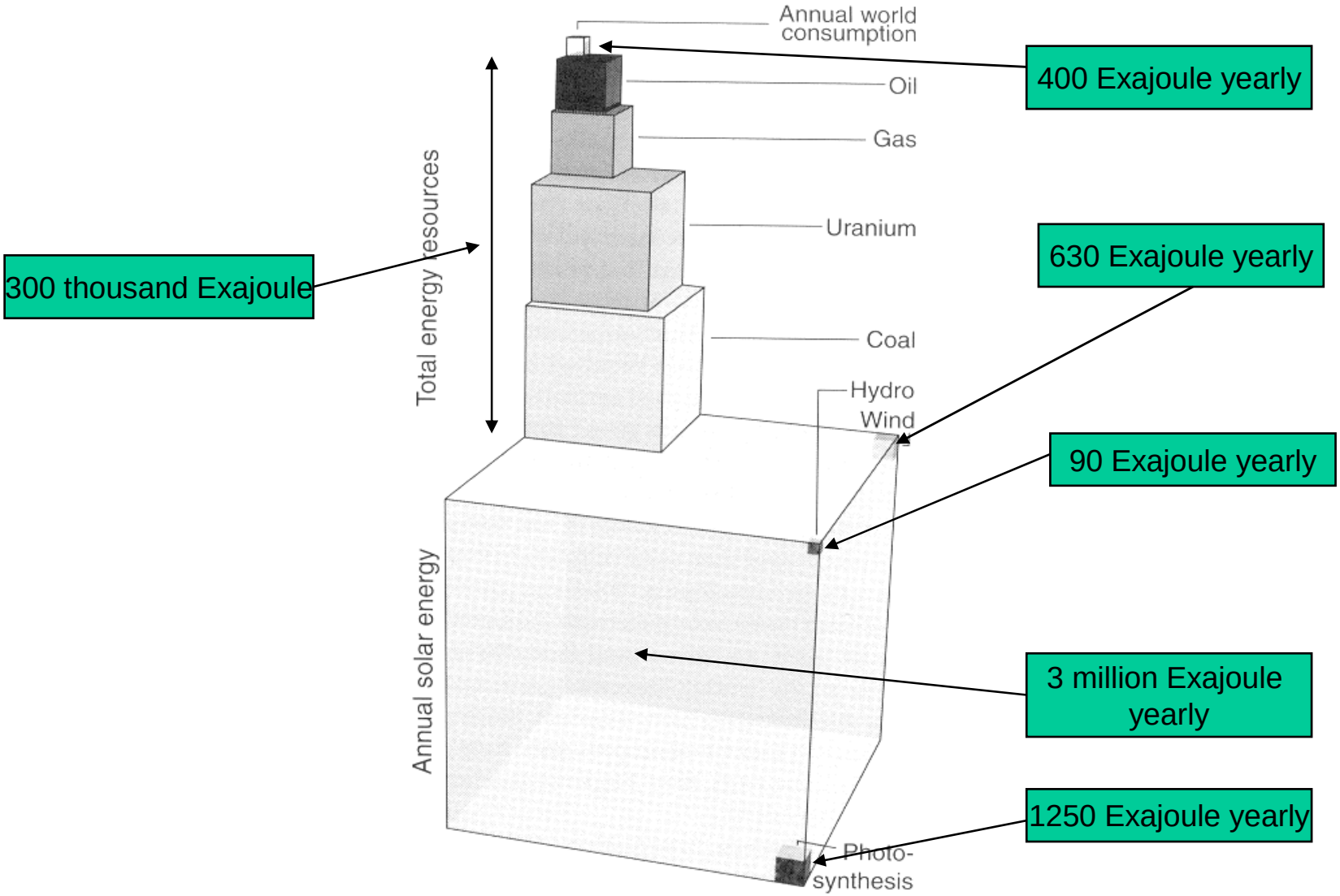
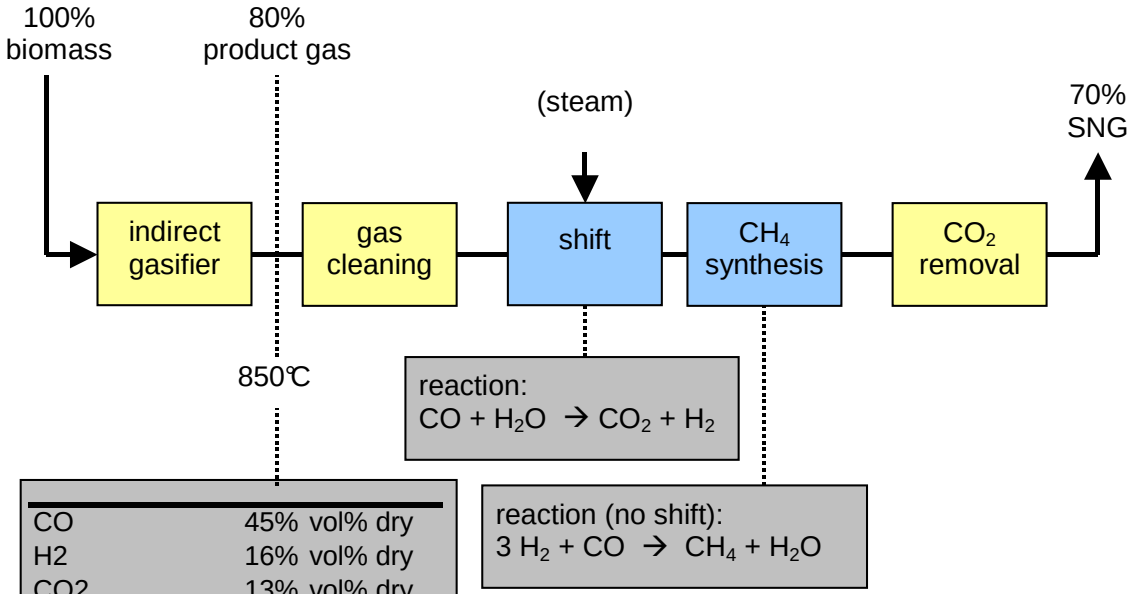
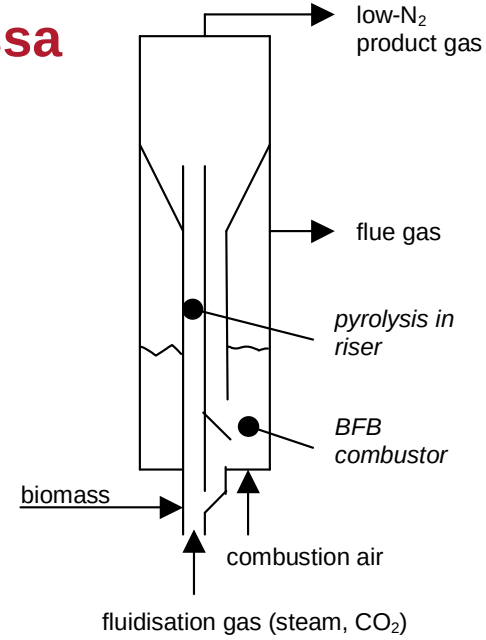

