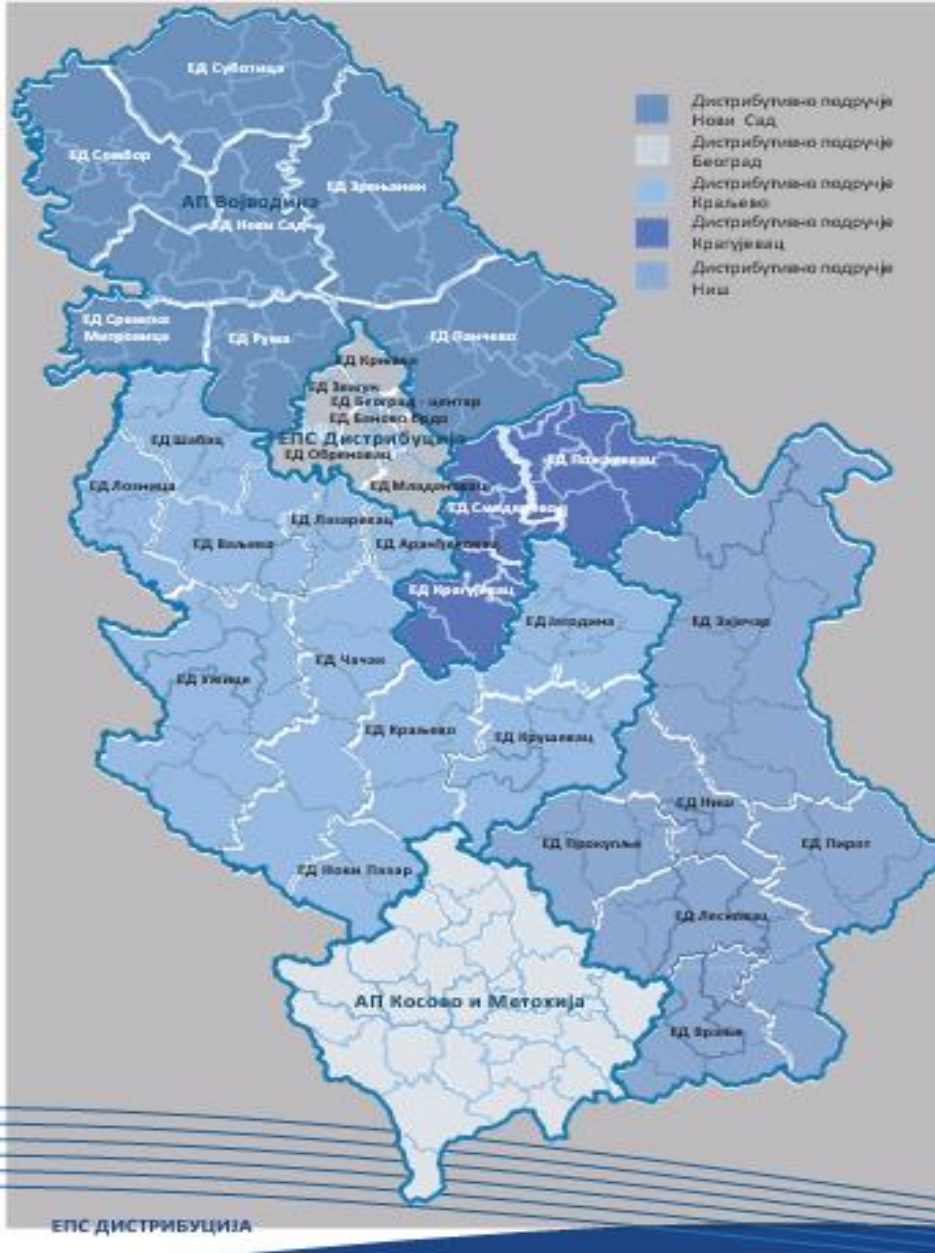




Suočavanje Elektrodistribucije Srbije sa izazovima - „električna budućnost“

Dalibor Nikolić, dipl.el.inž.
Direktor Direkcije za upravljanje DSEE

General data



Republic of Serbia:

Capital:	Belgrade
Area:	77.453 km²
Population:	7.186.862
GDP (per capita):	\$17.076
ISO 3166 code:	RS
Drives on the:	right

„EPS Distribution“ Ltd Belgrade:

- Power Distribution Company
- Distribution System Operator (DSO) – only in state
- State owned
- Headquarters in Belgrade

5 Distribution Areas with 33 Branches:

1. Belgrade (6 Branches)
2. Novi Sad (7 Branches)
3. Kraljevo (11 Branches)
4. Niš (6 Branches)
5. Kragujevac (3 Branches)

General data

CONSUMPTION AREA:

Number of customers:	3.664.599
Number of households:	3.261.339
Energy flow:	30.129 GWh
Peek power:	4.936 MW
Average annual consumption Households:	4.090 kWh
Anuall average consumption per inhabitant:	4.182 kWh
Average month consumption Households:	341 kWh
SAIFI (2019):	8,14
SAIDI (2019):	789

