

POWERSYS

Software & Services



Power Systems

Transport, Transmission & Distribution

Renewable Energy

Electrical Equipment



EXPERT IN POWER SYSTEMS STUDIES

WHO IS POWERSYS ?

Powersys is a provider of engineering services and simulation software for the electrical and electromechanical power systems markets. Thanks to its in-depth know-how and experience, Powersys is able to deliver solutions fitting your needs in the field of power system studies. Our headquarter is based in the south of France (Aix-en-Provence) and all over the world we are represented by our international distribution network and our local offices in the USA, Canada, India and Germany.

Power engineering Capabilities

We offer expertise for a variety of electrical power systems studies. They include:

POWER SYSTEM STUDIES

- Load flow
- Short circuit
- Harmonics
- Voltage stability
- Transient stability
- Motor starting
- Arc flash hazard
- Protective device coordination
- Grid integration of decentralized power systems
- Substation grounding
- Cable ampacity studies

ADVANCED STUDIES

- Insulation coordination
- Fast transient analysis
- Power quality
- Ferroresonance
- Switching surge
- Lightning surge
- HVDC connection
- Development of power systems models
- DC cables sizing for solar farms

WHY SHOULD YOU ENTRUST YOUR STUDIES TO POWERSYS ?

AN INTERNATIONAL PROFESSIONAL TEAM OF EXPERTS THAT PROVIDES YOU WITH MORE THAN SERVICE

POWERSYS owns a staff of engineers expert in simulation software and a network of partners with more than 30 years experience in the field of electrical design and studies of transport, distribution and industrial power systems. By the combination of engineering knowledge and experience in electrical grid studies, POWERSYS is a partner of choice for your advanced studies. Our services are customized to meet each customer's technical requirements and budget while maintaining a high quality level.

WE MEET THE DEMAND OF THE ENERGY MARKET

Thanks to our offices we delivered locally our solutions for the energy market. We pride ourselves to provide you with the best suited solutions for your unique requirements, objectives and projects. The technical success of your projects is our main objective.

WE DELIVER EXPERT SOLUTIONS FOR YOUR PROJECTS

Our high-skilled team will work closely with you from the definition of the project to the delivery of the engineering studies to achieve its successful completion. Our experience in understanding power systems issues combined with the best simulation software constitutes an efficient solution.

CHOOSE OUR CUSTOMER CARE

A STRONG CUSTOMER SERVICE CULTURE

POWERSYS delivers high quality, adaptable and affordable solutions. We care about our customers' satisfaction and do our best to accompany your projects and developments in a win-win relationship. Over the past 11 years, POWERSYS has delivered its solutions in more than 80 countries to more than 1300 customers, enabling its Clients to solve many and varied challenges of the power systems landscape.

THEY TRUST US

ABB, APPLE, ALSTOM, BOSCH, EDF, GENERAL ELECTRIC, GENERAL MOTORS, HYDRO QUEBEC, RENAULT, RTE, SNCF, SIEMENS, VALEO

PROJECTS & EXPERIENCE

Standard Power Systems studies

LONG RANGE PLANNING ANALYSIS ON DISTRIBUTION NETWORK

Customer: Distribution grid operator.

Study: For a large utility several network configurations have been studied on a 5 years long-range planning analysis to check equipment capacity to allow the new load forecast. Powersys proposed to realize contingency analysis with predefined network configuration. For each case overload equipment have been identified and specific solutions have been discussed with the customer.

Software used: CYME.

SHORT CIRCUIT ANALYSIS

Customer: Oil & gas company.

Study: For a large Oil and Gas company, a short circuit analysis has been realized to study the electromechanical and thermal busbar behavior. New inductances had to be added to allow the main busbar to resist a fault.

Software used: CYME.

GROUNDING SYSTEM ANALYSIS

Customer: Utility company.

Study: For a large utility, the Rg and GPR (Ground Potential Rise) were investigated to check the substation grounding. Touch and surface potentials have been calculated, inside and outside the grid perimeter. Powersys suggested some grid modifications to reduce those voltages and keep a good security in the substation.

Software used: CYMGRD.

PROTECTIVE DEVICE COORDINATION

Customer: Distribution grid operator.

Study: We performed a protective device coordination study on a 33kV/11kV substation and proceeded to the setting of protective relays.

