COMPANY PROFILE

DALEKOVOD PROJEKT

Behind Dalekovod-Projekt d.o.o. stands proven experience in design, supervising, consulting and engineering. Thanks to continuous investments in new technologies and in employee education, as well as by following the latest trends in the areas of its business activities, the company today possesses the best professionals, top-notch software and technological potentials that guarantee efficiency, professionalism, high quality design and execution of all projects.

CONTENTS

Our design story began over 65 years ago when a relatively modest team of experts in the recently established company Dalekovod began building electric power facilities. The proper preparation of project documentation was the first challenge placed in front of the young company, which had the task, in the period after World War II, of taking on demanding construction and design.

The first real design teams were founded in 1950. In accordance with the requirements and circumstances of the time, the experts of the design teams were mostly engaged in the realisation of projects of technical maps for overhead lines of nominal voltages up to 110 kV.

In the 1950s, all calculations and drawings were conducted "manually", however, already in the first years after the establishment of the company, an awareness developed for the need to invest in people and technological potentials in order to respond to new challenges with constant advancements. With the employment of new engineers and the further education of employees, the company went in step with contemporary trends in construction and design.

As the potential of the company spread, added to its list of business activities were services related to designing of substations and switchyards, underground and submarine cables, contact networks, cableways, antenna masts and other electric power and telecommunications facilities.

Investment in human resources and education was accompanied by investments in new, first-rate technologies and tools. Today, the company possesses the best software and tools, of which many were developed and perfected by experts within the company for specific projects.

The design division, with all of its potentials and references, was separated in 2007 from Dalekovod d.d. into a separate company, Dalekovod-Projekt d.o.o., which became an independent legal entity, registered for design, supervising, consulting and engineering.

Dalekovod-Projekt d.o.o. currently has 89 employees. Most are chartered architects and engineers of various professions, primarily electrical and civil engineers, but also surveyors, geologists and traffic engineers.

Thanks to its references and experience, Dalekovod-Projekt d.o.o. today has at its disposal highly professional teams, specialized for all services related to its business activities. Throughout its history, the company has completed numerous projects of various complexity and size - from transmission lines and substations to telecommunications antenna masts, production halls, sports halls, schools, buildings, municipal infrastructure buildings, solar power plants - which bear witness to the professionalism of the company concerning design, supervision, consulting and engineering.

Recorded and stored in the archives of Dalekovod-Projekt d.o.o. are

more than 12000 various projects in analogue and partially in digital form, including:

› 7000
transmission line projects of all voltages (including 500 kV) and low-voltage network designs (conceptual, main and detailed designs; designs for reconstruction, relocation and repair of transmission lines);

› 2200
projects for electric power facilities of all voltages (including 500 kV) - (conceptual, main and detailed designs; designs for reconstruction, repair and replacement of equipment in electrical power facilities);

› 1800
various studies (mutual dependency, protection from electromagnetic fields, protection grounding, impact studies and so on);

› 900
projects for antenna masts.

Dalekovod-Projekt d.o.o. is ISO 9001, ISO 14001, ISO 18001 certified.

HISTORY

ORGANISATIONAL STRUCTURE

Dalekovod-Projekt d.o.o. is organised into Departments run by the Management Board:

TRANSMISSION LINE DEPARTMENT:

- Homeland Section
- International Projects Section

ELECTRIC POWER INFRASTRUCTURE DEPARTMENT:

- Electric Power Supply Section
- Railway Infrastructure Section
- Renewable Energy Sources Section

HIGH VOLTAGE SUBSTATION DEPARTMENT

CIVIL ENGINEERING AND ARHITECTURE DEPARTMENT:

- Steel Lattice Structure Section
- Building Construction Section

PREPARATION AND TECHNICAL ARCHIVES DEPARTMENT:

- Survey (Geodetic) Engineering Section
- Copying and Archives Desk

COMMERCIAL AND ADMINISTRATIVE AFFAIRS.