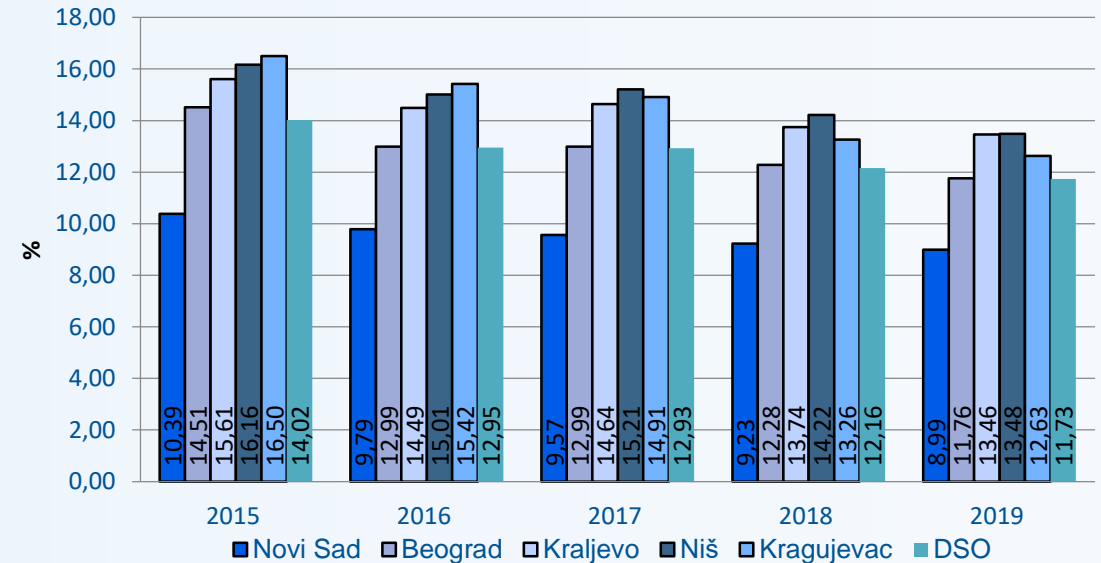
ELECTRIC DISTRIBUTION NETWORK OF ODS:

Main stations 110/x kV :	196 pcs
Install power of Main stations:	10.858 MVA
Primary station 35/x kV :	582 pcs
Install power of Primary stations:	6.470 MVA
Length of 35 kV network:	6.677 km
Substations of 20/0,4 kV:	8.703 pcs
Install power of substations 20/0,4 kV:	3.336 MVA
Length of 20 kV network:	10.295 km
Substations of 10/0,4 kV:	26.191 pcs
Install power of substations 10/0,4 kV:	9.791 MVA
Length of 10 kV network:	33.448 km
Length of LV network:	112.951 km

Energy flow, losses and customers date

Distribution Area [GWh]	2015	2016	2017	2018	2019
Novi Sad	8.408	8.413	8.490	8.373	8.354
Beograd	7.876	7.821	7.904	7.832	7.805
Kraljevo	6.866	7.006	7.139	7.059	7.032
Niš	5.001	4.991	5.042	4.896	4.902
Kragujevac	2.063	2.030	2.029	1.983	1.977
TOTAL	30.215	30.245	30.588	30.129	30.056

