

Republika e Kosovës Republika Kosova - Republic of Kosovo

> ZYRA E RREGULLATORIT PËR ENERGJI REGULATORNI URED ZA ENERGJJU ENERGY REGULATORY OFFICE



## **ELECTRICITY AND THERMAL ENERGY ANNUAL BALANCE FOR 2022**

Pristina, January 2022



## Table of Contents:

1	ELEC	TRICITY ANNUAL BALANCE 2022	5
	1.1 TH	E CRITERIA FOR COMPILING THE ELECTRICITY ANNUAL BALANCE	6
	1.2 ELE	CTRICITY INSTALLED CAPACITIES	7
	1.2.1	Installed capacities in TPP Kosova A and TPP Kosova B	7
	1.2.2	Installed capacities of hydro power plants, wind and photovoltaic sources	7
	1.3 ELE	CTRICITY GENERATION PLAN	9
	1.3.1	Planning of electricity generation in thermal power plants	9
	1.3.2 source	Planning of electricity generation from hydro power plants and other renewable energes (RES) of electricity	;у 9
	1.4 PL/	ANNING OF ELECTRICITY DEMAND AND LOSSES	. 11
	1.4.1	Electricity consumption plan	. 11
	1.4.2	Electricity losses	. 11
	1.4.3	Consumption and losses in distribution network	. 12
	1.5 PL/	ANNING OF MAXIMAL AND MINIMAL CHARGES	. 12
	1.6 AN	CILLARY SERVICES	. 14
	1.7 TH	E PLANNED IMPORT OF ELECTRICITY	. 14
	1.8 TH	E INPUT OF ELECTRICITY ANNUAL BALANCE FOR 2022	. 16
	1.9 DY	NAMICS OF PRODUCTION AND CONSUMPTION OF LARGE CHARCOAL WITH STATE IN	
	STORAC	je	. 17
	1.10 PL/	ANNING OF CONSUMPTION AND RESERVES OF OIL AND HEAVY FUEL OIL IN TPP KOSOVA	A 10
		P KOSOVA B	18 . 10
	1.12 FM	ISSION OF AIR POLITITANTS FROM TPP KOSOVA A AND TPP KOSOVA B	. 19
	1.13 INC	DICATORS OF THERMAL POWER PLANTS ENERGY EFFICIENCY	. 21
	1.14 TR	ANSMISSION NETWORK DATA	. 22
	1.14.1	Transmission capacities (lines) data	. 22
	1.14.2	Transformation capacities data	. 22
	1.15 PL/	ANNING THE REPAIRS WITH INTERCONNECTION AND IMPORTANT LINES FOR	
	INTERC	ONNECTION	. 23
	1.16 PR	OJECTS FORECAST FOR 2022	. 24
	1.17 DH	TERMOKOS	. 25
	1.17.1	Thermal Energy System	. 25
	1.17.2	Thermal Energy Production Capacities	. 25
	1.17.3	Distribution Network – DH Termokos	. 26
	1.17.4	Planning of thermal energy system development – DH Termokos	. 26
	1.17.5	Forecast of thermal energy demand – DH Termokos	. 27
	1.17.6	Forecast of network losses – DH Termokos	. 28

# 6

1.17.7	Thermal energy production – DH Termokos	29
1.17.8	Thermal Energy Annual Balance – DH Termokos	30
1.18 DH G	JAKOVA	30
1.18.1	Thermal energy system	30
1.18.2	Thermal Energy Production Capacities	30
1.18.3	Distribution network – DH Gjakova	31
1.18.4	Forecast of thermal energy system development – DH Gjakova	31
1.18.5	Forecast of thermal energy demand– DH Gjakova	32
1.18.6	Details on the forecast of long-term demand – DH Gjakova	32
1.18.7	Forecast of network losses – DH Gjakova	33
1.18.8	Forecast of net and gross production of thermal energy– DH Gjakova	34
1.18.9	Thermal Energy Annual Balance – DH Gjakova	34
1.19 Therr	nal Energy General Annual Balance 2022	36



## INTRODUCTION

Electricity and Thermal Energy Annual Balance 2022 is compiled in line with Law No. 05/L-081 on Energy (Article 8) as well as the Methodology on Preparation of Electricity Balances.

This document presents the annual planning of electricity and thermal energy production and demand, as well as the forecast for import and export of electricity and losses in transmission/transportation and distribution networks of electricity/thermal energy.

The purpose of this document is to inform all the interested parties on the forecast of energy demand and supply for 2022.

The basic documents for drafting this document were:

- Electricity Balance for 2022, compiled by KOSTT;
- Annual Balance 2022, compiled by District Heating Termokos JSC Pristina;
- Annual Balance 2022, compiled by District Heating Gjakova JSC.

The data presented in this Balance are based on the data from previous years, current development projections, and relevant documents (strategies, studies).



## **1 ELECTRICITY ANNUAL BALANCE 2022**

The Electricity Annual Balance presents the annual planning of electricity consumption in relation to the available electricity. The Electricity Annual Balance is based on the planned demand for electricity consumption for 2022, which is forecast to be supplied by domestic generation and import of electricity. The Balance also foresees the export of electricity surpluses.

The Electricity Annual Balance contains:

• Planning of electricity generation for each generating unit of each power plant. The plan shall contain monthly and annual values for forecasted electricity generation, the energy used for the power plant's own consumption and the co-generation energy (TPP Kosova B);

• Planning of electricity consumption demand in the transmission and distribution network according to the structure of:

- demand of the company for the distribution of electricity;
- demand of customers connected to transmission;
- Losses in transmission and distribution network.
- Electricity import and export plan;
- Planning of available capacities at the entry of power plants and required capacities to fulfil the demand for electricity and stability of functioning of the Electro-Energetic System (EES);
- Planning of the required amount for the fuels, based on calorific values (calorific capability); for the planned amount of electricity generation from thermal power plants;
- Planning of electricity consumption for mining demand;
- Planning of production, consumption and reserves of coal and fuels;
- Planning of production and transmission equipment overhauls;
- Planning of new facilities and plants that are projected to become operational.



#### 1.1 THE CRITERIA FOR COMPILING THE ELECTRICITY ANNUAL BALANCE

The main purpose of electricity Annual Electricity Balance is to project the fulfilment of customers' electricity demand, at sufficient amounts during the year, engaging production and transmission capacities in the best possible technical-economic manner.

Current electricity production capacities in the Republic of Kosovo do not fulfil the electricity demand on tariff basis. Therefore, in order to fulfil the planned demand of electricity consumption of the Republic of Kosovo during 2022, the need for export during low tariff and import of electricity especially during high tariff (peak) arises.

The main criteria used for compilation of the document Electricity Annual Balance 2022 are presented below:

- Availability of generating units of thermal power plants;
- Hydrological data of hydro power plants;
- Average three-year consumption growth;
- Planned demand of customers connected to transmission;
- The dynamics of production and consumption of coal and other fuels;
- Maintenance plan of transmission and distribution facilities;
- Technical capabilities of the transmission and distribution network; and
- Implementation of projects for development of electricity network.



## **1.2 ELECTRICITY INSTALLED CAPACITIES**

## 1.2.1 Installed capacities in TPP Kosova A and TPP Kosova B

The following tables present the data on installed capacities of generating units:

Table 1.1. Installed powers of generating units from TPPs

Generators	Start	Installed power		Technical m installed	inimum of power	Nomin Perfo	al power- ormanœ	Technical minimum of nominal current power		
Continuous -		In generator	At threshold	In generator	At threshold	In generator	At threshold	In generator	At threshold	
	Year	MW	MW	MW	MW		MW	MW	MW	
A1	1962			40	36	0	0	0	0	
A2	1964			78	70	0	0	0	0	
A3	1970	200	138	138	125	144	125	135	120	
A4	1971	200	138	138	125	144	125	135	120	
A5	1975	210	138	138	125	144	125	135	120	
Kosova A		610	414	532	481	432	375	405	360	
B1	1983	339	305	182	164	305	260	220	200	
B2	1984	339	305	182	164	305	260	220	200	
Kosova B	Kosova B 678		610	364	328	610	520	440	400	
Kaaran Caal ISC	1970	25					0	0	0	
Kosova Coai JSC	1970	16					0	0	0	
Kosovë A +Kosovë B 1329 1		1024	896	809	1042	895	845	760		

Generators A1 and A2 in TPP Kosova A and two units in Kosova Coal JSC are not in operation.