EMPLOYEE STRUCTURE

MEng	BEng	GCE
80%	10%	10%

DESIGN AND CONSULTING SERVICES

Include the elaboration of all types of designs for the following:

- overhead distribution and transmission lines for all nominal voltages (up to and including 500 kV)
- distribution and transmission of underground (including submarine) cable lines for all nominal voltages (up to and including 500 kV)
- substations for all nominal voltages (up to and including 500 kV)
- switchyards for all nominal voltages (up to and including 500 kV)
- wind power plants, solar power plants and other renewable energy sources
- lighting for road traffic, sports facilities and other buildings
- steel structures and foundations for transmission lines
- antenna masts
- contact networks for the electrification of railway lines
- electric traction substations
- petrol stations: modernisation, complete reconstruction, gas tanks, removal etc.
- architectural and visual designs for interiors and exteriors with 3D software packages
- metal and other structures and foundations for electricity, signalisation, management and safety of roads and motorways, railways
- telecommunications cables
- buildings, garages, sports halls, halls, schools.

Other services:

- consulting and professional supervision related to electric power industry, construction, architecture, geodesy and geology
- elaboration of studies and analyses
- topographic surveys and topographical surveying of transmission lines and data on the technical characteristics of transmission lines
- elaboration of cadastral maps and cadastral registry
- conducting of tasks related to government surveying and cadastral records of real estate
- surveying works for special needs
- surveying works for monitoring the construction of buildings
- elaboration of geodetic studies for designs
- elaboration of geodetic studies for registering buildings
- engineering and geological research activities
- hydrogeological research activities
- geomechanical research activities
- geomechanical supervision
- validation for the planned building site (for building construction projects, engineering construction projects and water supply and sewer system projects), road projects, water-works projects, foundations and other construction projects
- validation for the planned electrical and technical area (electrical installations projects in buildings, electric power building projects, IT and telecommunication technology projects).

In addition to all of the above services, we are willing to adapt to your specific needs and requirements, as well as to offer you high quality, fast and professional service.

COMPUTER SOFTWARE AND EQUIPMENT

Computer software

1. Allplan - Nemetschek
2. Autodesk: AutoCAD Mechanical, Raster Design, AutoCAD Civil 3D
3. Cadics - Roads - road design software
4. EFC-400 - software for the calculation of electric and magnetic fields
5. ETAP - software for calculation of power cable transmission capacity
6. PRIMTECH - CAE system for use with primary technology for design, construction, documentation and management of switchgear (substation)
7. Kora 2000 - geodetic calculation, equalisation, transformation and 3D imaging
8. MS Office
9. Net Ground - for calculating grounding
10. PLS-CADD, Tower, PLS-Pole - comprehensive software package for designing transmission lines
11. PowerCad - for calculating power flows and short circuits
12. SCIA - application for statics and dynamics analysis of structures and dimensioning concrete and steel structures
13. SEE Electrical/CADdy++ - for producing electric and connection schemes
14. Tekla - documentation software
15. Topcon Tools - software for producing survey maps
16. WinDis - for the calculation of low-voltage networks
17. ReluxPro i ReluxTunnel - for calculation of lighting
18. Autodesk Robot Structural Analysis Professional - static calculation and dimensioning of structure
19. EMTP-RV - program for simulation of electro-magnetic, electromechanical and control system transients

Geodetic instruments

1. Leica i Topcon total stations
2. Leica digital level
3. RTK/static GPS L1+L2/GLONASS - Topcon

Other equipment

1. Multifunctional printer/scanner/photocopier - A3, A4 and wide format
2. PC graphics workstations, notebooks
3. HP DJ 500, 800 and T770 plotters, HPCLJ 5500 printers
4. Equipment for organising and cutting plans
5. Hukseflux FTN01 - thermal conductivity measurement system
6. RD 4000 cable tracker

In the design phases, the design teams of Dalekovod-Projekt d.o.o. use world-renown computer software.

REFERENCES

The projects stated in the references consist of conceptual, main and detailed designs, or some of them, depending on investor's requirements.

