MONSTAT

STATISTICAL ENERGY BALANCES

2012-2013

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Content:

1 Introductory notes

The Publication „Statistical Energy balances“ contains annual data about production, import, export, transformation, consumption and distribution of coal, oil products, biomass and electricity in Montenegro, for 2012 and 2013.

In Energy statistics overall energy balance is composed from annual report on production and consumption of electricity, balance of coal production and consumption, balance of export, import and consumption of oil products, and balance of production and consumption of firewood, which covers all manufacturers and all those involved in import and export of all energy commodities. Each energy data are given in the natural unit of measure and in TJ (tera joules).

Methodology for making of energy balances, defining and grouping of energy products, as well as statistical terminology, are harmonized with internationally established standards IEA/OECD and Eurostat.

All energy balances which were created for 2012 to 2013 are regular statistical surveys.

Every suggestion referred from data users will be accepted with pleasure.

2 Methodological explanations

2.1 Data sources

Data necessary for compilation of energy balances are provided from:

a) Regular statistical surveys from the field of energy statistics,
b) Regular statistical surveys of industry, transport, external trade, agriculture and forestry, and households.

2.2 Reporting units of energy statistics

Reporting units for energy balance sheets are companies engaged in the production, transformation, distribution and sale of energy commodities, regarding to appropriate activities in these divisions from Classification of activities NACE Rev.2.

2.3 Content of rows in energy balance sheet

Primary production is a form of energy that has not been converted or transformed (coal, crude oil, natural gas, biomass excluding charcoal, hydro power energy, geothermal energy, wind energy and solar energy).

Recovered products are used to show electricity exchanged by specific contracts with some countries in the region. In international reporting this quantity is treated as an import / export.

Imports and exports cover quantities that crossed the national border.

Stock changes are the difference between stocks at the beginning of the year (initial stocks) and those at the end of the year (final stocks).

Statistical differences are a category that includes the sum of unknown statistical differences between the supply and consumption of selected fuels.

Gross inland energy consumption is calculated as follows:
Primary production
+ Imports
– Exports
+ Stock changes
– Marine bunkers

Transformation - input is the consumption of fuels as raw materials for energy production in thermal power plants, CHP, auto producers, district heating plants, refineries, blast furnace plants, coal transformation and charcoal plants.

Transformation - output covers the production of transformed energy forms such as thermoelectricity, heat, petroleum products, blast furnace gas oxygen steel furnace gas and charcoal.

Exchange and transfers include interproduct transfer (distillates), products transferred (hydro energy) and recycled products (naphtha, fuel oil and lubricants).

Own consumption in energy sector covers the energy used for energy sector running.

Distribution losses cover losses occurred:

- for electricity: during transmission and distribution;
- for solid fuels: during transport;
- for liquid fuels: during transport and distribution;
- for fire wood: during transport.

Energy available for final consumption is the energy intended for final consumers.

Final consumption for non-energy purposes covers consumption as raw material for production of non-energy products in technological process.

Final consumption for energy purposes covers final consumption of available energy for energy purposes in:

- industry (iron and steel, non-ferrous metal, chemical industry, non-metal minerals, mining and quarrying, food, drink and tobacco industry, textile, leather and clothing, paper and printing, engineering and other metal industry, other industries),
- transport (rail, road, air, navigation, other),
- households, agriculture and other sectors (total households, included those with employees, agriculture and other consumers, e.g. education, health, administration, etc.).

2.4 Explanations of energy products

Electricity – generated in: hydroelectric power stations, and thermal power plants.

Coal:

- brown coal/lignite – non-agglomeration coal with a GCV less than 20 000 kJ/kg.