#### **1.2.2** Installed capacities of hydro power plants, wind and photovoltaic sources

#### The following tables present the data on installed capacities of generating units from HPP:

Table 1.2. Installed capacities of generating units from HPP and wind turbines connected to transmission

Hydro power plants and wind turbines	Generator	Year of operation	Apparent power MVA	Installed power MW	Net (MW)
HPP I limani	G1	1981	19,5	17,5	16
	G2	1981	19,5	17,5	16
Total Ujmani			39	35	32
HPP Lumbardhi 1	G1	1957/2005	5,05	4,54	4,54
	G2	1957/2005	5,05	4,54	4,54
HPP Lumbardhi 2	G1	2020	6,38	6,2	6,19
HPP EGU Belaia	G1	2016	5,88	5,29	5,00
	G2	2016	3,11	2,79	2,50
HPR EGU Decani	G1	2016	11,24	6,66	6,50
	G2	2016	5,47	3,15	3,00
HPP- Kaskada e Lumbardhit (KELKOS)			42,18	33,17	32,27
Air-Energy -KITKA L.L.C (Wind park)	9*G	2018	36,00	32,40	32,40
SOWI KOSOVA-Selac 1	9*G	2021		34,47	34,47
SOWI KOSOVA-Selac 2	9*G	2021		34,47	34,47
SOWI KOSOVA-Selac 3	9*G	2021		34,47	34,47
Total HPP+WP connected to transmission				203,98	200,08



НРР	Generator	Year of operation	Apparent power MVA	Active power (MW)
HPP Radavci	G1	1934/reconstruction 2010	0,5	0,45
	G2	1934/reconstruction 2010	0,5	0,45
I otal HPP Radavci	01	1010/m	1	0,9
HPP Burimi	G1 G2	1948/reconstruction 2011	0,475	0,427
Total HPP Burimi	02		0,95	0,427
	G1	1957/repair phase 1-2010	0,55	0,5
HPP Dikanci	G2	1957/repair phase 1-2010	0,55	0,5
	G3	February 2013/new	2,921	2,34
Total HPP Dikanci			4,021	3,34
HPP Brodi 1	G1	2021		2,48
HPP Brodi 2	G1	Type of turbine Fransis, 2016	3,3	2,8
	G2	Type of turbine Pelton, 2016	2,6	2,2
HPP Brodi 3	G	2019		4,7
Total HPP Brodi			5,9	12,18
HPP Restelica 182	G1	Type of turbine Pelton, 2016	1,4	1,2
	G2	Type of turbine Pelton, 2016	1,4	1,2
HPP Restelica 3		2021		2,35
Total HPP Restelica 1&2 and 3			2,8	4,75
HPP Hydroline-Albaniku IV	G1	2021		1,119
HPP Hydroline-Albaniku II	G2	2020		3,55
HPP Hydroline-Albaniku III	G1	Hitzinger, 2016	3,6	3,147
	G2	Hitzinger, 2016	1,4	1,068
Total HPP Hydroline-Albaniku			5	8,884
	G1	2019		4,4
Hidroenergji (Lepenci 3)	G2	2019		4,3
	G3	2019		1,3
Matkos Group (HPP Brezovica)	G1	2017		2,1
EKO Energji (HPP Binqa)	G1	2020		0,6
HPP Sharri	G1	2021		6,45
HPP Vica	G1	2021		4,6
HPP Shterpca	G1	2021		5,3
RENELUAL TAHIRI LLC HPP Dragashi	G1	2019		3,4
RENELUAL TAHIRI LLC HPP ORQUSHA	G1	2021		4
Total HPPs connected to Distribution				67,358

## Table 1.3. Installed powers of generating units from HPPs

Renewable energy	Generator	Year of operation	Active power in MW
	G1	2010	0,45
Wind Generators (WP)	G2	2010	0,45
	G3	2010	0,45
PS Led Light Tehnology	Photovoltaic unit (solar panels)	2015	0,102
PS Birra Peja + FF Kosova	Photovoltaic unit (solar panels)	2018	3
	Photovoltaic unit (solar panels)	2018	3
PS SOLAR GREEN ENERGY	Photovoltaic unit (solar panels)	2019	3
PS N.t.sh. Eling	Photovoltaic unit (solar panels)	2019	0,4
PS Photovoltaic solar power plant ONIX	Photovoltaic unit (solar panels)	2016	0,5
Total			11,352

Tahle 1 4 Insta	lled nowers	of aeneratina	units from wind	d and photovoltaic	(solar nanels) sources
10016 1.4 111310	neu powers	oj generating		a una priotovoltaic	(solul pulleis) sources

#### 1.3 ELECTRICITY GENERATION PLAN

#### 1.3.1 Planning of electricity generation in thermal power plants

The annual generation of electricity in TPPs is planned up to the value of optimum utilization of generation capacities.

Electricity provided at the entry of transmission from TPP Kosova A and TPP Kosova B is planned in an amount of: **5,806** GWh, where:

- > TPP Kosova A = 2,248.9 GWh, at the entry of transmission.
- > TPP Kosova B = **3,557.2** GWh, at the entry of transmission.

## **1.3.2** Planning of electricity generation from hydro power plants and other renewable energy sources (RES) of electricity

Annual generation of electricity from HPP Ujmani and HPP-Kaskada e Lumbardhit (HPP Lumbardhi 1, HPP Lumbardhi 2, HPP EGU Belaja and HPP EGU Deçani) and from the Wind Park KITKA (Air-Energy) and SOWI KOSOVA (Selac) which are connected to the transmission network is planned as follows:

- HPP Ujmani = 86 GWh
- HPP-Kaskada e Lumbardhit = 94.6 GWh
- Wind Park Kitka=95,9 GWh
- Wind Park Sowi Kosova (Selac)=281 GWh

The annual generation of electricity from hydro power plants, wind sources of energy and solar panels connected to the distribution system is planned to be in the amount of **234,5 GWh**.

The generation of electricity entering the transmission system, generated from TPP Kosova A, TPP Kosova B, HPP Ujmani, HPP Kaskada e Lumbardhit and Wind Park Kitka and Sowi Kosova (Selac) for 2022 is planned in the amount of **6,363.6 GWh**.

Whereas, the entire national generation, including HPPs, wind generators and solar panels connected to the distribution network, is planned to be **6,598 GWh**.



Figure 1. Chart of electricity generation by type



## 1.4 PLANNING OF ELECTRICITY DEMAND AND LOSSES

#### 1.4.1 Electricity consumption plan

The overall electricity demand in Kosovo for 2022, including the supply for consumption in the North of Kosovo is estimated to be **7,144.6** GWh. This demand is planned to include the following:

- Net demand in distribution network (household, public lighting, small businesses etc., connected at the voltage level 35 kV, 10 kV and 0.4 kV) is foreseen to be **=4,820.15,122.6 GWh**
- Distribution losses (including the exceeded losses) in the amount of **=1,072.9** GWh,
- Mining = **113.8** GWh
- Trepça = **21.4** GWh,
- Sharr Cem = **66.9** GWh,
- NEW.CO. FERRONIKELI = 399.4 GWh,
- Generation consumption from transmission 146.3 GWh (TPP A =108 GWh, TPP B= 38 GWh),
- System losses (Consumption in the North of Kosovo)=367,1 GWh
- Transmission losses in the amount of = **136.7** GWh.

#### 1.4.2 Electricity losses

Total electricity losses are divided into:

- **Transmission network losses** which represent the difference between the measured values of electricity at the entry of transmission and those measured at the exit of transmission network. This includes losses due to transit (metering points on the 400, 220 and 110kV interconnection lines are transferred to the dividing boundaries using the approved transfer coefficients).
- **Distribution network losses** which are the difference of the measured values of electricity received at the dividing points from the transmission network and the entries from the generators connected to the distribution and on the other hand the measured values of electricity delivered to customers.

The planning of entire losses in the transmission system includes the losses incurred by Kosovo consumption load and losses incurred by electricity passing through transit.

- **Consumption in the North of Kosovo** is the energy consumed in the four northern municipalities of Kosovo. This energy is expected to be supplied by KOSTT with an out-of-tariff budget
- Allowed losses of electricity in transmission network are planned to be 136.3 GWh or 1,72 % of the overall amount of energy at the entry of transmission. KOSTT will provide this energy based on the principles of the competitive market, respecting the electricity trading procedure.

• Allowed losses of electricity in distribution network according to the data received from KESCO (technical and commercial losses) are planned to be 945,3 GWh or 16.04 % of the overall demand of the distribution network as well as exceeded losses in the amount of 127,7 GWh.

