

5<sup>th</sup> **Successful Run** in Asia!

# LOAD FORECASTING **IN POWER SYSTEMS**

A pragmatic methodology that can be used as a guide to construct Electric Power Load Forecasting models with real case studies

SGD 3000 for  
2  
Participants  
or More

26 – 28 MARCH 2018, MANILA, PHILLIPINES

## TOPICS COVERED

Building a benchmark model for different utilities and examples from practice

Practical implementation, best practice and continuous updates

Significance and implementation of Load Forecast

Accuracy vs. Sensitivity of Load Flow assessment

Data mining and information requirement for the analysis

Methodology

## Expert Course Faculty Leader



### **Vukan Polimac**

Chartered Engineer MIET CIGRE SMEIT SAIEE  
Fellow of IET, IEEE, CIGRE  
Consultant in Polimac Ltd

# LOAD FORECASTING IN POWER SYSTEMS

26 – 28 MARCH 2018, MANILA, PHILIPPINES

## About This Training Course

Load forecasting is a central and integral process for planning periodical operations and facility expansion in the electricity sector. Demand pattern is almost very complex due to the deregulation of energy markets. Therefore, finding an appropriate forecasting model for a specific electricity network is not an easy task. Although many forecasting methods were developed, none can be generalized for all demand patterns. This training presents a pragmatic methodology that can be used as a guide to construct Electric Power Load Forecasting models. The trainer brings with him real case studies and examples from his direct experience in this industry.

## Learning Outcomes

Participants will be able to understand and put into the practice the following key learnings

- Significance and implementation of Load Forecast
- Accuracy vs. Sensitivity of Load Flow assessment
- Data mining and information requirement for the analysis
- Methodology
- Building a benchmark model for different utilities and examples from practice
- Practical implementation, best practice and continuous updates

## Who Should Attend

Load/price forecasters, energy traders, quantitative/business analysts in the utility industry, power system planners, power system operators, load research analysts, and rate design analysts

### VUKAN'S INVOLVEMENT IN LOAD FORECAST

- Continuous 2.5 years working as Planning Assistant in Distribution Utility in Port Elizabeth with direct responsibility for
- Load Forecasting and System Planning of 132kV network
- Master plan for Mauritius, working on load forecast and T&D planning
- Responsible for creating a Long term strategic plan and medium plan with providing the appropriate load forecast for Yemen Republic
- Load Forecasting and System Planning for Palestine with interconnections to the Master plan of the region including Israel, Syria, Egypt and Jordan
- Short term planning with assessment of immediate load and short term forecast in Tajikistan
- Dynamic load forecast and wind farms generation input with weather correction factors as part of renewables connection and implementation of smart grid techniques
- 5 year investment plans based on predicted load forecast for five different areas in Victoria

**This training course has a limited attendance for up to 20 participants only.**

Sessions commence at 9am on all days, with short intervals at 10.30am and 3.30pm respectively.

Refreshments will be provided in the short intervals.

Lunch will be provided at 12:30pm for 1 hour. Sessions will end at 5pm on all days.

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## 3 Day Course Outline

### Day 1

#### Significance and implementation of Load Forecast

- Inexact Load Forecast leads to increased costs in supplementary application
- Load Forecast as crucial input to System Planning
- Load Forecast as a basis for Energy Saving evaluation

#### Accuracy vs. Sensitivity of Load Flow assessment

- The Art of forecasting and planning
- Strategic vs. virtual forecast; different approach
- Long term forecast and impact on investment
- Short term forecast or dynamic change of load impact on local Energy Market

### Day 2

#### Data mining and information requirement for the analysis

- Macro Economics for long term planning, GDP, Inflation, unemployment, price indexes, national income, investment...
- Micro economics, local development, taxation system, relative prices ratios, demand-supply matching,
- Stakeholder's information (utilities, ministries, independent agencies etc.)
- Historical values and trends
- Social and Environmental influences
- New technology application – Energy efficiency and energy storage

#### Methodology

- General approach and differences in application
  - i. Driving factors – Economy, Climate, Weather, Social activities, Stakeholders activities, Main specific characteristics of electrical load
  - ii. Analysis by graphic methods for comparison
  - iii. Type of load, technical parameters affecting the LF values
- Specific requirements for LF for generation planning
- Spatial forecasting for transmission and distribution planning

- Econometric approach
  - Basic econometrics models; Statistical models
  - Linear regression, Generalized linear models,
  - Probabilistic models
  - Artificial Intelligence methods, neural networks, fuzzy logic
  - Software application
- Weather Normalization corrections
- Application of sensitivity methods

### Day 3

#### Building a benchmark model for different utilities and examples from practice

- Urban, Rural, Industrial, Commercial, Transportation, Special consumers
- Spatial forecast/planning
- Methods for large and small utilities, identify special features for local utility
- Specific approach for short LF usually referred as to emergency or immediate requirements

#### Practical implementation, best practice and continuous updates

- Iterative process requiring constant updates
- Continuous improving of the forecast through application of new methods in the latest software models and refined parameters
- Lessons learned on previous forecasts

# LOAD FORECASTING IN POWER SYSTEMS

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## Your Expert Faculty

### Vukan Polimac

In his 30 years working experience he provided highest quality services in system planning and analysis to major transmission and distribution and transportation companies including London Underground, National Grid Company (UK), MTRC Metro in Hong Kong, West Coast Main Line connection to NG, Scottish Power, ESB-Ireland, ESKOM-South Africa, Mauritius CEB, Balkan countries - grids of Romania and former Yugoslavia, HV network ISA-Colombia, Western Power Distribution-UK, etc.

