

1. "Energy availability of substations in "Zorka Keramika Šabac" enterprise",  
 Ordered by: Zorka Keramika Šabac  
 Project Manager: Miloje Kostić, PhD.  
 Associate: Saša Minić, MSc.  
 Activities in this project included:
  - 1) Analysis of actual substations 6/0.4 kV supplying solution in Zorka Keramika Šabac.
  - 2) Analysis and evaluation of new equipment load in Zorka Keramika Šabac.
  - 3) Analysis of use existing 6 kV power supplying equipment to supply new drive in Zorka Keramika Šabac.
  - 4) Proposal of supplying total company load concept after starting new drive and proposed solution sensitivity analysis.
 Size of Project: 14 pages  
 Finished in: 2008.
  
2. "Effects and technical conditions of "Vulić i Vulić" consumer distribution network connection",  
 Ordered by: Public Utility "Elektrosrbija", Kraljevo  
 Project Manager: Saša Minić, MSc.  
 Associate: Danka Kecman, MSc.  
 Activities in this project included:
  - 1) Analysis of previous and expected "Vulić i Vulić" company electrical energy consumption at location "Hladnjača" near Varvarin.
  - 2) Relevant 10-35 kV network functioning analysis for actual "Vulić i Vulić" company load level.
  - 3) Consumer connection influence to voltage conditions, security and network losses analysis and minimal necessary actions to fulfill security demands.
  - 4) Analysis of additional 2 MW consumer load increase influence to network functioning and minimal necessary actions to fulfill security criteria.
 Conclusions presented in project are based on realized analysis.  
 Size of Project: 7 pages  
 Finished in: 2008.
  
3. "Short circuit currents calculation in Hydro Power Plant Đerdap 1 and 400 kV Plant Đerdap 1",  
 Ordered by: Public Utility HPP Đerdap Kladovo  
 Project Managers: Dragan Popović, PhD, Miloš Stojković, MSc.  
 Associates: Dragan Dabić, MSc.  
 Saša Minić, MSc.  
 Three-phase, two-phase and phase to ground short circuit currents calculations are performed for selected points in HPP Đerdap 1 and 400 kV Plant Đerdap 1. Calculations of selected network elements short circuit currents' values are also performed for same short circuit locations.  
 Size of Project: 7 pages  
 Finished in: 2008.
  
4. "Excitation current and power loss dependence of reactive load level in Thermal Power Plant "Obrenovac" synchronous generators",  
 Ordered by: Public Utility "Thermal Power Plant Nikola Tesla", Obrenovac  
 Project Manager: Miloje Kostić, PhD.  
 Associate: Igor Belić, MSc.  
 The purpose of this study was to find all losses components in generator-transformer blocks in TPP Nikola Tesla Obrenovac:
  - Generator's stator winding losses ( $P_{Cu,s}$ ),
  - Additional power losses in generator ( $P_{d-G}$ ),
  - Generator's rotor winding losses ( $P_f$ ), as well as,
  - Load losses in generator's transformer ( $P_{\gamma T,opt}$ ),
 and also their relation to generator's reactive load. Reactive load influences significantly to generator-transformer block losses increase, and as a consequence to generator's temperature increase, cooling system load and potential difficulties in this system functioning. By defining relation  $\Delta P_{\gamma G,t}(Q_{gen})$  it is easy to find

optimal power factor at generator's threshold, the price of reactive power supplied from generator and to define more precisely generator's circular diagram.

Size of Project: 54 pages

Finished in: 2008.

5. "Reactive Power Compensation Influence to Transport System HV Motor Operation in Coal Mining System "TIP" JP RB "Kolubara" - Concept of Reactive Power Compensation in Drobilana PK Tamnava Istočno Polje Drive"

Ordered by: Public Utility RB Kolubara, Površinski kopovi Baroševac

Project Manager: Miloje Kostić, PhD.

Associates: Miroslav Stanković, MSc.

Igor Belić, MSc.

The objective of this project is to improve power factor in Drobilana drive by creating conception of reactive power compensation taking into account influences to harmonic components and influences to capacitors' percussive currents. Compensation was considered as individual and as mutual (individual and group compensation) and these two solutions were analyzed technically and economically. Conclusions are presented in project as a result of these analyses.

Size of Project: 29 pages

Finished in: 2008.

6. "Possibility of eliminating transformation 110/35 kV in substation 110/35/20 kV Sremska Mitrovica 1 and possibility of supplying potential load in industrial area of Sremska Mitrovica investigation"

Ordered by: Public Utility Elektrovojvodina Novi Sad

Project Manager: Ana Šaranović, MSc.

Associates: Danka Kecman, MSc.

Saša Minić, MSc.

