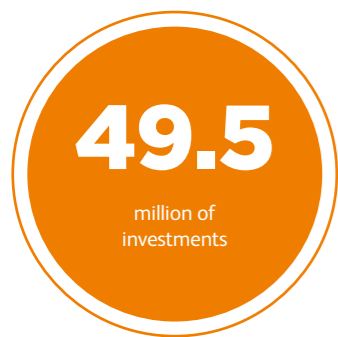




INFRASTRUCTURE

Existing high-voltage transmission line links and pertaining power plants are in good condition.

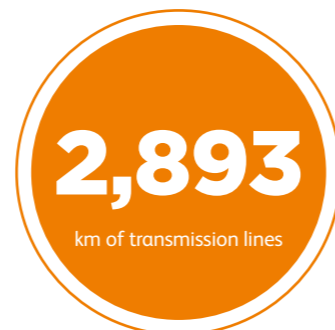
New links and plants needed for a reliable future supply to electricity customers are carefully planned and constructed.



Investments: €49.5 million, which is 43 % less than planned. Reasons: subsequent changes to the scope of implementation, the preparation of documents and the acquisition of approvals; opposition by civil initiatives.

The takeover of the 110kV network: ELES took over the 110kV transmission equipment of the line, connecting and metering bays at 110kV switching substations and the 110kV transmission lines from sellers with whom an appraisal agreement was made.

Maintenance activities cover transmission lines in the length of 2,893 kilometres and 45 stations with pertaining power transformers and other high-voltage transmission facilities and are carried out by transmission network infrastructure centres in Maribor, Podlog, Ljubljana and Divača. In 2017, all maintenance works were done that could be done considering the electricity situation.



The provision of an alternative supply for offtake: Due to emergency maintenance works on the 100kV link between Divača and Ajdovščina, the link was disconnected and offtake was provisionally supplied from an island operation established at the HPP on the Soča river.



The construction of transmission links: The Company implemented 21 projects to construct new and upgrade existing transmission links.

The management of damaged infrastructure: Heavy winds in December caused damage to several transmission lines. In close cooperation with distribution companies, the consequences were eliminated in the shortest possible time.





2.1.2 NETWORK EXPANSION AND MAINTENANCE

DESCRIPTION OF ACTIVITIES

Maintenance, construction and upgrades to the Slovenian power grid are important Company activities, as they allow the Company to cover a growing demand for electricity and provide its safe and effective transmission. Field maintenance teams make sure that existing connections operate flawlessly and that electric installation breakdowns are eliminated quickly.

KEY RESULTS IN 2017

Investments: Investments are made in network upgrades and expansion and technological innovations are introduced.

As the transmission system operator, the Company provides cost-efficient and transparent operations and its Plan of Transmission Network Development has been prepared in line with the Efficient Asset Management Policy, as adopted by ELES and enforced in 2013. Methods of efficient asset management, under the ISO 55000 standard and British PAS 55 standard, have also been included in the ISO 9001 quality system.

In 2017, the Company dedicated €49.5 million for investments, which is 43% less than planned.

ELES spent €24.6 million on new investments, €22.0 million on reconstructions and €2.8 million on minor investments.

Table 9: Investments by group

Investments and reconstructions		Real. 2016	Real. 2017	AP 2017	Index r17/r16	Index r17/AP17	AP 2018
in € million		1	2	3	4(2/1)	5(2/3)	
1.	Transmission lines	13,4	8,8	9,9	66	89	6,6
	400 kV	2,6	2,9	3,5	113	83	4,0
	220 kV	0,3	0,2	0,3	49	53	0,4
	110 kV	10,5	5,7	6,0	55	96	2,1
2.	Transmission system substations, substations	13,1	31,0	42,6	237	73	33,1
	400/x kV	4,1	7,8	11,1	189	71	13,5
	220/x kV	0,0	0,0	0,0			0,0
	110/x kV	8,9	23,2	31,5	259	74	19,6
3.	Major investments in system operation	2,9	1,4	16,2	48	9	14,2
4.	Secondary equipment	0,5	0,0	0,2	2	6	0,3
5.	Telecommunications	1,1	0,8	4,5	73	17	3,6
6.	Computer equipment	1,5	1,6	3,2	105	50	4,4
7.	Business buildings	0,2	3,5	7,7	2.039	45	6,5
8.	Development of new technologies	0,7	0,4	0,9	61	46	1,3
9.	Minor investments	1,2	1,9	2,0	163	96	2,5
10.	TOTAL	34,6	49,5	87,3	143	57	72,5

Note: Point 2 (Transmission system substations, substation), 110/x kV, also includes free-of-charge offtake for Divača power supply station (I542-001) in the 2016 realisation in the amount of €2.8 million.

