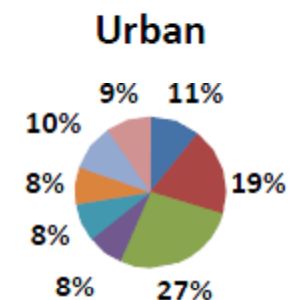
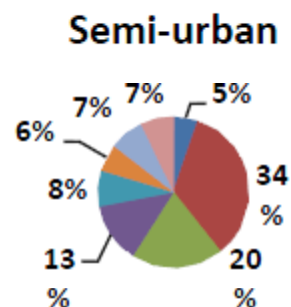
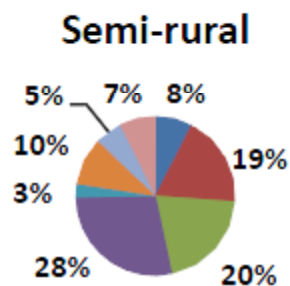
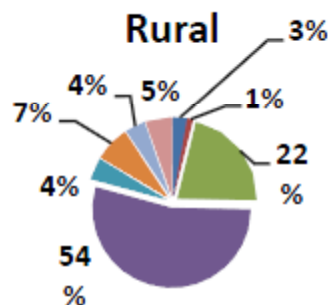
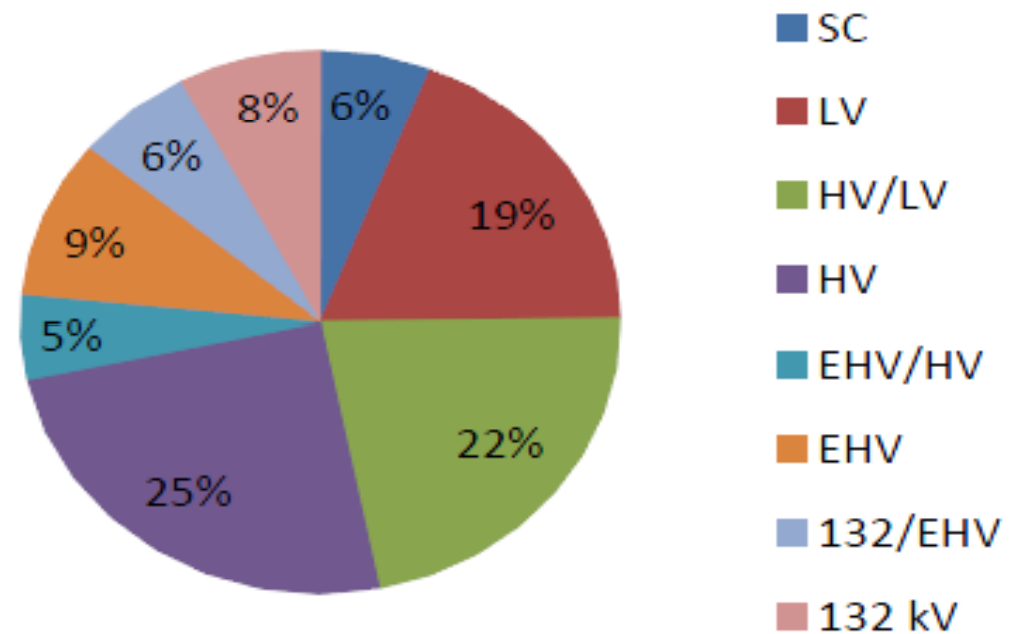




تلفات شبکه توزیع برق کشور انگلستان

Network Type	Losses
Rural	6.0% - 9.1%
Semi-rural	5.8% - 8.2%
Semi-urban	4.9% - 6.4%
Urban	4.2% - 4.9%



Service cables
High voltage networks
Grid substations

Low voltage networks
Primary substations
Grid networks

Distribution transformers
Extra high voltage networks



تفسیر تلفات شبکه توزیع برق کشور انگلستان

In rural networks more than half of the loss occurs in the HV networks. LV network losses are very low due to short feeders and fewer consumers supplied per feeder. The distribution transformers losses are about 22% of the total losses. The rural networks have the highest overall annual losses, approaching about 6.0-9.1% of energy supplied.

Losses in semi-rural type networks are similar to total GB losses with overall losses of about 5.8-8.2% which is expected as the majority of networks are of this type.

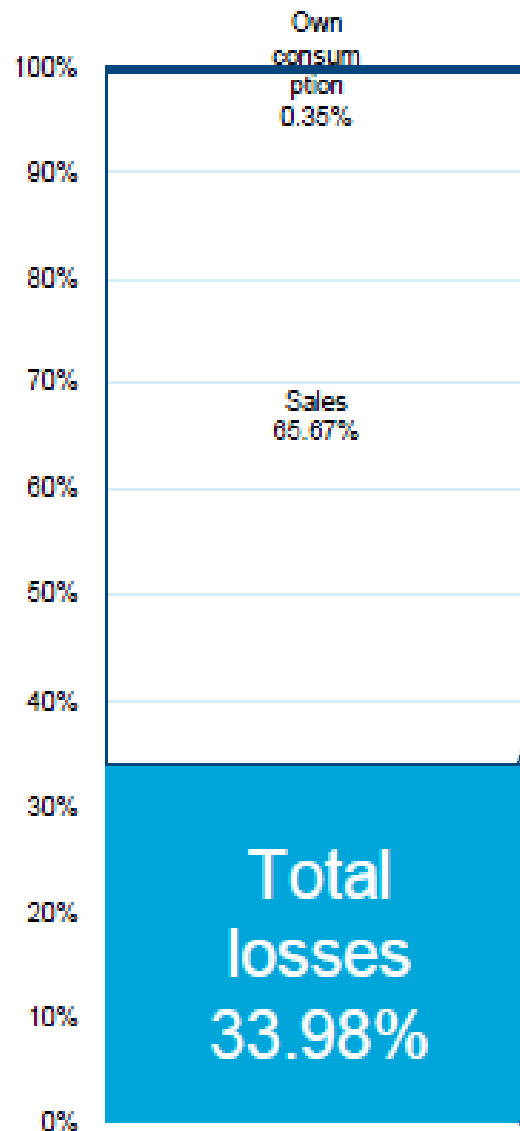
In semi-urban networks, the share of losses in LV networks increases and losses in the HV networks decrease. The overall annual losses are about 4.9-6.4% of the energy supplied.