#### **1.4.3** Consumption and losses in distribution network

#### Table 1.5 Consumption and losses in distribution network

Distribution demand MWh	Total	January	February	March	April	May	June	July	August	September	October	November	December
Distribution demand	5 675 535	697 947	515 711	557 354	472 113	346 613	329 175	368 961	378 566	333 175	469 248	515 507	691 166
Distributive HPPs and RES	234 450	17 749	23 844	28 110	30 415	34 649	26 452	16 385	12 262	9 850	12 292	11 091	11 352
Distributive HPPs for universal consum	217 468	17 585	23 475	27 665	27 834	30 912	23 648	14 629	10 976	8 675	11 197	10 231	10 640
Total distribution demand	5 893 004	715 532	539 187	585 019	499 947	377 524	352 823	383 590	389 542	341 850	480 446	525 738	701 805
Delivery	0	0	0	0	0	0	0	0	0	0	0	0	0
110kV	0	0	0	0	0	0	0	0	0	0	0	0	0
35 kV	56 472	5 109	3 668	4 898	4 545	4 377	4 454	4 820	4 952	4 622	4 823	4 836	5 368
10 kV	396 530	36 550	29 286	34 474	31 088	28 824	31 030	33 147	33 791	30 144	34 147	35 873	38 176
0,4kV	415 785	39 721	30 902	36 018	31 864	29 029	32 117	36 683	36 923	30 145	34 211	35 899	42 272
0.4/II kV	713 100	75 994	59 784	61 105	53 832	45 332	47 734	58 740	64 618	43 470	54 543	60 445	87 503
Household	3 201 846	418 407	300 064	315 033	284 778	209 739	183 912	200 755	208 258	178 608	250 243	283 911	368 140
Public lightning	36 325	3 946	2 816	3 004	2 611	2 381	2 256	2 298	2 549	2 928	3 593	3 784	4 160
Net distributive network	4 820 059	579 728	426 521	454 533	408 717	319 682	301 502	336 444	351 091	289 917	381 559	424 748	545 618
Technical losses	826 381	117 450	85 474	88 783	69 879	45 558	40 295	41 319	36 057	38 905	63 741	77 232	121 688
Commercial losses	118 897	13 982	12 501	19 173	9 816	5 648	5 069	2 679	1 100	5 989	16 157	10 923	15 860
Exceeded losses	127 666	4 372	14 691	22 531	11 535	6 637	5 957	3 148	1 293	7 039	18 988	12 836	18 639
Total losses in distribution network	1 072 945	135 804	112 666	130 487	91 229	57 842	51 321	47 147	38 451	51 933	98 886	100 991	156 187

#### 1.5 PLANNING OF MAXIMAL AND MINIMAL CHARGES

Charges for maximal customer power are submitted by customers separately.

Based on the basic characteristics of the system elements, the exploitation conditions and the load simulation with the PSS/E (Power System Simulation for Engineering) program it is estimated that the transmission capacity will be **1850** MW. This applies to **Criterion N** of network elements. Whereas, for the N-1 criterion, the transmission capacity will be **1280** MW.

#### Table 1.6. Planning of maximal and minimal charges

Customers/Charge (MW)	January	February	March	April	May	June	July	August	September	October	November	December
Mining	25	25	25	25	25	25	25	25	25	25	25	25
SharrCemi JSC	10,5	10,5	10,5	10,5	11,5	11,5	11,0	11,0	11,5	10,5	10,5	10,5
Trepça	5,6	5,5	5,6	5,2	5,2	5,2	5,2	5,2	5,2	5,6	5,6	5,6
New Co Ferronikeli JSC	49	49	49	49	49	49	49	49	49	49	49	49
Direct customers	65	65	65	65	66	66	65	65	66	65	65	65
Charge of distribution customers	1 084	1 112	1 051	1 028	759	654	702	715	649	817	1 031	1 230
Expenditures of TPP from transmission	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0
System losses (North)	77,0	60,0	55,0	50,0	40,0	25,0	24,0	21,0	30,0	40,0	50,0	70,0
Transmission losses (technical)	29,0	29,0	28,0	21,0	18,0	16,0	16,0	15,0	18,0	28,0	28,0	29,0
Minimal system charge	634	538	510	382	313	322	320	349	340	348	438	624
Maximal system charge	1 300	1 311	1 244	1 209	928	806	852	861	808	995	1 219	1 439

#### Figure 2. Chart of maximal and minimal charges





#### 1.6 ANCILLARY SERVICES

Based on the maximum projected loads, the demand for secondary reserves is calculated, as presented in the table below.

Table 1.7. Secondary reserves

Year 2022	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Consumption (MW)	1300	1311	1244	1209	928	806	852	861	808	995	1219	1439
Secondary reserves	38,4	38,7	36,9	36,0	28,3	24,8	26,1	26,4	24,9	30,1	36,3	42,1

The demand for tertiary reserves is presented in the table 4.4.1

Tabela 1.8. Tertiary reserves

Year 2022	January	February	March	April	May	June	July	August	September	October	November	December
Tertiary reserves (MW)*	260	260	260	260	260	260	260	260	260	260	260	260

#### 1.7 THE PLANNED IMPORT OF ELECTRICITY

Through this balance, based on available data and experience from previous years, imports are planned for:

- Inability to cover consumption only from domestic generation, especially during winter season;
- Unplanned short interruptions (failure of generating units);
- Long planned outages of generating units, repairs and revisions of generating and transmission units;
- Import for universal consumption and distribution losses;
- Import for supplying the consumption of Ferronikel, Sharri and Trepça, as unregulated customers;
- Import for transmission losses;
- Import for supply of consumption in the Northern part of Kosovo.

The planned amount of import for customers entitled to the universal service and import for covering the losses at DSO is **661.7 GWh**, presented in monthly basis as in the following tables:

 Table 1.9. Planning of import for universal consumption and distribution losses

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Import for universal consumption	209 813	105 780	3 623	145	18 465	4 358		13 947	29 050	7 602	3 720	634	22 488
Import for distribution losses	451 885	111 877	36 025	15 118	28 240	7 876	858	29 024	27 255	20 157	28 073	31 645	115 738
Total import	661 698	217 657	39 649	<b>15 26</b> 4	46 705	12 234	858	42 971	56 305	27 759	31 793	32 279	138 225

#### Table 1.10. Import of Ferronikel

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Import for Ferronikel	399 410	6 629	32 928	36 456	35 280	36 456	35 280	36 456	36 456	35 280	36 456	35 280	36 456

#### Table 1.11. Import of Sharrcem

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sharrcem import	66 900	2 600	5 400	5 800	6 400	6 300	3 400	6 300	6 900	6 600	6 200	6 200	4 800

#### Table 1.12. Import of Trepça

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Import for Trepça	21 400	2 000	2 000	2 000	1 800	1 600	1 600	1 600	1 600	1 600	1 800	1 800	2 000

## Table 1.13. Import for transmission losses

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Import for transmission losses	56 481	13 588	4 247	1 438	3 309	1 024	117	4 821	5 950	3 391	3 143	4 029	11 425

#### Table 1.14. Import for consumption in the North of Kosovo

Months/MWh	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Import for consumption in the North	367 119	46 084	39 805	41 682	34 433	23 208	18 027	15 186	15 540	17 308	30 585	38 207	47 052