The plan has not been achieved due to a subsequent change to the scope of execution, delayed production of design documents, administrative and other permits, issues with civil initiatives, delayed delivery by suppliers/providers, submission of review requests and due to lower tender prices offered by successful tenderers in public procurement procedures.

Considering the last, the corrected realisation with respect to that planned does not amount to 57%, but to 70%. The table also contains the calculation of the difference between the estimated and realised value of public contracts.

Table 10: Public contracts from 1 January 2015 to 31 December 2017

	Calculation elements	Values
1.	Estimated value (in € million)	126,0
2.	Realised value (in € million)	101,9
3.	Top tender values (in € million)	115,4
4.	Additional works - annexes (in € million)	2,2
5.	Realised value/estimated value (in %)	81
6.	Top tenders/estimated value (in %)	92
7.	Annex to basic contractual value (in %)	2

Table 11: Investments in 2017

	Calculation elements	Values
1.	Planned investments (in € million)	87,3
2.	Amended plan due to achieved tender prices (81 % of the plan) (in € million)	70,6
3.	Realised (in € million)	49,5
4.	Realisation (in %)	70

Takeover of a 110kV network: Pursuant to Article 512 of the Energy Act (Official Gazette of the Republic of Slovenia, No. 17/14, 81/15) and the Decree on the division of the 110kV network into the distribution and transmission systems (Official Gazette of the Republic of Slovenia, No. 35/15), companies are obliged to transfer for consideration the high-voltage 110kV transmission network (property and other right in rem or under the law of obligations to the network) to ELES within three years of the enforcement of the Energy Act by way of a contract.

ELES already strived to reduce control risks that may result from non-aligned purchase prices of the 110kV network with regulatory takeover values in 2015 and 2016, which is why it **sent several requests in 2017 to the Ministry of Infrastructure to harmonise the legislation and took an active part in the public**

hearing of the amended Energy Act in the relevant area, which was not passed by the National Assembly in February 2018. ELES notified the competent ministry of a failure to meet statutory periods for the takeover of the 110kV network due to non-harmonised 110kV network values between the current owners (sellers) and ELES (to buyers).

In 2017, ELES **took over the 110kV transmission equipment for line, connecting and metering bays at 110kV switching substations and 110kV transmission lines from sellers with which it made an agreement on appraisals**, i.e. in the carrying amounts of fixed assets at original owners. Within the scope of investment construction, the Company built the Plave transmission system substation, which is listed in the Decree for takeover, but in fact involves a new investment by ELES.

Table 12: Takeovers in 2017

Number	Structure	Owned by
1	RTP Domžale	Elektro Ljubljana
2	RTP Radeče	Elektro Ljubljana
3	RTP Brežice	Elektro Celje
4	RTP Dekani	Elektro Primorska
5	RTP Idrija	Elektro Primorska
6	RTP Sežana	Elektro Primorska
7	HPP Brežice	HESS
8	RTP Medvode	SEL + Elektro Gorenjska

Number	Transmission line	Owned by
1	DV 110 kV Krško DES – Krško	Elektro Celje
2	DV 110 kV Krško – Brežice	Elektro Celje
3	DV 110 kV Krško – HPP Brežice	Elektro Celje
4	DV 110 kV Beričevo – Domžale	Elektro Ljubljana
5	DV 110 kV Domžale – Kleče	Elektro Ljubljana
6	DV 110 kV Trbovlje - Hrastnik	Elektro Ljubljana

Transmission network maintenance: In addition to planning and construction, an important task of ELES is also to maintain the existing transmission network. Maintenance, which **includes transmission lines measuring 2,893 kilometres in length and 45 stations** with pertaining energy transformers and other high-voltage transmission devices, **is carried out by Transmission Network Infrastructure Centres in Maribor, Podlog, Ljubljana and Divača.** Maintenance also includes the elimination of consequences of extreme events, such as malfunctions and breakdowns.

