Regional/national forecast of the prices of different fuels.

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On the basis of representations about properties of dual estimations of optimal solution for the task of energy demand/supply balance for regions of the European part of Russia and Western Siberia the forecast of the marginal costs for natural gas, oil and coal is given. The only factor defining this system is price of barrel of petroleum in the centre of Europe. Main results of accounts are shown.

INTRODUCTION.

In conditions of acute shortage of the financial investments, as never, it is important to know, which directions of development of economy expediently to prefer.

In this connection, the reasonable forecast of the marginal costs for fuel, can play a key role in searches of the answer on this question.

If to address to experience of accounts of optimal fuel and energy balance of former USSR, it is possible to mark, that main result were metrics of production fuel and electric power transmission in various regions of the country and allocation different on quality fuel between various categories of the consumers. Alongside with it the system of metrics of marginal costs of on fuel was obtained, the value of which was gradually realised not only in scientific, but in planning bodies [1]. Eventually these metrics were recommended for wide use in practice of design and forecasting of economic development.

Common representations about a level of calculated metrics and their parities in different regions of the country gives tab. 1.

Table 1

Marginal costs of fuel in Russia for middle 80's years
(Rouble/T.C.F. In the prices 1970)**

			Sort of fuel			
Regions	Sort of marginal fuel (coal), regions balance fuel	Sort of marginal installation	Natural gas	Fuel oil	Black coal (non sorted)	Brown coal
Northwest (St.Petersburg)	Kuznetskiy	Steam power station (SPS)	22-24	21-23	19-22	
Centre (Moscow)	Kuznetskiy	SPS	22-24	21-24	19-21	
Povolzie (Samara)	Kuznetskiy	SPS	20-22	19-21	17-19	
Ural (Ekaterin-burg)	Kuznetskiy	SPS	18-20	17-19	14-16	
West Siberia (Novosibirsk)	Kuznetskiy	Boilers	14-17	13-16	9-12	
East Siberia (Krasnoyarsk)	Kansko-achinskiy	Boilers		13-16	9-11	6-8
Far East (Habarovsk)	Haronskiy	Boilers	17-20	16-18	12-14	2,5-3,3

* For local brown coal marginal costs on 4-6 rouble/t.c.f. below, than for black stone in this region.
** Rouble/T.C.F. - Rouble/ Ton of conditional fuel (7000 kcal/kg).

At an estimation of metrics, brought in tab. 1, it is necessary to take into account existing then a common low level of expenses on fuel, defined by the low salary in the country as a whole, low cost of the equipment and etc.. It is necessary to mark, what to develop a detailed fuel-power balance model of the USSR in the second half of 60's it was possible only under condition of its closure: the external links were considered as hardly given. Any attempts of optimisation of foreign trade links on import and export of energy resources was not made: between the internal and external market existed as though to disappear and only on separate rather weak "bridges" possible link came true, i.e. streams of fuel (mainly, streams of

petroleum and gas) were taken into account on-line assigned by central - planning bodies. Between economic metrics of the internal and external market of fuel any market interrelations did not in general admit.

In such conditions, isolated analysis of fuel-power balance (FPB) marginal costs differed by the following properties [2,3]:

1. The common level of marginal costs on fuel was determined by so-called marginal fuel of the country.

During realisation of these accounts as marginal fuel of the country on a perspective appeared the coals of Kuznetsk and Donetsk basins.

We shall mark, that the size of production of kuznetsk and donetsk coals was not dominating in FPB of the country: on a share donetsk coals it was about 3 % (and in production of the electric power -1.3 %), and on a share êóçíåöêèõ - only 10 % (4,4 %) from common consumption of fuel resources.

2. On the recommended optimal directions of fuel transportation the marginal costs increase precisely on the value of expenditures on transportation of appropriate sort of fuel or energy.

Above named accounts have allowed to construct the noncontradictory system of marginal costs of coal and gas:

À) An estimation of coal increased on direction Siberia - Centre and Donetsk - Centre;

B) An estimation of natural gas increased on directions Siberia - Centre and the Central Asia - European Centre of Russia (in that time sizes of transmission of gas to European regions of the country from Central Asia were comparable to its transmission there from Siberia).