## 1.8 THE INPUT OF ELECTRICITY ANNUAL BALANCE FOR 2022

#### Table 1.15. Balance

	EAB_2022	Total	January	February	March	April	May	June	July	August	ptember	October	ovember	ecember
1	Kosova A - Porduction at the entry of transmission	2 248 939	245 263	178 637	264 860	167 186	173 158	173 963	180 203	177 997	166 945	178 077	170 668	171 982
2	Kosova B - Production at the entry of transmission	3 557 228	234 524	326 880	362 589	311 789	326 638	356 457	201 006	185 440	185 383	331 244	362 403	372 877
3	Ujmani + Cascade of Lumbardhi+PE KITKA+PE Selaci	557 419	46 010	59 127	60 702	57 268	57 190	39 788	30 398	24 508	35 514	37 777	50 073	59 063
4	Generation of HPPs, wind and solar panels in distribution	234 450	17 748	23 844	28 110	30 415	34 649	26 452	16 385	12 262	9 850	12 292	11 091	11 352
5	(1+2+3+4) National production	6 598 036	543 545	588 488	716 262	566 657	591 635	596 660	427 991	400 207	397 692	559 389	594 234	615 274
6	(1+2+3) Production (entry in transmission)	6 363 586	525 797	564 644	688 152	536 243	556 986	570 208	411 607	387 945	387 842	547 098	583 143	603 922
	Import of KESCO	661 698	217 657	39 649	15 264	46 705	12 234	858	42 971	56 305	27 759	31 793	32 279	138 225
	Import of Ferronikel	399 410	6 629	32 928	36 456	35 280	36 456	35 280	36 456	36 456	35 280	36 456	35 280	36 456
	Import of Sharrcem JSC	66 900	2 600	5 400	5 800	6 400	6 300	3 400	6 300	6 900	6 600	6 200	6 200	4 800
7	Import of Trepça	21 400	2 000	2 000	2 000	1 800	1 600	1 600	1 600	1 600	1 600	1 800	1 800	2 000
	Import for transmission losses	56 481	13 588	4 247	1 438	3 309	1 024	117	4 821	5 950	3 391	3 143	4 029	11 425
	Import for consumption in the North	367 119	46 084	39 805	41 682	34 433	23 208	18 027	15 186	15 540	17 308	30 585	38 207	47 052
	Total import	1 573 008	288 558	124 029	102 640	127 926	80 822	59 282	107 334	122 751	91 938	109 977	117 795	239 958
8	(6+7) Energy at the entry of transmission	7 936 594	814 354	688 673	790 792	664 169	637 808	629 489	518 940	510 695	479 779	657 075	700 938	843 880
8*	(8+4) Available energy	8 171 044	832 102	712 517	818 903	694 583	672 457	655 942	535 325	522 958	489 630	669 367	712 029	855 232
9	Тгерçа	21 400	2 113	1 722	1 989	1 633	1 631	1 577	1 629	1 629	1 577	1 980	1 927	1 991
10	Sharrcem JSC	66 901	2 328	5 577	6 613	5 767	7 159	5 592	5 638	6 151	6 161	6 264	5 951	3 700
11	NewCo Ferronikeli JSC	399 410	6 629	32 928	36 456	35 280	36 456	35 280	36 456	36 456	35 280	36 456	35 280	36 456
12	Mining	113 822	11 249	10 160	10 951	9 450	11 928	6 743	7 042	7 892	8 247	9 995	9 682	10 483
13	Expenditures of TPP from transmission	146 294	13 216	12 325	12 421	11 130	11 928	9 118	10 488	14 452	15 233	12 014	10 542	13 425
14	Consumption in the North of Kosovo	367 119	46 084	39 805	41 682	34 433	23 208	18 027	15 186	15 540	17 308	30 585	38 207	47 052
15	Total distribution losses	1 072 945	135 804	112 666	130 487	91 229	57 842	51 321	47 147	38 451	51 933	98 886	100 991	156 187
16	Net demand in distribution	4 820 059	579 728	426 521	454 533	408 717	319 682	301 502	336 444	351 091	289 917	381 559	424 748	545 618
17	(9+10+11+12+13+14+15+16) Kërkesa neto	7 007 950	797 152	641 705	695 131	597 640	469 834	429 160	460 030	471 662	425 656	577 740	627 328	814 912
18	Transmission losses	136 661	16 372	13 706	13 551	11 286	7 596	7 999	8 273	8 491	9 048	11 532	13 405	15 402
19	Shortage													
20	Export	1 026 433	18 579	57 106	110 221	85 658	195 027	218 783	67 022	42 804	54 926	80 094	71 295	24 918
21	(17+18) Ktotal demand	7 144 611	813 523	655 411	708 682	608 926	477 431	437 158	468 303	480 154	434 704	589 272	640 733	830 314
22	(19+20+21 -8*) Balance	0	0	0	0	0	0	0	0	0	0	0	0	0

• The consumption of TPP Kosova A and TPP Kosova B from transmission is consumption which is taken from transmission for generation needs.

• Surpluses (export 1,026 GWh) are energy surpluses (mainly during night hours) which must be realized according to commercial contracts.

#### 1.9 DYNAMICS OF PRODUCTION AND CONSUMPTION OF LARGE CHARCOAL WITH STATE IN STORAGE

(ton)										Gjendja me:	31.12.21
Muaji	Prod	nimi i thëng	gjillit	Konsumi i	<mark>i thëngjill</mark> i	t			DEPO	DEPO A	DEPO B
	Sitnica	SJP	Total	TC A	тс в	TC A+B	Tregu *	Nevojat	500 000	200 000	300 000
1	0	850 000	850 000	407 027	336 389	743 416	12 000	755 416	594 584	237 834	356 750
2	0	800 000	800 000	295 378	463 186	758 564	13 000	771 564	623 020	249 208	373 812
3	0	800 000	800 000	440 476	514 651	955 128	15 000	970 128	452 892	181 157	271 735
4	0	700 000	700 000	274 650	437 453	712 103	20 000	732 103	420 789	168 315	252 473
5	0	680 000	680 000	285 014	454 609	739 623	20 000	759 623	341 166	136 466	204 700
6	0	680 000	680 000	285 014	497 496	782 510	20 000	802 510	218 656	87 462	131 193
7	0	630 000	630 000	295 378	265 903	561 281	20 000	581 281	267 374	106 950	160 425
8	0	612 000	612 000	290 196	257 326	547 522	20 000	567 522	311 853	124 741	187 112
9	0	720 000	720 000	274 650	257 326	531 976	20 000	551 976	479 877	191 951	287 926
10	0	750 000	750 000	290 196	462 829	753 025	15 000	768 025	461 852	184 741	277 111
11	0	780 000	780 000	279 832	514 651	794 483	15 000	809 483	432 369	172 948	259 421
12	0	780 000	780 000	279 832	531 806	811 638	10 000	821 638	390 731	156 292	234 438
Gjithsejt	0	8782 000	8782 000	3 697 645	4 993 624	8 691 269	200 000	8 891 269			

Table 1.16. Planning of production, consumption and storage of coal

Specific coal consumption for TPP A=1,52 t/MW; whereas for TPP B=1,267 t/MW

The basis for determining the coal coefficient is the average annual consumption over the last 3 years.

Table 1.17. Consumption and reserves of coal for TPP Kosova A

Consumption and reserves of coal for Kosova A	Total [ton]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Coal consumption A3+A4+A5	3 632 635	347 199	295 378	440 476	274 650	285 014	285 014	295 378	290 196	274 650	290 196	279 832	274 650
Coal reserves A3+A4+A5	1 760 304	146 692	146 692	146 692	146 692	146 692	146 692	146 692	146 692	146 692	146 692	146 692	146 692

#### Table 1.18. Consumption and reserves of coal for TPP Kosova B

Consumption and reserves of coal for Kosova B	Total [ton]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Coal consumption B1+B2	4 949 228	334 523	463 186	514 651	437 453	454 609	497 496	265 903	257 326	257 326	454 609	497 496	514 651
Coal reserves B1+B2	2 474 614	167 262	231 593	257 326	218 727	227 304	248 748	132 952	128 663	128 663	227 304	248 748	257 326

#### 1.10 PLANNING OF CONSUMPTION AND RESERVES OF OIL AND HEAVY FUEL OIL IN TPP KOSOVA A AND TPP KOSOVA B

Table 1.19. Planning of consumption and oil reserves

Consumption and reserves of oil for the generators A3+A4+A5	Total [ton]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oil consumption	2 867 870	274 105	233 193	347 745	216 829	225 011	225 011	233 193	229 102	216 829	229 102	220 920	216 829
Oil reserves	2 119 968	176 664	176 664	176 664	176 664	176 664	176 664	176 664	176 664	176 664	176 664	176 664	176 664

Table 1.20. Planning of consumption and heavy fuel oil reserves

Consumption and reserves of heavy fuel oil for the generators B1+B2	Total [ton]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Consumption of heavy fuel oil	3 598	243	337	374	318	330	362	193	187	187	330	362	374
Reserves of heavy fuel oil	14 400	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200

#### 1.11 PLANNING THE REPAIRS AND REVISIONS OF GENERATING CAPACITIES

TPP Kosova	Generator	January	February	March	April	May	June	July	August	September	October	November	December
Days		9	20			13				12			10
From - To	A3	23	20			19-31				1-12			1-10
Days		4			12				31				10
From - To	A4	1-4			1-12				1-31				11-21
Days		4			18	18	30	15 16		18	30	31	10
From - To	A5	8-11			13	18	1-30	15, 16-31		13.09-30.11			21-31
TPP Kosova I	в												
Days					7			30			7		
From - To	B1				1-7			1-30			09-15		
Days		21				7			31	29			
From - To	B2	1-21				1-7			1-31	1-29			
													-
							Ri	Repair	Re	Revision	R Reserve		

Table 1.21. Planning the repairs and revisions of generating capacities

6



#### 1.12 EMISSION OF AIR POLLUTANTS FROM TPP KOSOVA A AND TPP KOSOVA B

The main air pollutants from thermal power plants are the following combustion products:

- ash (dust particles)
- gas  $SO_2$
- gas  $NO_x$
- gas  $CO_2$

#### Table 1.22. Specific emissions of TPP Kosova A

	TPP KOSOVA A												
Month	Realized gross generation of EE [MWh]	Consumed coal [t]	Ash production (t) Average.0.235(t/ MW)	SO₂ [kg] Average. 2.204 [kg/MWh]	NOx [kg] Average.3.156 [kg/MWh]	CO₂ [kg] Average. 1370 [kg/MWh]	Emission of ash particles (kg) Average 0.2184(kg/MWh)						
1	267 781	407 027	62 929	590 189	845 117	366 859 895	58 483						
2	194 328	295 378	45 667	428 299	613 299	266 229 113	42 441						
3	289 787	440 476	68 100	638 691	914 568	397 008 327	63 290						
4	180 691	274 650	42 462	398 242	570 260	247 546 369	39 463						
5	187 509	285 014	44 065	413 270	591 779	256 887 741	40 952						
6	187 509	285 014	44 065	413 270	591 779	256 887 741	40 952						
7	194 328	295 378	45 667	428 299	613 299	266 229 113	42 441						
8	190 919	290 196	44 866	420 785	602 539	261 558 427	41 697						
9	180 691	274 650	42 462	398 242	570 260	247 546 369	39 463						
10	190 919	290 196	44 866	420 785	602 539	261 558 427	41 697						
11	184 100	279 832	43 264	405 756	581 020	252 217 055	40 207						
12	184 100	279 832	43 264	405 756	581 020	252 217 055	40 207						
1 to 12	2 432 661	3 697 645	571 675	5 361 585	7 677 478	3332 745 632	531 293						

Table 1.23. Specific emissions of TPP Kosova B

	TPP KOSOVA B												
Month	Realized gross generation of 臣 [MWh]	Consumed coal [t]	Ash production (t) Average.0.181(t/ MW)	SO₂ [kg] Average.2.215 [kg/MWh]	NOx [kg] Average.3.480 [kg/MWh]	CO₂ [kg] Average.1138.3 [kg/MWh]	Emission of ash particles (kg) Average 1.280(kg/MWh)						
1	265 500	336 389	48 056	588 083	923 941	302 219 093	339 840						
2	365 577	463 186	66 169	809 753	1 272 208	416 136 272	467 939						
3	406 197	514 651	73 522	899 726	1 413 564	462 373 635	519 932						
4	345 267	437 453	62 493	764 767	1 201 530	393 017 590	441 942						
5	358 807	454 609	64 944	794 758	1 248 648	408 430 045	459 273						
6	392 657	497 496	71 071	869 735	1 366 445	446 961 181	502 601						
7	209 868	265 903	37 986	464 858	730 342	238 893 045	268 631						
8	203 098	257 326	36 761	449 863	706 782	231 186 818	259 966						
9	203 098	257 326	36 761	449 863	706 782	231 186 818	259 966						
10	365 295	462 829	66 118	809 128	1 271 226	415 815 179	467 577						
11	406 197	514 651	73 522	899 726	1 413 564	462 373 635	519 932						
12	419 737	531 806	75 972	929 716	1 460 683	477 786 090	537 263						
1 to12	3 941 298	4 993 624	713 375	8 729 975	13 715 717	4486 379 400	5 044 861						



## 1.13 INDICATORS OF THERMAL POWER PLANTS ENERGY EFFICIENCY

- Improve the quality of coal;
- Reduction of specific coal costs in TPP A and TPP B ton/MWh;
- Reduction of TPP A, TPP B and Mines own electricity consumption; Reduction of specific fuel costs lit/MWh in TPPA and heavy fuel oil ton/MWh at TPPB by reducing unplanned failures;
- Delivery of replacement parts of adequate quality;
- Maintenance and operation at the required technical level;
- Perform quality and timely repairs;

Content of mining coal:

- Low thermal capacity 6700 9210 kJ/kg, projecting value 7325.5 kJ/kg
- Content of ash 14 21 %
- Content of humidity 38 47 %
- Content of sulphur during combustion is 0.3 %

The calculation of efficiency coefficient at the entry shall be:

- Calculation of the value of coal thermal capacity 7325 kJ/kg;
- Specific consumption of coal in TPP Kosova A hsq=1.52 ton/MWh at the generator;
- Specific consumption of coal in TPP Kosova B hsq= 1.267 ton/MWh at the generator;

Calculating the energy efficiency of Thermal Power Plants Kosova A and Kosova B:

TPP Kosova A η = 7325 \* 1.52=11134 kJ/kWh

#### Ef =Ed / $\eta^*$ 100% = 3600 / 11134 = 32.34 %

Ed=3600 kcal/kWh- specific electric energy  $\eta$  –average specific energy of the coal at the entry (thermal)

TPP Kosova B  $\eta = 7325 * 1.267 = 9280 \text{ kJ/kWh}$ 

Ef = Ed /  $\eta^*$  100% = 3600 / 9280 = 38,79 %



## 1.14 TRANSMISSION NETWORK DATA

## 1.14.1 Transmission capacities (lines) data

Table 1.24. Transmission capacities data

Voltage level	Total length
400 KV	279,5
220 KV	238,5
110 KV	919,2

## 1.14.2 Transformation capacities data

Table 1.25. Transformation capacities data

Voltage level kV/kV	Transformer number	Installed capacity MVA
400/220	3 x 400	1200
400/110	4 x 300	1200
220/110	9 x 150	1350
220/35	2 x 160	320
220/35/10(20)	2x40	80
220/10(20)	2x40	80
110/35/10(20)	65	2329



#### 1.15 PLANNING THE REPAIRS WITH INTERCONNECTION AND IMPORTANT LINES FOR INTERCONNECTION

#### Table 1.25. Transformation capacities data

	Linja	Ditët e nevojshme për remont	Prilli	Maji	Qershori	Korriku	Gushti	Shtatori	Tetori	Nentor
	Linja 400 kV Kosovë B – Nish	5	06-19.04							
	Linja 400 kV Ferizaj 2 – Shkupi 5	4						12-16.09.		
Linja të	Linja 400 kV Pejë 3 – Ribarevinë	3		09.05 18.05.	20.06. – 29.06.					
interkoneksionit	Linja 400 kV Kosove B – Koman	5	04-05.04				24-25.08.			
	Linja 220 kV Podujevë – Krusheveci	2							07.10 -	- 01.11.
	Linja 220 kV Prizreni 2 – Fierëza	5		23-24.05				06-07.09.		
	Linja 400 kV Kosovë B – Pejë 3	5				04-08.07.				
Linja sinjifikante	Linja 400 kV Kosovë B – Ferizaj 2	10			(01-10). 06.'22					
(kane ndikim në	Linja 220 kV Drenas – Drenas 1	2							03 - 04.10.	
interkension)	Linja 220 kV Drenas 1 – Prizreni 2	10			(11-20). 06.'22					
	Linja 220 kV Kosovë B - Podujevë	5	19-22 &26.04							

The plan for the repair of interconnection lines for 2022, was harmonized with the regional TSO, in the second half of November 2021, at the meeting of the regional working group OPC (Outage Planning Coordination).



## 1.16 PROJECTS FORECAST FOR 2022

There will not be any energisation of new lines as well as new substations during 2022, but the following works will take place during this year:

- I. Signed contract:
  - 1. Construction of SS 110/10(20) kV Ferizaj 3;
  - Construction of 110Kv line/cable for connection of the new substation 110/35/10(20) kV Kastriot-Ferizaj 3;
- II. The signing of contracts is expected for the following:
  - 3. Construction of the new substation- GIS 110/35/10(20) kV Fushë Kosova;
  - 4. Supply and installation of the reactor 100MVar at the side of 400kV in NS Ferizaj2;
  - 5. Construction of the new substation AIS 220/35/10(20) kV Malisheva with the accompanying line 220

kV;

6. Supply and installation of transformers of the 40MVA power at the SS 110/35/10(20) kV Fushë Kosova and SS 220/35/10(20) kV Malisheva.



## 2 THERMAL ENERGY ANNUAL BALANCE 2022

## 1.17 DH TERMOKOS

## 1.17.1 Thermal Energy System

DH "Termokos" JSC is the only supplier of thermal energy (district heating) in Pristina. In addition to district heating, DH "Termokos" JSC also provides district heating system maintenance to its customers. The demand for district heating provided by DH "Termokos" JSC is extremely high. This is due to the fact that DH "Termokos" JSC provides quality heating, 24 hours throughout the entire heating season, at a cheaper price than other heating alternatives.