ENERGY LOSSES [%] from 2015. until 2019. year

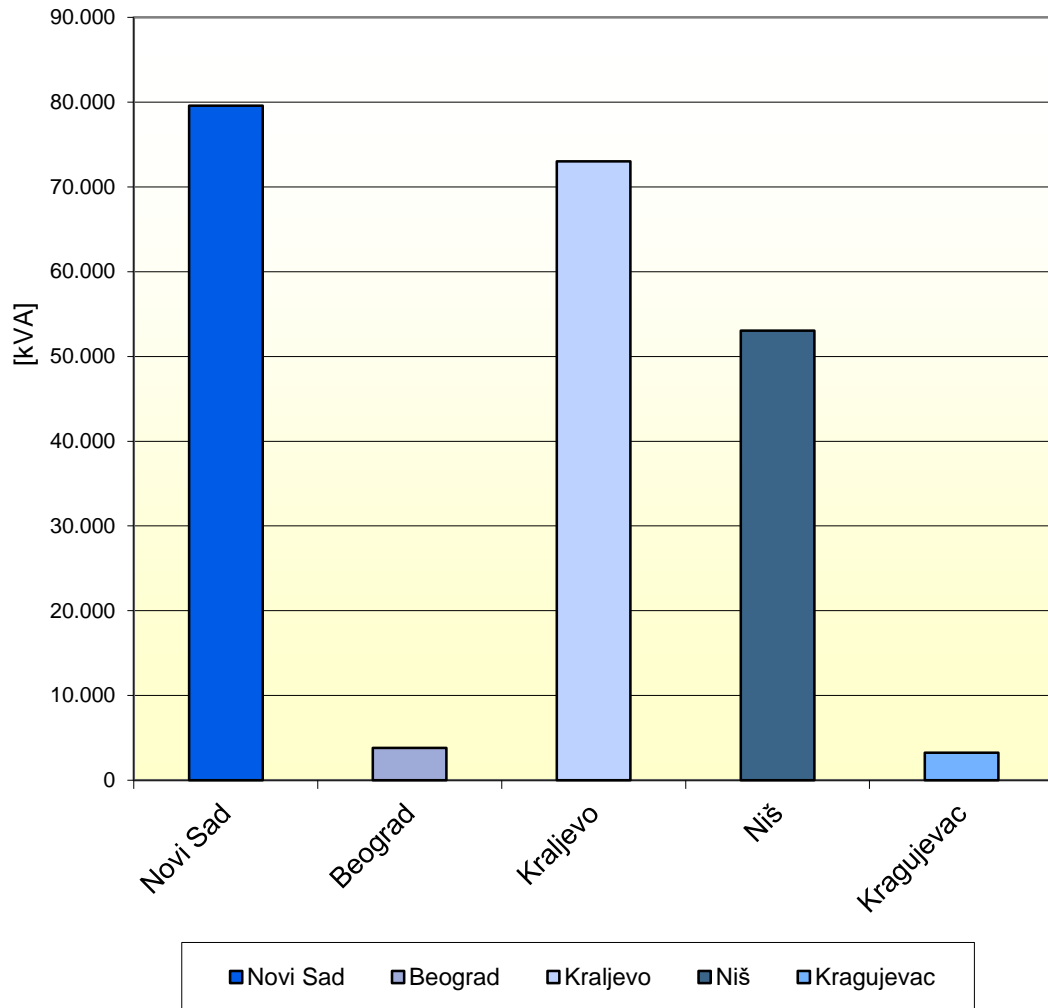


CUSTOMERS STRUCTURE:

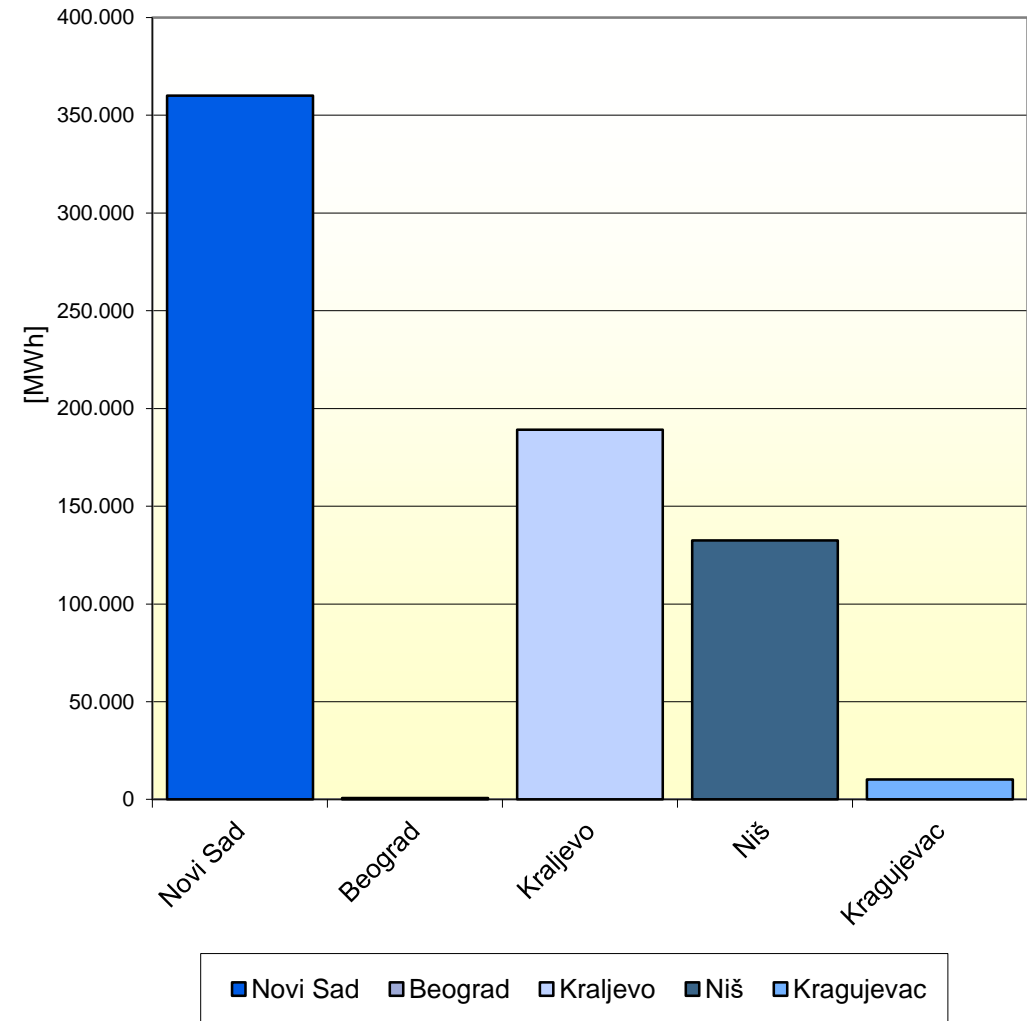
DISTRIBUTION AREA (DA)	HOUSEHOLD			OTHER			TOTAL per/in Distribution Area	
	Number of Customer	participation		Number of Customer	participation		Number of Customer	%
		% in DSO	% in DA		% in DSO	% in DA		
NOVI SAD	853.778	26,18	89,82	96.816	24,01	10,18	950.594	25,94
BEOGRAD	796.383	24,42	86,87	120.328	29,84	13,13	916.711	25,02
KRALJEVO	821.717	25,20	88,96	101.966	25,29	11,04	923.683	25,21
NIŠ	536.376	16,45	90,85	54.012	13,39	9,15	590.388	16,11
KRAGUJEVAC	253.085	7,76	89,36	30.138	7,47	10,64	283.223	7,73
DSO EPS DISTRIBUTION ltd.	3.261.339	100,00	89,00	403.260	100,00	11,00	3.664.599	100,00