Annual world consumption
400 Exajoule yearly
Oil
Gas
Uranium
Coal
Hydro
Wind
630 Exajoule yearly
90 Exajoule yearly
300 thousand Exajoule
Total energy resources
Annual solar energy
3 million Exajoule yearly
1250 Exajoule yearly
Photo-synthesis

SNG productie uit biomassa



CO	45% vol% dry
H2	16% vol% dry
CO2	13% vol% dry
CH4	18% vol% dry
C2H2	1% vol% dry
C2H4	5% vol% dry
C2H6	1% vol% dry
C6H6	1% vol% dry
N2	1% vol% dry
tar	0.4% vol% dry
H2O	35% vol% wet



		O_2-blown gasifier	Indirect gasifier	Hydrogasifier
Thermal input				
biomass	MW	100	100	50
hydrogen	MW			47
Efficiency SNG production	%	67.0*	66.3*	79.1
Carbon conversion	%	100	93.3	80.1
Specific investment costs	€/kW_{th}	449	482	616
SNG production costs	€/GJ_{SNG}	7.8	8.5	5.6
Dutch market price "Green Gas"	€/GJ_{SNG}	8.7	8.7	5.2
	€/tonne	83	95	115

* When the separated tar from the product gas is recycled and converted within the gasifier, SNG production efficiencies up to 70% (on LHV basis) can be achieved.