Currently, DH "Termokos" JSC provides district heating to 15,599 customers (of which 14,104 are household customers and 1,495 commercial and institutional customers). DH 'Termokos" JSC covers heating demand of existing customers by not fully utilizing the existing capacity. This leads to the conclusion that DH "Termokos" JSC can provide district heating for new customers, of similar categories to existing customers, namely a customer base with an approximate combination to the profile of household and commercial and institutional customers.

## 1.17.2 Thermal Energy Production Capacities

The basic unit of thermal energy production is TPP Kosova B, through the cogeneration system. The installed capacity is 140  $MW_{TH}$  while the operational capacity is estimated to be 137.48  $MW_{TH}$ . For the production of thermal energy, steam is extracted from the PM rate of both turbines at this power plant. The exchange of steam/water energy takes place at the power extraction station - HES, through two exchangers with a capacity of 70MW<sub>TH</sub>. This station is close to TPP Kosovo B, and is entirely managed by Termokos.

Termokos also possesses its own thermal energy production capacities, heavy fuel oil boilers, which were used before the cogeneration system became operational. These generating units are operational and can be used in specific cases (in case of power cuts by KEK - TPP Kosovo B).



## BILANCI VJETOR I ENERGJISË ELEKTRIKE DHE TERMIKE PËR VITIN 2022

Generating unit	Installed capacity	η (% )	Operational capacity	Fuel	Cons l.d. Kg/ MWh	Prod/ins year	Place
Cogeneration system TPP Kosova B	2x70= 140MW <sub>TH</sub>	98	137.48 MW <sub>TH</sub>	Lignite	-	2014	TPP Kosova B
	2x58 = 116MW <sub>TH</sub>	85	98.6 MW <sub>TH</sub>	Heavy fuel oil	105	1978	Termokos
Hot water boilers	2x7= 14MW <sub>TH</sub>	90	12.6 MW <sub>TH</sub>	Diesel	96	1983	UCCK Heating
	4 MW <sub>TH</sub>	90	3.6 MW <sub>TH</sub>	Heavy fuel oil	96	2003	Termokos
Total Heating cap.	134 MW <sub>TH</sub>	85,6	114.8 MW <sub>TH</sub>	-	-	-	-
Total generating cap.	274 MW <sub>TH</sub>	92	252.28 MW <sub>TH</sub>	-	-	-	-

The thermal power transmission network from TPP KOSOVA B to the power station - HRS at DH Termokos is 10.5 km long.

#### 1.17.3 Distribution Network – DH Termokos

The primary distribution network with an 84 km pipeline length and a water capacity of about 3,610 m<sup>3</sup>, was installed mainly in the 70s in the urbanized part of Prishtina. However, owing to investments especially in recent years, about 80% of the network is replaced with new pre-insulated pipes whereas the rest with amortized pipes.

Tab. 1.21	viain characteristics of primar	y distribution network- DH Termokos							
Distribution network and substations- DH Termokos									
Number of substations	Length of the network- pipeline (km)	Number of meters at thermal substations							
Total: 481	84	From 481 active substations, functional meters have been placed in 392 substations, whereas in 89							
Active: 471		substations (mainly small capacity substations)							
Passive: 10		there is either no functional meter or no meter at							

Tab. 1.2 Main characteristics of primary distribution network- DH Termokos

#### 1.17.4 Planning of thermal energy system development – DH Termokos

Termokos, bases its long-term plans for thermal energy production on the cogeneration system, as a safe, economically advantageous and convenient source in terms of environmental protection. The current capacity of 140  $MW_{TH}$  (2x70  $MW_{TH}$ ) and the transmission capacity of thermal conductors (Thermal Power Transmission Network) TPP Kosova B – Termokos of 160 MW, are limiting factors for greater energy extraction.

In the upcoming years, major investments are expected in the rehabilitation and expansion of the distribution network, which results in the increase of heating area connected to Termokos district heating system. The details are shown in the following table:

Year	Investments/ mil €	Expansion of the area m2	Current connected area m2	Total connected area m2	
2021	1-2.5	56 000	1 386 124	1 442 124	
2022	4-6.5	170 000	1 442 124	1 612 124	

Tab. 1.3 Scenario 1. Medium projection - DH Termokos

## 1.17.5 Forecast of thermal energy demand – DH Termokos

The Methodology used for forecast of heating demand is based on the historical data of heat consumption, characteristics of the district heating system in terms of the possibility of expanding the network and consequently increasing the customer base, as well as the production capacity of thermal energy. Also in the demand forecast are taken into account the development projections of NP Termokos as well as the planning of overall economic growth nationwide.

The development projections of DH Termokos district heating system mainly include the plans for expansion of the distribution network and consequently the increase of the customer base/heating area, which are the determining factors for the increase of heat consumption.

The number of new customers, in addition to the feasibility of expanding the network in certain parts of the city, is also determined by the energy capacity available from the cogeneration system, which is currently  $140MW_{TH}$ .

For compiling this Balance, the medium projection (scenario) was taken into account. As shown in table 2.3, an increase in the heating area of about 170,000 m<sup>2</sup> is projected for 2022. This growth forecast is mainly based on the ongoing network rehabilitation and expansion project of KfW, which is expected to be finalized in 2022.

The following table shows the annual planning of demand, respectively the thermal energy supply, divided by months for 2022.

	CUSTOMERS DEMAND FOR THERMAL ENERGY – YEAR 2022													
	Hou	sehold custo	mers	Commercial	and institutio	nal customers		Total customers						
	Heating Area (m²)	Thermal capacity (MW)	Thermal energy amount (MWh)	Heating area (m²)	Thermal capacity (MW)	Thermal energy amount (MWh)	Heating area (m²)	Thermal capacity (MW)	Thermal energy amount (MWh)					
January	848 903	67,91	27 208	593 221	59,32	24 335	1 442 124	127,23	51 543					
February	848 903	67,91	22 224	593 221	59,32	19 886	1 442 124	127	42 110					
March	848 903	67,91	19 982	593 221	59,32	18 482	1 442 124	127,23	38 464					
April	848 903	67,91	7 526	593 221	59,32	6 831	1 442 124	127	14 357					
October	998 903	79,91	10 015	613 221	61,32	7 895	1 612 124	141,23	17 910					
November	998 903	79,91	24 718	613 221	61,32	20 776	1 612 124	141	45 494					
December	998 903	79,91	28 994	613 221	61,32	24 974	1 612 124	141,23	53 968					
Total / Average	913 189	73,06	140 667	601 792	60,18	123 179	1 514 981	133,23	263 846					



The following table shows the planned demand for thermal energy including network losses.

THERMAL ENERGY DEMAND (CUSTOMERS DEMAND PLUS NETWORK LOSSES) – YEAR 2022											
Description	January	February	March	April	October	November	December	Total			
Customers demand for thermal energy (MWh)	53 074	43 165	40 041	14 714	16 596	43 174	53 083	263 846			
Quantitative losses in distribution network(MWh)	4 615	3 753	3 482	1 280	1 443	3 754	4 616	22 943			
Total consumption demand plus losses (MWh)	57 689	46 918	43 523	15 994	18 039	46 928	57 698	286 789			

Tab. 2.4.1 Forecast of thermal energy demand plus losses in the network for 2022

## 1.17.6 Forecast of network losses – DH Termokos

Network losses include losses in the thermal energy transmission network (TPP Kosova B- DH Termokos) and in the thermal energy distribution network.

Losses in thermal energy transmission network TPP Kosova B - DH Termokos are expected to be 2% or 5,731 MWh<sub>TH</sub>.

In 2022, the distribution network foresees a loss rate of 8% which represents an average reduction of the loss rate of 2.2% compared to the previous year/season.

It is expected that the realization of the network rehabilitation and expansion project of KfW, which is currently in progress and is expected to be completely finalized in 2023, will have an impact in the reduction of losses in the distribution network.

The table below presents the details on the losses in transmission network (cogeneration, TPP Kosova B-DH Termokos) and the losses in distribution network for 2022.