The analysis of the scheme of creation of fuel estimates has revealed also number of the important rules. One of them is the following principle: at prevalence of deliveries of fuel from one region in to other regions the estimations are equal to a sum of direct expenses in the region - supplier plus of an expense on transport of fuel (principle - suitable for any product).

3. The difference in estimations for fuels of different quality determined by a difference in expenses of it burning on marginal (on efficiency of use) installation.

The kind of "marginal on efficiency installation" can essentially vary depending on saturation of fuel - power balance by qualitative sorts of fuel. So, for example, in former USSR natural gas in the beginning used for preparation of food (in capital); then it has found application in technological processes chemistry and iron and steel industry, and only then has become to be used in industrial and home boilers, on power stations and, at last, on condensation steam - power plants. Accordingly varied and type of marginal installation. With change of marginal installations in accordance with saturation of fuel - power balance of the country by natural gas the estimations of qualitative fuel decreased.

The scheme of creation of marginal costs of fuel in European part of Russia (Fig. 1).

For obtaining estimations of marginal costs of fuel outside Russia (for example, for the countries of Europe), one should think, it is necessary from a model of the separate country to proceed to a model of fuel - power balance (FPB) of continent. However the wide intercontinental interrelations between the suppliers and consumers of fuel require the simultaneous analysis of a situation in the world as a whole.

This task until now can not be solved with accuracy, sufficient for obtaining of detailed and reliable estimations of costs of fuel: for many countries and the regions while are not present the authentic forecasts of production, expenses on transport and use of fuel, possibilities of saving of energy, reasonable data on a comparable money estimation of expenses and results in the compared countries and etc..

In such conditions for the forecast of the prices for fuel a combination of the forecasts of the prices on separate sorts of fuel (energy), executed by various organisations, and representations about properties of the prices, following from experience of optimisation of energy balance is hereinafter used.

Key value have: a way of definition of a common level of expenses on fuel; distinction in the prices of fuel of different quality ; interregional distinctions in estimations of fuel.

From positions set in the article of the task centuries executed about a quarter back the accounts have a number of essential disadvantages:

1. FPB of former USSR was not considered as an organic part of world power balance with a choice of optimal specialisation of the country.

2. There were given too little attention to ecological consequences of using of different fuel, first of all - losses from burning of high - sulphur high - ashes fuel.

3. Non sufficient attention was done to analysis of distinctions in expenses of burning of high quality sorts of fuel, such as oil and natural gas, which have the rather distinguished characteristics on sulphur, viscosity, and - completely different location and scales of concentration of consumption.

The object of optimisation was only supply part of balance, i.e. only " supply-oriented models " was used. To possible lowering of energy demand (with a rise in prices) sufficient attention was not given.

If to consider that FPB of Russia is an organic part FPB of the world, then becomes clear that Donetsk and Kuznetsk coals cannot compensate oscillations the demand of fuel in such comprehensive system: scales of production of these coals and possible variation in demand of energy are simply non-comparable.

The analysis of production and consumption of energy resources in the world (table.2) demonstrates a deciding role of fuel oil, alongside with coal, in consumption of energy resources. Two energy crises of 70's have shown, that any other sorts of fuel could not replace fuel - oil even under the sharply increasing prices.

Table 2

Role of separate sorts of resources in a energy balance of the world.
(Without production and consumption of light petroleum), million t.c.f. [4].

Sorts of fuel	Years		
	1985	2000	2020
All Including	10300(100%)	14000(100%)	18400(100%)
Fuel oil	4000(38.8%)	4600(32.9%)	3900(21.2%)
Natural gas	2100(20.4%)	3000(21.4%)	3500(19.0%)
Coal stone	3000(29.1%)	4200(30%)	6100(33.2%)
Coal brown			
Atomic power stations	500(4.9%)	1200(8.6%)	2500(13.6%)
Hydropower and non - traditional Sources of energy	700(6.8%)	1000(7.1%)	2400(13.0%)

The largest region - the consumer of petroleum and nearest to central regions of Russia is Europe. A role of fuel - oil in Europe it is much more, than in the world as a whole. Fuel - oil at the moment in Europe is consumed in two times more than natural gas [5, s.39-42].