In urban networks, where LV and HV feeders become shorter, the share of losses in distribution transformers increases. However, overall losses are smaller and they account for about 4.2-4.9% of annual energy supplied.

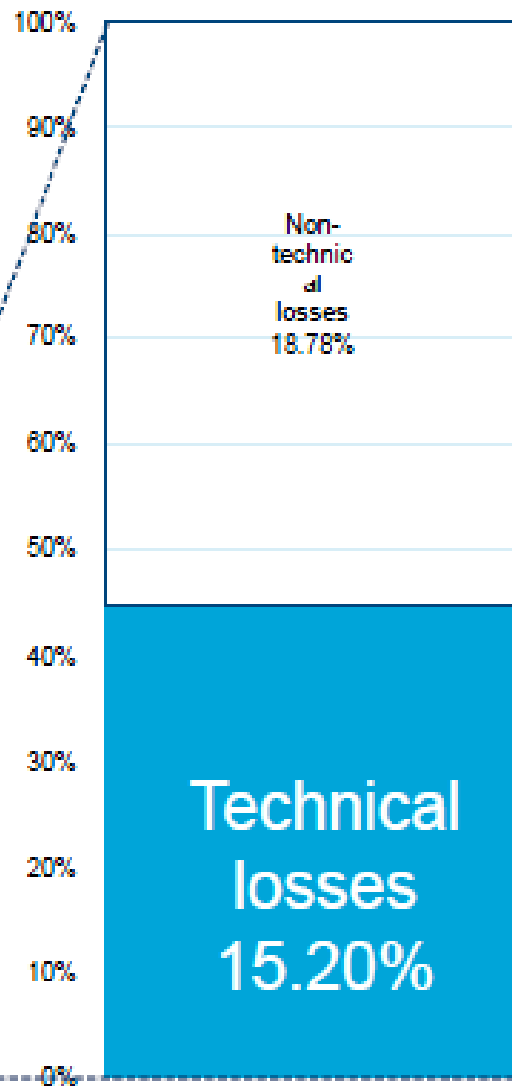


تلفات شبکه توزیع برق کشور آلبانی

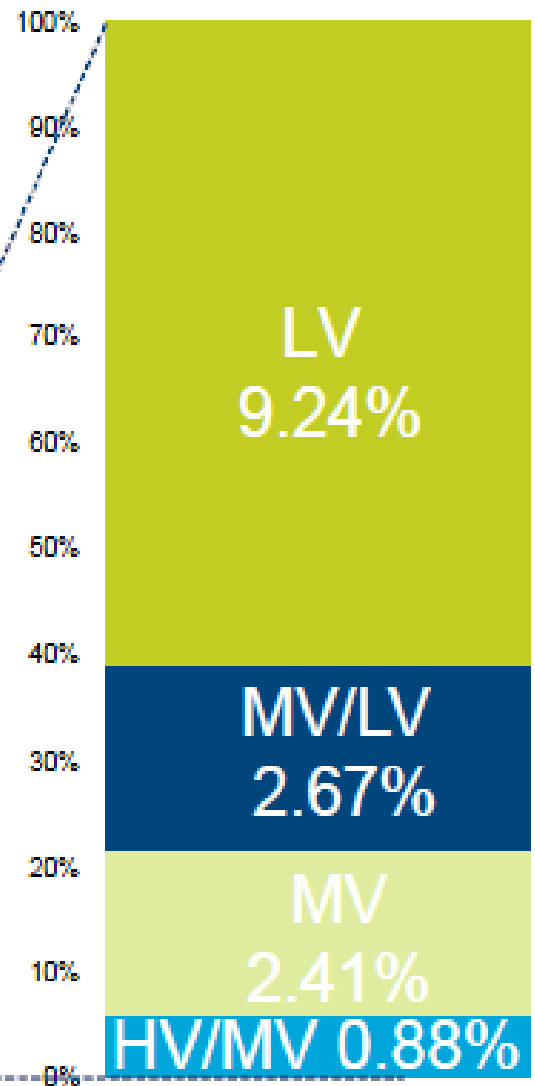
OSSH Energy balance

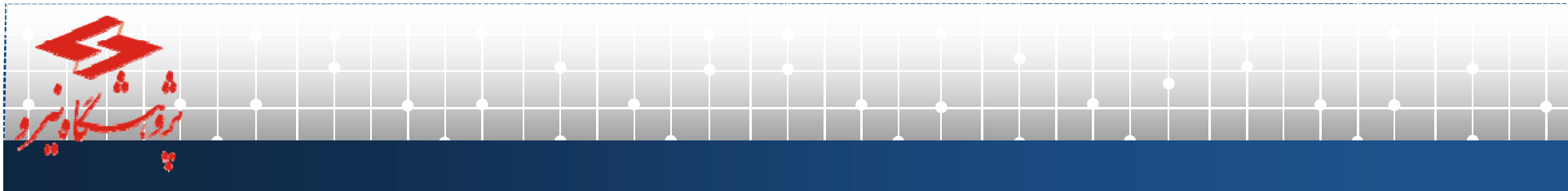


Total losses

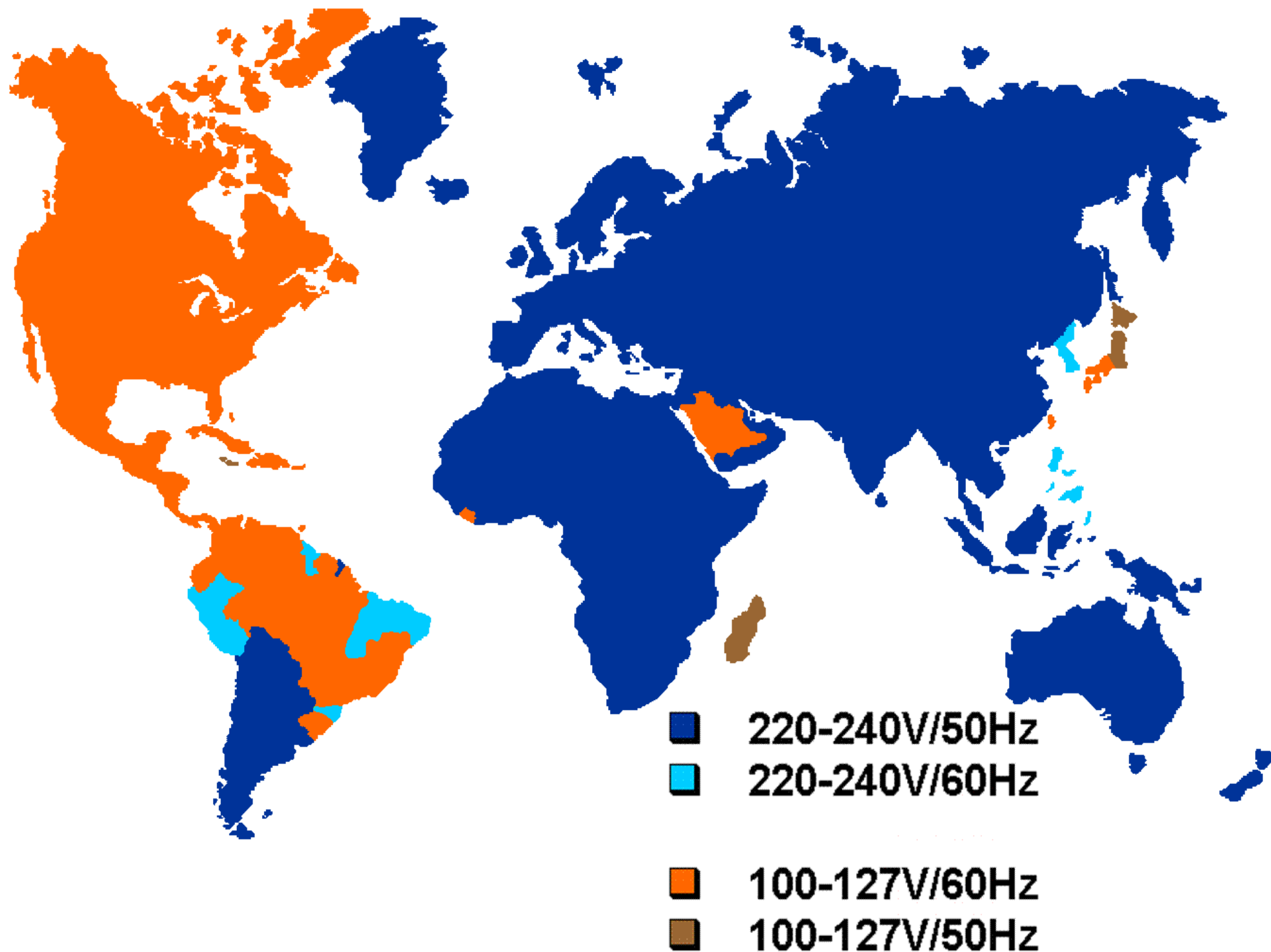


Technical losses by voltage level





بررسی کلی شبکه‌های توزیع اروپا





سطوح مختلف ولتاژ فشار متوسط و فشار قوی شبکه توزیع

Country/ Voltage level I	LV	MV														HV													
		3 kV	5 kV	6 kV	10 kV	11 kV	15 kV	20 kV	22 kV	23 kV	24 kV	25 kV	30 kV	33 kV	35 kV	36 kV	38 kV	45 kV	50 kV	52 kV	60 kV	65 kV	66 kV	70 kV	110 kV	120 kV	130 kV	132 kV	150 kV
AT					◆			◆					◆												◆				
BE*				◆		◆	◆								◆									◆					
BG				◆	◆			◆						◆											◆				
CY						◆				◆																			
CZ		◆	◆	◆					◆					◆											◆				
DE					◆		◆	◆					◆												◆				
DK																					◆								
EE				◆	◆		◆	◆						◆															
ES						◆	◆	◆					◆					◆					◆		◆			◆	
FI								◆																	◆				
FR								◆																					
GR				◆			◆	◆	◆														◆						◆
HU					◆			◆						◆												◆			
IE					◆			◆										◆							◆				
IT**								◆																					◆
LT				◆	◆									◆															
LU			◆					◆														◆							
LV				◆	◆			◆																					
MT																													◆
NL***		◆		◆	◆			◆		◆		◆						◆					◆						
PL				◆			◆	◆					◆												◆				
PT				◆	◆		◆						◆								◆								
RO				◆				◆																	◆				
SE						◆					◆		◆											◆	◆		◆		
SI					◆			◆						◆											◆				
SK					◆				◆																◆				
UK						◆							◆															◆	
NO									◆																			◆	

