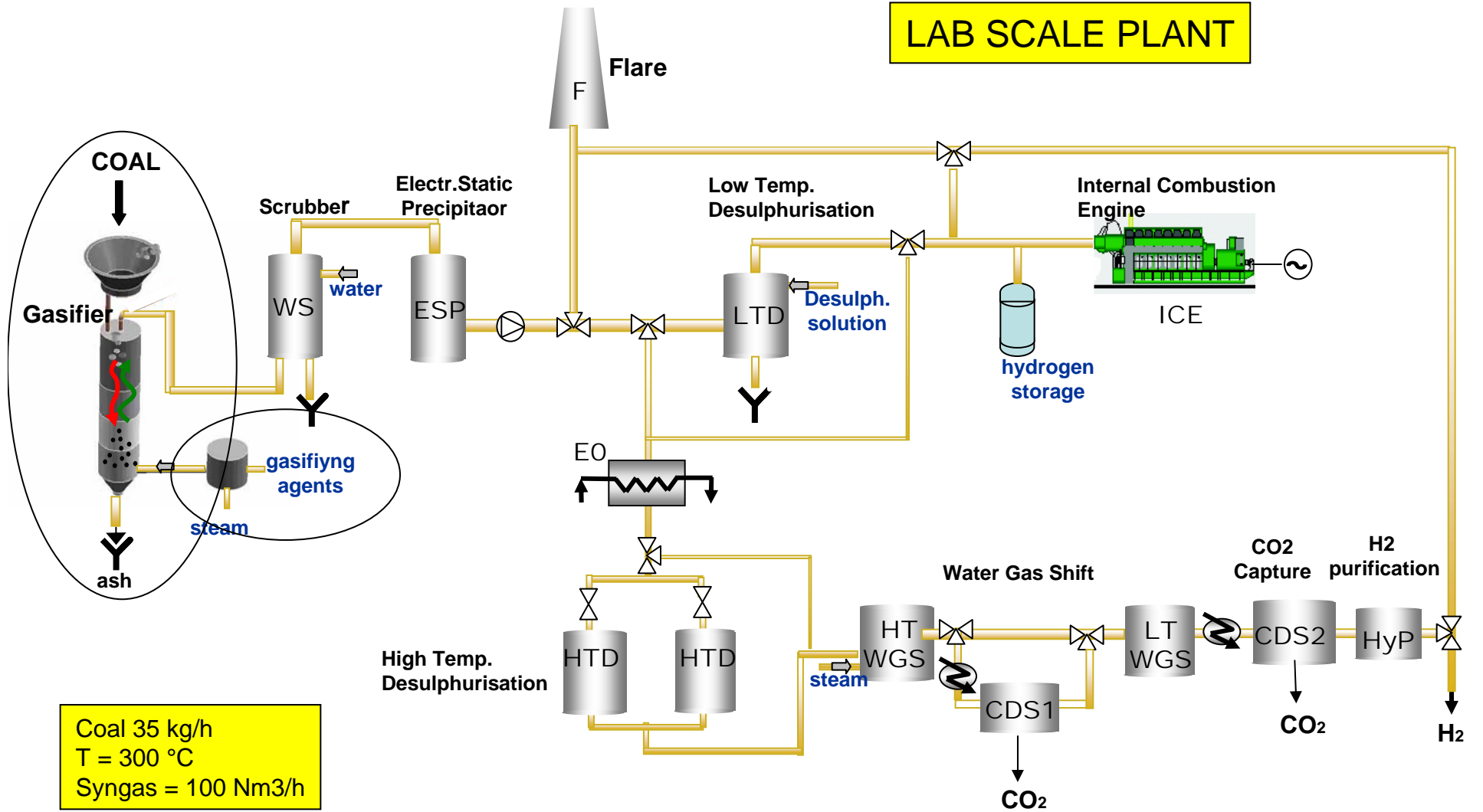
LAB SCALE PLANT



LAB SCALE PLANT

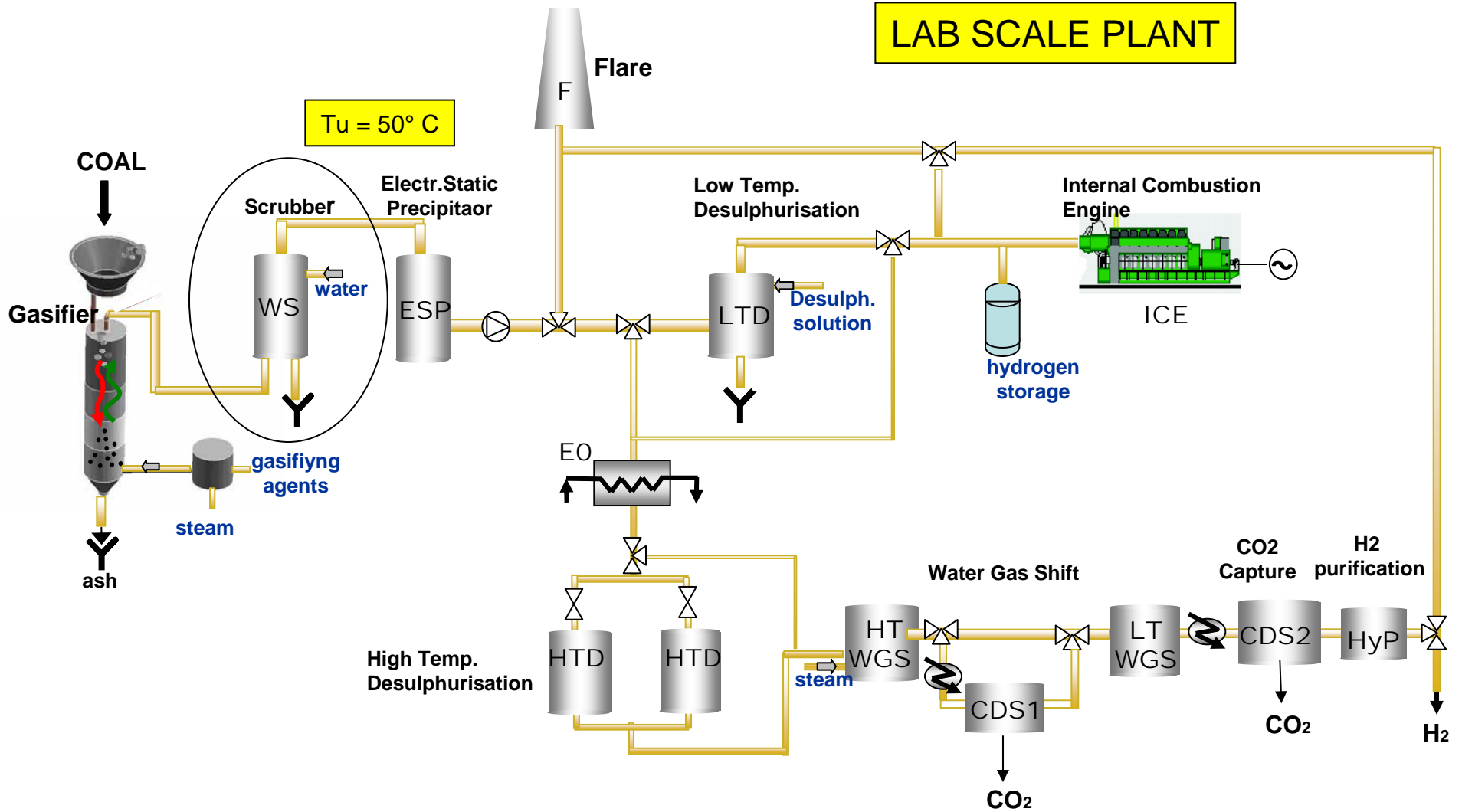


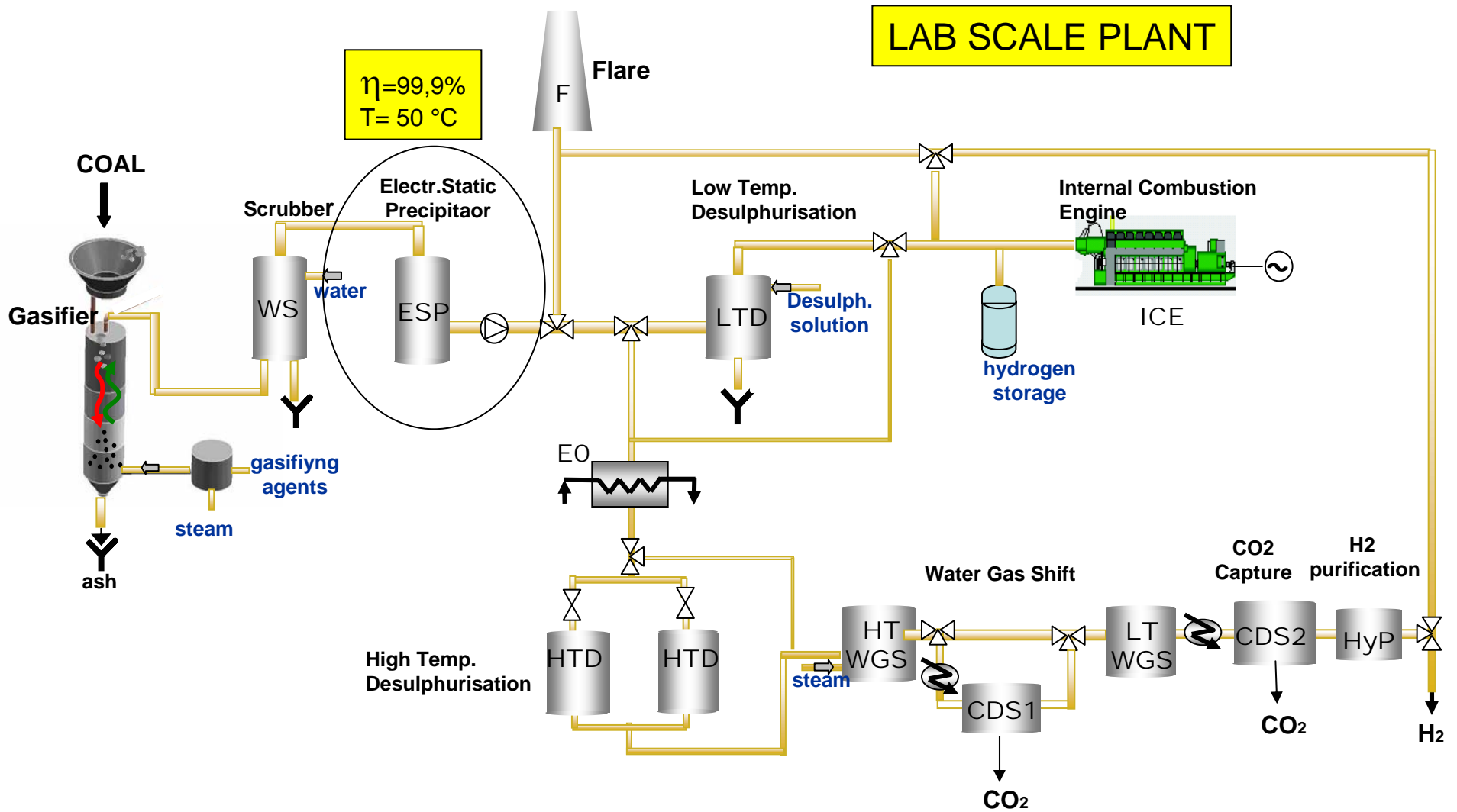
LAB SCALE PLANT