Month	Quantitative losses in transmission network	Transmission network losses (%)	Quantitative losses in distribution network (MWh <sub>TH</sub> )	Distribution network losses (%)	Total network losses (MWh <sub>тн</sub> )	Total network losses (%)
January	1 157	2,0%	4 615	8,0%	5 772	10,0%
February	937	2,0%	3 753	8,0%	4 690	10,0%
March	868	2,0%	3 482	8,0%	4 350	10,0%
April	317	2,0%	1 280	8,0%	1597	10,0%
October	358	2,0%	1 443	8,0%	1 801	10,0%
November	937	2,0%	3 754	8,0%	4 691	10,0%
December	1 157	2,0%	4 616	8,0%	5 773	10,0%
Total	5 731	2,0%	22 943	8,0%	28 674	10,0%

Tab. 1.5 Losses in thermal energy transportation and distribution network- DH Termokos in 2022



## 1.17.7 Thermal energy production – DH Termokos

The planning for thermal energy production is generally evaluated to cover the forecast of thermal energy demand (consumption). In addition to this, the planning for thermal energy production also reflects network losses as well as energy efficiency.

As stated above, DH Termokos bases its thermal energy production on the cogeneration plants at TPP Kosova B with a nominal capacity of 140 MW<sub>TH</sub>. However, DH Termokos has its own reserve production capacity with a nominal capacity of 134 MW<sub>TH</sub> which are planned to be used only for short periods of time, only in the event of unplanned outages of cogeneration plants in TPP Kosova B. Forecast gross consumption from DH Termokos heating plant is 6,820 MW<sub>TH</sub>, taking into account boiler efficiency of 85%, while gross thermal energy production from cogeneration plants, as the main generator, is much greater, namely 286,540 MWh<sub>TH</sub>.

The table below presents the annual forecasts (for 2022) of gross thermal energy production from cogeneration and the production capacities of the heating plant.

Gross production of thermal energy	22
Thermal energy production from cogeneration-TPP Kosova B (MWh <sub>TH</sub> )	286 540
Thermal energy production at the heating plant (MWh $_{TH}$ )	6 820
Total gross production (MWh <sub>TH</sub> )	293 360

- . . . . . .. c . . . -----. ....

The following table presents the data for gross and net thermal energy production by months for 2022.

THERMAL ENERGY PRODUCTION - YEAR 2022									
Description/Month	Janar	February	March	April	October	November	December	Total/Average	
Energy from fuel (MWh)	1 337	1 337	1 337	669	669	1 337	1 337	8 0 2 3	
Thermal efficiency of production plants at the Heating (%)	85%	85%	85%	85%	85%	85%	85%	85%	
Gross production in the production plants at the Heating (MWh)	1 137	1 137	1 137	568	568	1 137	1 137	6 820	
Gross production in the cogeneration plants (if applicable) (MWh)	57 859	46 838	43 394	15 843	17 909	46 838	57 859	286 540	
Total gross production of thermal energy (MWh)	58 996	47 975	44 531	16 411	18 477	47 975	58 996	293 360	
Quantitative losses in transmission network (if applicable) (MWh)	1 157	937	868	317	358	937	1 157	5 731	
Own consumption (MWh)	150	120	140	100	80	110	140	840	
Net production of thermal energy (MWh)	57 689	46 918	43 523	15 994	18 039	46 928	57 699	286 789	

Tab. 1.7 Gross and net production of thermal energy by months - DH Termokos in 2022



## 1.17.8 Thermal Energy Annual Balance – DH Termokos

No.	Description	Unit	Amount
1	Energy from fuel- heavy fuel oil	(MWh <sub>TH</sub> )	8 023
2	Thermal efficiency of the production plants at the Heating	(%)	85%
3	Gross production of thermal energy in production plants at the Heating	(MWh <sub>TH</sub> )	6 820
4	Gross production of thermal energy in cogeneration plants	(MWh <sub>TH</sub> )	286 540
5	Total gross production of thermal energy	(MWh <sub>TH</sub> )	293 360
6	Quantitative losses in transport network (cogeneration network)	(MWh <sub>TH</sub> )	5 731
7	Share of losses in transport network	(%)	2,0%
8	Own consumption	(MWh <sub>TH</sub> )	840
9	Net production of thermal energy/ thermal energy entering the distribution network	(MWh <sub>TH</sub> )	286 789
10	Quantitative losses in distribution network	(MWh <sub>TH</sub> )	22 943
11	Share of losses in distribution network	(%)	8,0%
12	Thermal energy supply	(MWh <sub>TH</sub> )	263 846
13	Fuel consumption	(ton)	710
14	Heating area - annual average	m <sup>2</sup>	1 514 981
15	Number of thermal substations (active/passive)	-	471/10
16	Installed production capacity	MW	274
17	Length of network pipeline	km	84

Tab. 1.8 Thermal energy annual balance - DH Termokos in 2022

#### 1.18 DH GJAKOVA

#### 1.18.1 Thermal energy system

District Heating JSC in Gjakova provides district heating services operating in the public, commercial and household sector in the city of Gjakova.

Upon the commencement of work in January 2021 of the new plant of the district heating and a cogeneration unit of electricity and thermal energy, which is financed by the European Commission funds, as part of IPA II (2015), a normal and independent operation and gradual improvement of customers supply with thermal energy is expected to be achieved.

## **1.18.2** Thermal Energy Production Capacities

District Heating JSC Gjakova will have at its disposal two units (boilers) for production of thermal energy only with a total installed capacity of 11  $MW_{TH}$  and a cogeneration unit with a capacity of 4  $MW_{TH}$  and 1.1  $MW_{EL}$  that use biomass fuel; with the following technical characteristics:

rus. 15 reenneur endructensites of boners - Dri Gjukovu										
DATA ON PRODUCTION CAPACITIES OF DH GJAKOVA										
Production unit	Year of operation	Type of fuel								
Unit 1 - CHP	2021	4 (TH) 1.1 (EL)	3.60 (TH) 1.1(EL)	90%	Biomass					
Unit 2 - HoB	2021	5.5 (TH)	4.95 (TH)	90%	Biomass					
Unit 3 HoB	2021	5.5 (TH)	4.95 (TH)	90%	Biomass					
Total		15 (TH); 1.1(EL)	13.5 (TH); 1.1(EL)	90%						

#### Tab. 1.9 Technical characteristics of boilers - DH Gjakova

TH – Thermal capacity; EL – Electrical capacity

## 1.18.3 Distribution network – DH Gjakova

Distribution network of District Heating JSC in Gjakova is divided into two branches, as shown in the table below.

Tab. 1.10 Distribution network characteristics – DH Gjakova
---

	Old network	New network
Orientation	North part	South part
Direction	From P.S Zekeria Rexha	From the City Hospital
Year of start of network deployment	1980	2001
Type of network	Classic pipe in concrete channel	With pre-insulated pipes

Heat supply is carried out by indirect heating system (through heat exchangers in thermal substations).

The network system is two-pipes-indirect; based on recent feasibility study is estimated that the primary distribution network is approximately 15.5 km long track/31 km pipeline. The total number of substations is 302, while there are currently 220 active thermal substations.

#### 1.18.4 Forecast of thermal energy system development – DH Gjakova

DH Gjakova bases its long-term thermal energy production plans in the current project for the new heating plant with biomass, which is finalized and is planned to gradually operate with full capacity. This project will have an impact on creating a safe, economically favourable and suitable source in terms of environmental protection. The current production capacities are:

- Units (boilers) for the production of thermal energy only, with a nominal capacity of 2 x 5.5 MW<sub>TH</sub>;
- Electricity and thermal energy cogeneration unit with capacities of 1.12 MW<sub>EL</sub> and 4MW<sub>TH</sub>;

Reservoirs for heat storage of 500 m<sup>3</sup> (2x250 m<sup>3</sup>) are also installed.

As follow-up activities to the project for the new heating plant, significant investments in the heating network, rehabilitation and extension of the network are expected in the upcoming years, which will result



in the expansion of the customer base, respectively, the increase of the heating area connected to the district heating system of DH Gjakova.

An increase of the heating area of 52,850  $m^2$  is also planned, so that the heating area in 2022 will reach 116,390  $m^2$  – details presented in the following table:

Year	Current heating area (m2)	Expansion of heating area (m2)	Total connected heating area (m2)
2021	63 540	-	63 540
2022	63 540	52 850	116 390

## 1.18.5 Forecast of thermal energy demand- DH Gjakova

Long-term development projections of DH Gjakova district heating system for thermal energy production are mainly based on the current project for the new heating plant that includes the cogeneration unit with biomass fuel. Also, these development projections include plans for rehabilitation of the existing network and expansion of the distribution network. This will affect the return of customers (currently "passive") and increase the customer base, and consequently increase the heating area, which are the determining factors for the increase of heat consumption. Also, development projections will affect the reduction of losses in the network and in the system in general.

Given that the operation of the new plant with biomass fuel started in 2021, a significant improvement of thermal energy supply for heating is expected.