Cost of petroleum in centre of Europe (for example, in Berlin) and can be accepted as stone - mark at definition of marginal costs on fuel in Russia on a perspective. Thus, one of the central tasks consists in the forecast of the prices for petroleum in the Central Europe. We shall for this purpose consider at first appropriate account metrics in the last years.

It is known, as after two petroleum crises of 70's, and high prices of the middle of 80's, there was the common lowering of the prices on petroleum and natural gas (table 3)

Table 3

Parity of the prices on petroleum (fuel oil) and natural gas in Europe. [$/t.c.f.]

Years	Petroleum	Natural gas	Parity(ratio) natural gas/petroleum
1985	133	105.5	0.8
1986	70.9	102.3	1.4
1987	87.2	69.9	0.8
1988	72.7	61.8	0.85
1989	86.8	54.1	0.6
1990	110.3	77.3	0.7
1991	97	89	0.9
1992	91.1	76.1	0.8

1993	80.4	70.2	0.9
the average			0.8

Thus, the ratio of the prices on the average for considered period has made the value 0.8. The tendency to lowering cost of petroleum in Europe was observed and in 90's, and it concerned as to Arabian petroleum, and to petroleum of Northern sea and to petroleum, delivered from USA (tab. 4).

Dynamics of the prices on petroleum, extracted in the various countries, is represented in tab. 4.

Table 4.

Dynamics of annual price level on petroleum in Europe in 90's ($/barrel) [7]

	Regions of production			
Years	Dubai	Northern sea	Nigeria	West Texas
1990	20.5	23.8	24.3	24.5
1991	16.6	20.0	20.5	21.5
1992	17.2	19.4	20.0	20.6
1993	14.9	17.1	17.6	18.4
1994	14.8	16.0	16.2	17.2
1995	16.1	17.2	17.3	18.4

Defined parity between the prices for petroleum and natural gas was simultaneously maintained. So in 1995ã. the average price for imported petroleum has made 88,6 $/t.c.f., and on natural gas 76.9 $/t.c.f. and parity between them has made 0.87, i.e. defined tendency to alignment of the prices on petroleum and natural gas is observed.

At the forecast of the prices for petroleum on a perspective the following reasons were taken into account:

1) at the moment (middle of 1997) in connection with international embargo in the world market is away Iranian petroleum (potential - approximately 150-200 million t. in a year) . That is why it is possible to expect the tendency to stabilisation of the price on petroleum on a low level (20 $/bar. in 2010 and 26 $/bar. in 2020) [8];

2) on a farther perspective (till 2020) it is difficult to expect opening powerful deposits of cheap petroleum, comparable on the metrics to modern deposits of the Near East. More naturally to await a little bit lower profitability of production; apparently, and growth of the cost of petroleum transportation in connection with increase of " ecological part ", i.e. insurance of tankers in connection with failures with tankers will increase. Thus, it is possible to expect, that in the long term the tendency of a weak rise in prices on petroleum will take place.

Using formulated above approach, it is possible to accept for the years on 2010-2015 as a starting point the price of petroleum in Central Europe on an average level 23 $/áàð. (118.5 $ /t.c.f.).

Essentially, to the same output the experts of an International power commission (IEW) [15] have come. The forecasts, which were consistently done by the experts of this commission with 1981 till 1997, monotonously reduced a price level on petroleum with 50-90 $/barrel. Up to 20-23 $/bar (see fig. 2).

The price level on natural gas in Europe at the moment changes rather a little (tab.5), and only closeness of Spain to Algeria predetermined lowering of the prices on gas in this country.

Table 5

The price for gas on the boundaries of the countries - importers, 1995.
$/1000 m3 [10]

	The exporters					
	Russia	The Netherlands	Norway	Algeria	Libya	The average price
Belgium		93	86.4	85.4		88.4

France	89	93.2	87.4	88.7		89.7
Germany	87.4	92.6	87.7			89.4
Italy	85.8	93.3		87.4		88.7
The Netherlands			88			88.0
Spain			91.6	80.6	87.1	86.4
Great Britain			89.7			89.7
Average price of exported gas						88.4

At forecasting the price for gas on a perspective two approaches are possible:

1. Saving a constant parity of the prices on petroleum and the gas, which developed by years and which, certainly, tends to stability in connection with huge sizes of existing consumption of these sorts of fuel.