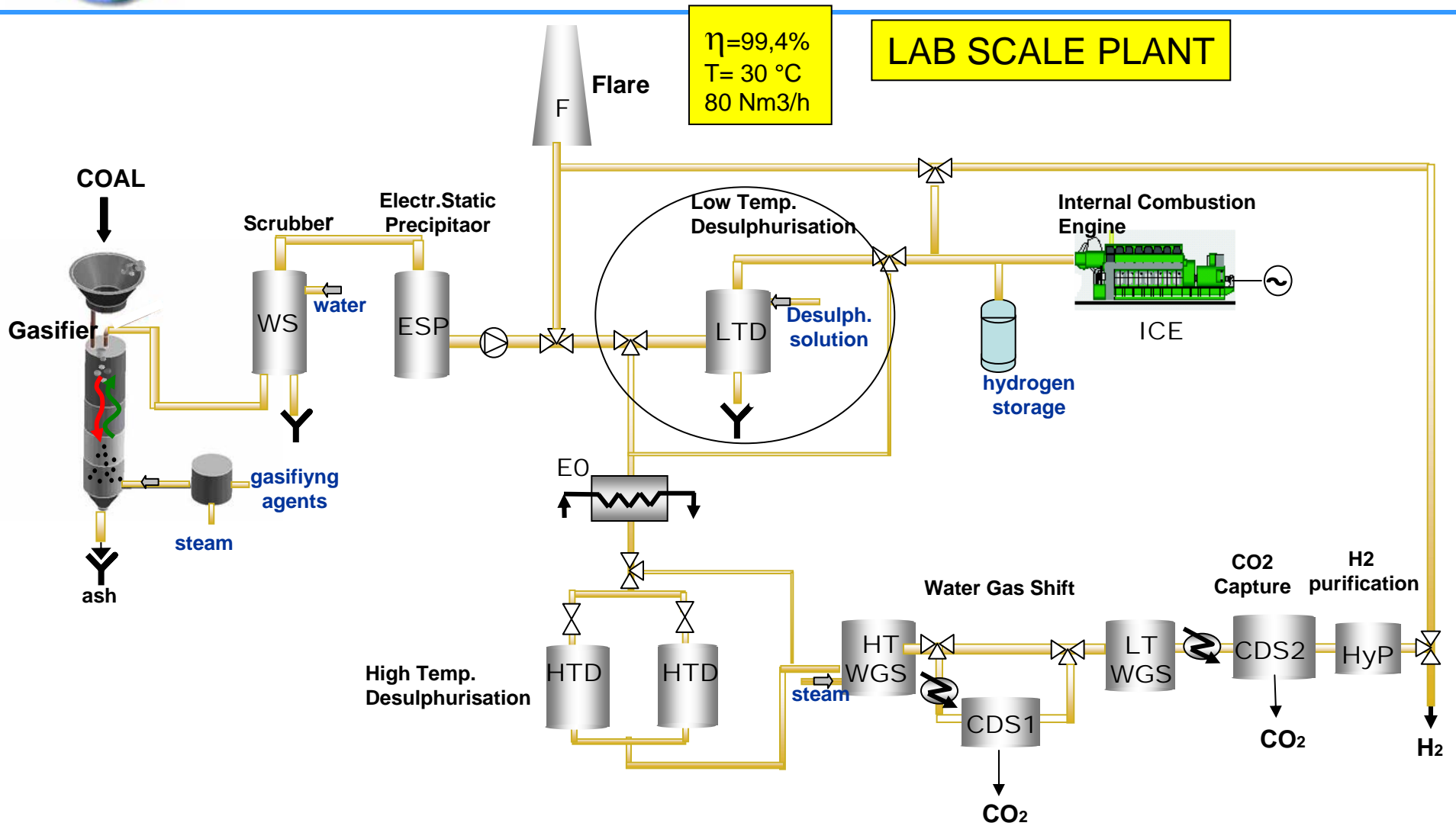


Coal 35 kg/h
T = 300 °C
Syngas = 100 Nm3/h

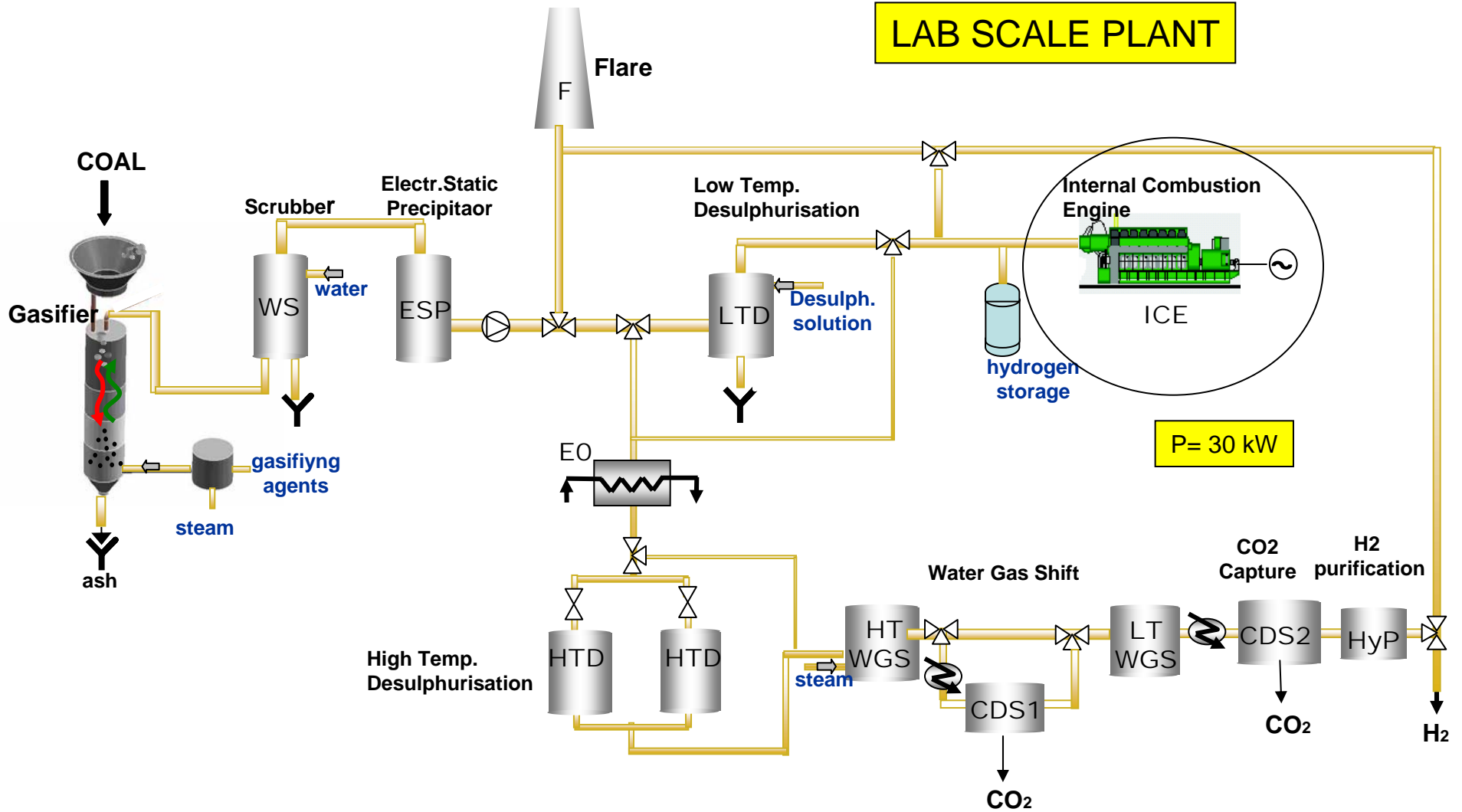
LAB SCALE PLANT