***Oil products*:**

- Refinery gas includes a mixture of non-condensable gases mainly consisting of hydrogen, methane, ethane and olefins obtained during distillation of crude oil or treatment of oil products (e.g. cracking) in refineries. This also includes gases which are returned from the petrochemical industry.
- Liquefied Petroleum Gases (LPG) is light paraffinic hydrocarbons derived from the refinery processes, crude oil stabilization and natural gas processing plants. They consist mainly of propane (C3H8) and butane (C4Hl0) or a combination of the two.
- Motor gasoline consists of a mixture of light hydrocarbons distilling between 35°C and 215°C. It is used as a fuel for land based spark ignition engines.
- Kerosene Type Jet Fuel is a distillate used for aviation turbine power units. It has the same distillation characteristics between 150°C and 300°C (generally not above 250°C) and flash point as kerosene.
- Gas/diesel oil is primarily a medium distillate distilling between 180°C and 380°C. Several grades are available depending on:
    - Transport Diesel- on road diesel oil for diesel compression ignition (cars, trucks etc.), usually of low sulphur content, and
    - Heating and other - light heating oil for industrial and commercial uses, marine diesel and diesel used in rail traffic; other gas oil including heavy gas oils which distil between 380°C and 540°C.
- Mazut: heavy fuel oil with sulphur content lower or higher than 1%.
- Other Oil products, like bitumen, petroleum coke, lubricants and other.

Biomass: Covers a multitude of woody materials provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings. briquettes, black liquor etc.)

3 Conversion Equivalents between Units of Energy

Conversion factors for converting energy into various energy units are published in the Manual of Energy Statistics IEA / OECD / Eurostat.

Conversion refers to particular energy unit are shown in Table 1:

Table 1. Conversion factors

	TJ	Gcal	Mtoe	GWh
TJ	1	238.8	2.388 x 10-5	0.2778
Gcal	4.1868 x 10-3	1	10-7	1.163 x 10-3
Mtoe	4.1868 x 104	107	1	11630
GWh	3.6	860	8.6 x 10-5	1

Unit of measure:

TJ – terajoule
Gcal – gigacalorie
Mtoe – milion tones of oil equivalent
GWh – gigawatt - hour

4 Energy balances for 2013

In the gross domestic consumption of energy the largest share takes coal 44.4% (15 399 TJ) of which about 98.6% is spent for producing electricity (15 178 TJ), and the rest for final consumers, for industry and households.

Table 2 shows the energy balance in TJ grouped by energy products.

Table 2. Energy balance for 2013, TJ

	Total energy	Coal	Oil products	Biomass	Electricity
Primary production	**22 885**	15 583	-	7 302	-
Recovered products	**2 196**	-	-	-	2 196
Import	**13 059**	28	12 265	32	734
Stock changes	**-**	-	-	-	-
Export	**- 3 476**	- 212	- 622	- 313	- 2 329
Gross inland energy consumption	**34 664**	**15 399**	**11 643**	**7 021**	**601**
Transformation - input	15 203	15 178	-	25	-
Transformation - output	4 732	-	-	12	4 720
Exchange and transfers	8 906	-	-	-	8 906
Own consumption in energy sector	490	-	-	-	490
Losses	2 239	-	-	-	2 239
Non-energy consumption	**1 246**	**-**	**1 246**	**-**	**-**
Final energy consumption	**29 124**	**221**	**10 397**	**7 008**	**11 498**
Industry	7 508	120	2 211	209	4 968
Transport	7 917	-	7 795	-	122
Households and other sectors	13 699	101	391	6 799	6 408
Statistical differences	**-**	-	-	-	-

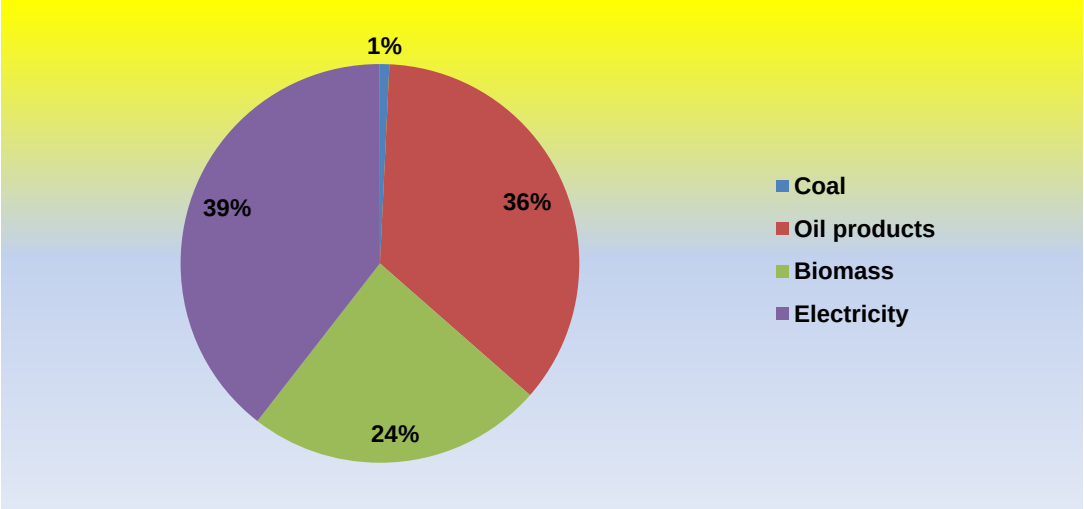
4.1 Available energy for final consumption