PROJECTS FOR THE ELECTRIC POWER INDUSTRY:

TRANSMISSION LINES (TL)

Project documentation for the 2x400 kV S/S Ernestinovo - S/S Pécs transmission line, section: Ernestinovo - state border

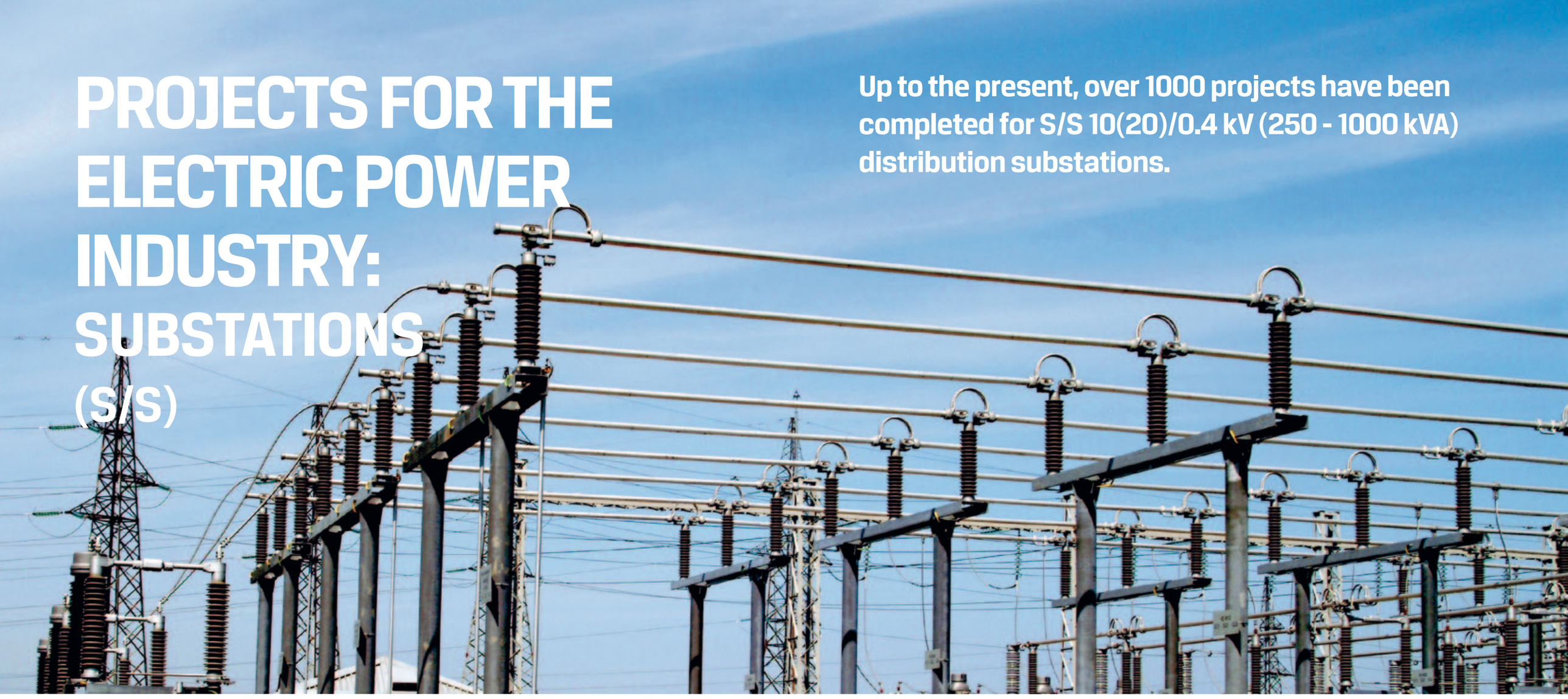
Nominal voltage	400 kV
Section length	44 km
Number of towers - suspension Number of towers - tension Total	90 27 117
Average span	376 m

