

***В.М. Батенин, В.И. Ковбасюк***

Объединённый институт высоких температур РАН, Москва

[PLATECH@MAIL.RU](mailto:PLATECH@MAIL.RU)

# БУРЫЙ УГОЛЬ ДОЛЖЕН И МОЖЕТ ОБЕСПЕЧИТЬ РОСТ ЭНЕРГЕТИКИ СТРАНЫ



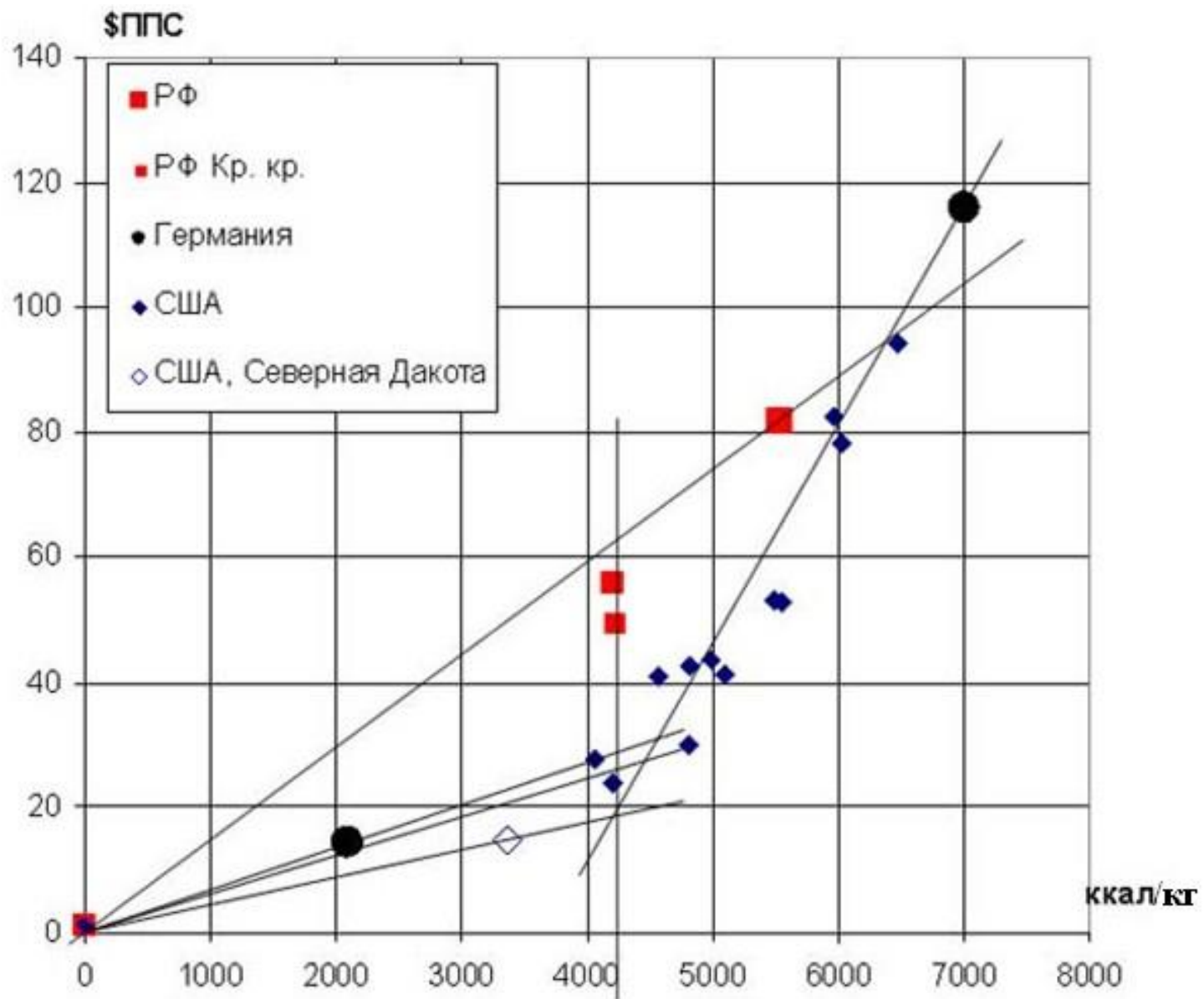
## The World Continues to Rely on Coal for Stable and Affordable Power

Many countries around the world, particularly nations of the European Union (EU), have attempted to increase the use of renewable energy through mandates and subsidies. As these policies have grown increasingly expensive for national economies attempting to recover from global recession, in addition to reactors being shutdown over concerns with nuclear power, countries around the world are increasingly turning to coal to provide affordable, baseload power.