POWER AND PRODUCTION OF DISTRIBUTION POWER PLANTS

INSTALIRANA SNAGA PO DISTRIBUTIVNIH IZVORA PO DISTRIBUTIVNIM PODRUČJIMA



PROIZVODNJA ELEKTRANA PRIKLJUČENIH NA DISTRIBUTIVNI SISTEM



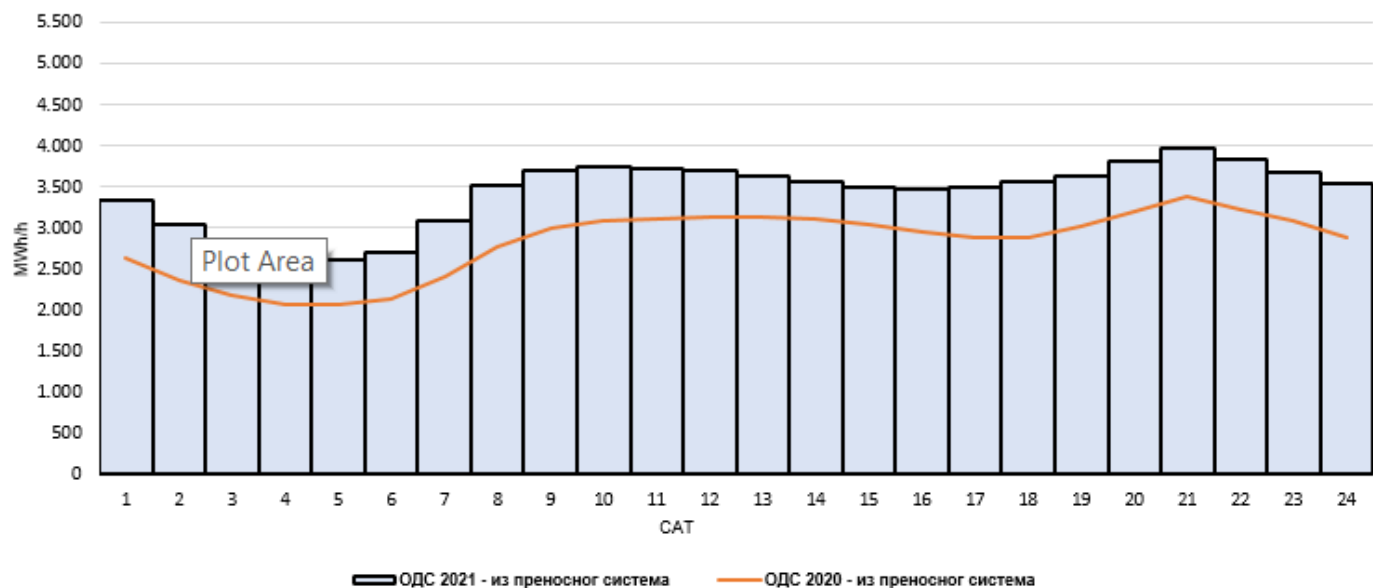
ENERGY PRODUCTION OF DISTRIBUTION PRODUCTION MODULES

		NOVI SAD	BEOGRAD	KRALJEVO	NIŠ	KRAGUJEVAC	EDS	
	PHOTOVOLTAGE PP	Number	16	13	44	58	6	137
		Install power [kVA]	1.899	662	1.888	6.963	116	11.528
		Production EE [MWh]	2.399	754	2.100	7.891	119	13.262
	HYDRO PP	Number			74	67		141
		Install power [kVA]			66.603	42.501		109.104
		Production EE [MWh]			182.763	100.092		282.854
	BIOGAS	Number	26		1	2		29
		Install power [kVA]	26.806		499	1.200		28.505
		Production EE [MWh]	161.925		3.459	5.053		170.437
	WIND PP	Number	3		1			4
		Install power [kVA]	24.820		500			25.320
		Production EE [MWh]	61.655		264			61.920
	COGENERATION PP	Number	11	2	1		3	17
		Install power [kVA]	22.645	3.165	3.500		3.150	32.460
		Production EE [MWh]	122.986		625		10.070	133.681
GAS	Number	2					2	
	Install power [kVA]	3.409					3.409	
	Production EE [MWh]	11.015					11.015	
BIOMASS	Number				1		1	
	Install power [kVA]				2.380		2.380	
	Production EE [MWh]				19.468		19.468	
TOTAL EDS	Number	58	15	121	128	9	331	
	Install power [kVA]	79.579	3.827	72.990	53.044	3.266	212.706	
	Production EE [MWh]	359.979	754	189.211	132.504	10.189	692.637	

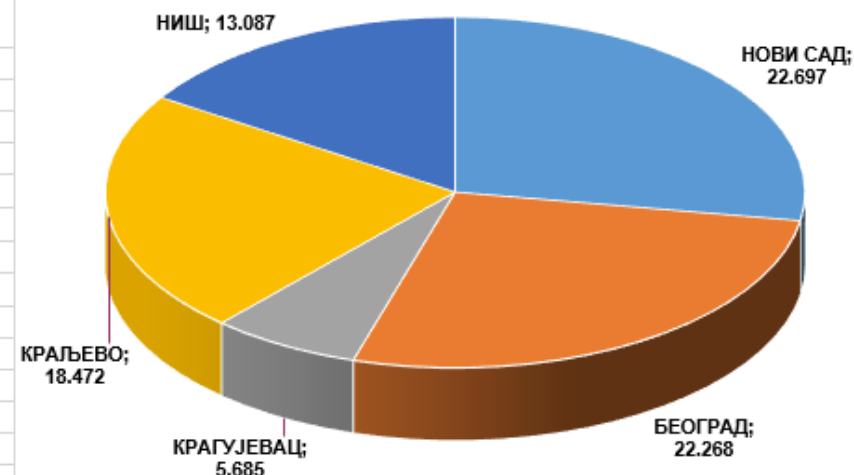
ENERGY PRODUCTION OF DISTRIBUTION PRODUCTION MODULES for a typical winter day