Vukan's technical expertise includes most aspects of power systems analysis, electrical asset management and railway connections to power networks where he provides solutions to technical problems and supports other field's experts in complex assignments. He has project management skills in technical and environmental projects as well as experience in short and long-strategic term planning, maintenance and asset management, power quality analysis of transmission and generation systems, distribution, transportation and other power networks. Experienced in generation and network integration, electrical component of energy master plans as well as strategic asset replacement, he was also involved in load- forecast analysis and generation dispatching. Published papers on asset management based on projects and experience in working for distribution companies in Africa and Europe.

Vukan is very experienced in design, procurement, commissioning, erection and refurbishment of major projects in transmission and distribution substations up to 420 kV and hydro and thermal power plants. Served as project manager on several major projects as well as head of the Engineering Group, Vukan was responsible for final design, equipment specifications, layouts tender evaluation and commissioning. He has carried out conceptual development of protection and control philosophy for various projects as well as reviewed and approved project drawings and documents. He has applied the latest IEC standards, various codes of practice and engineering recommendations. He has also specific experience in conceptual design of power supply for transportation and traction railway systems, defining the design principles and technical specifications for future design and privatisation process. He has analysed quality of power supply for connection of AC and DC unbalanced load to power network and published papers on practical implementation. Vukan carried out feasibility studies on reactive compensation (SVC and MSC) focusing on voltage variation and harmonic distortion issues.

Vukan has performed technical and economic evaluations, cost benefit net present value analysis, of various transmission and distribution schemes and electrical equipment. He carried out a number of asset evaluation analysis on electrical equipment and published papers on asset management, reliability and maintenance. He has performed equipment assessment and residual life prediction as part of strategic asset management analysis for a major underground transportation company in Asia. His duties have also included equipment arrangement optimisation in particular reliability aspect in terms of failure rate and financial consequences as non-supplied energy to the consumers.

# LOAD FORECASTING IN POWER SYSTEMS

## 26 – 28 MARCH 2018, MANILA, PHILIPPINES

	NORMAL PRICE	2 PARTICIPANTS OR MORE	IN-HOUSE TRAINING
<b>3 Day Programme</b>	<b>SGD 3,200 Per Participant</b>	<b>SGD 3,000 Per Participant</b>	<b>Guaranteed Minimum 40% Off Normal Price</b>

### ATTENDEE DETAILS

Name ..... Job title .....

Tel ..... Department ..... Email .....

Name ..... Job title .....

Tel ..... Department ..... Email .....

Name ..... Job title .....

Tel ..... Department ..... Email .....

Name ..... Job title .....

Tel ..... Department ..... Email .....

Name ..... Job title .....

Tel ..... Department ..... Email .....

### COMPANY DETAILS

Organisation name ..... Industry.....

Address .....

Postcode..... Country.....

Tel ..... Fax.....

### PAYMENT METHODS

By Cheque/ Bank Draft: Make Payable to PowerEdge Pte Ltd.

By Telegraphic Transfer: Please quote AE1 with the remittance advise

Account Name: PowerEdge Pte. Ltd.

Bank Code: 7339 Branch code: 686 Account Number: 686-253386-001 Swift Code: OCBCSGSG

Bank Address: 65 Chulia Street OCBC Centre, Singapore 049513

All bank charges to be borne by payer. Please ensure that PowerEdge Pte Ltd receive the full invoiced amount.

### PAYMENT POLICY

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to PowerEdge Pte Ltd. payment terms

\* GST- Exclusive price is only applicable for overseas corporate customers subject to qualifying conditions.

### CANCELLATIONS & SUBSTITUTIONS

You may substitute delegates at any time. POWEREDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another POWEREDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (including day 7), no credits will be issued. In the event that POWEREDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future POWEREDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that POWEREDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit

### 4 ways to Register

- Online Web Registration
- info@poweredgeasia.com
- (65) 6741 9927
- (65) 67478737

### RELATED TRAINING

- [EPC Contract Management for Power & Utilities](#)
- [Electrical Generators & Excitation Systems](#)
- [Ultra Supercritical Power Plants](#)
- [The 4 Pillars of Transformer Condition Monitoring](#)

### ON SITE TRAINING

Can't make it for the Course? We'll make the course come to you!!

Simply let us know your preferred time and dates and we will meet you at your schedule and venue.

With a host of highly trained experts, we will be happy to customize your programme with your needs 100% fulfilled.

Contact us today at

- info@poweredgeasia.com
- (65) 6741 9927