- TL 2x400 kV, sections: Žerjavinec - Heviz i Žerjavinec - state border
- TL 2x400 kV Žerjavinec - Prevlaka
- TL 2x400 kV Ernestinovo - Pécs, section: Ernestinovo - state border
- TL 400 kV Tumbri - Melina
- TL 2x220 kV Pehlin - Plomin
- TL 2x220 kV Plomin - Vodnjan
- TL 2x110 kV Slavonski Brod - Đakovo
- TL 2x110 kV Vinodol - Melina
- TL 2x110 kV Samobor - Rakitje - Botinec
- TL 2x110 kV connection for S/S Medulin
- TL 2x110 kV Konjsko - Ogorje
- TL 110 kV Obrovac - Zelengrad
- TL 110 kV Grude - Imotski, section: state border - S/S Imotski
- TL 110 kV Beli Manastir - Kneževi Vinogradi
- underground cable line 2x110 kV connection for S/S Dujmovača
- underground cable line 110 kV Resnik - Dugo Selo
- submarine cable line 110 kV Pelješac - Korčula
- submarine cable line 110 kV Crikvenica - Krk
- TL 2x220 kV connection for S/S Plat
- TL 2x110 kV connection for S/S Tupljak
- 35 kV, 110 kV i 220 kV, connection transmission lines for S/S Plat
- 2x110 kV transmission line/underground cable line connection for S/S Srđ
- TL (2x)110 kV connection for wind power plants Otrić, Mazin, Voštane and others

Dalekovod-Projekt d.o.o. has designed a large number of underground and overhead lines of nominal voltages of 10, 20 and 35 kV, as well as low-voltage lines and installations.

PROJECTS FOR THE ELECTRIC POWER INDUSTRY: SUBSTATIONS (S/S)

Up to the present, over 1000 projects have been completed for S/S 10(20)/0.4 kV (250 - 1000 kVA) distribution substations.



- S/S 220/110/30/10 kV Bilice (projects for the replacement of part of the 110 kV and 220 kV equipment)
- S/S 380/220/110/10 kV Konjsko (projects for the replacement of part of the 220 kV equipment)
- S/S 30(35)/220 kV for wind power plant Senj
- S/S 110/35/20 kV Vrbovsko
- S/S 110/35/20 kV Stari Grad - reconstruction
- S/S 110/10(20) kV Kukuzovac
- S/S 110/10(20) kV Kneginec
- S/S 110/20 kV Sv. Vinčenat
- S/S 110/20 kV Buzet
- S/S 110/20 kV Sesvete (GIS*)
- S/S 110/10(20) kV Dugopolje (GIS)
- S/S 110/10(20) kV Ploče (GIS)
- S/S 110/35 kV INA - Rijeka Oil Refinery (GIS)
- S/S X/110 kV for wind power plants Otrić, Mazin, Voštane, Krš Pađene and others
- S/S 110/30 kV Zelengrad
- S/S 110/20 kV Bruška
- S/S 110/30(35)/10(20) kV Primošten
- S/S 110/10(20) kV Vodice
- S/S 110/10(20) kV Koprivnički Ivanec
- S/S 110/20(10) kV Terminal (TTTS) (GIS)
- S/S 110/30/10(20) kV Rakitje - reconstruction
- S/S 110/35 kV Kraljevac - reconstruction
- S/S 110/35/10 kV Dugi Rat - reconstruction
- S/S 110/35/10 kV Nijemci - reconstruction
- S/S 110/20/10 kV Glina - reconstruction
- S/S 110/35 kV Pračno - reconstruction of plant 35 kV
- S/S 35/10(20) kV Županja 1 - reconstruction
- S/S 35/10(20) kV Babina Greda
- S/S 35/20 kV Biluća - reconstruction
- S/S 35/10 kV Tkalec - reconstruction
- S/S 35/10(20) kV Varaždin 1 - reconstruction
- S/S 35/10(20) kV Voćin - reconstruction
- switchyard 35 kV Okoli
- switchyard 35 kV Energostatik
- S/S 35/10(20) kV Pregrada - reconstruction
- S/S 35/10(20) kV Kraljevica - reconstruction
- S/S 35/6,3/0,42 kV Janaf at Slavonski Brod oil terminal
- S/S 35/10(20) kV Otok
- S/S 35/10(20) kV Križ
- S/S 35/10(20) kV Ružić
- S/S 35/10(20) kV Generalski Stol
- S/S 110/35(20)/10 kV Zabok - reconstruction of plant 35 kV and 20 kV
- S/S 110/35/10 kV Komolac - replacement of plant equipment 35 kV
- S/S 35/10(20) kV Špišić Bukovica
- S/S 35/10(20) kV Bedekovčina
- S/S 0.69/X kV for wind power plants Otrić, Mazin, Voštane and others