2. Orientation to metrics of direct expenses on production and transport of fuel of the possible new suppliers of gas in Europe.

If to recognise that the price for petroleum will on the average rise with 16 $/bar. up to 23$/bar., accordingly, it is possible to expect, that average cost of natural gas will increase with 88 up to 116 $/1000ì3.

Some representations about the potential suppliers of natural gas on the European market and their expenses give data tab. 6.

Table 6

The additional potential exporters of natural gas in Europe in an intermediate term perspective (till 2015)

The exporters	Sizes billion m^3	Approximate expenses on boundary, $/1000ì3	Region of delivery
Algeria through Tunis	11	48.5	Spain
Algeria through Maroc	15	48.5	Spain
Libya	14	48.5	Italy
Algeria (liquid)	7	75	Italy
Libya (liquid)	8	75	Italy
Norway	30	80	Norway
Iran - (liquid)	10	100	---
Iraq- through Turkey	5	100	---
Qatar- (liquid)	6	100	---
Russia through Belarussia	50	118	Germany
Iraq -ÑÏÃ through Syria	5	118	Germany
Nigeria - (liquid)	8	104	Italy
Iran through Kavkaz, Ukraine	20	131	Germany
Iran - through Turkey	10	143	Italy
Qatar - (liquid) through Egypt	10	116.5	---
Turkmenia - through Iran, Turkey	10	122	Germany
Qatar - through Sowing. Africa	15	116.2	Italy
Qatar through Turkey	10	164.5	Italy
In total:	244		

[9, ñ.65,16, ñ.150]

In the Tab. 6 is the most interesting, perhaps, following: it visually shows, that of cheap gas (less than 75 $/1000 m3) from Algeria, Libya and Norway can be put only about 20 % of a common possible(probable) potential gain of deliveries and yet 20 % - with expenses up to 100 $/1000 m3. At the same time 60 % of a gains are connected to average expenses at a level from 100 up to 160 $/1000m3.

Proceeding from above - mentioned, it is possible to count, that at the accepted price per barrel of petroleum in Europe (23 $/barrel) and parity of the prices on petroleum and gas (0.8), price for natural gas in Germany on a perspective 2010- 2015 can reach about 116 $/1000m3.

If to recognise that a minimum error of the forecast makes about 10 %, is minimum and greatest possible prices for natural gas in the examined script can make from 106 up to 126 $/1000m3.

The forecast of the marginal costs for natural gas in Russia.

Fixing the marginal costs on natural gas in centre of Europe allows to proceed to definition prognosis of the prices for this sort of fuel in main regions of Russia.

1. A starting point for return account is centre of Europe (conditionally Berlin).
2. On territory of the whole European part of Russia, Western and East Siberia prices for gas will in the long term be determined by the marginal costs for gas of northern regions of Western Siberia.
3. The Transbaikal and Far East will not be connected to the system of allocation of Siberian gas.

Cost of delivery of gas outside Russia takes into account payment of transit on territory Belorussia and Poland.

Tariffs for transportation of gas on territory of Russia corrected in view of change of expenses on a structure and maintenance of gas pipelines depending on local conditions.

In this connection the following regions of construction are selected:

1. Regions of the extreme north of Western Siberia, where cost of delivery on an estimation of the experts makes about 2.8 $/1000 m3/100 km.
2. Ural (cost of delivery 2.1 $/1000m3/100 km).
3. Central regions of a European part of Russia (1.4 $/1000m3/100 km)
4. Regions of European Centre, Northern Caucasis (1.1 $/1000m3/ 100 km).

Main directions of delivery gas are accepted following:

A) an operating export gas pipeline: a deposit Urengoi - Punga - Uhta - Griazovets (with line on Cherepovets) - Torgiok (with deriving on St.-Petersburg and Moscow) - Smolensk - Belorussia - Poland - Germany (reaper - point Berlin));

B) so-called "a southern course " : from the north of Tumen reg.-Punga - Cheliabinsk - Ekaterinburg;

C) Ural - Povolzie: Cheliabinsk - Saratov;

D) Centre of Chernozem region - northern Caucasis: Torziok - Moscow - Voronezh - Stavropol.