In 2017, **all maintenance works were performed that could be performed with respect to the electricity situation.** Maintenance was primarily conducted due to identified deficiencies, such as:

- rehabilitation of consequences due to windfall;
- 220kV Divača-Padriče transmission line: repair of a damaged crossarm at standing spot (SS) 12;
- 220kV Obersielach-Podlog transmission line: rehabilitation of a damaged conductor at SS 86-87;

- 2 x 110kV Pekre-Dobrava 3 and Dobrava-Tezno transmission lines: repair of a damaged protective conductor with OPGW optical fibre;
- 400kV Beričevo-Krško 2 transmission line: replacement of damaged Balisor lamps;
- Divača transmission system substation: participation in the elimination of malfunctions on the phase-shifting transformer;
- Okroglo transmission system substation: repair of an oil leak on cooling groups on the T411 transformer;
- Maribor transmission system substation: replacement of capacitors on the circuit-breaker at the 400kV line bay Kainachtal 474;
- Trbovlje transmission system substation: replacement of a malfunctioned voltage instrument transformer at the 110kV line bay Brestanica;
- Maribor transmission system substation: replacement of a malfunctioned transmission system substation instrument transformer at the 400kV connecting bay;
- Beričevo transmission system substation: replacement of a malfunctioned NIT at the 110kV line bay TE-TOL.

In addition to maintenance works, a great deal of electrical installation work was performed within the scope of reconstructions and new constructions, such as:

- 110+20kV Vuhred-Podvelka transmission line, 110+20kV Podvelka-Ožbalt transmission line: replacement of an earth wire with OPGW;
- 110kV Karbid transformer substation-Korund transformer substation transmission line, 2 x 110kV Fala-Pekre-Karbid branch transmission line: installation of OPGW;
- Pekre transmission system substation: participation in the reconstruction of the plant;
- Maribor transmission system substation: participation in the replacement of the T42 transformer and busbar protection;
- 110kV Hudo substation: participation in the reconstruction of the plant – replacement of HV and secondary equipment;
- Karbid transformer substation: construction of own plant consumption.

Construction of transmission links: In 2017, 21 projects to construct new and upgrade existing transmission links were implemented. Major investments are presented below.

- 2 x 400kV Cirkovce-Pince transmission line, transmission line + OPGW: Within the scope of a project to construct a transmission line with Hungary, which was also included on the European list of projects of common interest (PCI), the Company continued

the procedure to obtain an environmental permit.

The administrative procedure is run by the Slovenian Environment Agency (ARSO), while ELES as a party to the proceedings submitted 5 clarifications and answers to the questions raised by notice parties at ARSO's request. The environmental permit is expected to be issued at the beginning of 2018. Intensive work was continued in procedures to conclude easement contracts and the Company managed to conclude 96% of all necessary easement contracts with land owners and enter them in the land register by the end of the year. In the last quarter, the Company also concluded a contract for the production of technical and design documents.

- 2 x 110kV Maribor-Cirkovce transmission line: In June, the Company commenced construction and electrical installation works, which were partly completed with the activation of the transmission line at the end of December. In 2018, access roads will also be arranged and damage will be reimbursed to land owners.
- Reconstruction of the 2 x 110kV Brestanica-Hudo transmission line: The transmission line is broken down to 3 sections. Section 1 of the transmission line is in the stage of preparation for construction works and the procedure to obtain a national spatial plan is pending. Sections 2 and 3 of the transmission line are in construction stage. ELES re-obtained a building permit on 19 September 2017, but the permit is not yet final. Due to a lawsuit filed at the

end of November, the deadline for the resolution is not known. Tender documents are being prepared along with public procurement procedures. The start date for public procurement depends on the final building permit. Construction works are planned to commence in November 2019.