Дијаграм сатног оптерећења конзума (MWh/h) за дан

среда, 28. април 2021



Дијаграм дневне потрошње по ДП (MWh)



АКТИВНО САТНО ОПТЕРЕЋЕЊЕ ПО ДИСТРИБУТИВНИМ ПОДРУЧЈИМА (MW)

ДП	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	УКУПНО
НОВИ САД	863	783	728	696	698	735	854	978	1.037	1.059	1.061	1.073	1.064	1.033	996	980	982	985	994	1.042	1.098	1.050	972	934	22.697
БЕОГРАД	925	898	821	772	751	787	895	988	996	1.005	990	971	951	928	912	909	920	951	981	1.017	1.052	1.022	945	880	22.268
КРАГУЈЕВАЦ	225	198	185	175	177	181	204	238	254	258	253	249	247	247	240	241	245	251	258	269	283	275	273	260	5.685
КРАЉЕВО	749	652	590	565	555	572	655	782	849	861	847	834	816	798	782	778	784	793	818	867	901	873	890	859	18.472
НИШ	562	501	452	427	426	434	480	534	568	569	563	564	552	556	553	555	560	569	577	613	644	622	598	607	13.087
ОДС 2021 - из преносног систем	3.323	3.032	2.776	2.636	2.607	2.709	3.087	3.521	3.703	3.752	3.714	3.691	3.631	3.561	3.484	3.464	3.493	3.549	3.628	3.808	3.978	3.842	3.679	3.540	82.208

АКТИВНО САТНО ОПТЕРЕЋЕЊЕ ОДС - из преносног система за 2020. годину дан на дан (MW)

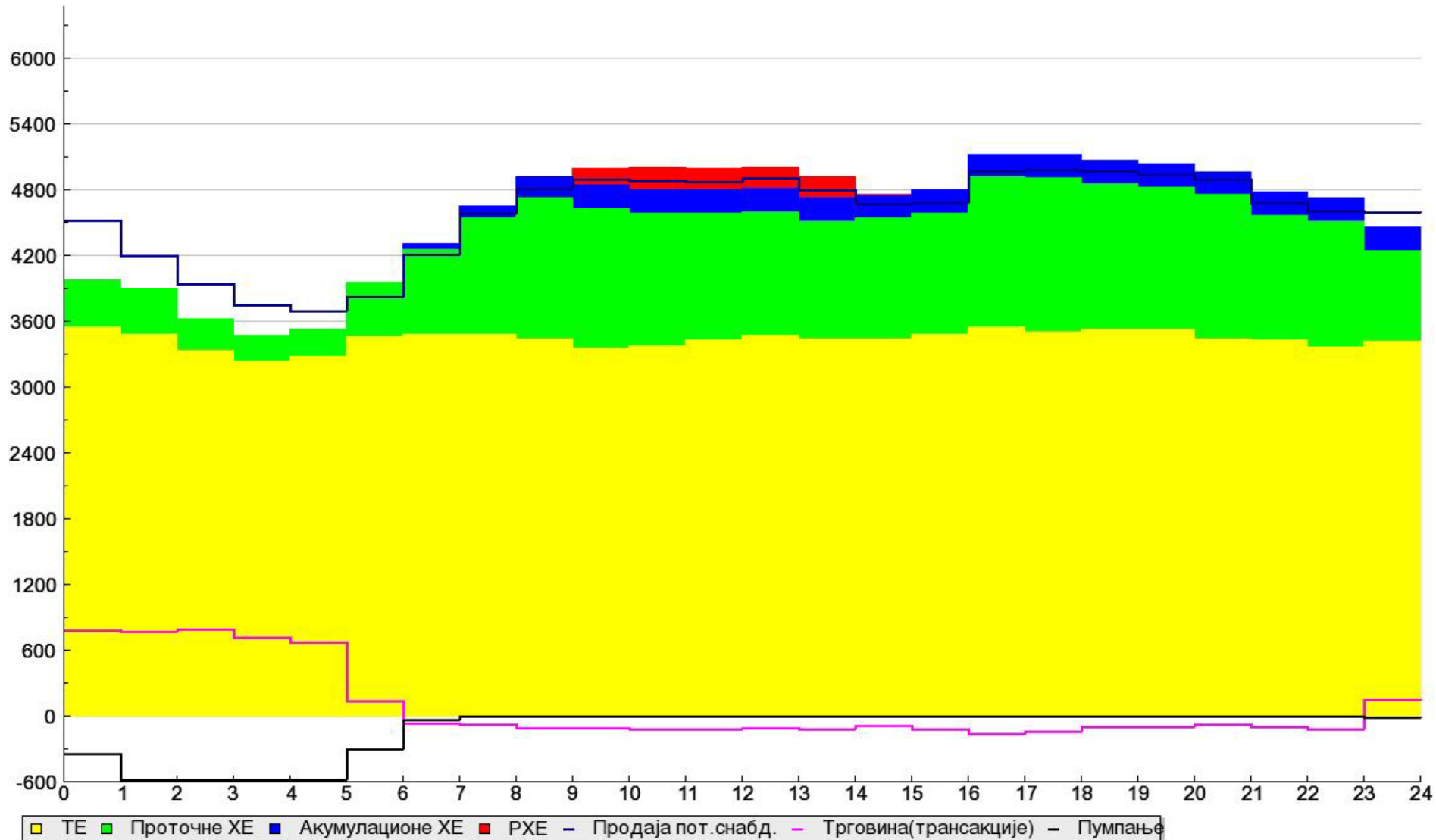
ОДС 2020 - из преносног систем	2.628	2.364	2.169	2.069	2.060	2.127	2.402	2.776	3.003	3.090	3.113	3.120	3.127	3.116	3.046	2.945	2.886	2.871	3.005	3.191	3.374	3.214	3.086	2.885	67.668
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ПОТИСНУТО АКТИВНО САТНО ОПТЕРЕЋЕЊЕ У ПРЕНОСНИ СИСТЕМ ЕМС а.д. (kW)