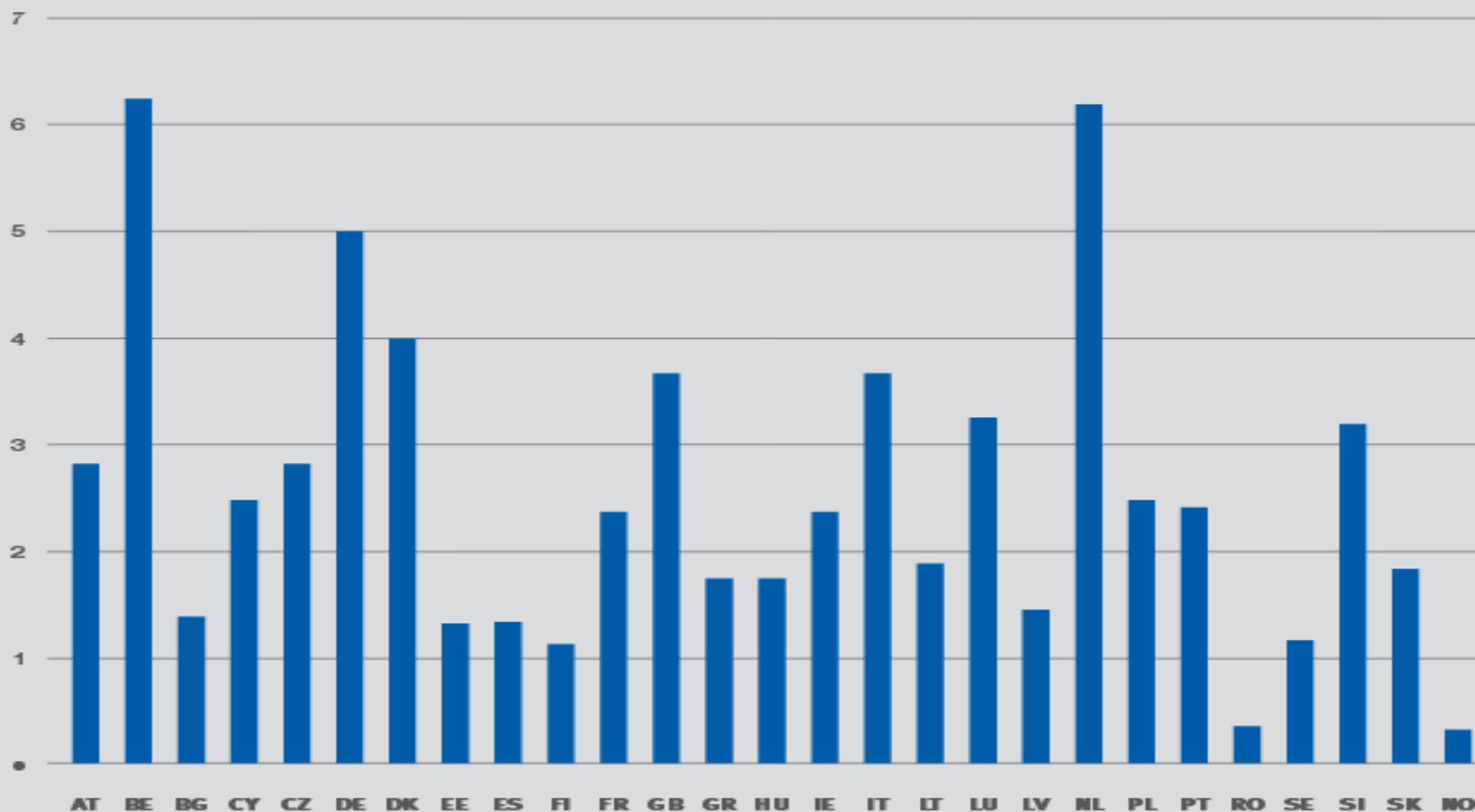
◆ Voltage level used in a given country



طول شبکه بر سطح شبکه توزیع

Line density approximately corresponds with population density.