Proceeding from the perspective price accepted for Germany for gas in 116 $/1000m3, the revers counting defined the marginal costs for gas on territory of Russia (from western boundaries up to Siberia). The results of accounts are represented in table 7.

Table 7

The forecast of the marginal costs for natural gas in various regions of Russia.

POINTS	Distance, km	Marginal costs, $/ 1000 m3			Marginal costs, $/ t. c.f..		
The name Items	Distance, km	max. Level	middle level	min level	max. level	middle level	min level
Boundary Belarus-Russia	**1240**	**104**	**94**	**84**	**91**	**82**	**73**
North of Europe Parts							
Cherepovets	**2348**	**93**	**83**	**73**	**82**	**73**	**64**
Northwest							
Sankt-Petersburg	**2049**	**106**	**96**	**86**	**93**	**84**	**75**
Centre							
Smolensk	**1290**	**103**	**93**	**83**	**90**	**81**	**72**
Torjok	**1565**	**99**	**89**	**79**	**87**	**78**	**69**
Moscow	**1765**	**102**	**92**	**82**	**89**	**80**	**71**
Griazovets	**2184**	**91**	**81**	**71**	**80**	**71**	**62**
Punga	**3694**	**59**	**49**	**39**	**52**	**43**	**34**
North of Tiumen region							

Urengoyskoe	**4200**	**45**	**35**	**25**	**40**	**31**	**22**
Centre of Chernozemie, Povolzie and North Kavkaz							
Voronej	**2253**	**107**	**97**	**87**	**94**	**85**	**76**
Stavropol	**3030**	**116**	**106**	**96**	**101**	**92**	**83**
Saratov (from the North of Tiumen)	**2800**	**104**	**94**	**84**	**91**	**82**	**73**
Ural							
Ekaterinburg (from the North of Tiumen)	**1500**	**81**	**71**	**61**	**71**	**62**	**53**
Cheliabinsk (from the North of Tiumen)	**1300**	**77**	**67**	**57**	**68**	**59**	**50**

Calculation " by reverse counting " metrics of the marginal costs down to northern regions of Tyumen area allow to determine a level of profitability of production of gas in regions with the most severe natural conditions.

On data the projects of development of separate deposits a level of expenses on production makes:

For Nadym - Pur - Taz region 12-12.5 $/1000m3

For Yamal region 26.5 $/1000m3

Thus, even in the most deleted regions of a peninsula Yamal the production of gas is economically justified, since in "average" variant it makes 35 $/1000m3, and in "minimum" - 25 $/1000m3. In the latter case the value of the rent on production becomes negative.

As it is visible from table 7 a common price level on gas on a perspective will much increase and by 2015 will make in a European part of Russia 90-106 $/1000m3. Thus, it is possible to expect convergence of price levels within the limits of Russia with a world price level on natural gas.

The forecast of the marginal costs for coal.

For definition of the marginal costs on black coal are possible two mutually complementary approaches:

1.The marginal costs for coal in any region of Russia should be lower than the prices for natural gas on the level of additional expenses, connected with it burning on marginal (by efficiency) installations i.e. usually on steam power stations.

2.In some regions the price for black coal can be defined (the same as and on gas) with the help " of return counting ", i.e. on a chain Southern Europe (Italy) -Novorossiysk - Kemerovo or on a chain Northern Europe (Germany) - Sankt - Peterburg - Kemerovo (hypothetical variants).

Thus " a southern course " allows to determine the marginal costs for black coal in a southern zone of the country, and " northern course " allows to determine these values in northern and central regions of a European part of Russia and Ural.

At last, value of the marginal costs on coal it is possible to receive and on a chain: the largest deposit, dominating in the considered regional market coal an arbitrary point in radius of an economic efficiency of sales of this fuel. It is natural, that in an initial point of counting the rent on coal production should be accepted equal to zero.

It is deserves to be marked, that the first way based on an expenses on powerful streams of fuel), on our sight, gives a steadier estimation of the marginal costs on coal, since transportation of Russian coal through southern (for example, Navorossiysk) and northern (St.-Petersburg) ports, is faster theoretical, than practical possibility.