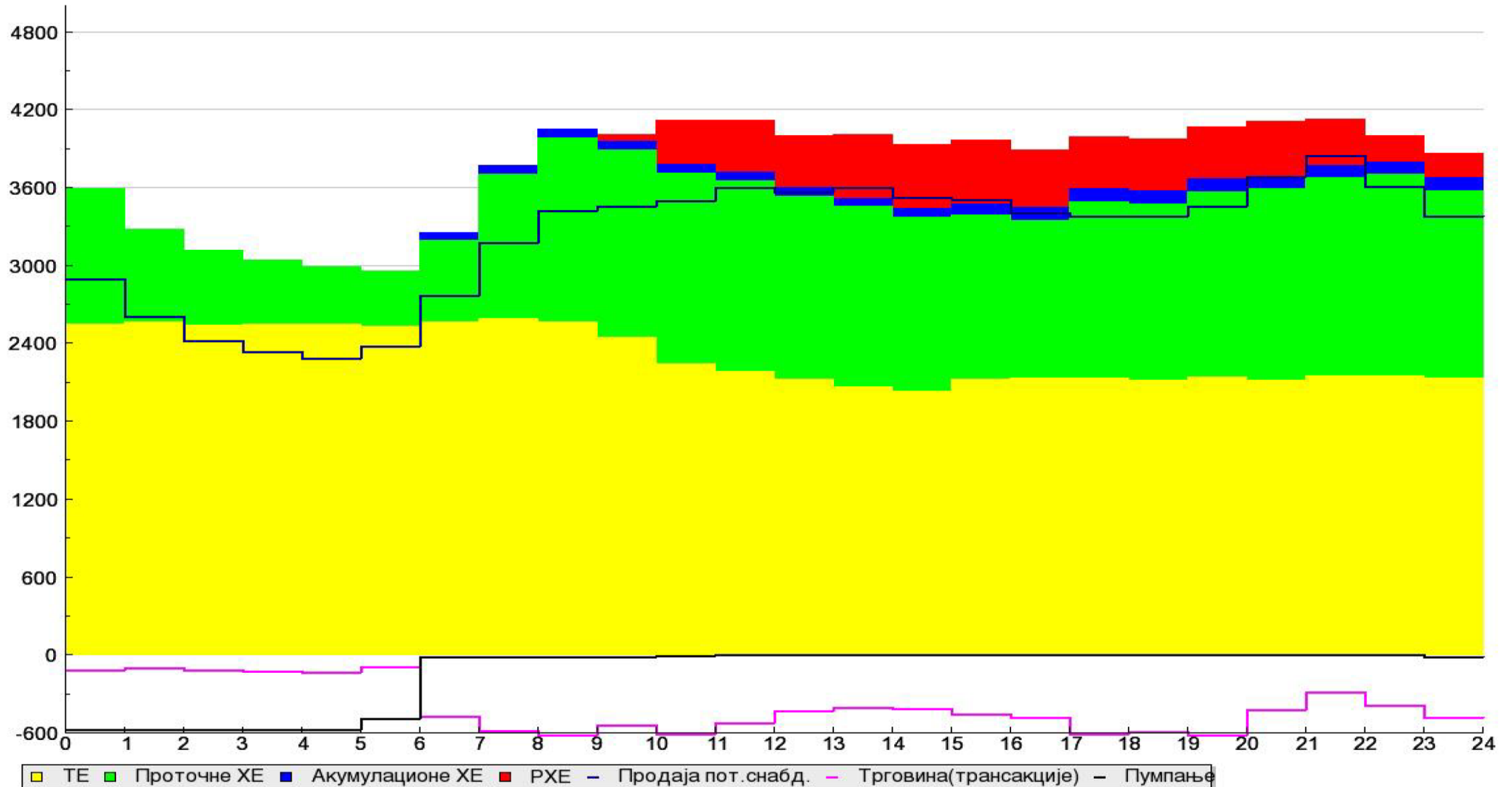
ОДС Укупно	5.000	5.099	5.324	5.415	5.354	5.173	5.027	4.793	4.554	4.694	4.703	4.818	4.901	4.859	4.876	4.917	4.983	5.008	4.925	4.752	4.554	4.628	4.571	4.843	117.771
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Production structure in the Republic of Serbia for a typical winter day

