

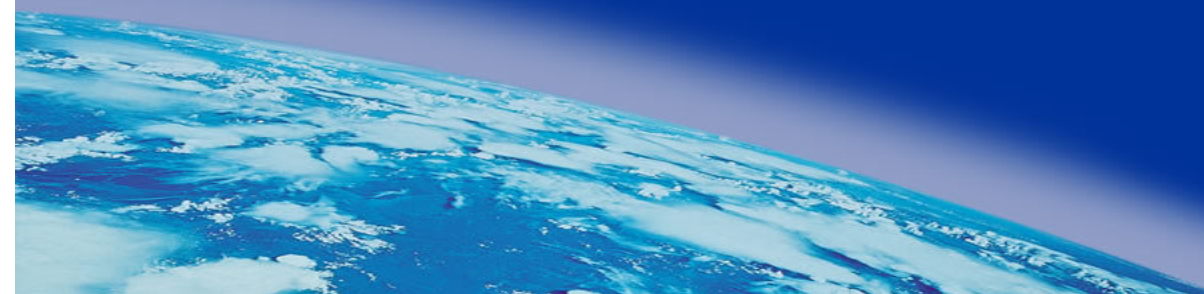


**Shell Global Solutions**

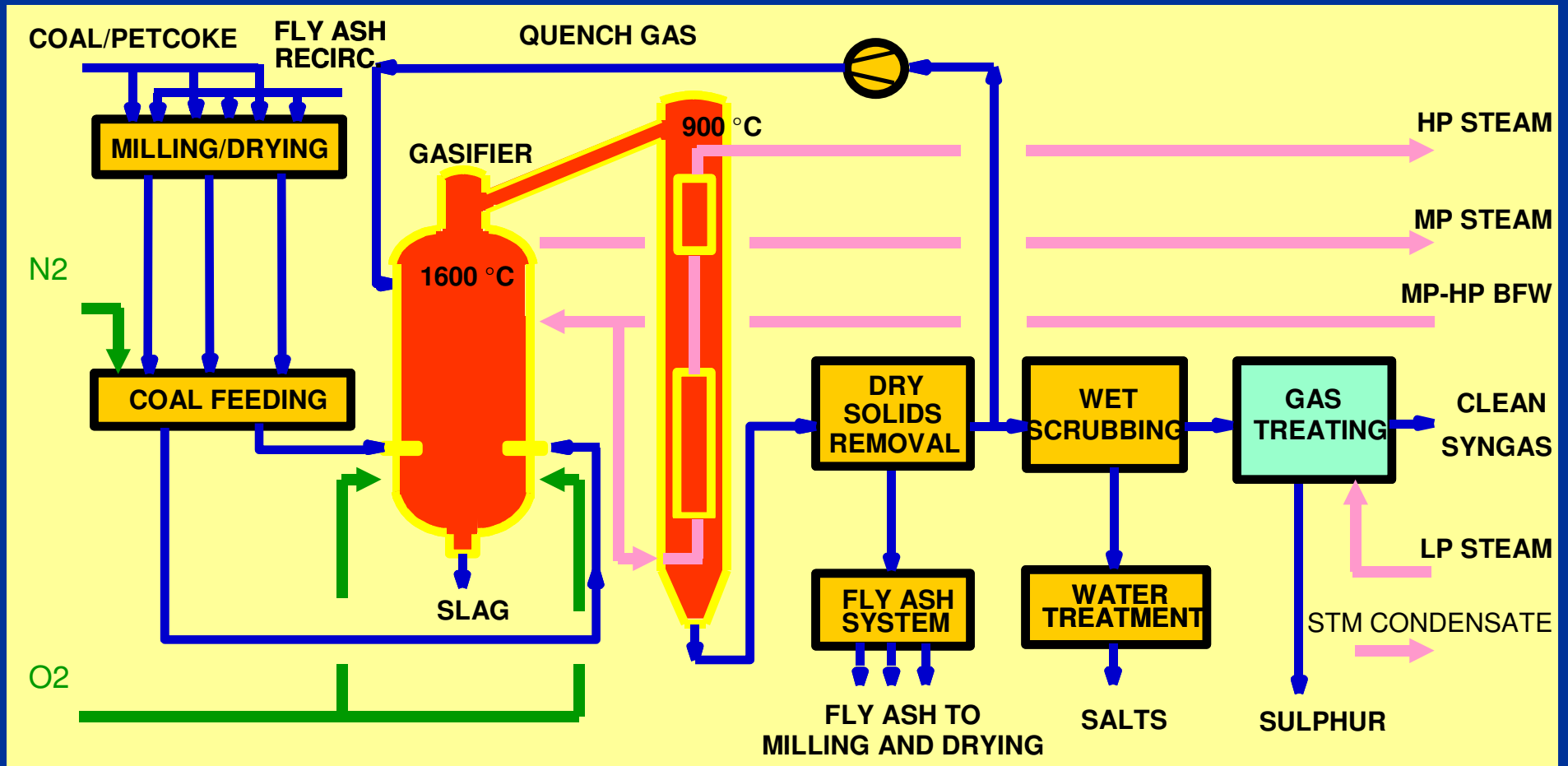
# Shell Coal Gasification Process Using Low Rank Coal