SNG properties in dependence of syngas technology

Property		NG	O_2-blown gasifier	Indirect gasifier	Hydrogasifier
Composition					
CH_4 (incl. C_{2+})	vol.%	84.75	87.67	87.62	82.97
H_2	vol.%	0.00	1.77	1.95	8.02
CO_2	vol.%	0.89	8.65	8.90	8.37
N_2	vol.%	14.35	1.84	1.441	0.53
Calorific value, LHV	MJ/kg	38.0	38.41	38.41	39.57
	MJ/Nm^3	31.7	31.26	31.26	30.67
Wobbe-index	MJ/Nm^3	43.46-44.41	43.74	43.74	44.03

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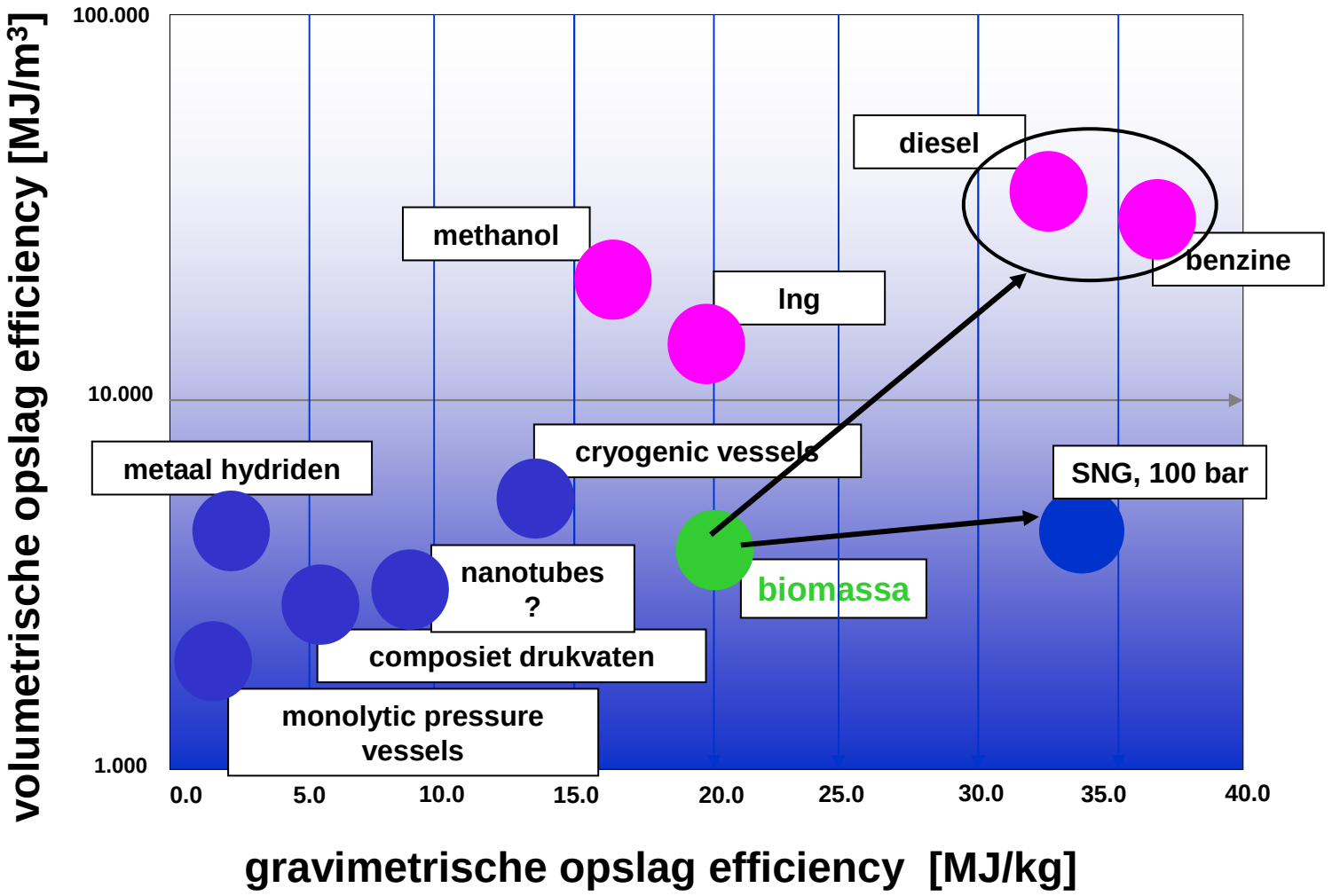
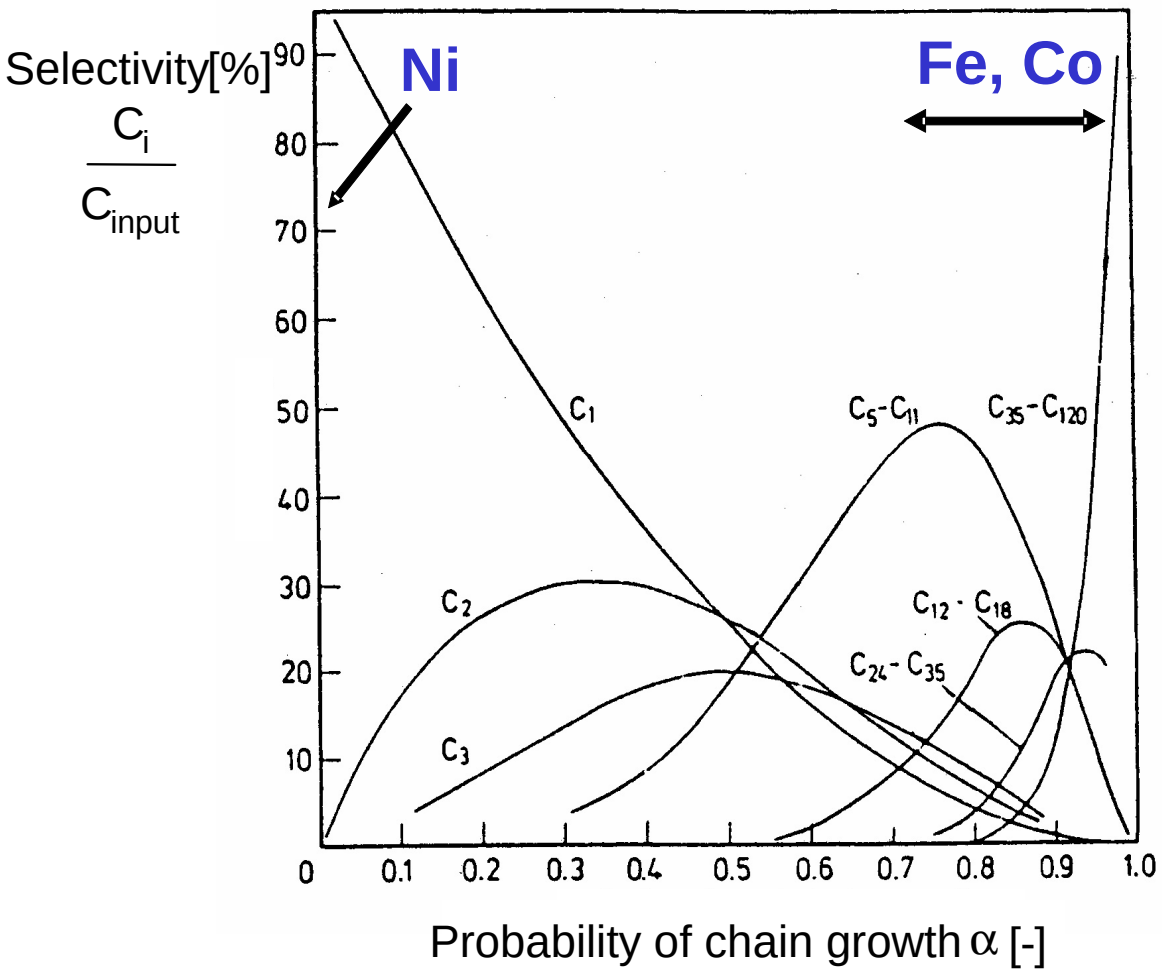
Synthetic fuels and storage capacity



SNG and FT products



Catalyst for fuel synthesis

Bio-SNG

$CO + 3\,H_2 \longleftrightarrow CH_4 + H_2O$

C_1: methane

C_5-C_{11}: gasoline

C_{12}-C_{18}: diesel

FT liquids

$8\,CO + 17\,H_2 \longleftrightarrow C_8H_{18} + 8\,H_2O$