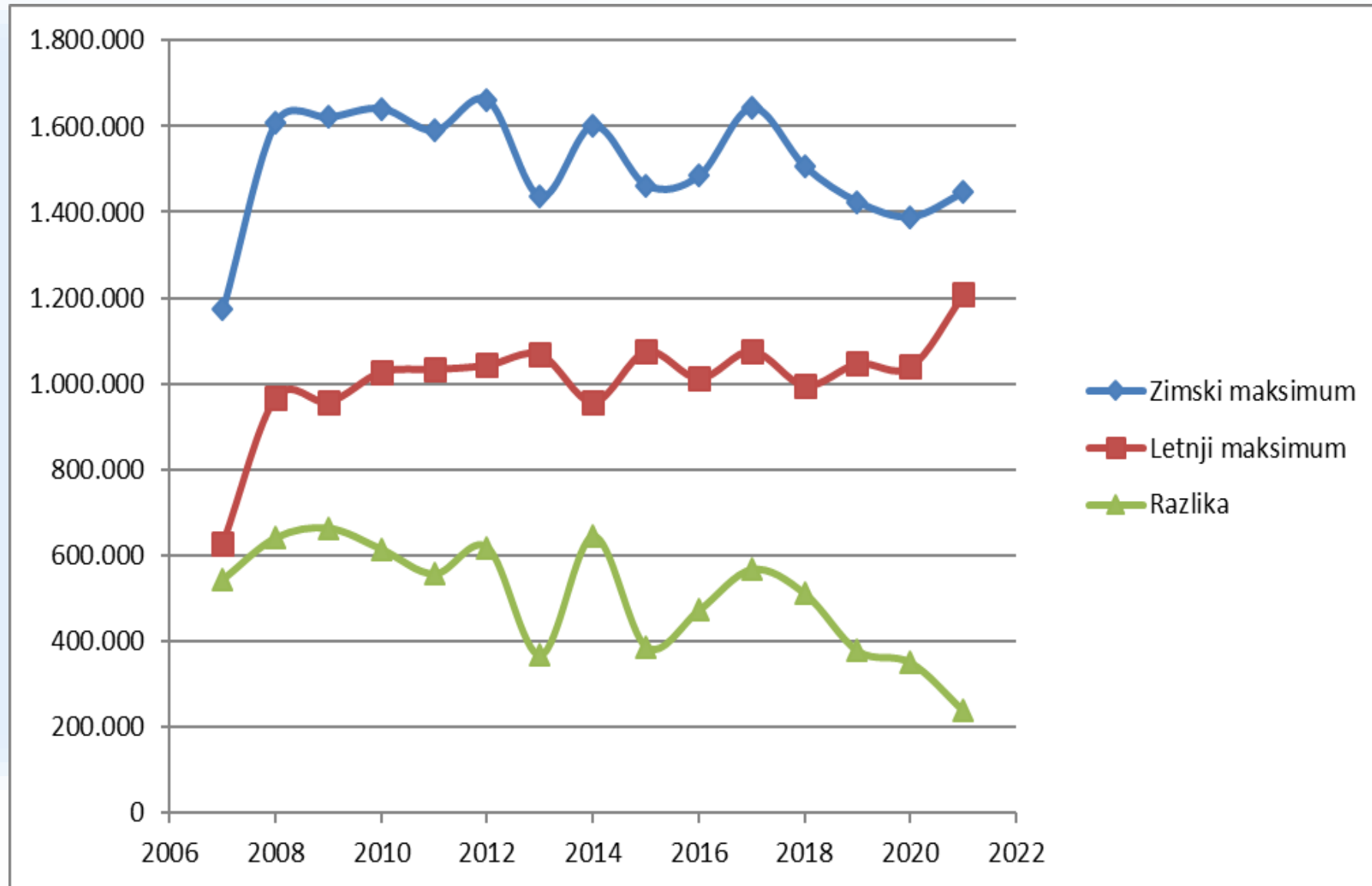
Производња за дан Четвртак, 17.12.2020.