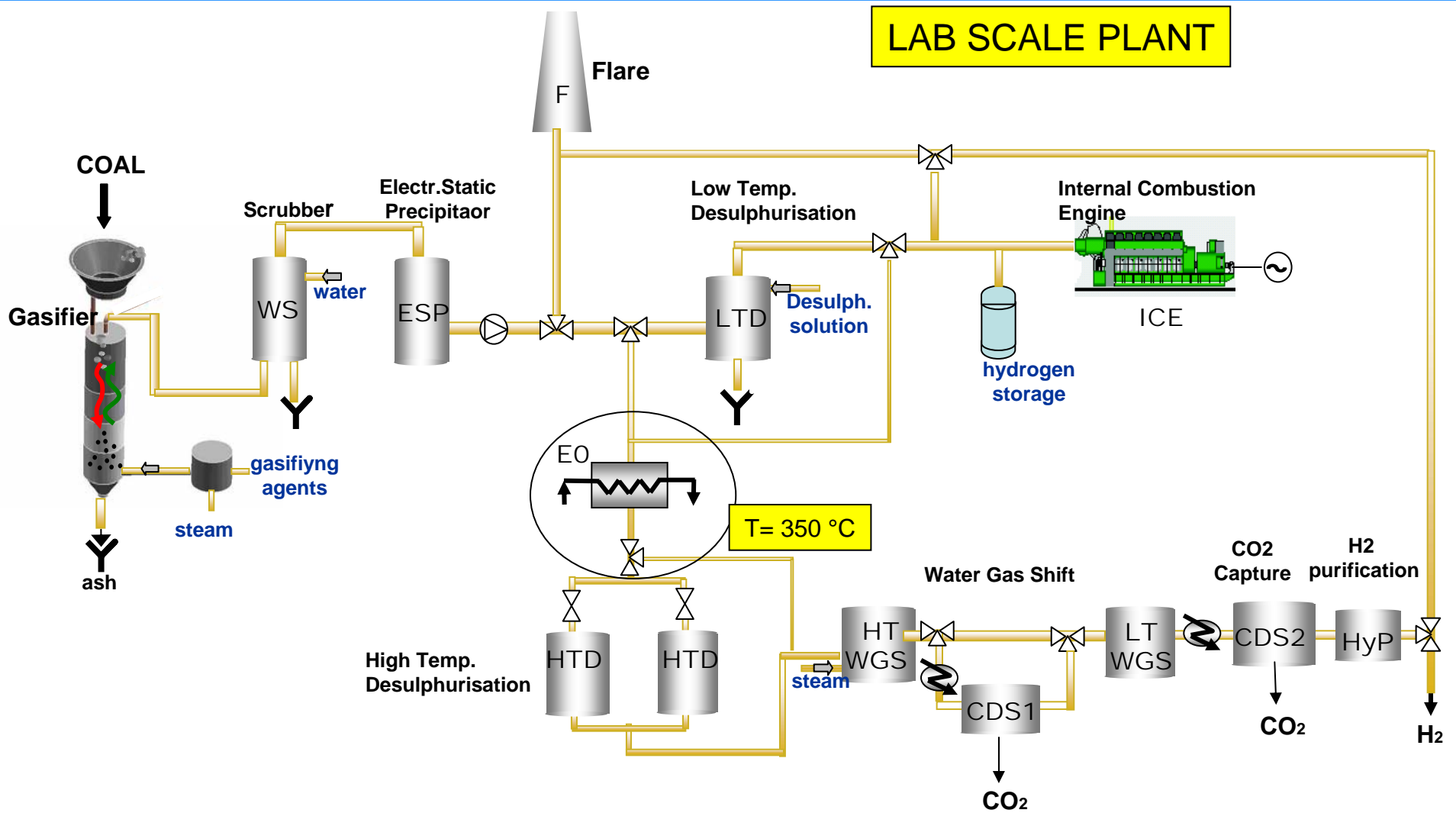




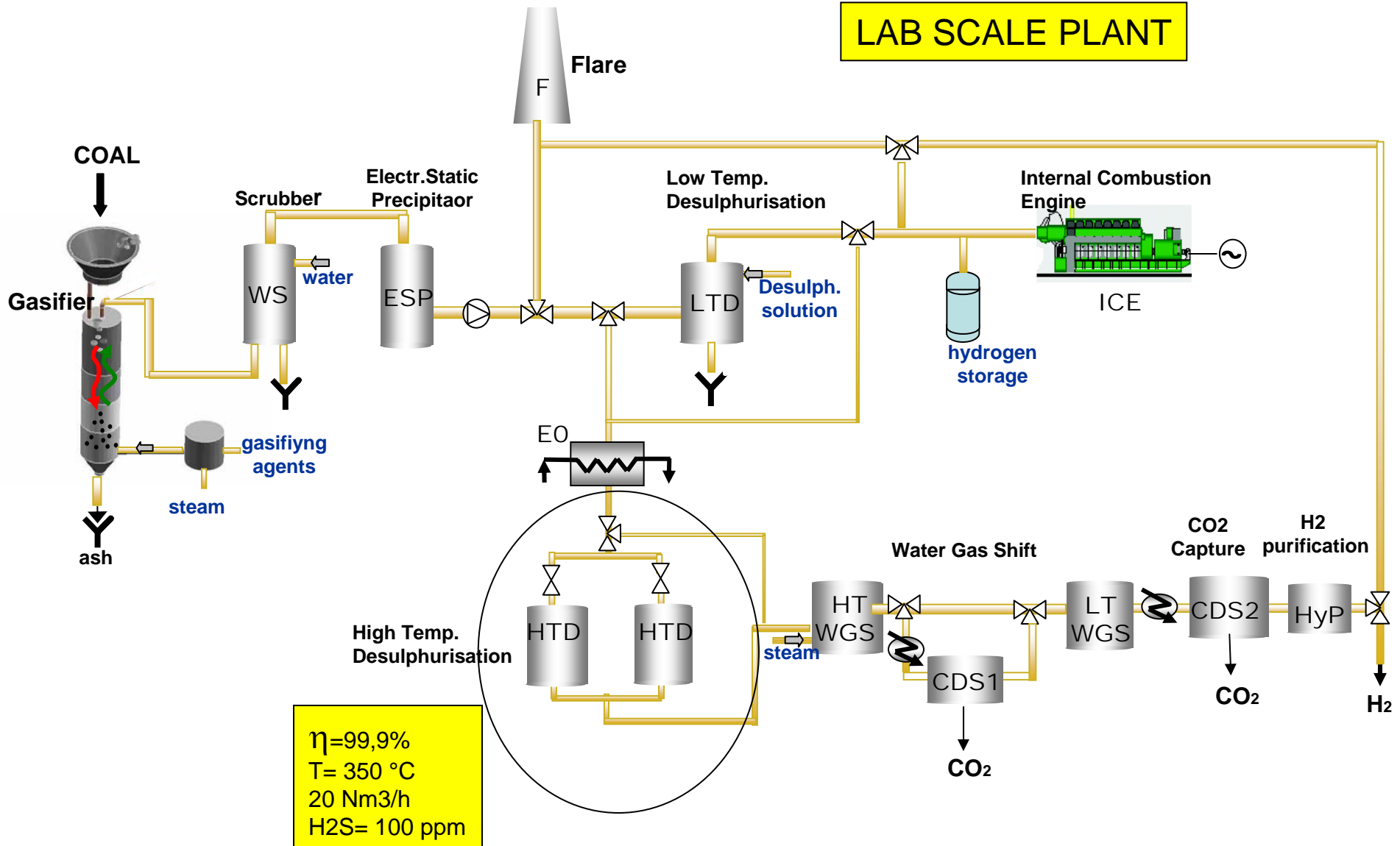


LAB SCALE PLANT

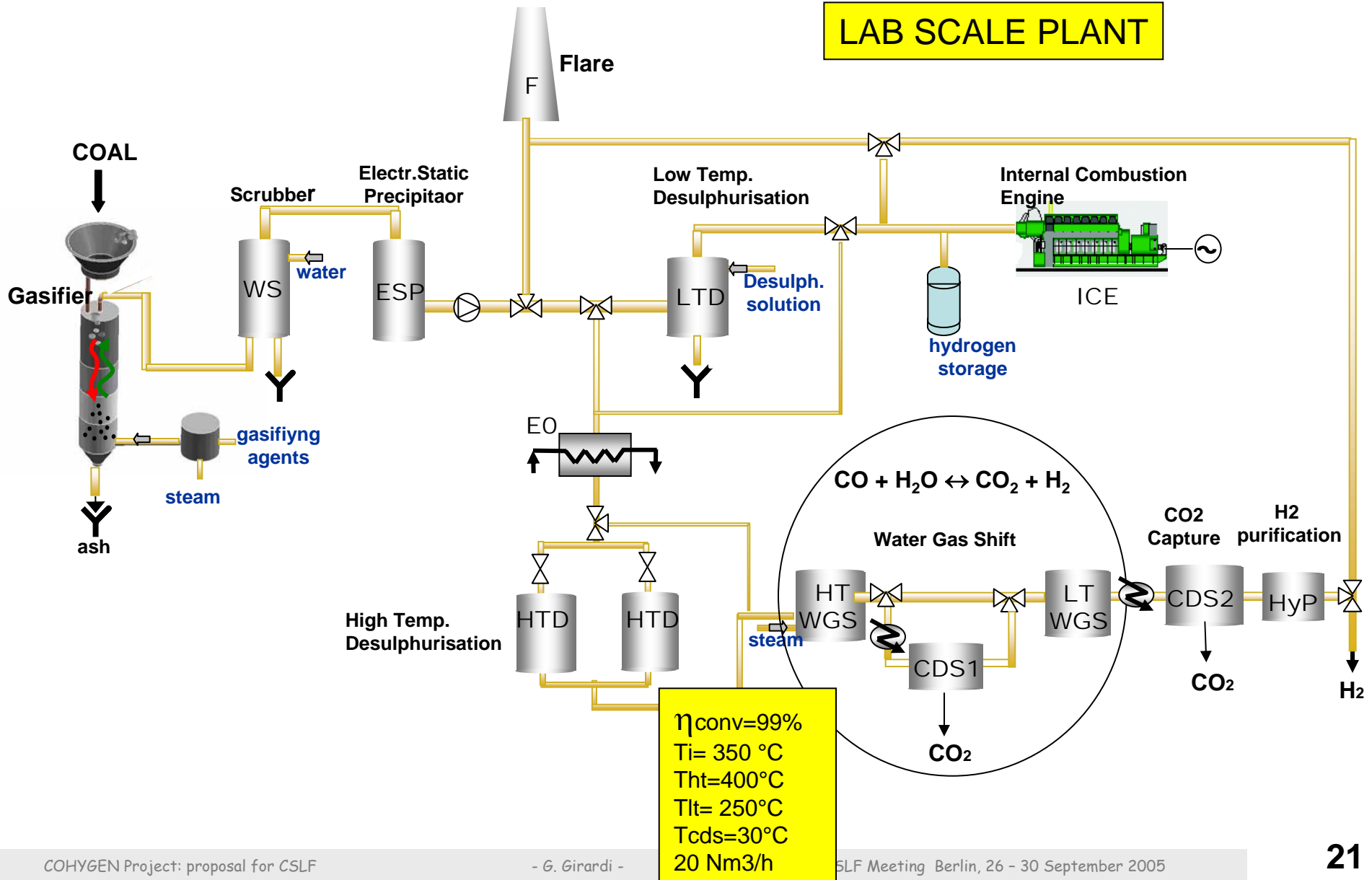




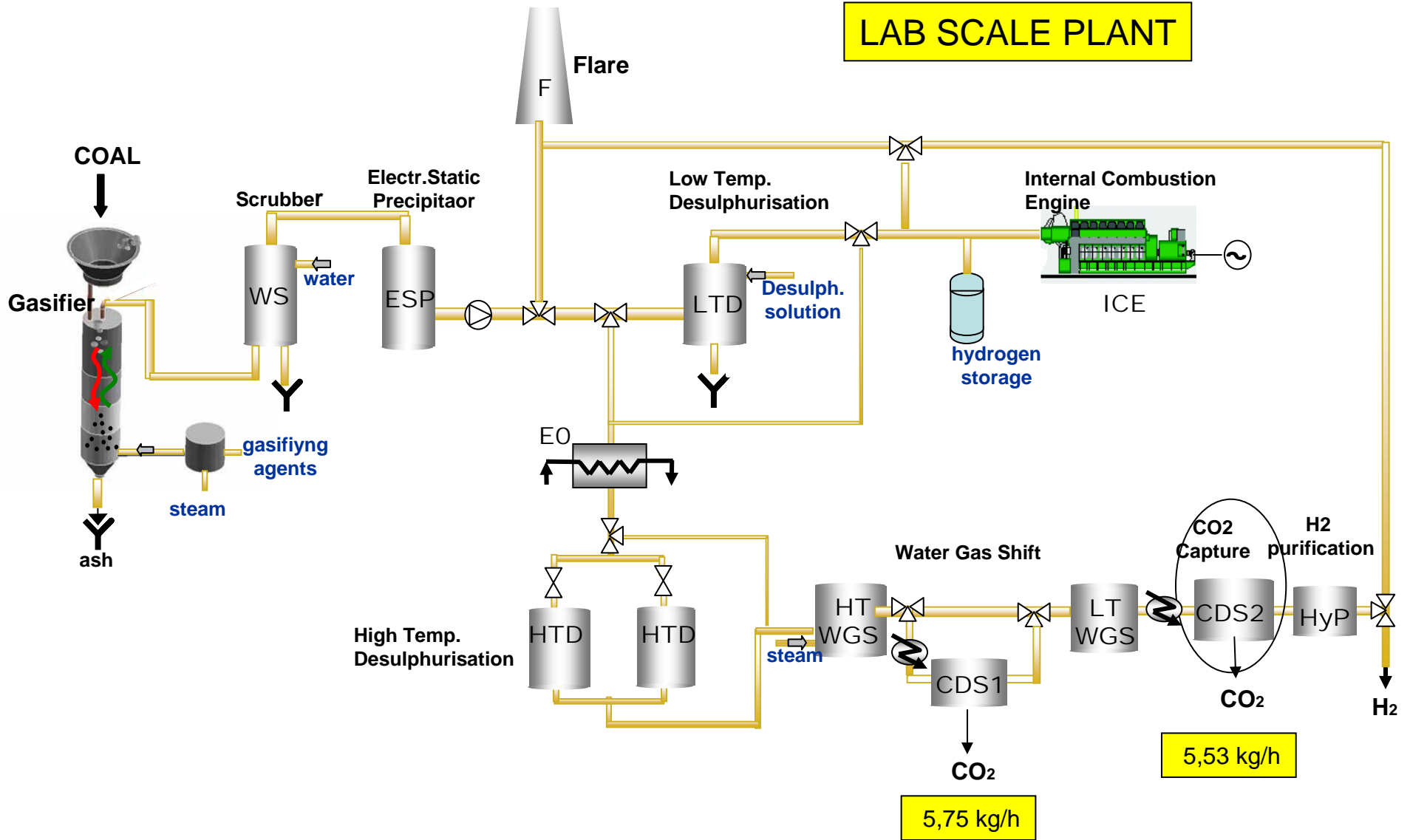