Gross inland energy consumption in 2013 is 34 664 TJ which representing a decrease of 11.0% compared to the 2012.

Final energy consumption in 2013 is 29 124 TJ which representing a decrease of 2.2% compared to the 2012.

Final energy consumption mostly consist the consumption of electricity (39%) and consumption of oil products (36%), then energy from biomass (24%) and coal (1%).

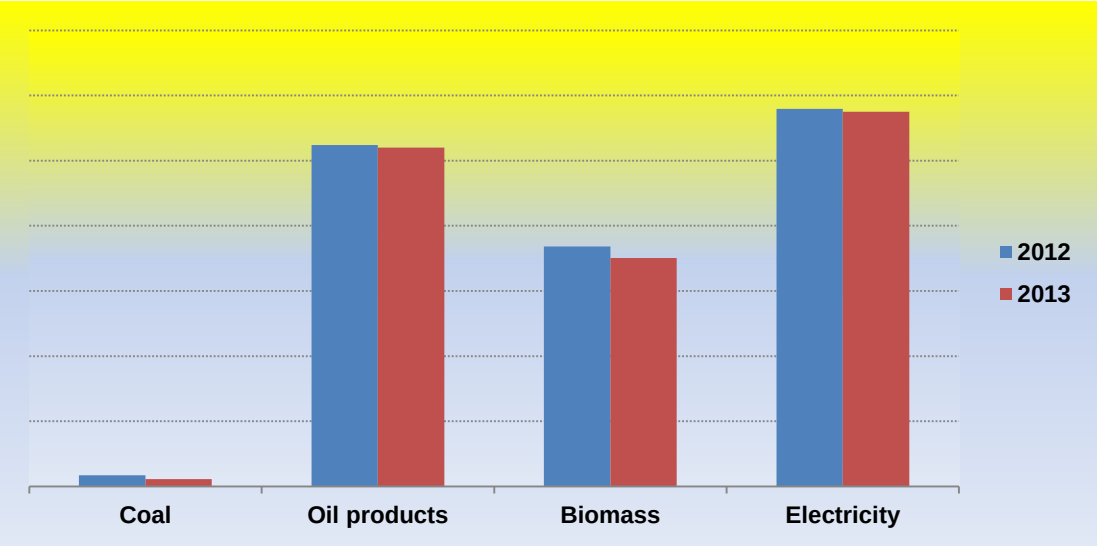
Graph 1. Share of energy sources in final consumption for 2013



4.2 Final energy consumption

The graph below shows the parallel energy consumption of individual groups in the 2012 and 2013 year.

Graph 2. Realized energy consumption for 2012 and 2013, TJ



5 Balance of coal

5.1 Balance of coal

Coal production in 2013 is lower by 5.3%, while the final consumption is lower by 35.2% compared to the 2012.