Software used: CYMTCC.

GRID-CONNECTED PHOTOVOLTAIC SYSTEMS

Customer: Decentralized solar power producers

Study: Design and Engineering of 5MW PV Grid connected Solar power plant in Gujarat, India at 11/66kV:

- DC part dimensioning and choice of PV modules.
- Technical specification of the array boxes.
- Technical specification of the inverters and combiner boxes (DC Box).
- Study of the PV- system connection to the 11kV grid.
- Cable ampacity and sizing.
- Short circuits study and protective devices coordination.
- Study transformer switching transients.
- Harmonic study and filter design.

Software used: EMTP-RV and CYME.

ARC FLASH HAZARD

Customer: Tunnel boring machines manufacturer.

Study: We realized arc flash hazard analysis on an industrial network powering boring machines. A 11kV grid was connected to 3 medium voltage transformers powering the motors through cables.

We investigated the arc flash risk level in each cabinet and determined the adequate safety procedures in each electrical cabinet.

Software used: CYME.





PROJECTS & EXPERIENCE

Advanced Power Systems studies

INSULATION COORDINATION

Customer: Engineering consultancy office.

Study: For a large engineering company, an insulation coordination analysis is performed to check if surge arresters are required at the substation entry (63kV and 90kV). A statistical approach is used to calculate the back-flashover rate and the meantime between failures (MTBF) with and without surge arresters.

Software used: EMTP-RV.

TRANSFORMER SWITCHING STUDY

Customer: Industrial customer.

Study: A transformer switching study is performed for a North-American engineering company. It consists in estimating the voltage drop at the point of common coupling of a wind plant when energizing the main power transformer. The wind plant is located at the end of a long transmission line and the network short-circuit power is quite low. A specific attention is devoted to the modeling of the transformer saturation. The impact of the remanent flux is studied in order to estimate the maximum possible voltage drop that can appear at the point of common coupling.

Software used: EMTP-RV.

ANALYSIS OF ELECTROMAGNETIC INTERFERENCES BETWEEN UNDERGROUND CABLES AND A PIPELINE.

Customer: North American Engineering Company

Study: Powersys performed for a north American engineering company a study consisting in evaluating the magnetic coupling between a buried pipeline and a network of 34.5kV underground cables. The aim of the study was to calculate the induced voltage and current in the pipeline in steady-state and fault conditions. Crinoline is a software dedicated to the analysis of electromagnetic interferences resulting from the inductive, capacitive and conductive couplings on telecommunication cables, pipelines, fences and all types of long metallic overhead or underground structures installed on the vicinity of electric power systems. The latter can be any AC or DC transmission system (overhead lines and underground cables).

Software used: EMTP-RV and Crinoline.

HARMONIC STUDY ON PHOTOVOLTAIC SYSTEM

Customer: Photovoltaic operator.

Study: A harmonic analysis of a large photovoltaic system is performed with EMTP-RV. The system is composed of several inverters modeled individually. The inverters are connected to the medium voltage network through Delta-Wye transformers. The harmonics analysis demonstrates that the system has resonant frequencies dangerously close to the harmonics generated by the inverters. This results in extremely high THD values and the use of filters is highly recommended.

Software used: EMTP-RV.

FERRORESONANCE INVESTIGATION

Customer: Engineering consultancy office.

Study: Probability of ferroresonance occurring in a photovoltaic plant located in the south of the United State is investigated. Ferroresonance is a non-linear resonance phenomenon that can affect power networks. Basically, it consists in a saturable core interacting with a capacitor leading to high overvoltages. In a photovoltaic plant, lots of conditions that increase the likelihood of ferroresonance (long cable, low load, possible single phase fault, and delta ungrounded transformer) are met. In this specific project, the entire plant is modeled in EMTP-RV and a specific attention is devoted to the modeling of the cable and of the transformer saturation. Different cases are simulated (transformer energization, transformer de-energization, single phase loss, single phase and double phase energization) at different operating points in order to assess the probability of ferroresonance.

Software used: EMTP-RV.

HVAC CABLE INSERTION IN THE GRID

Customer: Transmission line operator.

Study: Electrical studies have to be done when inserting a long HVAC cable in the grid. A transmission lines operator asked Powersys to perform a frequency domain analysis for the resonance detection considering different topologies of the grid. A transient overvoltage and inrush current calculation when energizing the long HVAC cable were also performed in order to verify the insulation specification of the cable and substations equipment.