## 1.18.6 Details on the forecast of long-term demand – DH Gjakova

An increase in the heating area of about 52,850 m<sup>2</sup> is foreseen for 2022 (table 2.11 above). The return of 'passive' customers will have the biggest share in this increase.

The following table presents the annual planning of demand respectively thermal energy supply.

CUSTOMERS DEMAND FOR THERMAL ENERGY – YEAR 2022											
	Hou	sehold custon	ners	Com.	and inst. cust	omers		Total customers			
	Heating area (m²)	Thermal capacity (MW)	Thermal energy amount	Heating area (m <sup>2</sup> )	Thermal capacity (MW)	Thermal energy amount	Heating area (m²)	Thermal Capacity (MW)	Thermal energy amount		
January	31 020	2,79	1 254	32 520	3,58	1 460	63 540	6,37	2 714		
February	31 020	2,79	1 045	32 520	3,58	1 195	63 540	6,37	2 240		
March	31 020	2,79	775	32 520	3,58	985	63 540	6,37	1 760		
April	31 020	2,79	235	32 520	3,58	302	63 540	6,37	537		
October	68 050	6,12	398	48 340	5,32	336	116 390	11,44	734		
November	68 050	6,12	1 850	48 340	5,32	1 453	116 390	11,44	3 303		
December	68 050	6,12	2 420	48 340	5,32	1 869	116 390	11,44	4 289		
Total/ Average	46 890	4,22	7 977	39 300	4,32	7 600	86 190	8,54	15 577		

#### Tab. 1.12 Forecast of thermal energy supply/demand - DH Gjakova in 2022

The following table presents the planned demand for thermal energy including network losses.

Tab. 2.12.1: Forecast of thermal energy demand plus network losses for 2022

THERMAL ENERGY DEMAND (CUSTOMERS DEMAND PLUS NETWORK LOSSES) – YEAR 2022										
Description	January	February	March	April	October	November	December	Total		
Customers demand for thermal energy (MWh)	2 714	2 240	1 760	537	734	3 303	4 289	15 577		
Total quantitative losses in the network (MWh)	678	560	440	134	183	825	1 073	3 893		
Total consumption demand plus losses (MWh)	3 392	2 800	2 200	671	917	4 128	5 362	19 470		

## 1.18.7 Forecast of network losses – DH Gjakova

In 2022 the level of losses in the distribution network is estimated to be around 20%, more specifically the quantitative losses in the network are expected to be 3,893  $MWh_{TH}$ , which is mainly due to the obsolete pipes network (in the northeast part of the city), water leakage in pipelines etc.

In the second half of 2022, within the project of the Swiss Agency for Development – SECO, the pipeline replacement in the northern part of the city is planned to be completed, which will have a positive impact on improving supply, especially for customers connected to this part of the network, and reducing network losses. The following table presents the annual forecasts by months for quantitative losses and share of the levels of losses in the distribution network.

NETWORK LOSSES - YEAR 2022											
Description	January	February	March	April	October	November	December	Total/Ave rage			
Quantitative losses in transmission network (if applicable) (MWh)	-	-	-	-	-	-	-	-			
Share of losses in transmission network (%)	-	-	-	-	-	-	-	-			
Quantitative losses in distribution network (MWh)	678	560	440	134	183	825	1 073	3 893			
Share of losses in distribution network (%)	20%	20%	20%	20%	20%	20%	20%	20%			
Total quantitative losses in the network (MWh)	678	560	440	134	183	825	1 073	3 893			
Share of total network losses (%)	20%	20%	20%	20%	20%	20%	20%	20%			

#### Tab. 1.13 Forecast of losses in distribution network - DH Gjakova in 2022

## 1.18.8 Forecast of net and gross production of thermal energy- DH Gjakova

Given that the operation of the new plant with biomass-wood chips fuel has started in 2021, the price of which is more favourable than fuel oil, therefore it will be possible to provide a significant amount of fuel. Due to this, the forecast of thermal energy production is consequently based on full production by the end of the year. The planning for thermal energy production are generally estimated to cover the projected demand for thermal energy (consumption).

In addition to this, the planning for thermal energy production in 2022 also reflect network losses as well as the thermal efficiency of boilers. The following table presents the forecast of gross and net production of thermal energy, by months for 2022.

THERMAL ENERGY PRODUCTION- Year 2022										
Description/Month	January	February	March	Prill	October	November	December	Total/Average		
Energy from fuel (MWh)	3 785	3 120	2 450	750	1 025	4 595	5 975	21 700		
Thermal efficiency of the production plants at the Heating (%)	90%	90%	90%	90%	90%	90%	90%	90%		
Gross production in production plants at the Heating (MWh)	3 407	2 808	2 205	675	577	2 757	3 585	16 014		
Gross production in cogeneration plants (if applicable) (MWh)	-	-	-	-	345	1 378	1 793	3 516		
Total gross production of thermal energy (MWh)	3 407	2 808	2 205	675	922	4 135	5 378	19 530		
Quantitative losses in transmission network (if applicable) (MWh)	-	-	-	-	-	-	-	-		
Own consumption (MWh)	15	8	5	4	5	8	15	60		
Net production of thermal energy (MWh)	3 392	2 800	2 200	671	917	4 127	5 363	19 470		

Tab. 1.14 Forecast of gross and net production of thermal energy - DH Gjakova in 2022

## 1.18.9 Thermal Energy Annual Balance – DH Gjakova

Tab. 1.15 Thermal energy annual balance – Gjakova 2022



GENERAL BALANCE OF THERMAL ENERGY - YEAR 2022								
No.	Description	Unit	Value					
1	Energy from fuel - heavy fuel oil	(MWh <sub>TH</sub> )	21 700					
2	Thermal efficiency of production plants at the Heating	(%)	90%					
3	Gross production of thermal energy in the production plants at the Heating	(MWh <sub>TH</sub> )	16 014					
4	Gross production of thermal energy at the cogeneration plant	(MWh <sub>TH</sub> )	3 516					
5	Total gross production of thermal energy	(MWh <sub>TH</sub> )	19 530					
6	Quantitative losses in transmission network (cogeneration network)	(MWh <sub>TH</sub> )	-					
7	Share of losses in transmission network	(%)	-					
8	Own-consumption	(MWh <sub>TH</sub> )	60					
9	Net production of thermal energy /thermal energy entering the distribution network	(MWh <sub>TH</sub> )	19 470					
10	Quantitative losses in distribution network	(MWh <sub>TH</sub> )	3 893					
11	Share of losses in distribution network	(%)	20,00%					
12	Thermal energy demand/supply	(MWh <sub>TH</sub> )	15 577					
13	Fuel consumption	(ton)	7 000					
14	Heating area	m²	86 190					
15	Number of active/passive thermal substations	-	133/220					
16	Installed production capacity	MW	15(TH); 1.1(EL)					
17	Length of network pipeline	km	31					



## 1.19 Thermal Energy General Annual Balance 2022

No.	Description	Unit	DH Termokos	DH Gjakova	Total/sector
1	Energy from fuel - heavy fuel oil / biomass	(MWh <sub>TH</sub> )	8 023	21 700	29 723
2	Gross production of thermal energy in the production plants of the Heating	(MWh <sub>TH</sub> )	6 820	16 014	22 833
3	Gross production of thermal energy in cogeneration plants	(MWh <sub>TH</sub> )	286 540	3 516	290 056
4	Total gross production of thermal energy	(MWh <sub>TH</sub> )	293 360	19 530	312 889
5	Quantitative losses in transmission network (cogeneration network)	(MWh <sub>TH</sub> )	5 731	-	5 731
6	Share of losses in transmission network	(%)	2,00%	-	2,00%
7	Own-consumption	(MWh <sub>TH</sub> )	840	60	900
8	Net production of thermal energy /thermal energy entering the dis. net.	(MWh <sub>TH</sub> )	286 789	19 470	306 258
9	Quantitative losses in distribution network	(MWh <sub>TH</sub> )	22 943	3 893	26 836
10	Share of losses in distribution network	(%)	8,0%	20,0%	8,8%
11	Thermal energy supply	(MWh <sub>TH</sub> )	263 846	15 577	279 422
12	Fuel consumption - heavy fuel oil/biomass	(ton)	710	7 000	710/7000
13	Heating area	m²	1 514 981	86 190	1 601 171
14	Number of thermal substations (active / passive)	-	471/10	133/220	604 / 230
15	Thermal energy installed production capacity	$MW_{TH}$	274	15	289
16	Length of network pipeline	km	84	31	115

Tab. 1.16 Thermal energy general balance 2022

End of document