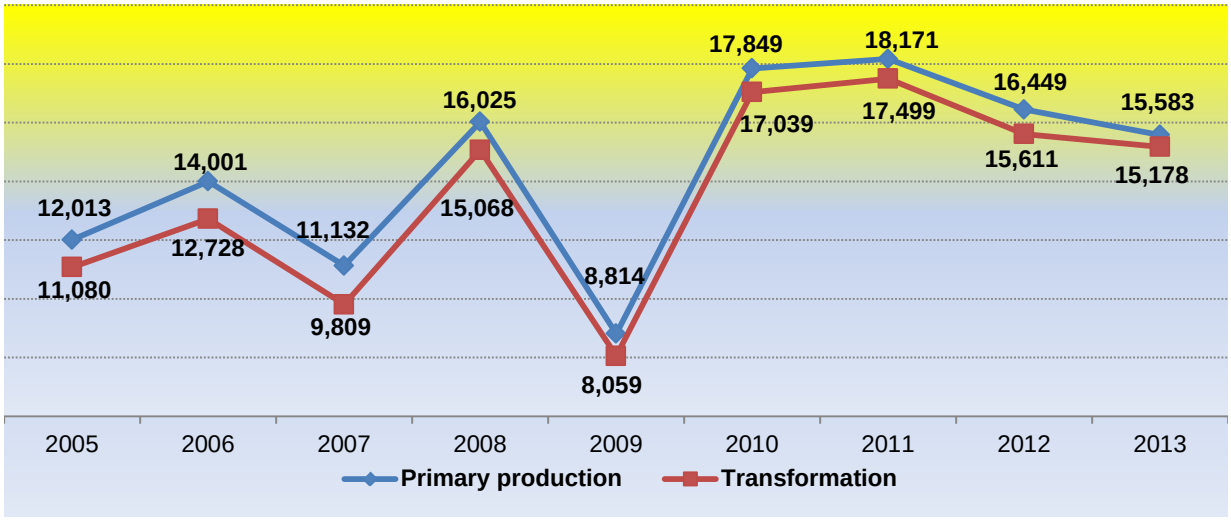
Table 3. Balance of coal for 2013, TJ

	2012	2013
Primary production	16 449	15 583
Recovered products	-	-
Import	9	28
Stock changes	-	-
Export	- 507	- 212
Gross inland energy consumption	**15 952**	**15 399**
Transformation - input	15 611	15 178
Transformation - output	-	-
Consumption of the energy branch	-	-
Final energy consumption	**341**	**221**
Industry	212	120
Transport	-	-
Households and other sectors	129	101
Statistical differences	**-**	**-**

5.1 Production and transformation of coal

Share of consumption of coal in power plants for electricity production shows the trend over the period since 2005 – 2013 ranging between 90% to 98% of the gross domestic consumption. The remaining part is allocated to the final consumption of final consumers and to industries and households.

Graph 3. Production and consumption of coal in transformation sector, TJ



6 Balance of oil products

6.1 Balance of oil products

Gross domestic consumption of oil products for 2013 is lower by 3.6% compared to the 2012.

In the final energy consumption diesel fuel make the highest part with 69.8%, motor gasoline with 13.7%, liquefied petroleum gas by 6.3%, jet fuel with 5.5% and fuel oil with 4.6%. The consumption of other oil product belongs to non-energy consumption, and it was realized in the industry.

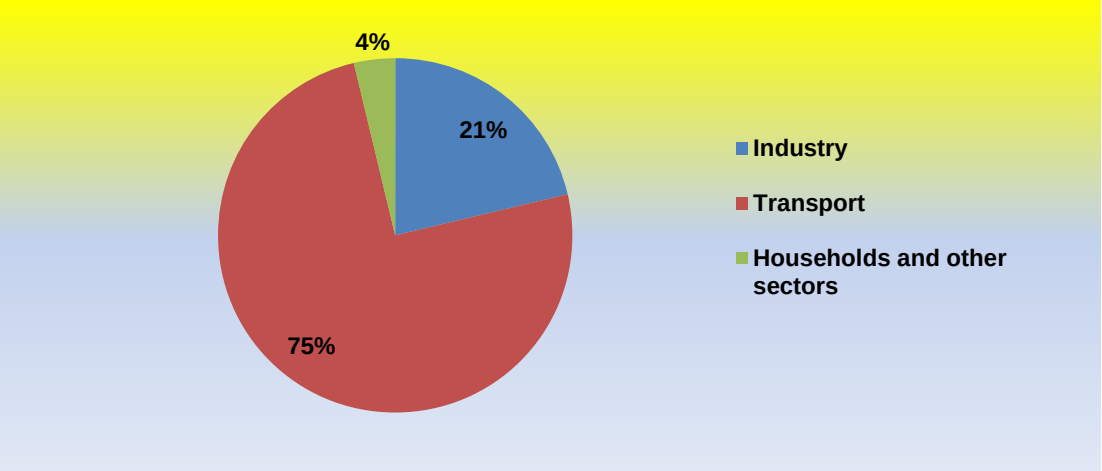
Graph 4. Balance of oil products for 2013, TJ