- 2 x 110kV Divača-Pivka-Ilirska Bistrica transmission line (transmission line + OPGW): In 2017, activities were conducted in relation to obtaining the right to build, produce the Building Permit Design and align the Building Permit Design (PGD) with owners' requirements. The Company also cooperated with the Ministry of the Environment and Spatial Planning in respect of the lawsuits filed by a civil initiative.
- Connecting a 220kV transmission line and connecting bays at the (Metal) Ravne transmission system substation: The project included activities to produce the documents required to adopt a national spatial plan (NSP) and a building permit (for a sort-term construction of stage 1 and final stage 2 of the construction).
- 2x110kV Gorica-Divača (Renče) transmission line: In 2017, all activities were carried out in relation to obtaining the right to build for the new transmission line alignment based on the adopted NSP.

Construction of transmission system substations: Within the scope of reconstructions, updates and

upgrades to transformer substations across Slovenia, the Company carried out 25 projects in 2017. Below are the most important investments:

- 400/110kV Cirkovce transmission system substation (primary + secondary equipment): After making progress in obtaining an environmental permit, the Company continued producing design documents. An amended Building Permit Design was made and submitted, along with a part of the tender documents.
- 400/110kV Podlog transmission system substation, 300MVA: A building permit was obtained and contract notices were published for HV equipment, TR 400/100kV, TR 110/20kV, construction works, steel structures, HV electrical installation works, supply and installation of own consumption equipment, supply and installation of 110kV cable system and the supply of terminal equipment and tubular busbars. Contracts to deliver HV equipment. TR 400/110kV, steel structure and coordinate safety and health at work II and prepare a security plan have already been signed and decisions on the award of public contracts have been signed for other indicated contracts (other than TR 110/20kV). Factory tests have been conducted and HV equipment has been delivered to the warehouse, i.e. 400 and 110kV lightning arresters, 400 and 110kV pin insulators and 110kV circuit-breakers. The manufacture of TR 400/110kV is underway.



Replacement of a transformer in Divača



Rehabilitation of damage cause by vandalism



Works on the alignment of the 110+20kV Vuhred-Podvelka and 110+20kV Podvelka-Ožbalt transmission lines



- 110/35kV Plave transmission system substation at HPP Plave: HPP Plave 2 and all 3 ELES's 110kV transmission lines operate at the new GIS switching substation. Before connecting HPP Plave 1, Soške elektrarne Nova Gorica (SENG) must meet the requirements laid down in ELES's consent to connection to the 110kV network. It is also necessary to switch another two distribution 110kV transformers owned by Elektro Primorska and one 110kV transformer owned by SENG.
- Beričevo transmission system substation – construction of 110/20kV transformation for the purposes of own consumption: Works have been completed and the new system is partly in operation and ready to connect users. The Company received an expert assessment from EIMV for the works performed. According to the time schedule, the Company was also supposed to carry out a technical inspection in December, but the production of the As-Built Design was late and, consequently, also the expert assessment, which is why the technical inspection will be carried out in quarter 1 of 2018. The deadline for the completion of the project has been extended to December 2018, due to a decision to carry out additional works related to the connection of the ELES Technology Centre building to own consumption within the scope of the project.
- 110/20kV Slovenska Bistrica transmission system substation: The construction of a new GIS building has been completed. The equipment for GIS, own consumption system, telecommunication equipment and all 110kV cables has been delivered and installed. The system of measurements, protection and management is in the factory testing stage.
- 110/20(35)kV Pekre transmission system substation – reconstruction of a 110kV switching substation: The construction of a GIS building was completed on the interior, of which the façade is expected to be made in 2018. The equipment for GIS, telecommunication equipment, own consumption system, control, protection and measurement system have been delivered and installed, and all 110kV cables have been laid. New towers have been erected and all bays have been switched

from the existing open air switching substation to the new gas-insulated switchgear (GIS). Furthermore, 6 internal expert technical inspections were conducted.