The purpose of this project was possibility of eliminating transformation 110/35 kV in substation 110/35/20 kV Sremska Mitrovica 1 investigation. Namely, possible lasting or persistent outage of 110/35 kV 31.5 MVA unit, which is very old, in mentioned substation dictates investigation of 110/35 kV transformation further destiny, keeping in mind significant load reduction of once the biggest 35 kV consumer "Matroz". This company stepped into bankruptcy in the meantime. The cheapest way, subject to technical constraints, to eliminate 110/35 kV transformation is presented in this study. The second part of the project was investigation of possibility to supply potential additional load in industrial area of Sremska Mitrovica, after eliminating 110/35 kV transformation and finding a way to increase supplying capacity.

Size of Project: 67 pages

Finished in: 2008.

7. "Electrical 6-110 kV network long-term development study for distributive area of Šabac"

Ordered by: Public Utility "Elektrosrbija", Kraljevo

Project Manager: Milan Ivanović, MSc.

Associates: Branislav Čupić, MSc.

Gordana Radović, MSc.

Ana Šaranović, MSc.

Saša Minić, MSc.

The objective of this study is development of prospective 110 kV, 35 kV, 20 kV and 10 kV networks in the distributive area of Šabac for the period 2006 to 2025. The population of analyzed area is ~190000 (~78000 electrical energy consumers with 455000 MWh annual consumption and ~113 MW annual active power peak). The study includes analyses of energy consumption development for the period up to the year of 2005 as well as load and energy consumption forecast until the year of 2025. Detailed analyses of 110 kV, 35 kV, 20 kV and 10 kV networks present condition (including physical state of networks, load of elements, voltage conditions and losses) have been accomplished.

Based on those analyses, results of load forecasting, techno-economical analyses and comparison of possible development variants, the most prosperous solution of distributive network further development in the considered area for the period up to the year of 2025 has been suggested. Variants of network development have been formed and analyzed with propagation of 20 kV voltage. Network has been considered in respect of adjacent distributive areas (Loznica, Valjevo). Initial network size: ~860 MV/LV substations.

Size of Project: 515 pages

Finished in: 2008.

8. "Study of long-term prospective 35-110 kV network development for distributive areas of Niš, Leskovac, Prokuplje, Pirot and Vranje"

Ordered by: Public Utility Elektroprivreda Srbije Beograd  
Project Manager: Tijana Janjić, MSc.  
Associates: Petar Kovačević, MSc.  
Saša Minić, MSc.  
Gordana Radović, MSc.  
Maja Marković, MSc.  
Milan Ivanović, MSc.  
Miloš Stojković, MSc.  
Igor Belić, MSc.  
Danka Kecman, MSc.

The objective of this study is development of prospective 110 kV and 35 kV networks in south Serbia (areas of Niš, Leskovac, Prokuplje, Pirot and Vranje) for the period 2010 to 2025. This area has population ~1 million (~450000 electrical energy consumers with 2.7 billions kWh annual consumption and ~700 MW annual active power peak). The study includes analyses of energy consumption development for the period up to the year of 2006 as well as load and energy consumption forecast until the year of 2025. Detailed analyses of 110 kV and 35 kV networks present condition (including physical state of networks, load of elements, voltage conditions and losses) have been accomplished.

Based on those analyses, results of load forecasting, techno-economical analyses and comparison of possible development variants in separate areas, the most prosperous solution of distributive network further development in the considered areas for the period up to the year of 2025 has been suggested.

Size of Project: 674 pages  
Finished in: 2008.

9. "Study of long-term prospective 10 kV network development for Niš city"

Ordered by: Public Utility Jugoistok Niš  
Project Manager: Gordana Radović, MSc.  
Associates: Maja Marković, MSc.  
Petar Kovačević, MSc.  
Tijana Janjić, MSc.  
Branka Kostić, MSc.  
Miloš Stojković, MSc.  
Branislav Čupić, MSc.  
Igor Belić, MSc.  
Saša Minić, MSc.

The objective of this study is development of prospective 110 kV, 35 kV and 10 kV networks in the city of Niš for the period 2006 to 2025. The population of analyzed area is ~240000 (~260 MW annual active power peak of relevant substations 110/X kV). The study includes analyses of energy consumption development for the period up to the year of 2005 as well as load and energy consumption forecast until the year of 2025. Detailed analyses of 110 kV, 35 kV and 10 kV networks present condition (including physical state of networks, load of elements, voltage conditions and losses) have been accomplished.

Based on those analyses, results of load forecasting, techno-economical analyses and comparison of possible development variants, the most prosperous solution of distributive network further development in the considered area for the period up to the year of 2025 has been suggested. Initial network size: ~740 MV/LV substations.

Size of Project: 625 pages  
Finished in: 2008.

10. "Load flows, voltage conditions and short circuits 6-35 kV network analyses in refinery Pančevo and improvement possibilities analyses"

Ordered by: NIS A.D. Petrol  
Project Manager: Saša Minić, MSc.  
Associates: Dragan Dabić, MSc.  
Igor Belić, MSc.