	Total oil products	LPG	Motor gasoline	Jet fuel	Gas/diesel oil	Fuel oil (mazut)	Other oil products
Primary production	-	-	-	-	-	-	-
Recovered products	-	-	-	-	-	-	-
Import	12 265	656	2 007	571	7 303	482	1 246
Stock changes	-	-	-	-	-	-	-
Export	- 622	-	- 579	-	- 43	-	-
Gross inland energy consumption	**11 643**	**656**	**1 428**	**571**	**7 260**	**482**	**1 246**
Non-energy consumption	**1 246**	**-**	**-**	**-**	**-**	**-**	**1 246**
Final energy consumption	**10 397**	**656**	**1 428**	**571**	**7 260**	**482**	**-**
Industry	2 211	609	-	-	1 240	362	-
Transport	7 795	-	1 383	571	5 721	120	-
Rail	43	-	-	-	43	-	-
Road	6 891	-	1 383	-	5 508	-	-
Air	614	-	-	571	43	-	-
Inland navigations/ships	247	-	-	-	127	120	-
Other transport	-	-	-	-	-	-	-
Households and other sectors	391	47	45	-	299	-	-
Statistical differences	**-**	**-**	**-**	**-**	**-**	**-**	**-**

6.2 Final consumption of oil products

From the total final consumption the highest part is consumed in the transport sector and for transport purposes (75%). Industry participates with 21%, while households and other sector participate with 4% of the total available oil products.

Graph 4. Share of consumption of oil products by sectors



6.3 Balance of oil products for 2012 and 2013

Final consumption of oil products in the 2013 is lower by 0.8% compared to the 2012

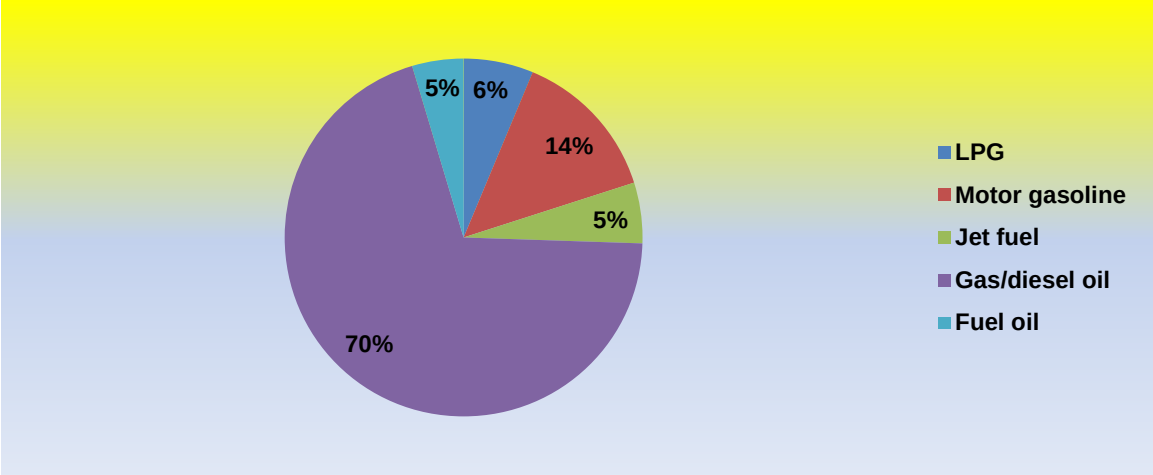
Table 5. Balance of oil products for 2012 and 2013, TJ

	2012	2013
Primary production	-	-
Recovered products	-	-
Import	12 615	12 265
Stock changes	-	-
Export	- 531	- 622
Gross inland energy consumption	**12 084**	**11 643**
Own consumption in energy sector	40	-
Non-energy consumption	**1 567**	**1 246**
Final energy consumption	**10 476**	**10 397**
Industry	1 131	2 211
Transport	9 215	7 795
Rail	-	43
Road	8 350	6 891
Air	570	614
Inland navigations/ships	252	247
Other transport	43	-
Households and other sectors	130	391
Statistical differences	**-**	**-**

6.1 Oil products available for final consumption

The structure of the distribution of the final energy consumption of oil products is shown in the following graph:

Graph 5. Final consumption of oil products



The consumption of oil products was occupied with the largest share of diesel fuel with 70%, followed by motor gasoline with 14% and liquefied petroleum gas with 6%, while jet fuel and fuel oil participate with per 5% of final consumption.