- 110kV Hudo substation: reconstruction of the plant (HV replacement + secondary equipment): Within the scope of the project, 9 110kV line bays were renewed and put into motion and 110kV busbars were protected. The outdoor lighting and fence at the switching station were replaced, technical protection was put into operation and the control building and warehouse shed were renovated. A total of 6 internal expert technical inspections were conducted and all contracts with providers were finalised.
- 400/110kV Maribor transmission system substation, replacement of TR 42: All works planned on the project to replace the transformer were completed in 2017. The pace of works deviated from the plan due to a switch of transformer supply between the Maribor transmission system substation and the Divača transmission system substation. An expert technical inspection was conducted and all As-Built Design documents were produced. The open invitation to tender for the sale of waste material from the old transformer was unsuccessful and the procedure for a repeated invitation is underway. Due to the unsuccessful call to sell waste material, an annex was prepared to extend the deadline in the contract for the disassembly and decommissioning of the old transformer.
- 110/35/20kV Tolmin transmission system substation, HV + secondary equipment replacement: In March, the Company signed a contract for the production of investment, design and technical documents. In the last quarter of the year, an expert committee reviewed the Cost-Benefit Analysis of investments (DAISKIV document) and sent its remarks to the design engineer. The amended and supplemented document is being re-examined.

IT and telecommunication investments: ELES builds its fibre optic network together with transmission lines. Fibre optic measuring 1,698km in length is installed particularly in the stranded

lightning conductor, which holds a double function (stranded lightning conductor and transmission telecommunication conduit). Fibre optic is built for own purposes or, rather, for the purposes of managing the electricity system – for control, protection and measurement connections. Connections run between individual power facilities in Slovenia to electricity undertakings abroad.

At the existing fibre optic connections, **40-60% of connections are used for own purposes and 10-20% for exchange with other electricity undertakings** in order to provide rings to ensure a secure supply of electricity and access to individual power facilities. Up to 20% of capacities must stay available at all times due to potential defects on individual fibres and requirements laid down by the Ministry of the Environment and Spatial Planning. The subsidiary Stelkom d.o.o. may lease 20% of optical connections to interested lessors (large companies, cable operators, Telekom, mobile operators, etc.), provided that free capacities remain available at individual routes.

In 2017, the Company carried out **several major investments** in IT and telecommunications:

Introduction of the BusinessConnect electronic documentary system

The introduction of the documentary system was completed in April. That investment resulted in a modern documentary system that meets the following goals:

- to reduce the use of printed paper and increase the use of electronic documents (paperless operations);
- to increase working efficiency and economy, i.e. to shorten the time to execute certain processes (travel and confirmation of documents between people and organisational units);
- to increase the transparency of operations and set up controlled insights in individual processes (it is known at every moment where a document is located and why);
- to increase the quality of employees' work by eliminating possibilities for errors while reducing the need for routine work;
- safe, quick - indexed and non-location-dependent access to documents.

Upgrade to the SDH (Synchronous Digital Hierarchy) network for the purposes of EMS

During the term of the project, all old SDH elements were replaced with new BroadGate (BG) devices. XDM devices (transport multiplexers) that are more than 10 years old were also replaced with new NPT devices (package transport on flexible switching architecture that supports SDH and package transmission).

The replacement of old equipment provided a platform for the transmission of existing turnover and new requirements for control under a new protocol and transfer of distance protection with new interfaces criterion. In 2017, the management of the electricity system was transferred to the MPLS-TP network. The project was completed in June.

Izgradnja omrežja DWDM (Dense Wavelength Division Multiplexing – optično multipleksiranje)

In 2017, a new DWDM network was built that represented a connecting layer for higher layer technologies. That network provided adequate bandwidth at major ELES locations for the purposes of IP/MPLS, SDH, MPLS-TP, uninterrupted operation and recovery of sources and connection of control centres. It also eliminated bottlenecks in the fibre optic network. The fundamental goals of the investment achieved with the construction:

- provision of secure and safe operation of the telecommunications network and, indirectly, secure and safe operation of the Slovenian electricity transmission network;
- possibilities to increase telecommunication transmission capacities and relieve occupied fibre optic in the ELES fibre optic network;
- to reduce costs for the lease of fibre optic from other providers;
- to reduce the cost of the maintenance of obsolete equipment;
- to provide new market opportunities in the sale of excess telecommunication transmission capacities.

The project was completed in November.