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# SCGP Process Flow Diagram



# SCGP-1 in Deer Park (US)



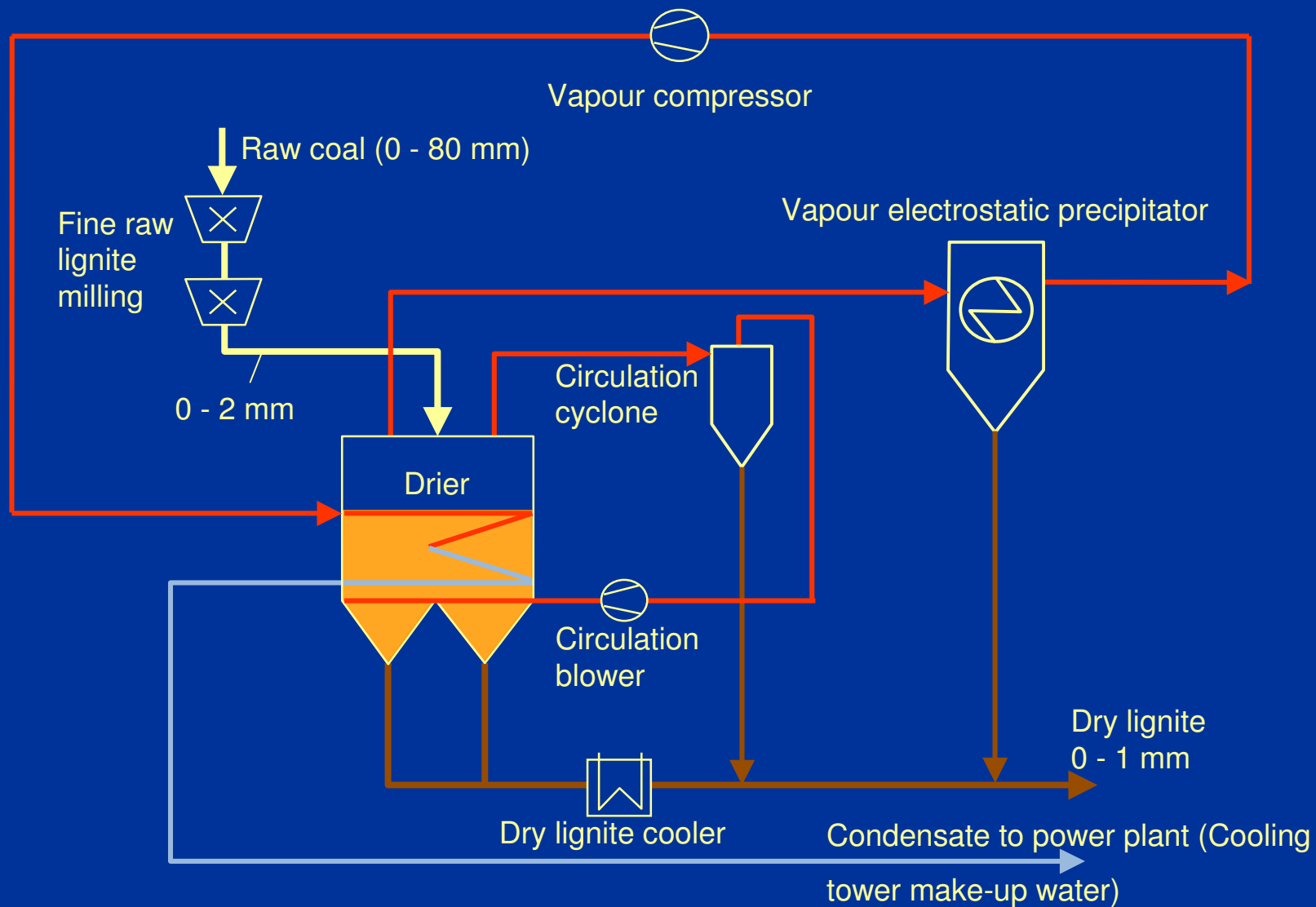
- Campaign 1987-1991
- Capacity 250-400 tpd

# SCGP-1 Gasification Performance

	Carbon Conversion	CGE (%HHV)
Illinois #5	99.7	81.6
Maple Creek	98.7	76.0
Drayton	99.6	79.3
Buckskin	99.7	78.0
Blacksville #2	99.7	80.5
Pyro #9	99.9	78.3
Sufco	99.9	81.0
Texas Lignite	99.4	80.3
Pike County (washed)	99.9	80.9
Pike County (ROM)	99.9	83.0
Dotiki	99.9	80.1
Newlands	99.7	80.3
El Cerrejon	99.6	83.4
Skyline	99.9	82.4
Robinson Creek	99.7	82.2
R&F	99.5	79.6
Pocahontas #3	99.3	82.4
Petroleum Coke	99.5	78.9