Production structure in the Republic of Serbia for a typical spring day

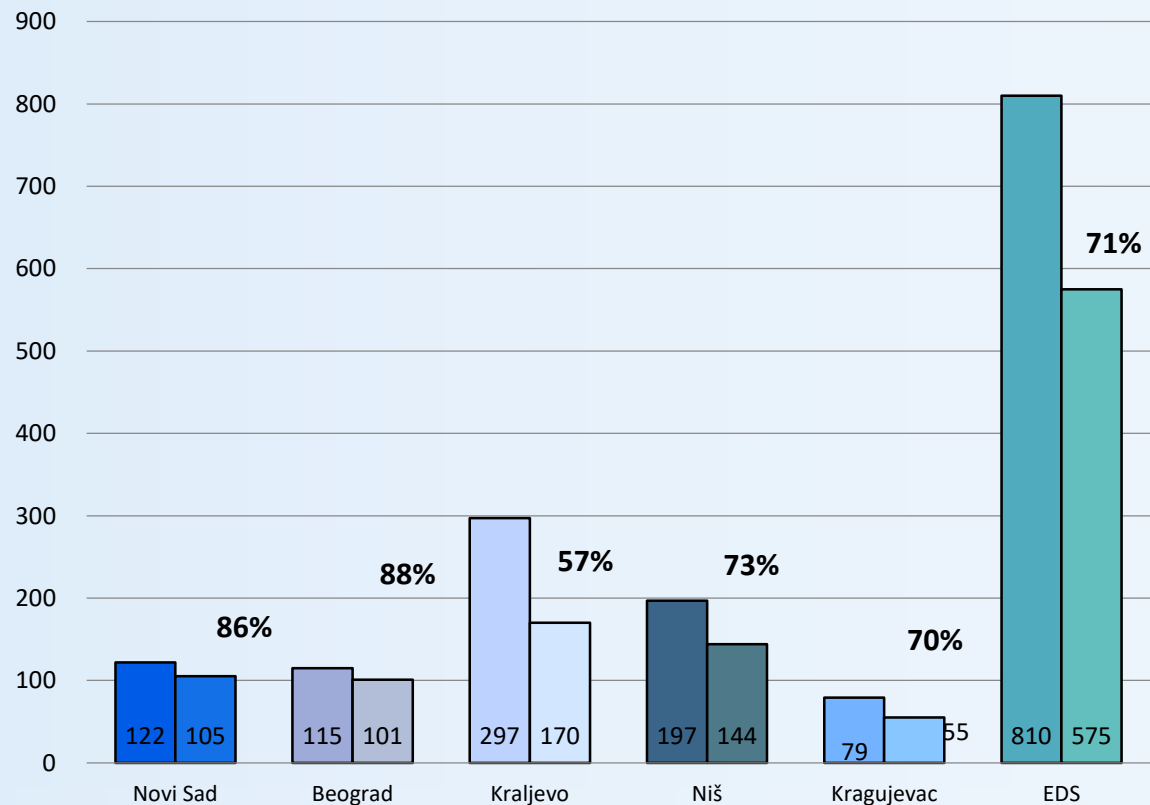


Changes in load diagrams over the last ten years in DA Belgrade



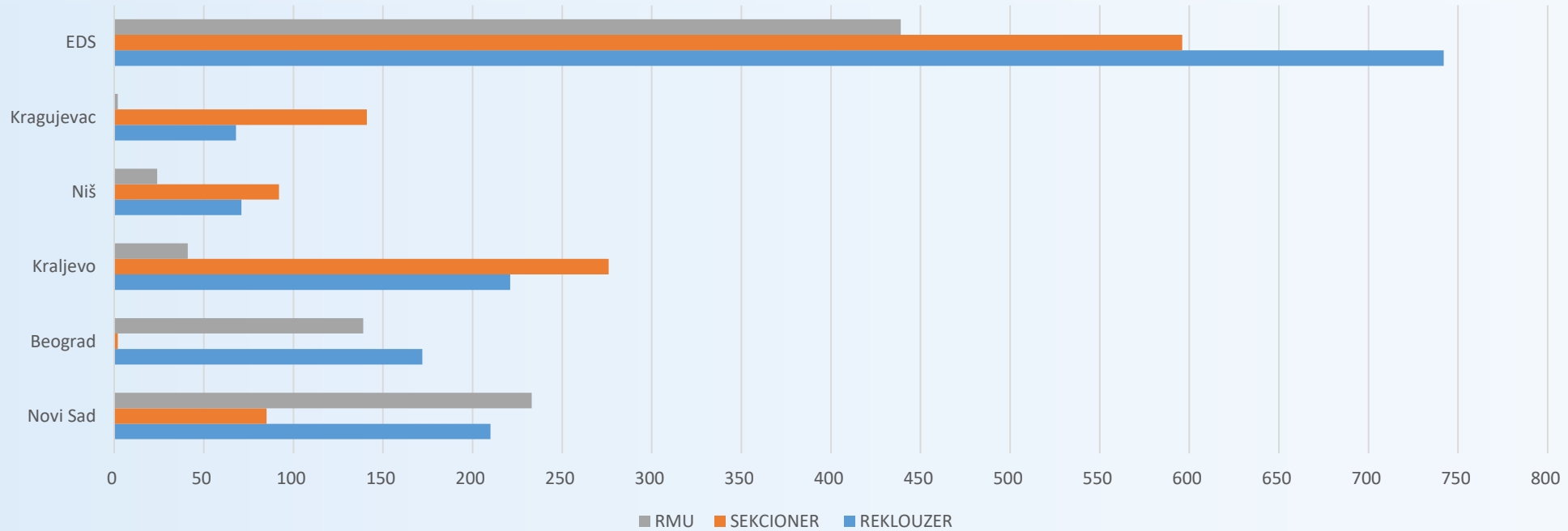
DATA OF SUBSTATION IN SCADA SYSTEM

Broj TS 110/x и 35/x kV - ukupno i uključeno u SDU



TS110/x kV	UKUPNO	UKLJUČENO U SDU
Novi Sad	62	61
Beograd	29	29
Kraljevo	53	45
Niš	38	38
Kragujevac	16	16
EDS	198	189
TS 35/x	UKUPNO	UKLJUČENO U SDU
Novi Sad	60	44
Beograd	86	72
Kraljevo	244	125
Niš	159	106
Kragujevac	63	39
EDS	612	386

MEDIUM VOLTAGE NETWORK AUTOMATION



	REKLOUZER	SEKCIJONER	RMU
Novi Sad	210	85	233
Beograd	172	2	139
Kraljevo	221	276	41
Niš	71	92	24
Kragujevac	68	141	2
EDS	742	596	439