Even as regulators in the United States try to reduce or, as evidenced by the EPA's proposed New Source Performance Standards, effectively ban the use of coal for electric power generation, world coal demand is expected to increase by over 40% from 8 billion tons currently to 11.5 billion tons by 2040<sup>1</sup>.

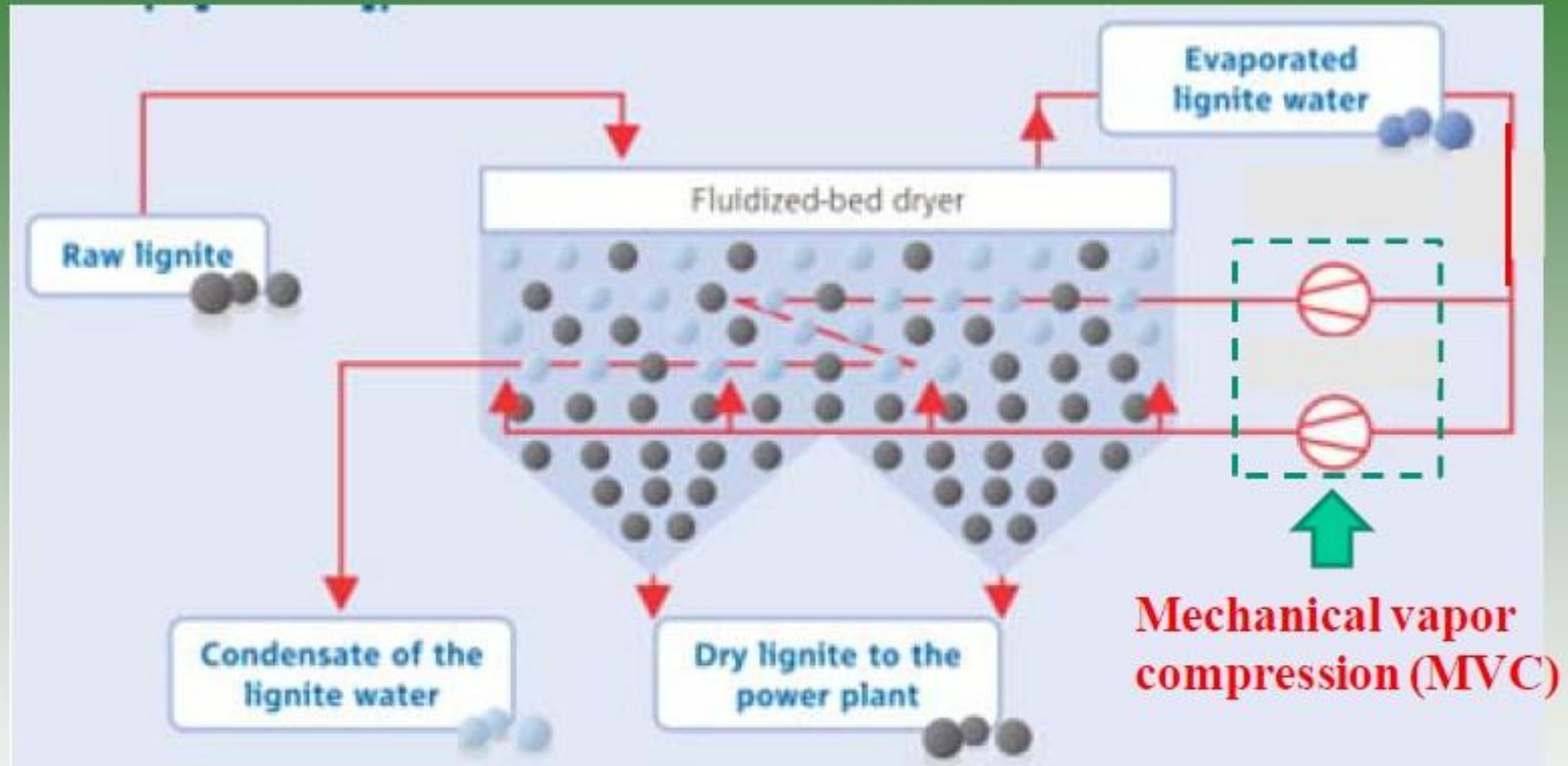
### European Union

The return to coal has been most prevalent in Germany, which recently amended its renewable energy laws to reduce targets and cut subsidies for certain