* GIS - gas insulated switchgear

PROJECTS FOR TELECOMMUNICATIONS INDUSTRY

WE DESIGNED:

〉 160 installation projects

of optical ground wire (OPGW) on transmission lines of voltages from 35 kV to 400 kV over a total distance of 4000 km

〉 200 base stations

and antenna masts for Tele2 (telecommunications company)

〉 30 projects

for laying underground optical cable routes of 100 km (HEP - Croatian Power Company, HAC - Croatian Motorways, ARZ - Rijeka - Zagreb Motorway and others)

〉 500 base stations

and antenna masts for Vipnet (telecommunications company).

In the period from 2009 to the present, a large number of projects for lighting have been completed for the following clients:

BINA Istra:

- lighting in Učka Tunnel and all pre-portal zones on A8 motorway
- lighting for Ivoli, Rogovići, Cerovlje, Lupoglav and Vranja junctions on A8 motorway.

Croatian Motorways (HAC - Hrvatske autoceste):

- lighting for Zagreb - east frontal toll station on A3 motorway
- reconstruction of lighting at Ivanić Grad, Slavonski Brod - west, Slavonski Brod - east, Županja toll stations on A3 motorway
- lighting for Karamatići toll station on A1 motorway
- lighting for Čarapine frontal toll station and Kula Norinska junction on A10 motorway
- lighting for Gradec and Križevci junctions on A12 motorway
- lighting for Farkaševac junction on A13 motorway.

Croatian Roads (HC - Hrvatske ceste):

- lighting for Frančići and Benčinići junctions on Opatija Riviera by-pass
- lighting for intersection along with relocation of D225 in Zaprešić
- lighting D66 - Northern by-pass of Pula.

City of Zagreb:

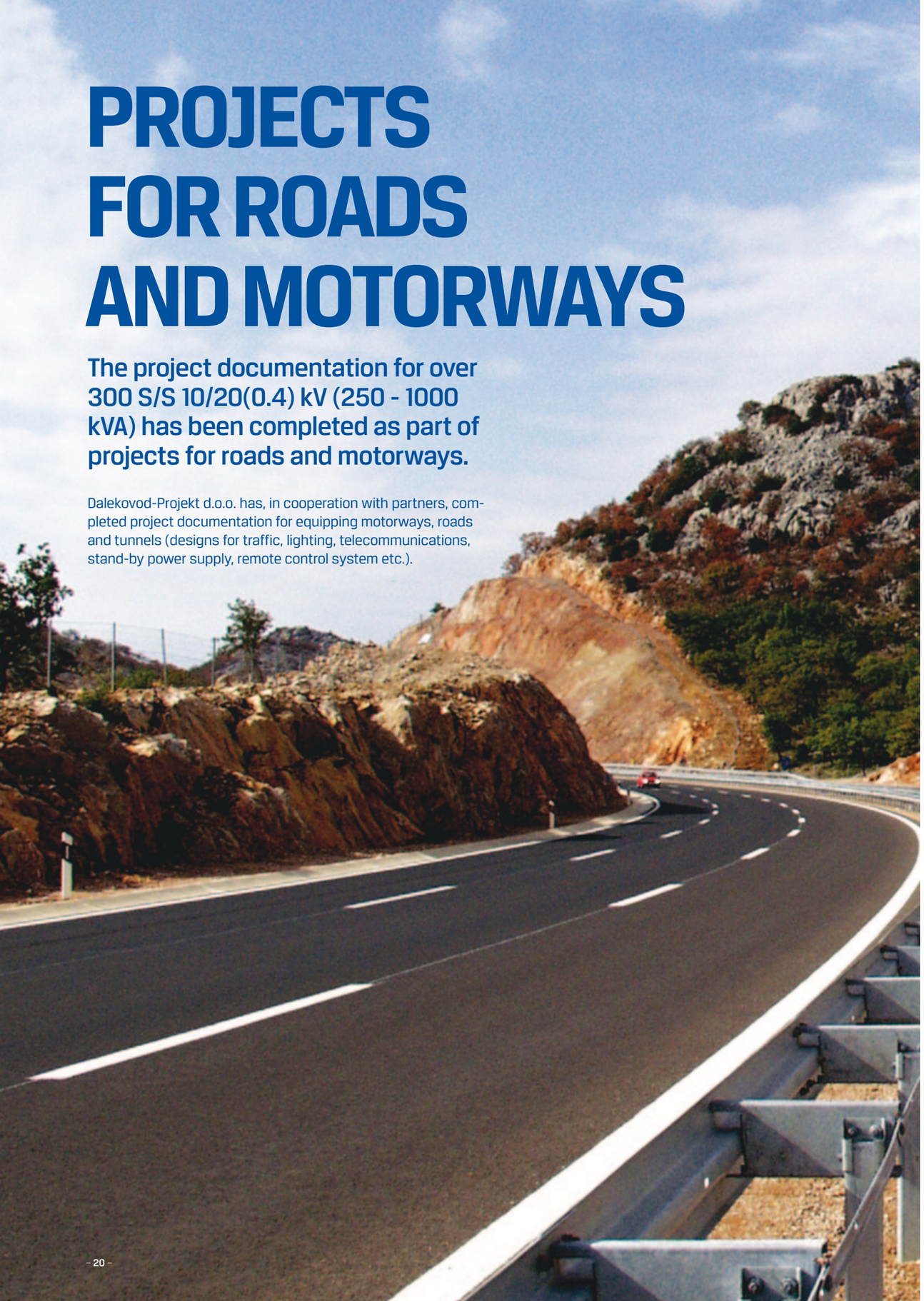
- reconstruction of lighting of Slavonska Avenue - Marin Držić Avenue traffic loop
- lighting for R. F. Mihanović Street.