Software used: EMTP-RV.

SUBSTATION EMTP-RV MODEL VALIDATION

Customer: Industrial customer.

Study: A large utility company contacted Powersys and asked for the validation of an EMTP-RV substation model for a lightning insulation coordination study. It consists in analyzing each individual component of an air-insulated substation model (surge arresters, dropper, capacitor voltage transformer, incoming transmission lines & towers, bus bars, Power Transformers...).

The model of each equipment is analyzed, compared with IEC and IEEE standards and references, and updated if necessary.

Software used: EMTP-RV.

A solution for each simulation need

POWERSYS PROPOSES A COMPREHENSIVE SOFTWARE OFFER FOR THE ENERGY MARKET



Our main market orientation is to offer specialized, affordable and expandable software to our customers.

The combination of the different software constitutes a complete survey in the field of electrical power systems, power electronics and electromechanics. We market and support a comprehensive range of simulation software and also provide training services related to these products.

Powersys presents **7 software suites and related services (engineering and training)** to its customers in industry, research and education :



POWER SYSTEMS TRANSIENTS

EMTP-RV is a full-featured and technically advanced simulation and analysis software for power system transients. The package is a sophisticated computer program for the simulation of electromagnetic, electromechanical and control systems transients in multiphase electric power systems.

> www.emtp-software.com

SIMULATION TECHNOLOGY FOR ELECTROMECHANICAL DESIGN



JMAG is a FEA software for Electromechanical and electromagnetic design and development. It accurately grasps complex physical phenomena inside of equipment and performs high-speed analysis.

> www.jmag-international.com



POWER ELECTRONICS AND MOTOR DRIVES

PSIM is one of the fastest simulators for power electronics simulation. It achieves fast simulation while retaining excellent simulation accuracy. This makes it particularly efficient in simulating converter systems of any size, and performing multiple-cycle simulation.

> www.powersimtech.com

MODELING AND SIMULATING PHYSICAL SYSTEMS



Saber is a proven platform for modeling and simulating physical systems, enabling full-system virtual prototyping for applications in analog/power electronics, electric power generation/conversion/distribution and mechatronics.

> www.synopsys.com



POWER SYSTEMS IN TRANSMISSION, DISTRIBUTION AND INDUSTRIALS TRANSIENTS

CYME offers an extensive line of Power Engineering Software that feature some of the most advanced analysis tools for transmission, distribution and industrial power systems.

> www.cyme.com

COUPLING ENVIRONMENT



The MpCCI Coupling Environment has been developed at SCAI in order to provide an application independent interface for the coupling of different simulation codes. MpCCI Coupling Environment has been accepted as a 'de-facto' neutral standard for simulation code coupling.

> www.mpcci.de



POWER CONVERTERS CONTROL DESIGN

SmartCtrl is a controller design software specifically for power electronics applications. It features a friendly interface, simple workflow, and easy to understand display of control loop stability and performance.

> www.powersmartcontrol.com

EFFICIENT TECHNICAL SUPPORT

By working together with clients, Powersys application experts provide assistance to our customers and collect feedback that are taken into account for future software enhancements.

COMPREHENSIVE TRAINING OFFER

Powersys also offers comprehensive training programs that help you meet today's challenges and improve your simulation skills. A global training solution is offered for all levels, from beginners to advanced users. All training can be held at our customers locations.

HIGH SKILL CONSULTING

We offer through our associated staff (Powersys and partners) a variety of consulting services worldwide to assist you regarding new and emerging problems related to the application fields of our software. Powersys has an exclusive team of expert engineers and an extensive experience as developers and users.

Ours associated staff are involved every day in industry activities by conducting seminars and workshops for utilities and industrial groups worldwide. They participate in technical societies such as IEEE and International Standard Committees.

DISCOVER THE POWER OF OUR SOFTWARE

TRY OUR SOFTWARE AND OUR COMPREHENSIVE SUPPORT SERVICES DURING A 15-DAY EVALUATION

Technical support services

During your evaluation, our technical support team will assist you in your use of the software.

Online support section

In this section you will find videos tutorials, an exchange platform, FAQ, forum...

Events

Many events are regularly organized such as training, user group meetings and courses.

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