types of renewable power sources in order to stem soaring electricity prices<sup>2</sup>. Germany's "energiewiede" program required at least 80% of its power needs to be met by renewable



**Стоимость в \$ППС и теплотворная способность углей в России, Германии и США**

# RWE WTA Lignite Drying Process (Superheated steam drying via MVC)



**Commercial technology.**

**Maximum capacity: dry coal production: 2600 tpd.**

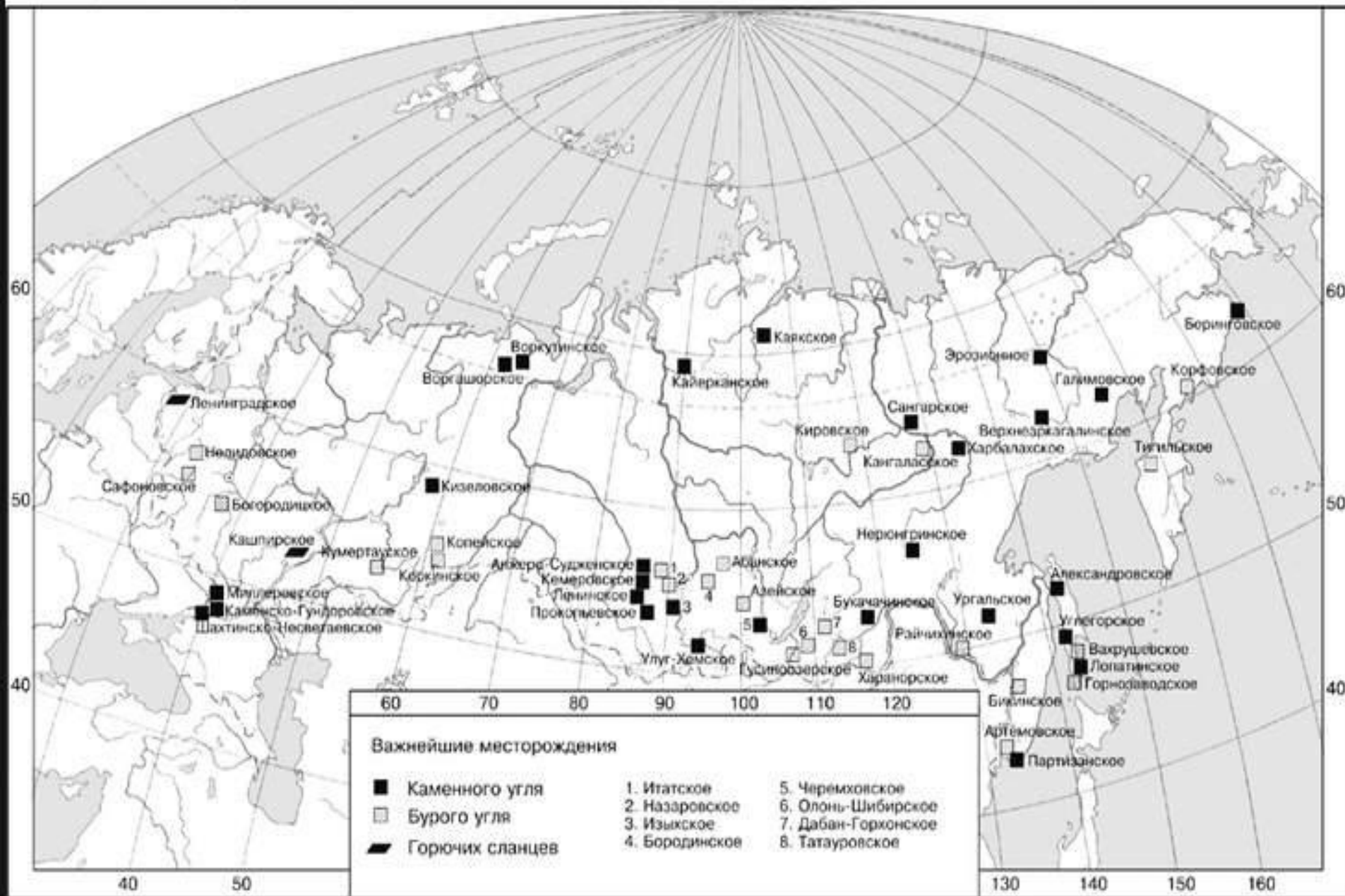
**Energy requirement: 110 kWh/t H<sub>2</sub>O removed.**