km of lines/km²

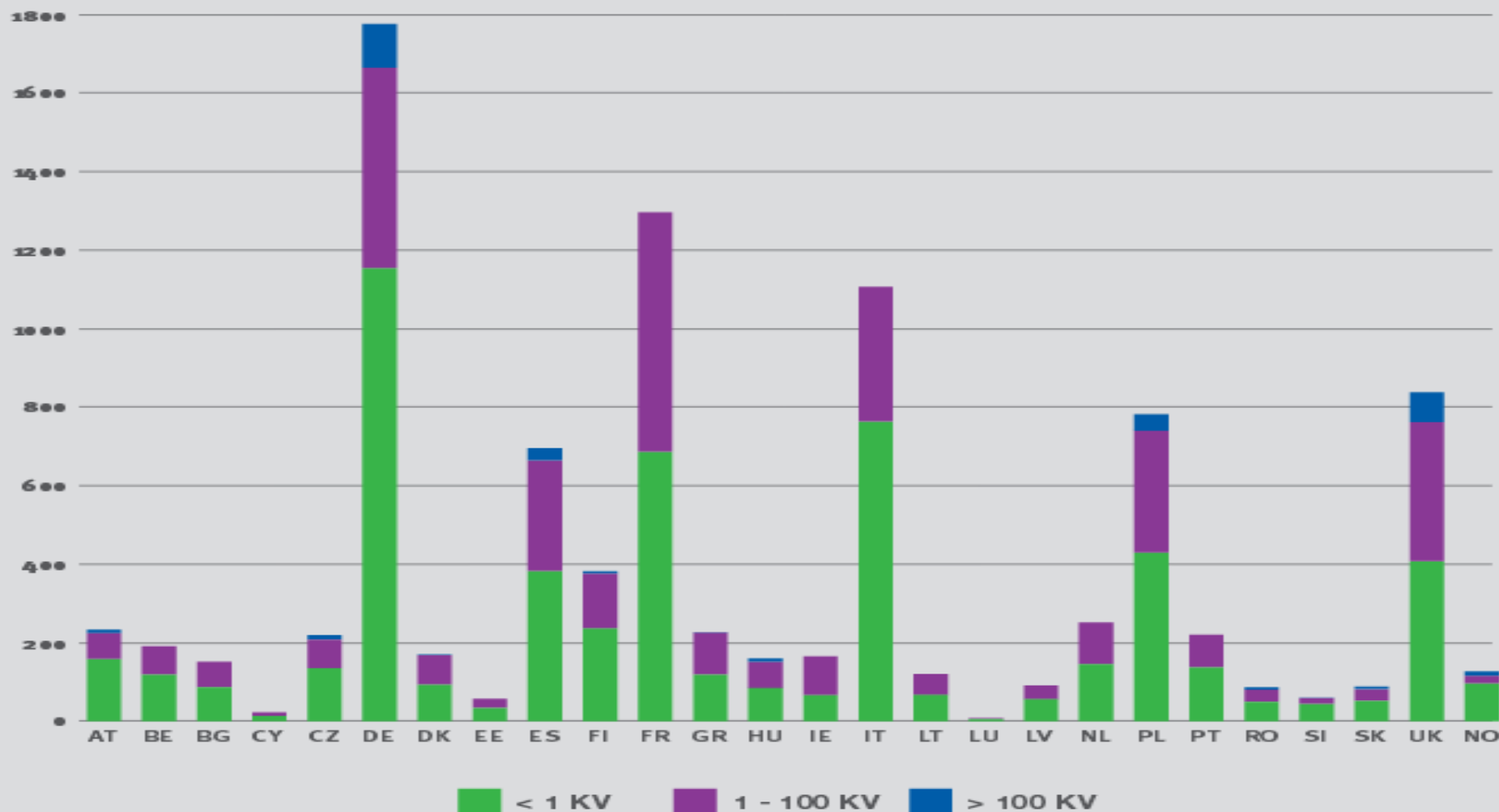




طول شبکه توزیع بر اساس سطح ولتاژ

Length of lines per voltage level

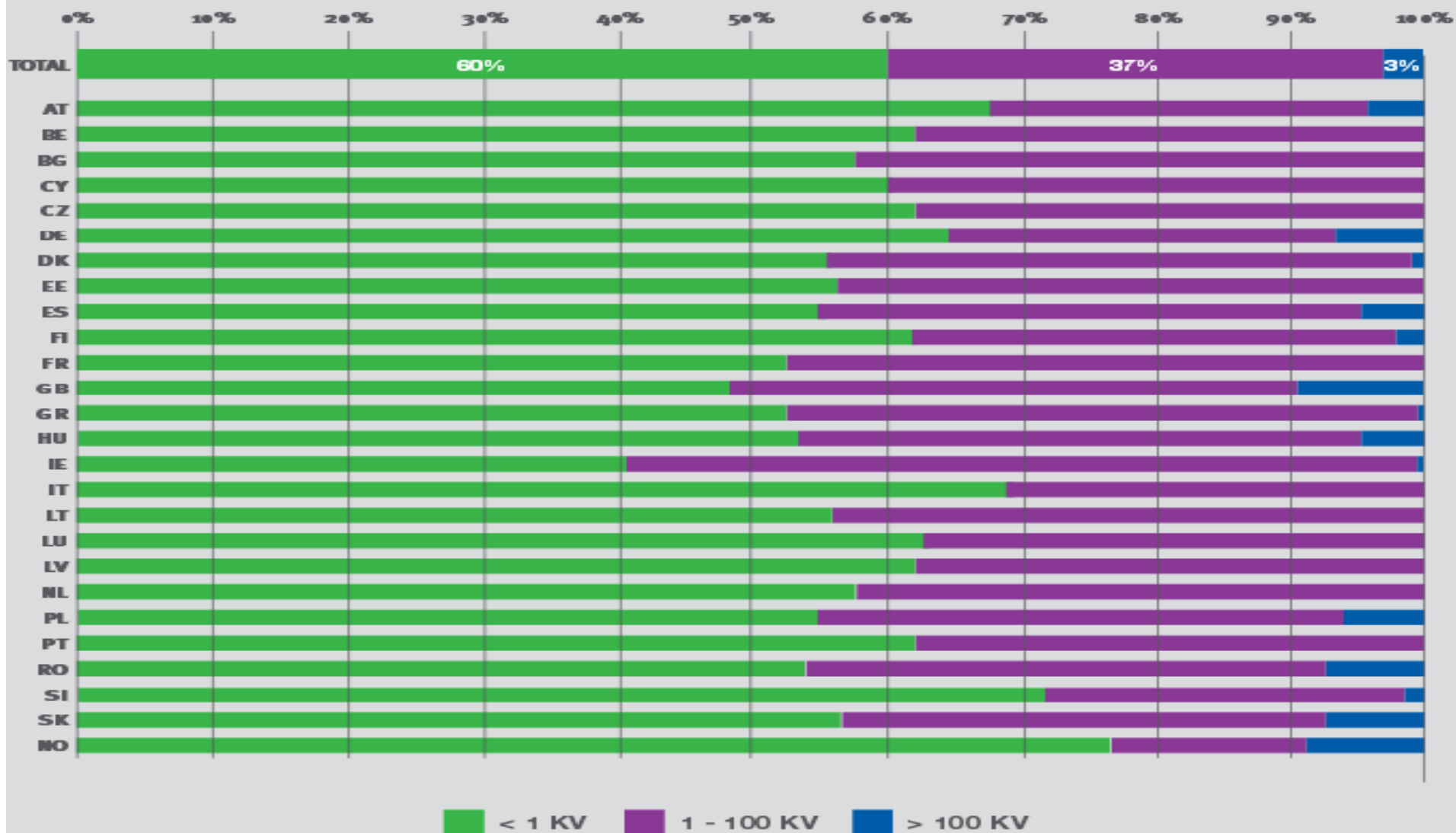
thousand km





سهم هریک از سطوح ولتاژ در طول شبکه توزیع

Most distribution lines are low or medium voltage.





اطلاعات آماری شبکه توزیع

Distribution Circuit Length

Country	Overall circuit length (km)	> 100 kV (km)	> 100 kV Overhead (km)	> 100 kV Under-ground (km)	1 – 100 kV (km)	1 – 100 kV Overhead (km)	1 – 100 kV Under-ground (km)	LV (< 1 kV) (km)	LV Overhead (km)	LV Under-ground (km)	No. of MV & LV Transformers	Number of DSO-TSO interconnection points
AT	235,600	9,760	9,200	560	65,550	29,250	36,300	160,300	37,600	122,700	76,800	n.a.
BE	193,165	0	0	0	72,522	7,021	65,501	120,643	52,164	68,480	69,398	544
BG	153,916	114	73	41	64,452	49,651	14,801	89,350	63,533	25,817	48,543	524
CY	22,428	0	0	0	8,788	5,482	3,305	13,640	9,206	4,434	14,774	1,800
CZ	221,441	12,258	12,245	13	71,713	58,734	12,979	137,470	65,764	71,706	3,677	30
DE	1,772,696	113,887	106,869	7,018	506,671	122,226	384,445	1,152,138	143,516	1,008,622	461,900	n.a.
DK	171,819	1,743	1,364	379	73,983	8,629	65,354	96,093	3,961	92,132	71,100	n.a.
EE	60,000	0	0	0	26,000	20,000	6,000	34,000	26,000	8,000	25,000	350
ES	695,427	31,380	30,363	1,017	280,845	203,225	77,620	383,202	241,735	141,467	289,671	776
FI	382,740	6,622	6,438	184	138,153	121,153	17,000	237,966	148,758	89,208	133,570	567
FR	1,293,466	0	0	0	608,053	356,263	251,790	685,413	419,060	266,353	751,000	2,240
GR	229,877	777	569	208	107,691	96,793	9,915	121,409	107,837	13,570	156,061	198
HU	161,954	7,872	7,755	118	66,816	53,887	12,929	87,266	64,039	33,227	59,485	155
IE	167,528	538	402	136	97,790	87,866	9,924	69,200	57,100	12,100	248,588	189
IT	1,105,216	0	0	0	342,600	207,247	135,353	762,616	510,301	252,315	426,559	1,728