LIGHTING PROJECTS

PROJECTS FOR ROADS AND MOTORWAYS

The project documentation for over 300 S/S 10/20(0.4) kV (250 - 1000 kVA) has been completed as part of projects for roads and motorways.

Dalekovod-Projekt d.o.o. has, in cooperation with partners, completed project documentation for equipping motorways, roads and tunnels (designs for traffic, lighting, telecommunications, stand-by power supply, remote control system etc.).



One of the most significant and complex projects was designing of the electric power supply, the transfer of installations and the equipping of the Zagreb - Split - Dubrovnik motorway, the sections from Dugopolje to Ploče, which included elaboration of the conceptual, main and detailed designs:

- 20 km 110 kV Ploče - Vrgorac transmission lines
- 120 km MV* cable lines
- 70 km - transfer of overhead lines of all voltages, at the intersection with the motorway
- 60 km - reconstruction of 10(20) kV overhead lines
- 112 km - optical cables
- S/S 110/10(20) kV Vrgorac
- S/S 110/10(20) kV Zagvozd
- S/S 110/10(20) kV Ploče
- reconstruction of S/S 110/35/20 kV Kraljevac
- reconstruction of S/S 35/10(20) kV Klis
- reconstruction of S/S Prančevići
- S/S 10(20)/0.4 kV - approx. 25 units
- lighting of all traffic junctions (5 units) and road-side service facilities (7 units), installations and tunnel equipment (5 units), toll stations (5 units).

Reconstruction of EPS lines and EPS:**

- on the Zagreb - Split - Dubrovnik motorway, section: Ravča - Ploče 1
- on the Beli Manastir - Osijek - Svilaj motorway, section: Beli Manastir - Osijek
- on the Beli Manastir - Osijek - Svilaj motorway, section: Sredanci - B&H border
- on the Zagreb - Split - Dubrovnik motorway, section: Doli - Dubrovnik
- Sveta Klara Junction on the Bregana - Zagreb - Lipovac motorway
- on the Pelješac Bridge with access road from the direction of Komarna.

Reconstruction of EPS lines, EPS and TC installations on the Zagreb - Sisak motorway, section: Lekenik - Sisak.