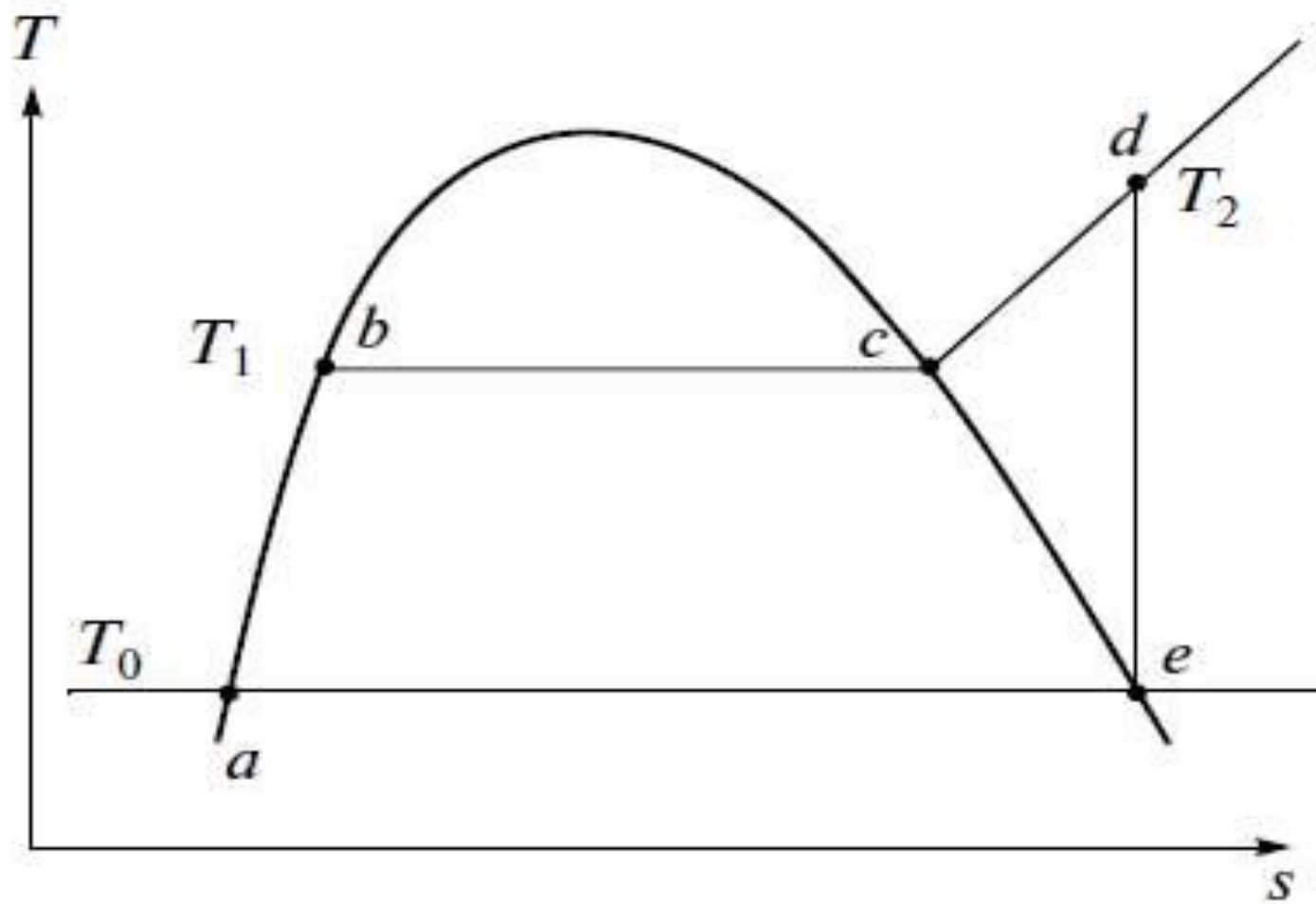




**ПГУ ТЭС Эдвардспорт, США, на каменном угле с газификацией**

# Месторождения угля и горючих сланцев в России

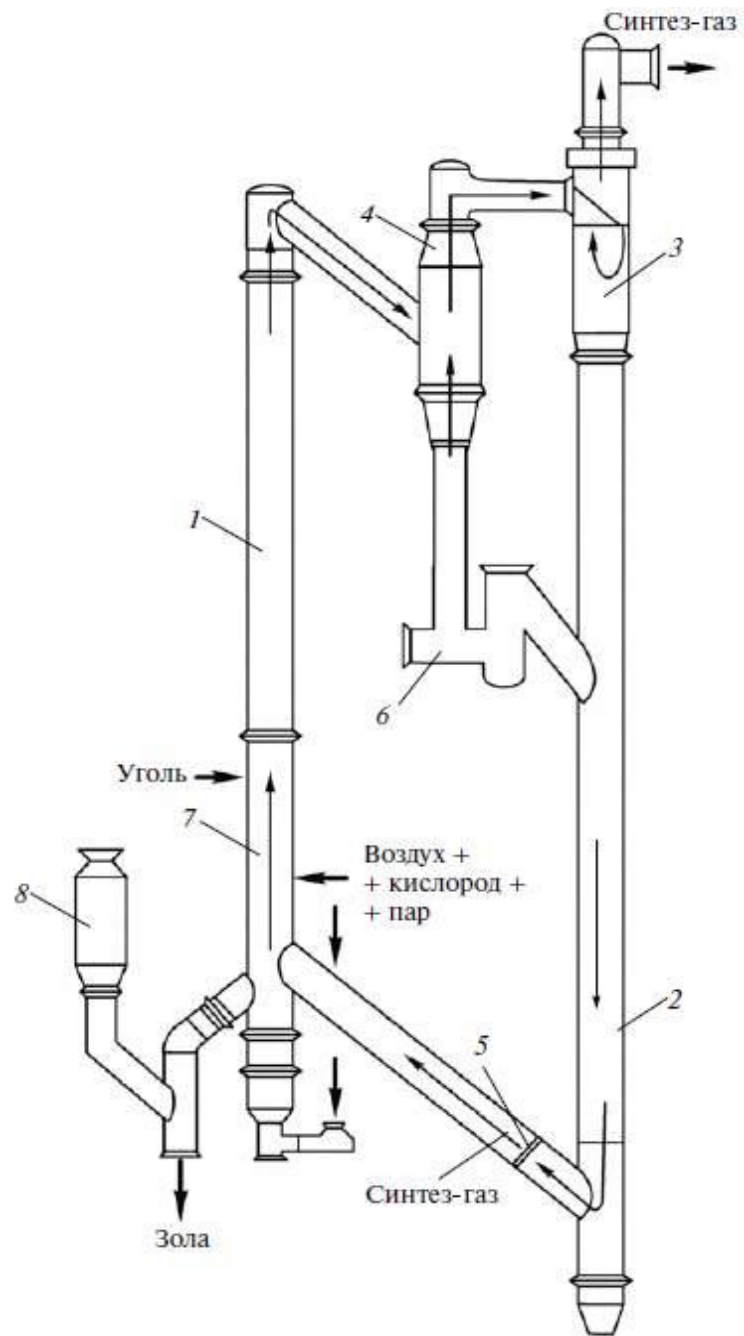




Принципиальная  $T$ - $s$  диаграмма сушки



«Транспортный»  
газификатор  
США



## Газификация осушенного торфа

Температура газификации 1123 К						
%O <sub>2</sub>	Q	$G_{сг}/G_T$	$GO_2/G_T$	$N_{вых}/N_{вх}$	$NO_2/N_{вх}$	
0.21	6219	2.498	0	0.8953	0	
0.4	8267	1.653	0.2611	0.9107	0.02278	
0.6	9247	1.395	0.522	0.9155	0.04654	
Температура газификации 1573К						
0.21	4648	3.552	0	0.7649	0	
0.4	7643	2.125	0.4339	0.8364	0.03086	
0.6	9246	1.694	0.8699	0.858	0.06187	