LAB SCALE PLANT



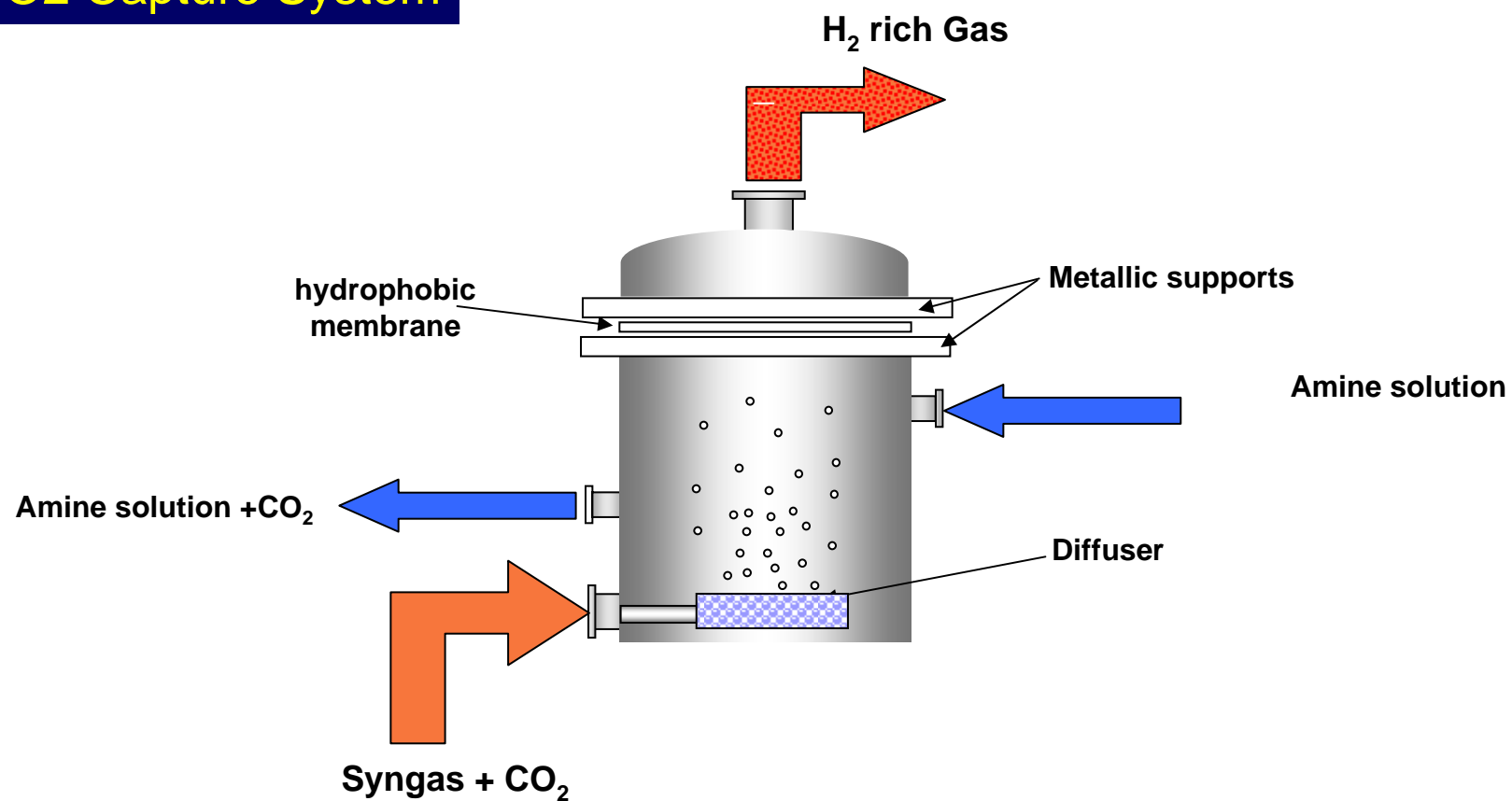
LAB SCALE PLANT



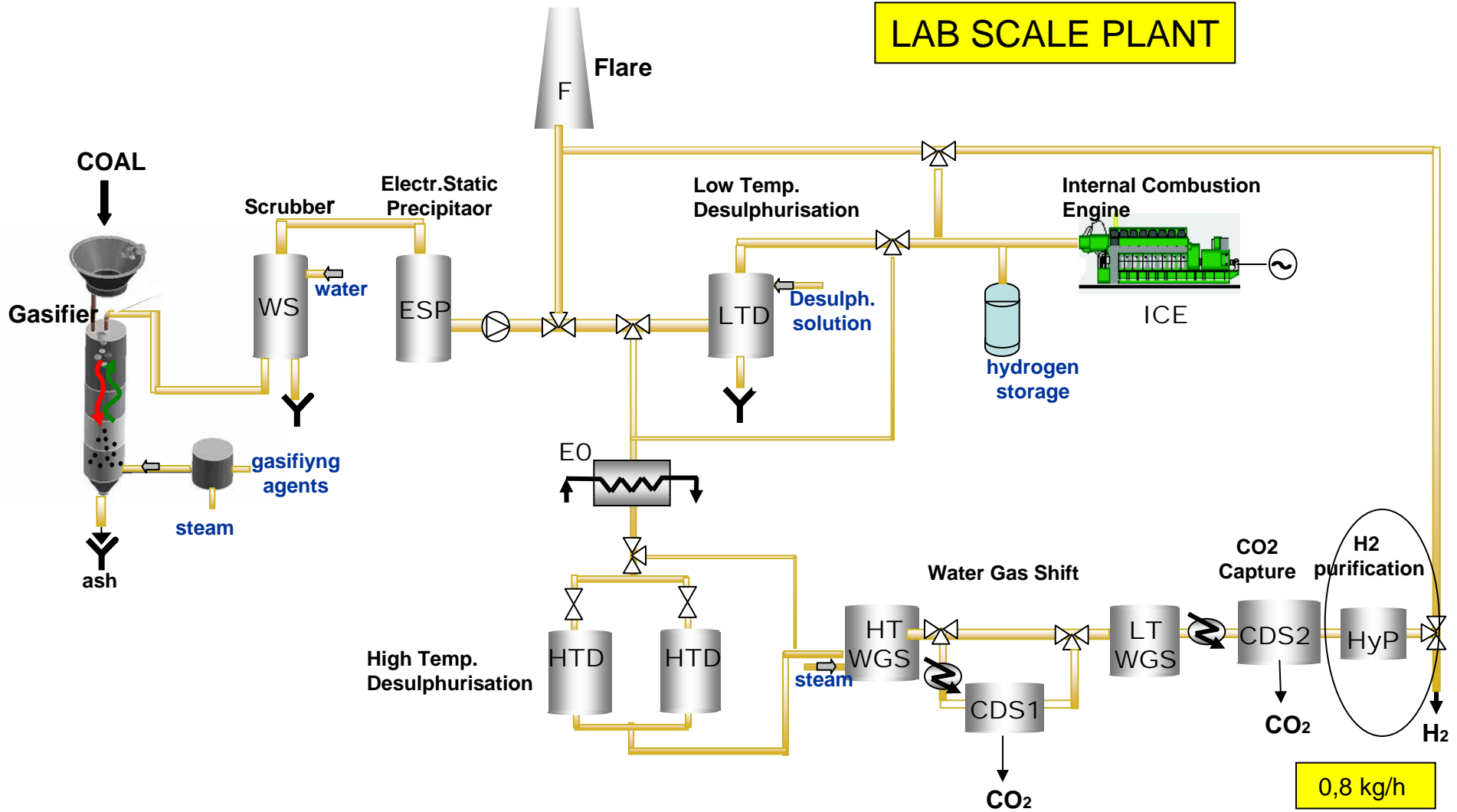
LAB SCALE PLANT



CO₂ Capture System