اطلاعات آماری شبکه توزیع (ادامه)

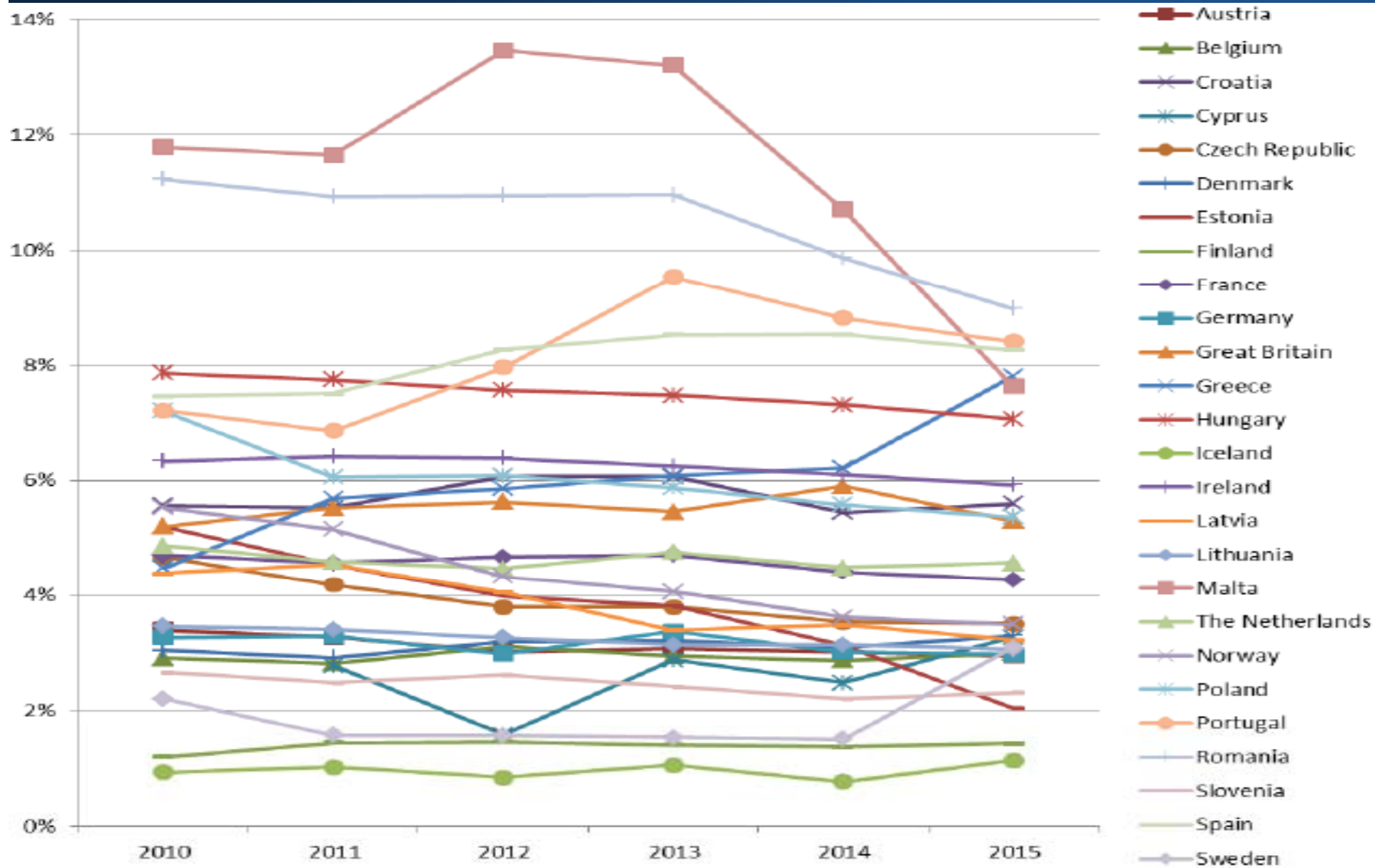
LT	123,749	0	0	0	54,017	43,362	10,655	69,732	56,848	12,884	36,308	395
LU*	8,477	0	0	0	3,160	1,115	2,044	5,318	319	4,999	n.a.	n.a.
LV	93,764	0	0	0	34,964	29,434	5,530	58,800	40,640	18,160	28,488	134
NL**	252,634	0	0	0	105,968	n.a.	n.a.	146,666	n.a.	n.a.	n.a.	n.a.
PL	774,141	32,671	32,486	185	305,492	234,732	70,760	435,978	291,671	144,307	250,229	98
PT	222,627	0	0	0	83,256	66,725	16,531	139,371	106,744	32,627	64,458	59
RO*	89,944	6,584	6,332	252	34,665	22,645	12,021	48,695	28,589	20,106	20,736	25
SE	528,606	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	306,019	69,868	236,151	n.a.	n.a.
SI	63,120	811	801	10	16,854	12,189	4,665	45,456	24,655	20,801	16,425	93
SK	91,353	6,743	n.a.	n.a.	32,361	n.a.	n.a.	52,250	n.a.	n.a.	n.a.	n.a.
UK	837,156	75,440	50,462	24,978	352,841	193,102	159,739	408,875	70,276	338,599	665,408	637
NO	128,591	11,062	n.a.	n.a.	18,687	n.a.	n.a.	98,842	n.a.	n.a.	142,651	171
Total	9,952,845	307,200	265,359	35,098	3,555,204	2,030,731	1,385,161	5,867,865	2,491,426	3,038,764	4,060,829	10,713