Load flows, voltage conditions and short circuits 6-35 kV network analyses in refinery Pančevo were performed in this project. Refinery has its own power generation which is not sufficient for its energy

demands. Based on load flow analyses and taking into account technology constraints in refinery possibilities of network reconfiguration were investigated in order to utilize own energy resources as much as possible. Protection selectivity was one of constraints during optimal configuration (from energy consumption and security point of view) pick process. Reactive power compensation was also considered as a measure for more efficient energy use.

Size of Project: 47 pages  
Finished in: 2008.

11. "Electrical 10-110 kV network long-term development study for distributive area of Lazarevac"

Ordered by: Public Utility "Elektrosrbija", Kraljevo  
Project Manager: Ivan Stanisavljević, MSc.  
Associates: Vladimir Sovrlić, MSc.  
Nikola Šušnica, MSc.  
Saša Minić, MSc.

The objective of this study is development of prospective 110 kV, 35 kV, 20 kV and 10 kV networks in the distributive area of Lazarevac for the period 2006 to 2025. The population of analyzed area is ~107000 (~44000 electrical energy consumers with 243500 MWh annual consumption and ~46 MW annual active power peak). The study includes analyses of energy consumption development for the period up to the year of 2006 as well as load and energy consumption forecast until the year of 2025. Detailed analyses of 110 kV, 35 kV and 10 kV networks present condition (including physical state of networks, load of elements, voltage conditions and losses) have been accomplished.

Based on those analyses, results of load forecasting, techno-economical analyses and comparison of possible development variants, the most prosperous solution of distributive network further development in the considered area for the period up to the year of 2025 has been suggested. Variants of network development have been formed and analyzed with propagation of 20 kV voltage. Network has been considered in respect of adjacent distributive areas (Beograd, Valjevo, Čačak). Initial network size: ~700 MV/LV substations.

Size of Project: 649 pages  
Finished in: 2008.

12. "Making and verification of Serbian power system (with environment) computer dynamic simulation model"

Ordered by: Public Utility "Elektromreža Srbije", Belgrade  
Project Manager: Dragan Popović, PhD.  
Associates: Miloš Stojković, MSc.  
Ivan Stanisavljević, MSc.  
Saša Minić, MSc.

Size of Project: 656 pages  
Finished in: 2008.

13. "Thermal power plants Kolubara B and Nikola Tesla B3 stability study and the most suitable generators' and block-transformers' parameters and characteristics selection"

Ordered by: Public Utility Elektroprivreda Srbije Beograd  
Project Manager: Dragan Popović, PhD.  
Associates: Ivan Stanisavljević, MSc.  
Miloš Stojković, MSc.  
Saša Minić, MSc.

The objective of this study is selection of the most suitable parameters for generators and block-transformers in future thermal power plants Kolubara B and Nikola Tesla. Nominal power factors of generators, transmission ratio of block-transformers, short-circuit ratio scope, transient reactance scope, inertia time constant scope for generators, excitation system type, and voltage control type were parameters analyzed and proposed as the result of this study. Selected parameters were base for making tender documentation.

Load flow, short-circuit, static and transient stability analyses were performed in this study in order to determinate parameters values and scopes. All analyses were performed by using previously developed, evaluated and approved domestic software. For research and educational purposes some of results were evaluated and confirmed by using brand name world known software.

Size of Project: 129 pages  
Finished in: 2008.

14. "Rationalization of the own electrical energy consumption in Thermal Power Plant "Kostolac A""

Ordered by: Public Utility "Thermal Power Plants and Mines Kostolac", Kostolac

Project Manager: Miloje Kostić, PhD.

Associates: Branka Kostić, MSc.

Thermal Power Plant "Kostolac A" has two aggregates (100+200 MW). Its own consumption is about 10% of the plant's power (about 30 MW) as well as about 10% of total produced electrical energy. 6 kV asynchronous motors participate with about 88-90% and 0.4 kV asynchronous motors participate with about 5% in the Thermal Power Plant's own consumption.

The first phase of project contains 3 parts:

1. Energy analysis of own consumption and loads, based on estimations and/or calculations of total losses in 6 kV and 0.4 kV asynchronous motors, and the structure of losses.
2. Selection of measures for the rationalization according to the analysis specified in previous thesis. For the rationalization of plant's own consumption (that is, of the electromotive drive), following measures have been chosen:
  - Identification of the optimal voltage values within  $U_n \pm 5\%$ , for the 6 kV network;
  - Selection of the consumers with economically justified reactive power compensation;
  - Application of asynchronous drives with the speed regulation for chosen drives and,
  - Individual energy rationalizations for 6 kV network, 6/0.4 kV transformers and motors.
3. The savings attained by rationalization of plant's own consumption have been estimated to about 400000 kWh and about 11 300 000 kvarh per year.

The second phase included:

- Projects of concrete measures for reducing own electrical energy consumption;
- Realization of projected measures for reducing own electrical energy consumption;

Size of Project: 102 pages

Finished in: 2008.