7 Balance of biomass

Balance of biomass refers to balance of production and consumption of fuel wood and its components.

Table 6. Balance of biomass, TJ

	2012	2013
Primary production	7 704	7 302
Import	35	32
Export	- 359	- 313
Gross inland energy consumption	**7 380**	**7 021**
Transformation - input	**28**	**25**
Transformation - output	**13**	**12**
Final energy consumption	**7 365**	**7 008**
Industry	223	209
Transport	-	-
Households and other sectors	7 142	6 799
Households	6 888	6 521
Agriculture	-	-
Other sectors	254	278
Statistical differences	-	-

The consumption of biomass has increased by 4.8% compared to the 2012. The largest part of biomass is consumed by households.

8 Balance of electricity

The total available quantity of electricity for final consumption is lower by 0.8% compared to the 2012.

Production in TPP Pljevlja was 4 720 TJ, which is 4.1% less than in 2012.

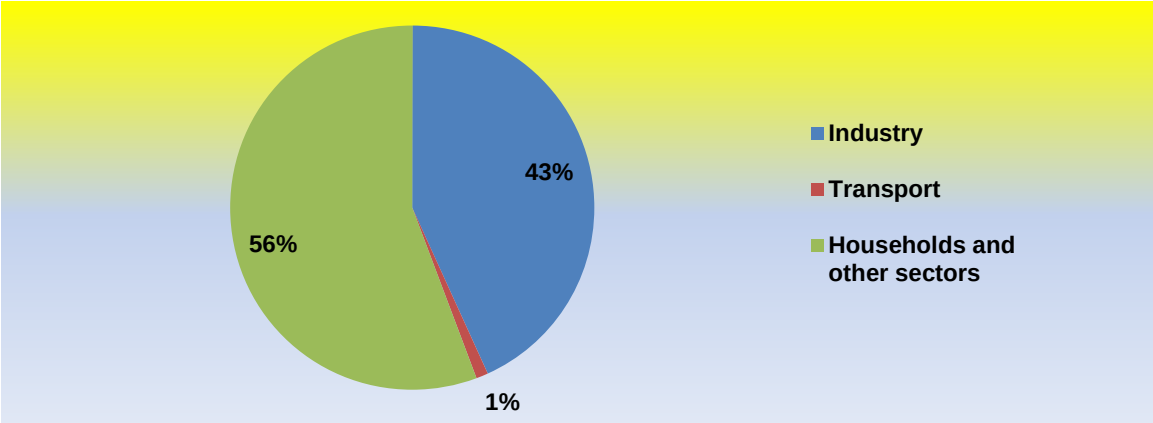
Due to favorable weather conditions, the production of hydroelectric power is significantly increased compared to the previous year. Achieving production in HE in 2013 amounted to 8 906 TJ, which is 67.5% higher than in 2012.

Table 7. Balance of electricity, TJ

	2012	2013
Primary production	-	-
Recovered products	1 714	2 196
Import	3 470	734
Export	- 821	- 2 329
Gross inland energy consumption	**4 363**	**601**
Transformation -input	-	-
Transformation -output	4 921	4 720
Exchange and transfers	5 317	8 906
Own consumption in energy sector	508	490
Losses	2 502	2 239
Final energy consumption	**11 592**	**11 498**
Industry	**6 678**	**4 968**
Iron and steel industry	169	104
Non-ferrous metal industry	4 000	2 646
Chemical industry	11	14
Non-metallic minerals	83	122
Mining and Quarrying	14	14
Food, drink & tobacco industry	436	76
Textile, leather & clothing industry	4	-
Paper, pulp and print	4	14
Engineering & other metal industry	7	11
Other industries	1 948	1 967
Transport	**54**	**122**
Households and other sectors	**4 860**	**6 408**
Households	4 716	5 440
Agriculture	36	43
Other sectors	108	925
Statistical differences	-	-

Consumption level in the industrial sector was 43%. The participation of other sectors in final energy consumption is shown in graphs:

Graph 6. Final consumption by sectors



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