* Luxembourg: only Creos, Romania: only CEZ

** Cross-border 150 kV lines owned by the DSOs and operated by the TSO are not included

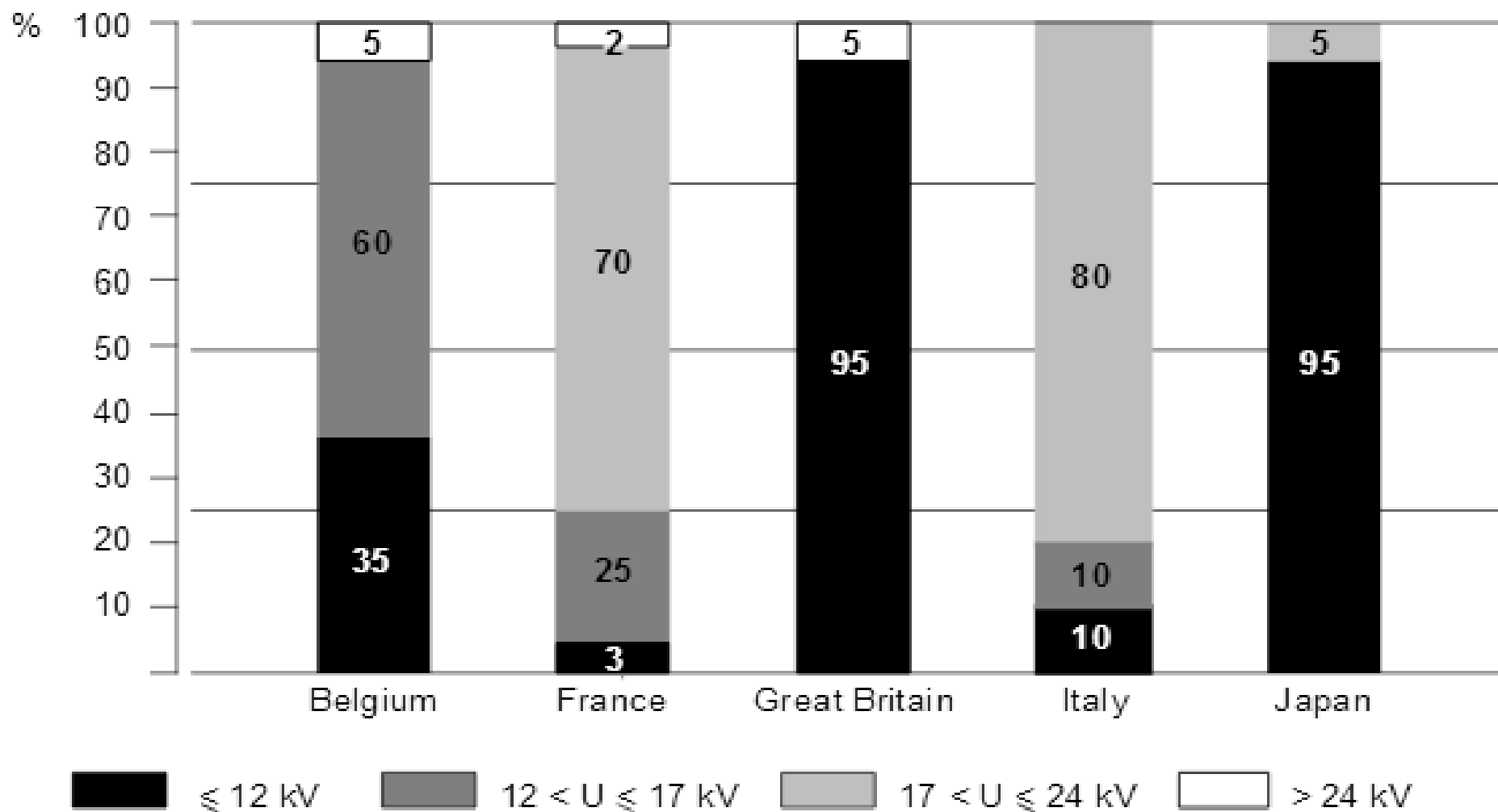


تلفات شبکه توزیع در کشورهای اروپایی





مقایسه طول شبکه توزیع برخی کشورهای اروپایی و ژاپن





تفکیک تلفات شبکه برق هند و هدف گذاری آن

Norms for technical Losses

Review of system Losses

System Components	Existing Level	International norms	
		Max Tolerable	Target Level
Transmission	4	4	2
Sub Transmission	4	4.5	2.25
High Voltage Distribution	6	5	3
Low Voltage Distribution	18	2	1
Total	32	15.5	8.25

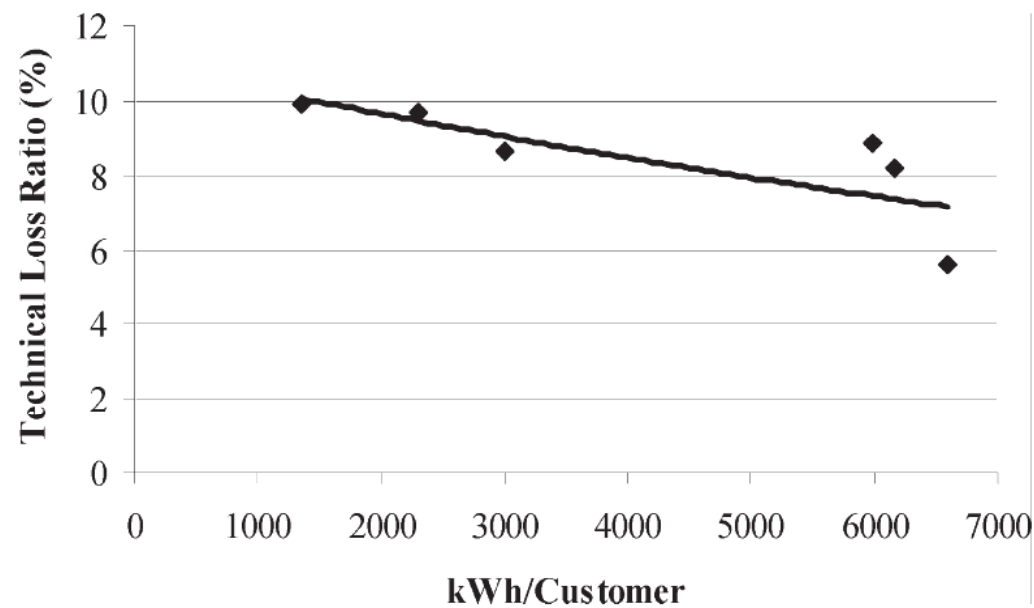
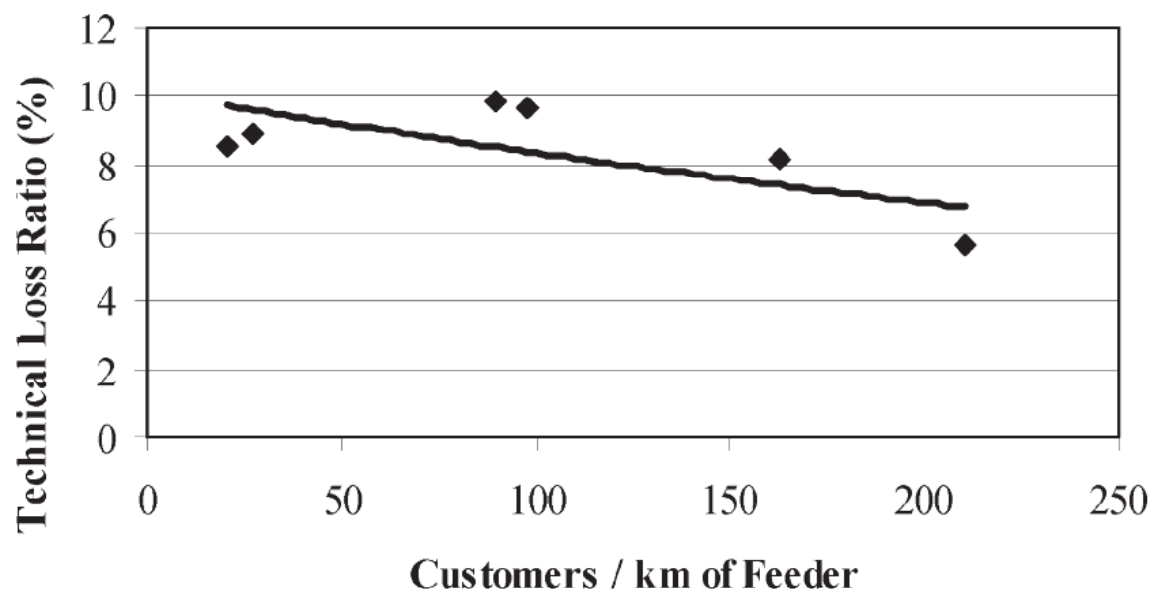
Tolerable: a quality that is acceptable, although certainly not good