If the calculated thus marginal costs will be higher than the prices for coal on the first variant of accounts (on the basis of gas), they should be eliminated from further consideration.

If to accept, as well as earlier, for the source price of petroleum 23 $/bar. and to take into account, that additional expenses on steam power stations in transition from fuel oil to black coal make 12-13 $/t.c.f., the price for qualitative stone coal will make [11]: à) on coast of Germany 85$/t.c.f., b) on coast of Italy 89$/t.c.f.

In view of cargo handling operations the marginal - acceptable price for qualitative stone coal will make [12]: à) in region of St.-Petersburg 83$/t.c.f. b) In Novorossiysk region 85$/t.c.f.

The accounts on transportation kuznetsk coal are executed under condition of 50 % of the discount of the operating tariff. It is obvious, that at definition of expenses on production and transport of coal from accounts all sorts of the grants and the cross sponsorship (for example, for the benefit of passenger transport) should be eliminated.

The accounts spent on the basis of this approach are represented in table 8.

Table 8

The limiting - acceptable prices for qualitative coal, ($/t.c.f.)

Regions(Items)	Distance, km	Methods account based			
	from St.-Petersburg and Novorossiysk	On the marginal costs for gas	On a southern exit of coal in Europe	On northern exit of coal in Europe	Under the zero rent in Kuzbass
1.Northwest (St.-Petersburg)	**0**	**72**		**83**	**62**
2. North					
Cherepovets	**472**	**70**		**81**	**59**
4.Central - Moscow	**775**	**68**		**79**	**60**
8.Ural Northern (Ekaterinburg) Southern(Cheliabinsk)	 **2600** **2850**	 **50** **47**		 **70** **69**	 **48** **50**
Kemerovo	**4420**			**61**	**36**
Novorossiysk	**0**				
5.Central region of Chernozemie(Voronez)	**1018**	**73**	**80**		
6.Lower Povolzie(Saratov)	**1149**	**70**	**79**		
7.Northern Kavkaz (Stavropol)	**409**	**84**	**83**		

As it is visible from table 8 qualitative black coal at an average wholesale price of producer 36$/t. c.f. (average calorific value coefficient for Kuznetsk pool is accepted 0.76 and railroad tariff reduced on 50 %), is more effective then natural gas on power stations of Siberia and Southern Ural.

In Some southern regions of a European part of Russia use of Kuznetsk coal is effective. In northern regions of a European part the Kuznetsk coal are more effective, than coal from Inta - region, but have a very short odds in comparison with natural gas. However, even at small growth of the tariff for rail transportation's in comparison with designed, this stock " of economic efficiency " disappears.

Domestic coals have rather low qualitative characteristics. So, for example, at rather low natural content of ashes in Kuznetsk and Rostov coals the consumers receive at the moment coals from these two pools with ash - content about 20 %. In this connection the additional expenses on burning of Kuznetsk and Rostov coals in comparison with low - ashes coals can be assisted in 2-3 $/ t.c.f.

The essentially large expenses are connected with burning of sulphur - reach fuel (content of sulphur, for example, in podmoskovny - coal reaches several percents). The expenses on cleaning from sulphur can be appreciated at a rate of 2-3 $/t.c.f. for each percent of a content of sulphur.

At last, the major value has damage, put burning of poor-quality fuel to an environment.

In table 9 data about content of sulphur of fuel and average specific damage to an environment are shown.

Table. 9.

Specific damage from emission of sulphur. [13,14]

Sort of fuel	Ñåðíèñòîñòü ,in %	Average specific damage, thousand rub/t
Coal		

1.Cheremhovskiy	1.1	2.4
2.Kuznetskiy	0.4	0.9
3.Azeyskiy	0.4	0.9
4.Nazarovskiy	0.4	0.9
5.Irsha-Borodinskiy	0.2	0.4
6.Podmoskovniy	3.0(cond.)	7.0
Ñåðíèñòûé black oil	2.0	4.7

Thus, marginal costs on bad quality coal can differ from brought in table 9 on a few tens of thousands of roubles for 1 t.c.f. (it concerns first of all to such coals, as podmoscovnie).

The forecast of the perspective prices on fuel oil.

