

General characteristics

Investment size*	15 millions EUR
Internal rate of return IRR	43%
Investment return	1.8 -1.9 years
Usage fields:	Ecological energetic Coal processing Thermal energy production

* - investment size depends on necessary production volume.

Short description of business project

Cheap thermal energy production is based on complex coal processing technology **TERMOKOKS** into high value products realization of which covers it's production.

Coal and air are only raw materials that are needed to produce middle temperature coke and combustible gas that doesn't contain tar and other poisonous substances. Technology is tested in life and is easy to use, safe and wasteless.

Middle temperature coke is demanded (deficit) and ecological fuel for communal usage, metallurgy and other technologies. Price of such product in European markets (Germany, England, Norway and etc.) is 150 – 200 EUR/t with current initial coal price 50 – 70 EUR/t.

Combustible gas can be effectively used in power industry to produce thermal or electric energy, price of which is also high and is used in other industry that require gas burning.

Reduction of thermal energy cost is accomplished by supplying expensive and demanded middle temperature coke to domestic market.

Technology **TERMOKOKS** is easily expandable that allows to establish production step by step or locate smaller capacity productions close to users of thermal energy. This technology has simplicity of machinery and flexibility of production technology that allows to process different types of coal.

Figures of energo-technical park

Table.1. shows the figures of energo-technical park that can be obtained exercising this project.

Table. 1. Energo-technical figures

Coal, D brand D	207 thousands t/year or 24.7 t/hour
Coke	100 thousands t/year or 11.9 t/hour
Gas ($Q_H^p = 2,5 \text{ MJ/m}^3$)	52.5 thousands m^3/hour
Thermal energy	143 GJ/hour

Ecological safety

Emission to 1 GJ is considerably lower than burning gas or 25 times lower than with traditional methods of coal processing with two times higher tariff than technology **TERMOKOKS**.

When using technology **TERMOKOKS** for replacing existing production, impressive advantage is reduction of carbon dioxide emission. This allows rational usage of pollution quota.

Emission comparison of different technologies

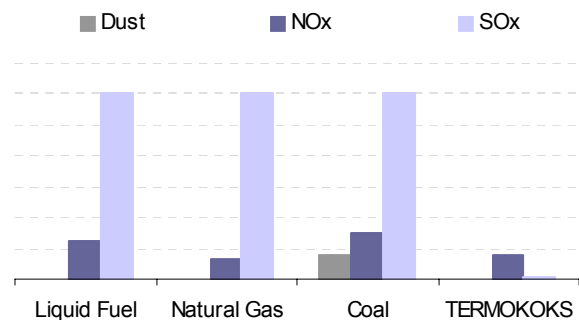


Table. 2. Emission concentration in exhaust smoke

Technology	Concentration, mg/m^3		
	Hard parts	NO _x	SO _x
Liquid fuel	No standard	250	1200
Natural gas	No standard	125	1200
Coal	150	300	1200
TERMOKOKS	< 5	150	10

Standards for devices up to 250 MW

Technology usage Perspective

In XXI century role of coal in energy balance of many countries will grow considerably. That is defined by growing costs of oil and gas extraction, as well as draining these resources in this century. Supplies of coal are much bigger than supplies of carbons. Coal supplies can provide energy until next millennium.

Market share of coal in world energy balance is 30%, in USA – 50%, in China – 70%, in Germany – 55%, in Japan – 20% without domestic output, in Russia only 18% with enormous domestic output. In Latvia market share of coal is very small, in 2004 only 100 thousands ton were consumed with transit reaching 18 million tons.

This kind of disproportion was made in 60-ies when cheap natural gas extraction began. Supplies of natural gas were overvalued. Almost all countries of eastern block of Soviet Union became dependent on gas supply.

Technology **TERMOKOKS** allows diversifying thermal energy resources and avoiding dependence on one source of energy.

Basic technical and economic figures

There are possible different variations to organize the complex energotechnology depending on utilization type of side gas:

- Burning gas in boiler for water heating;
- Burning gas in boiler with directing steam to turbine;
- Burning gas in gas turbine with directing smoke gas to boiler and directing steam to steam turbine.

Gas utilization in thermal boiler is used in these calculations.

Table. 3. Technical and economic figures

Parameters	Quantity
Production	
Thermal energy capacity (including heat of main production) GJ/h (MW)	157 (43)
Production of thermal energy, thousands GJ/year	1320
Production of coke, thousands ton/year	100
Capital expenses	
Facilities for coal processing and coke production, millions EUR	11
Facilities for gas utilization (gas boiler), millions EUR	4
Total capital expenses, millions EUR	15
Exploitation expenses	
Coal (55 EUR/t), millions EUR/year	11
Amortization of equipment and administration expenses, millions EUR/year	2.62
Total exploitation expenses, millions EUR/year	13.62
Sales	
Coke sales (180 EUR/ton), millions EUR /year	18
Thermal energy sales (20 EUR/MWh), millions EUR/year	5.44
Total sales, millions EUR/year	23.44
Yearly income	
Before taxes, millions EUR/year	9.818
After taxes, millions EUR/year	8.345
Investment return (without discounting), years	1.8

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