ارائه یک فعالیت تحقیقی و عملیاتی

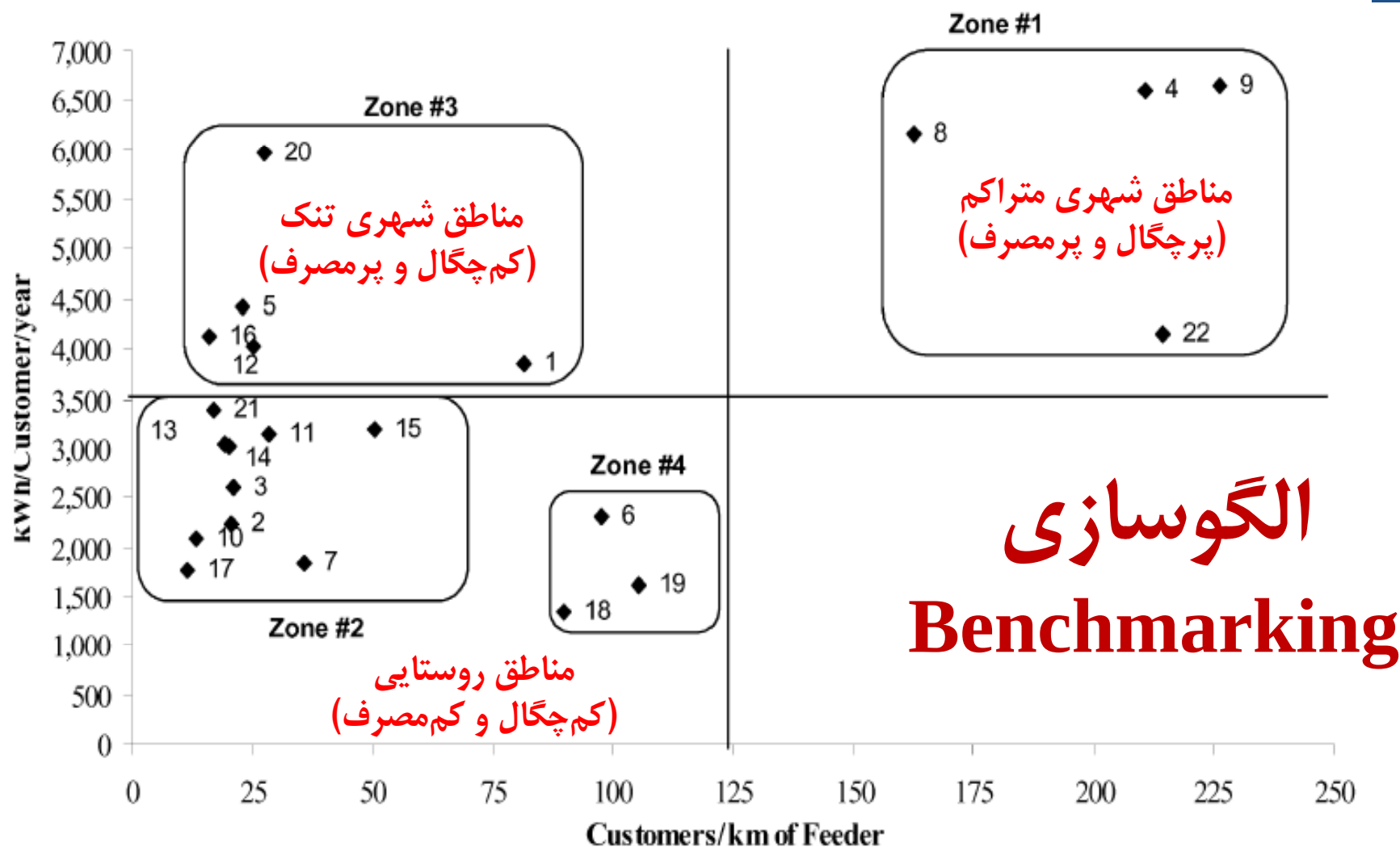


بررسی دو عامل مهم تاثیرگذار بر تلفات شبکه توزیع





مطالعه موردی برای ۲۲ ناحیه و چهار منطقه همسان



In this example, it turned out that four clusters were sufficient to divide the space of 22 regions into coherent groups (or zones).



ارتباط بار/ تلفات برای چهار منطقه همسان