LAB SCALE PLANT



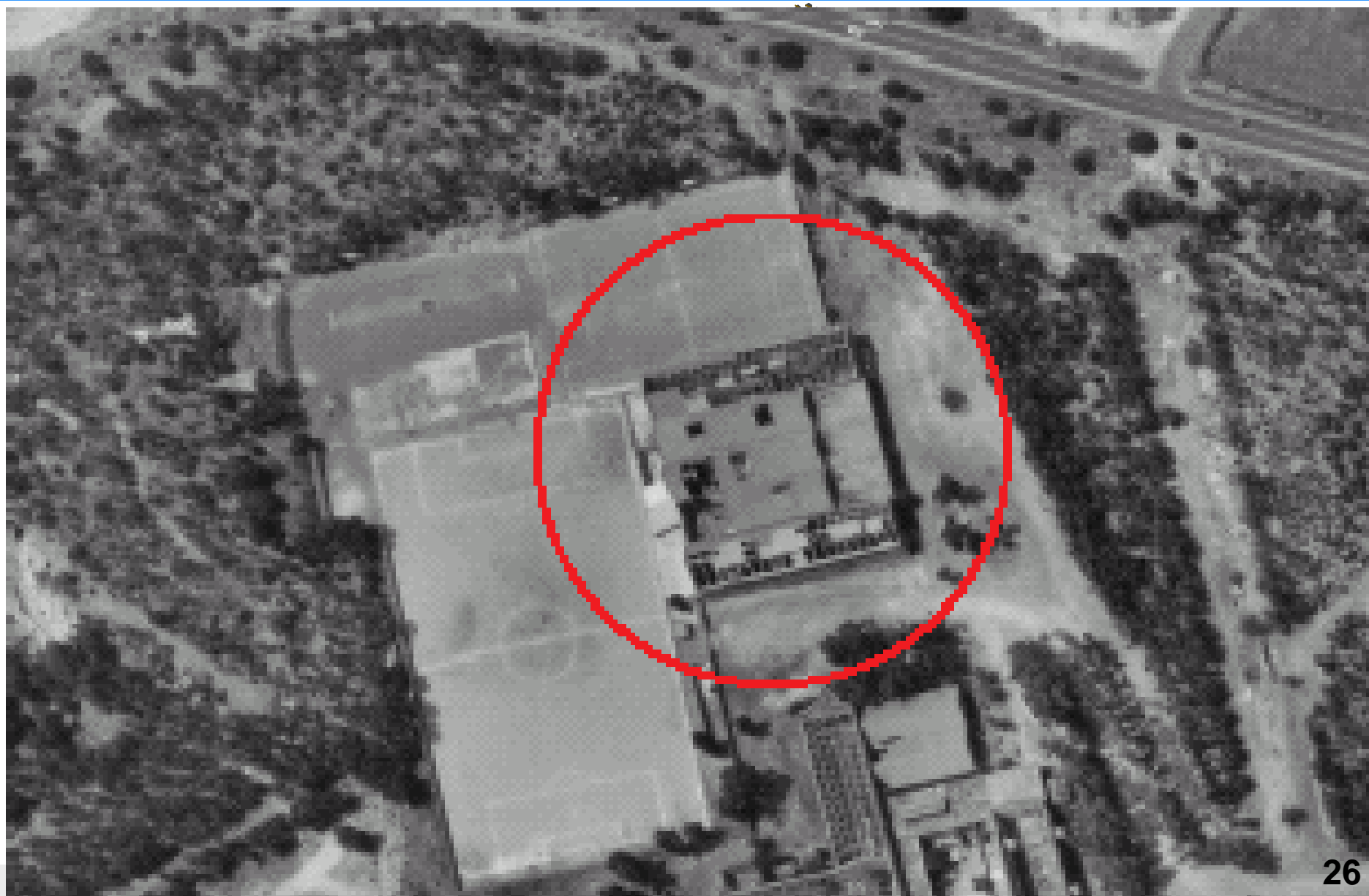
R&D Project on Pilot Platform

Some of the main objectives :

- Improving and optimising the coal gasification process (automation and feeding system).
- Improving gasifier performance.
- Testing the cleaning and desulphurization techniques (hot and cooled).
- Developing and validating simulation models.
- Qualifying and quantifying CO-Shift catalysts.
- Evaluating hydrogen separation processes.
- Evaluating and comparing CO₂ separation technologies