**Q** - теплотворная способность синтез-газа, кДж/м<sup>3</sup>

**$G_{сг}/G_T$**  – выход синтез-газа на 1 кг/с сухого топлива

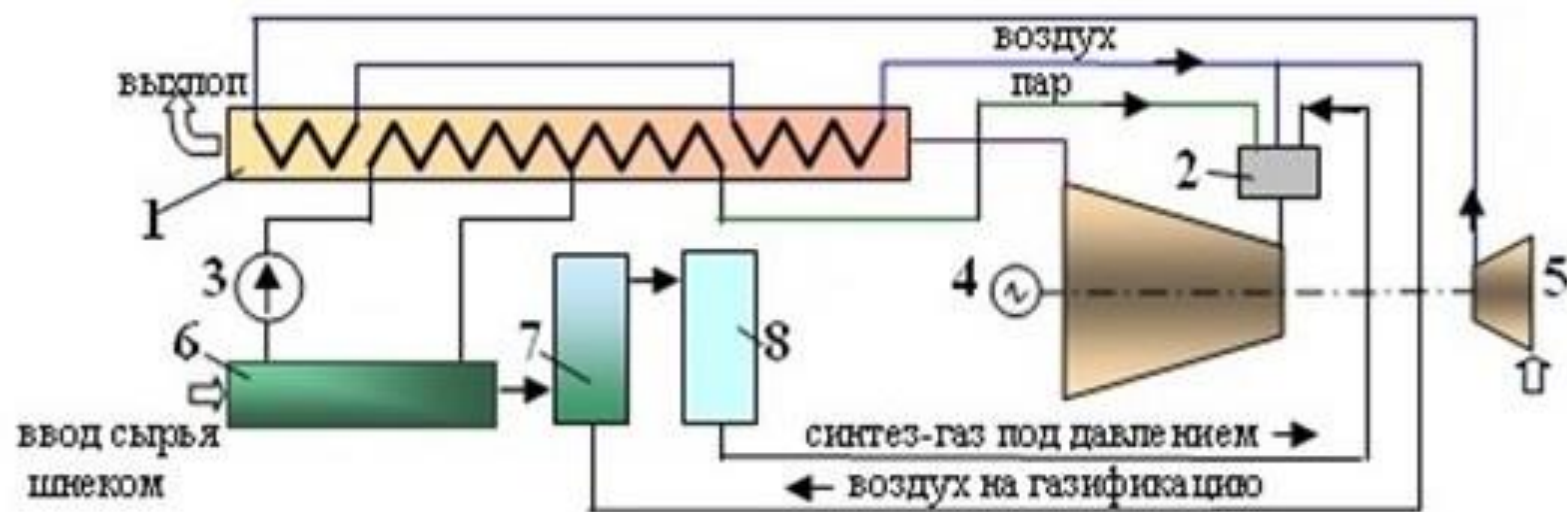
**$GO_2/G_T$** - расход кислорода на 1 кг/с сухого топлива

□  **$N_{вых}/N_{вх}$**  □ - к.п.д. газификатора

**$NO_2/N_{вх}$** – отношение мощности кислородной установки к тепловой мощности



## ПАРОВАЯ УСТАНОВКА НА ПРОДУКТАХ ГАЗИФИКАЦИИ ВЛАЖНЫХ ТОПЛИВ



designations

1. The heat exchanger at the outlet of the gas turbine
2. The apparatus for controlling the parameters of input media into the turbine
3. Circulator superheated steam in the drying device
4. The turbine with the steam ejection (and electric generator)
5. Air compressor for gasification and combustion
6. Dryer with superheated steam under pressure
7. The gasifier of dispersed fuel in the stream
8. The dust cleaning and heat recovering