Reconstruction of EPS lines, EPS, lighting, telecommunications and tunnel equipment:

- high-speed road Ploče Junction - FTS*** Karamatići
- Rijeka by-pass, section: Orehovica - Diračje
- Sveti Ilija Tunnel (Biokovo) on the northern and southern access roads
- Ravča - Drvenik Junction, along with Drvenik Tunnel.

Reconstruction of EPS lines on the Istrian Y high-speed road, section: Pula - Pomer.

Reconstruction of EPS lines, TC installations and water pipelines at intersections with Istrian Y high-speed road.

Reconstruction of EPS lines, gas pipelines and water pipelines, EPS, lighting and telecommunications:

- Mokrice - Andraševec high-speed road
- Zabok - Krapina high-speed road.

EPS and reconstruction of high-voltage and low-voltage transmission lines at intersections with the Beli Manastir - Osijek - Svilaj motorway, sections: Osijek - Đakovo and Đakovo - Sredanci.

As part of the above sections, we also made designs for the following projects:

- S/S 110/10(20) kV Đakovo 3
- S/S 110/20 kV Krapina - Bobovje
- S/S 110/35 kV Oštarije
- S/S 110/35 kV Obrovac
- underground cable line 2x110 kV connection for S/S Đakovo 3
- reconstruction of S/S 110/35/10 kV Beli Manastir
- reconstruction of S/S 110/20(10) kV Donji Andrijevci
- S/S 35/10(20) kV Sv. Rok Tunnel - north
- S/S 35/10(20) kV Mala Kapela Tunnel - south
- S/S 35/10(20) kV Drenovci
- reconstruction of S/S 35/10(20) kV Krapina - Strahinje
- S/S 35/10(35) kV Obrovac.

* MV - medium voltage ** EPS - electric power supply
*** FTS - frontal toll station

PROJECTS FOR PETROL STATIONS

Since 2010 to the present, numerous projects related to petrol stations have been completed:

- projects for the modernisation of petrol stations
- projects for the complete reconstruction of petrol stations
- projects for removal of petrol stations
- projects for UNP gas tanks
- interior designs for petrol stations using 3D software packages.

RAILWAY INFRASTRUCTURE PROJECTS

- ETS* 110/25 kV Plase
- ETS 110/25 kV Đakovo
- ETS 110/25 kV Vrata
- ETS 110/25 kV Ledenice
- ETS 110/25 kV Josipdol
- ETS 25 kV Horvati
- ETS 25 kV Draganić
- TSC** Zaprešić
- MPTSC*** Hrvatski Leskovac
- MPTSC Dubrava
- high-efficiency railway line: state border - Zagreb - Rijeka; sector 3: Hrvatski Leskovac - Karlovac - Krasica
- reconstruction designs for high-voltage and low-voltage transmission lines at intersections with the new Karlovac - Rijeka railway line
- contact network design for the Moravice - Rijeka - Šapjane and Škrljevo - Bakar railway lines
- building for maintenance of electric traction sub-stations, Delnice
- project for the electrification of the Knin - Split railway line

* ETS - electric traction substation
** TSC - track sectioning cabin
*** MPTSC - mid-point track sectioning cabin

- detailed spatial plan for TL 400 kV from the Montenegrin coast to Pljevlja and submarine 500 kV cable (Montenegro)
- TL 400 kV Tirana - Podgorica (Albania and Montenegro)
- TL 2x220 kV Rama - Posušje (B&H)
- TL 2x220 kV Jablanac - Jajce, connection at Rama hydro power plant (B&H)
- TL 110 kV Tomislavgrad - Prozor (B&H)
- TL 110 kV Tomislavgrad - Livno (B&H)
- TL 2x110 kV connection with S/S Buna (B&H)
- TL 2x110 kV connection with Mostarsko Blato hydro power plant (B&H)
- TL 110 kV Podgorica 5 - T-connection KAP I (line 1) (Montenegro)
- TL 110 kV Podgorica 5 - Golubovci (Montenegro)
- TL 110 kV Berivojce - Kitka (Kosovo)