The marginal costs of fuel oil can be achieved by analogy to natural gas. For a point of counting the prices on fuel oil in Europe were accepted: in centre of western Europe in Berlin, on northern coast of Europe - is conditional Kiel, on southern shore of Europe is conditional Genoa (Italy).

In Berlin feed of petroleum is provided by pipe line. In ports of southern and northern Europe at first pipe line feed of fuel oil, and then tankers up to ports of Russia (Novorossiysk and St.-Petersburg) and further on large pipelines.

For definition of expenses on pipe line transportation of petroleum the following assumption was used: cost of transport 1 t.c.f. of petroleum on the pipeline of corresponded diameter is about 3 times lower, than cost of transport 1 t.c.f. of gas.

Accounts have shown, that under accepted conditions the price on fuel oil in considered regions of a European part of Russia will make the value from 90 up to 100 $/t.c.f. (Table 10)

Table 10

Estimation of the price on fuel oil in various regions of Russia, $/t.c.f.

Item of delivery	Path: "Direct" oil pipeline
Smolensk	98
Moscow	96
St.-Petersburg	97
Voronez	95
Cherepovets	90
Samara	93
Saratov	94
Stavropol	97
Ekaterinburg	93
Cheliabinsk	92

Thus " return counting " of the limiting prices on " to northern and southern course " has not given any new information, since in both cases oil pipe lines provide the prices.

Transbaikal region and Far East.

I was above shown, that for an estimation of the forecast of the prices on fuel in Russia it is necessary to consider interregional exchange by fuel in region, surrounding: Near East, Northern Africa, Europe, Siberia.

These main streams are:

1. Streams of Arabian petroleum in Europe.
2. Streams of natural gas and petroleum from periphery regions to central regions of Europe.
3. Powerful streams of gas from Western Siberia in Europe.
4. Streams of coal from Siberia in a European part of Russia.

At the accepted scheme of the analysis such regions, as East Siberia, Transbaikal, Far East were not examined. They enter the system interconnected on fuel and energy with regions of pacific zone. Main streams of fuel in them, probably, will be:

1. Powerful stream of petroleum from the countries of Persian gulf.
2. Streams of liquid fuel from natural gas (LG).
3. Stream cheap Australian coals.
4. Export of coal from China.

In Russia the "price constructing" streams of petroleum from Siberia on Far East can rather conditionally be considered alongside with kuznetsk coal from kuzbass up to Pacific coast (these streams of fuel are rather insignificant).

In the nearest perspective such " price constructing" value could be received by powerful gas pipeline planned to construction from Irkutsk area (Cavictinskiy deposit) - China and from Irkutsk area - into direction of Japan.

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Generalising experience of realisation of described above accounts it is possible to formulate basic elements of the methodology of the offered approach:

1. The marginal costs for coal and gas are defined by a common level of the world prices on energy, which, first of all depends on the prices for petroleum. Therefore, basically, our internal energy market is not in future insured from influence of such "explosions" in the world market of energy, which took place in 1973-1974 and 1977-1978 years. «World price» of energy is represented by cost of barrel of crude oil in the Center of Europe (defined, mainly, by price of Arab oil).

2. For a European part of Russia as region of interface of internal and external streams of fuel Central Europe (conditionally Berlin) can be recognised. Just this region can become source for definition of the marginal costs on fuel in a European part of Russia and in Western Siberia.

3. Return (from Berlin) counting of cost of transport of natural gas allows to define the marginal costs for gas on boundary with Poland, in Minsk, Smolensk, Moscow and further on all points of the operating gas network of Russia on the basis of knowledge of rational directions of gas transportation in a considered perspective.

4. Knowing the value of the marginal costs on gas in various regions of the country, it is easy to calculate the marginal costs for various sorts of oil prices and coals (on the basis of metrics of burning marginal (by efficiency) installations in view of ecological damage).

5. Above marginal costs for fuel in East Siberia, Transbaikal and on Far East were not analysed. For this purpose it is necessary to consider in interrelated questions of energy supply of the countries Pacific region (China, Japan, Australia and other) and all main streams of energy.
6. The price of Arab oil is a «common chane» in both systems of marginal costs (European and Asian once) and plays decisive role in level of energy formation.

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