Sotacarbo Research Centre LOCATION

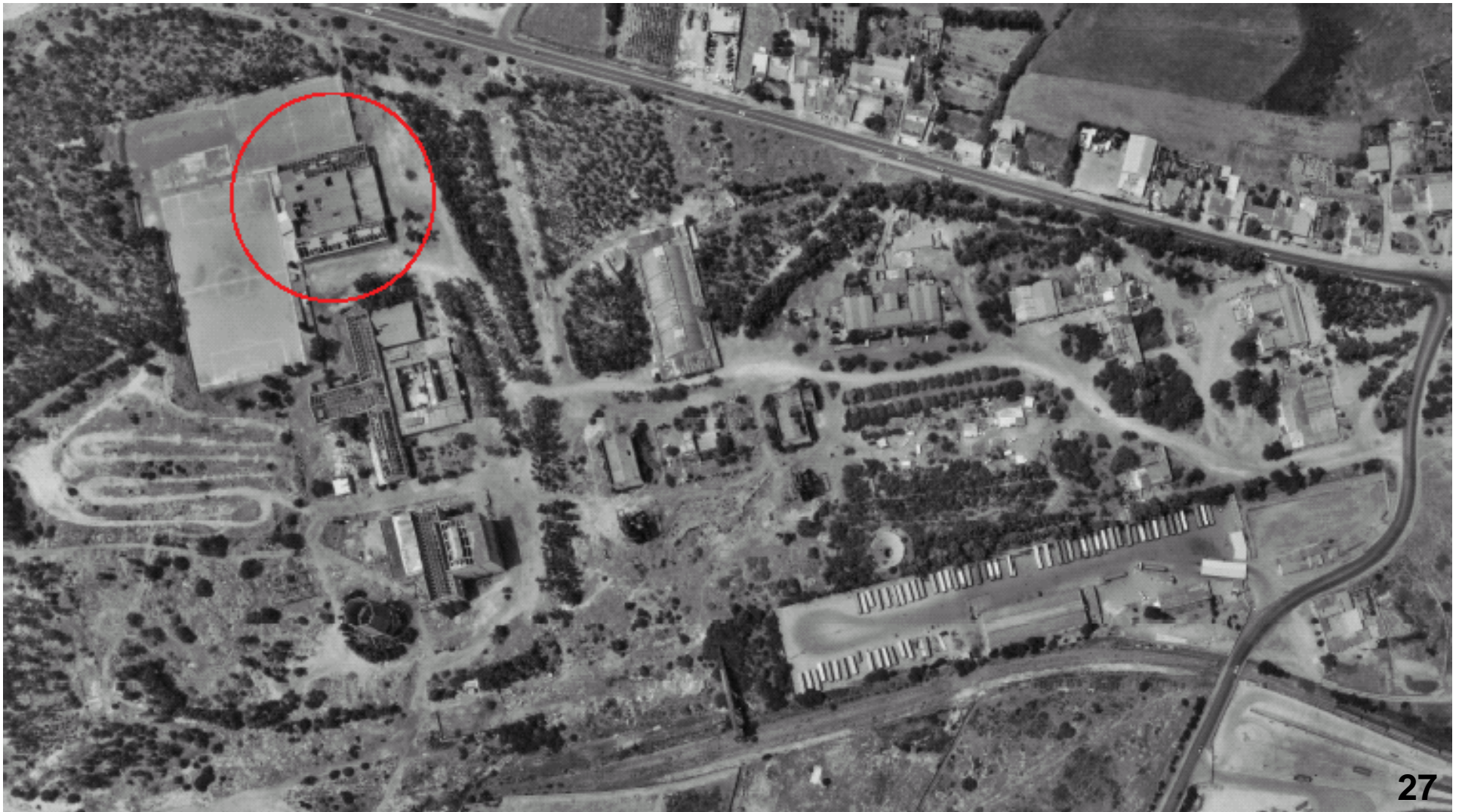




Sotacarbo Research Centre on the site of a disused coal mine



Sebariu mine

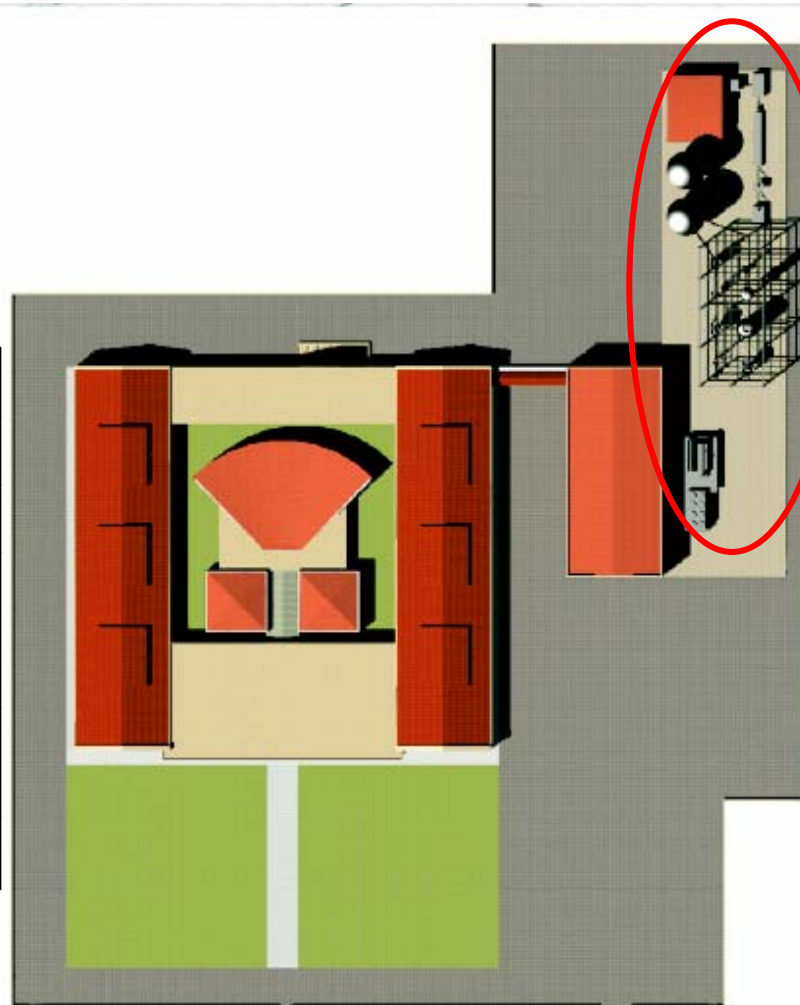




Sotacarbo Research Center view



Covered area	m ²	2500
Offices	m ²	800
Laboratories	m ²	850
Test area & mechanical shop	m ²	300
Common facilities	m ²	550
Land area	ha	1



Pilot Platform



Sotacarbo Research Center view