- reconstruction of 220 kV plant in Aluminij factory in Mostar (B&H)
- S/S 110/20 kV Kitka (Kosovo)
- equipping of outgoing feeder in S/S 110/10 kV Berivojce (Kosovo)
- reconstruction of S/S 110/35 kV Podgorica 3 (Montenegro)
- reconstruction of S/S 110/35 kV Podgorica 5 (Montenegro)
- reconstruction of S/S 400/220 kV Ribarevina and connection transmission line (Montenegro)
- reconstruction of S/S 220/110/35 kV Mojkovac and connection transmission line (Montenegro)
- reconstruction of S/S 110/35 kV Andrijevica and connection transmission line (Montenegro)

- reconstruction of EPS lines, EPS, lighting, telecommunications, traffic and tunnel equipment on the 5C corridor motorway through B&H, sections: Mostar north - Mostar south; Mostar south - Počitelj; Počitelj - border with Croatia (B&H)
- reconstruction of EPS lines, EPS, lighting, telecommunications and traffic on the Banja Luka - Doboj motorway (B&H)

- reconstruction of HV and LV transmission lines at intersections with the Bar - Boljare motorway, Veruša - Mateševo section (Montenegro)
- reconstruction of HV and LV transmission lines (220 kV, 110 kV, 35 kV and 10 kV) at intersections with motorway in Kosovo, section 9
- TL 110 kV Kirirom - Phnom Penh, 120 km (Cambodia)
- TL 110 kV Boali II - Bangui, 95 km (Central African Republic)

- TL 2x400 kV Divača - Redipuglia (Slovenia and Italy), Divača - Slovenian border section, 38.9 km
- TL 220 kV Rama - Jablanica (line I) 12.5 km (B&H)
- TL 220 kV Rama - Jablanica (line II) 12.5 km (B&H)

TL 400 kV Kosovo - Albania (state border)

Nominal voltage	400 kV
Section lenght	90 km
Number of towers - suspension Number of towers - tension Total	185 56 241
Average span	373 m

PROJECTS ABROAD

OTHER PROJECTS

- Spaladium Centre, sporting and commercial centre, Split - detailed design of the steel roof structure
- Krešimir Ćosić Sports Hall at Sports Recreational Centre Višnjik, Zadar - detailed design of the steel roof structure
- First Aid Institute, Zagreb - detailed design
- reconstruction of production plant (extensions to production halls) - Elka kabeli
- Ninčevići Elementary School
- Kneginec Junction on access road, Varaždin Junction (Zagreb - Goričan motorway) - eastern by-pass of Varaždin, civil engineering designs for the reconstruction of the main gas pipeline DN 300/50 Bara - Budrovac - Varaždin
- Kneginec Junction on access road, Varaždin Junction (Zagreb - Goričan motorway) - eastern by-pass of Varaždin, civil engineering designs for the reconstruction of the water supply system and sewer system
- Solin - Klis - Sinj high-speed road, Grlo - Podi subsection, transfer and protection of installations, water supply and sewer system, water supply system by OS11
- Solin - Klis - Sinj high-speed road, Podi - Križice subsection, transfer and protection of installations; water supply system and sewer system, transfer of water supply system
- connection of water supply system for S/S 35/10(20) kV Generalski Stol
- connection of S/S 110/35 kV Oštarije to the public water supply network
- design of the steel structures of an outdoor warehouse at Dugo Selo location
- Hrastovačka Gora belvedere, Petrinja
- cable panels 110 kV Zamošće and Perna
- solar power station Vipnet (30 kW)

The experience and successful operations of Dalekovod-Projekt d.o.o. rightfully instil clients with a sense of security. The company has worked on projects of various complexity and size - from transmission lines and substations to telecommunications antenna masts, production halls, sports halls, schools, buildings, municipal infrastructure facilities, solar power plants - which bear witness to the professionalism of the company concerning design, supervision, consulting and engineering.

The 89 employees of the company see each new project as an opportunity to once again prove their expertise and professional responsibility.

DALEKOVOD PROJEKT

Marijana Čavića 4

10 000 Zagreb

Hrvatska

Tel: +385 1 24 11 100

Fax: + 385 1 24 52 381

E-mail: dalekovod.projekt@dalekovod.hr

www.dalekovod-projekt.com

2015.