$$CGE = \frac{\text{HHV of sweet gas}}{\text{HHV of coal feed}}$$

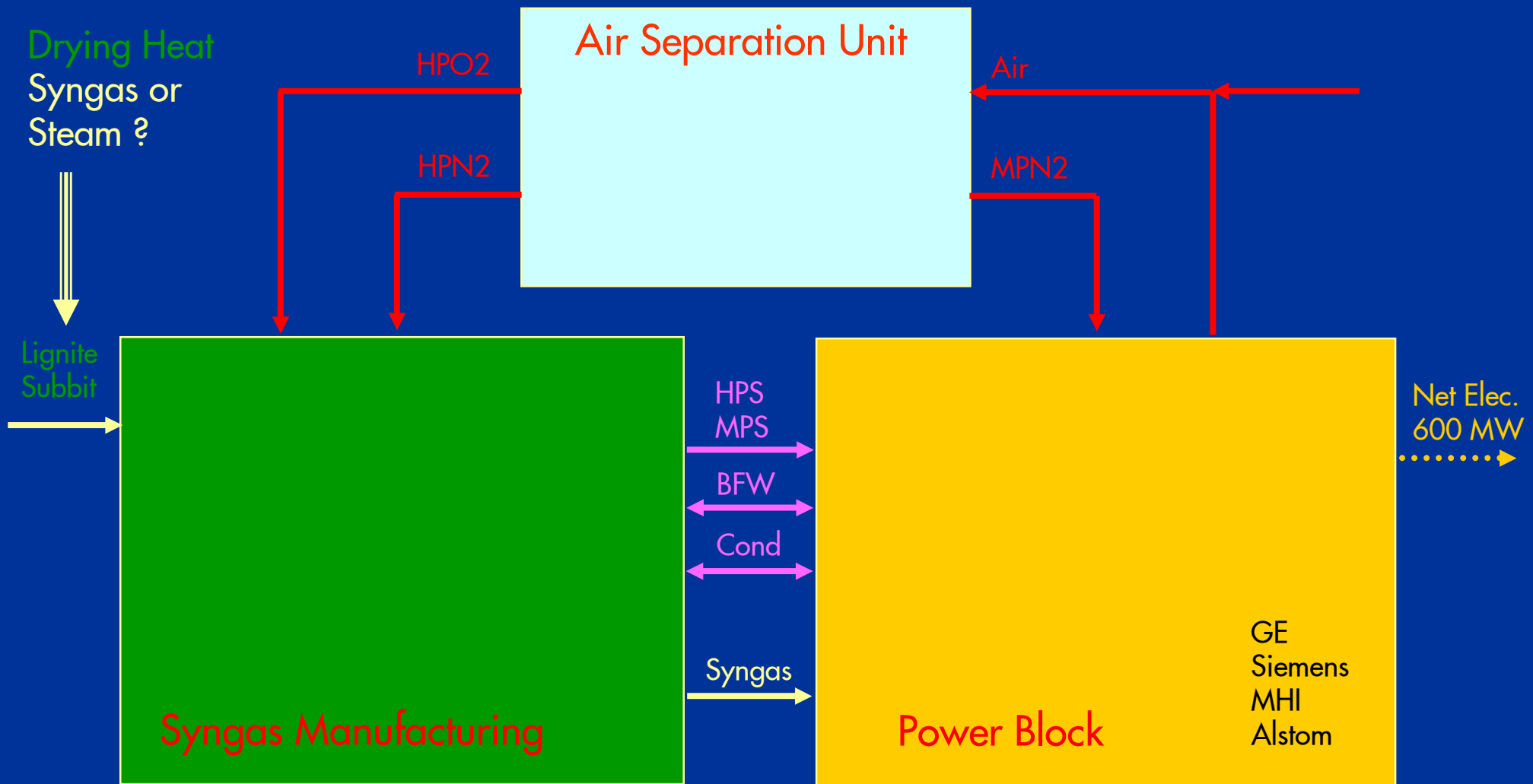
# Schematic of Lignite Drying Process (Source: RWE)



# SCGP Lignite Coal Drying Options

Coal Feed "dried" basis	Power use [kWh/t]	Steam use [t/t]	Water Product [t/t]
Conventional drying (Rotary Kiln)	17	1.2	0
Fluid Bed simple	25	1.1	0
Fluid Bed with MVC	85	0.17	0.7

# SCGP IGCC USA Case Study – Block Flow



# SCGP IGCC 600 Lignite/Subbit Coal – MVC FB Drying

- Case 1 : Lignite dried from 53 -> 12%
- Case 2 : Subbituminous dried from 30 -> 6%

	"Dry" Coal Basis		Wet(A.R.) Coal Basis	
2*Fr.7FB or equal 50% ASU integrat.	IGCC-Eff. [%HHV]	HHV Rate [BTU/kWh]	IGCC-Eff. [%HHV]	HHV Rate [BTU/kWh]
Case 1	43.7	7800	42.1	8100
Case 2	42.6	8000	41.6	8200

# SCGP Lignite/Subbit Coal Drying - Conclusions

- Dry feeding system essential feature SCGP, remove free water
- Pre-drying required for lignite, advisable for subbituminous coal
- High moisture coals after drying excellent feedstock SCGP
- Different low rank coals have little impact on IGCC efficiency