

ΕΛΛΗΝΙΚΗ
ΠΙΤΡΟΠΗ

Symposium 13-16 April 2005

Power Systems with Dispersed Generation Technologies, Impacts on Development, Operation and Performances

ATHENS—GREECE

Symposium venue:

HOTEL DIVANI CARAVEL

2 VAS, ALEXANDROU Avenue
16121 ATHENS
GREECE
<http://www.divanicaravel.gr>

CIGRE GREECE

Tel : + 30 210 7722888
Fax: + 30 210 7723586
e-mail:
vcos@power.ece.ntua.gr

CIGRE PARIS

Tel : + 33 1 53 89 12 90
Fax: + 33 1 53 89 12 99
e-mail:
secretary-general@cigre.org

REGISTRATIONS

CIGRE PARIS
registrations@cigre.org

CIGRE GREECE
vcos@power.ece.ntua.gr

BACKGROUND AND SCOPE

In many countries the power systems experience the emergence of dispersed generation, very often in a context of deregulation of the electricity supply industry.

The objectives of the Symposium are :

- to examine available or coming technologies, for generation, connection, power conditioning
- To review the implications on system development, operation and performance
- To assess the implications on market operation, environment and social development.

PARTICIPANTS

The Symposium is directed towards utilities, manufacturers, design engineers, system operators, transmission operators, traders, users of electricity as well as universities that provide research support.



SYMPOSIUM TOPICS

The Symposium comprises 10 sessions as described in the time-table hereafter. Each session will start with a short presentation of the papers by their author, followed by a discussion.

The topics addressed are as follow :

- **Technologies/Design/Issues**
- **Impact on Distribution and Transmission Development**
- **Impact on system operation and control centres tools**
- **Impact on system performance - wider issues**

Wednesday 13th April

7.00 p.m.	Welcome cocktail
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Thursday 14th April

9.00 a.m. - 11.00 am	Opening
11.30 a.m. - 1.30 p.m.	Post opening Session
3.00 p.m. - 5.00 p.m.	Session 1a & Session 2a

Friday 15th April

9.00 a.m. - 11 a.m.	Session 1b & Session 3a
11.30 a.m. - 1.30 p.m.	Session 2b & Session 3b
3.00 p.m. - 5.00 p.m.	Session 2c & Session 3c

Saturday 16th April

9.00 a.m. - 12.30 noon	Session 4 & Closing Panel
1.00 p.m. - 8.00 p.m.	Technical - Tourist Visit

TIME TABLE

On Wednesday a Tutorial is organized by SC C1 «Managing Transmission in the changing electricity industry (see more on www.cigre.org)

Power Systems with Dispersed Generation Technologies, Impacts on Development, Operation and Performances

Visa requirements

Please apply at your earliest to the Greek Embassy or Consulate in your own country to comply with Visa requirements.

Member
300 €

Non member
350 €

Companion
50 €

REGISTRATIONS

The Symposium is open to all. Registrations can be made in advance using the registration form and also on arrival to the Symposium. Early registration means early delivery of your conference documents.

The registration fee covers:

- Attendance and participation in discussion meetings;
- The CD-Rom of papers (forwarded to delegates by air-mail) if payment is received before March 31st;
- Participation in the welcome cocktail and official dinner;
- Morning and afternoon coffee;
- The visit planned on Saturday 16th.

Late registrants will be able to collect their CD-Rom of papers on arrival at the Symposium.

Tourist visits for accompanying persons have also been organized against payment (see on accommodation form).

HOTEL RESERVATIONS

Rooms will be available for delegates at the Symposium Headquarters, and in neighbouring hotels.

The corresponding hotel form is available on website and from National Committees.

PAYMENT OF FEES

All personal attendees at meetings are expected to pay the full registration fees (including authors of papers).

Registration form and corresponding registration fees should be sent to CIGRE before April 1st (Greek Nationals have to send both to the Greek National Committee). After that date, all applications should be sent directly to the Greek National Committee.

CIGRE

21 rue d'Artois

F - 75008 PARIS

registrations@cigre.org

Fax + 33 (0)1 53 89 12 99

GREEK NATIONAL COMMITTEE

NTUA/ ICCS 9, Iroon Polytechniou str.,
ATHENS 15773

vcos@power.ece.ntua.gr

Fax: + 30 210 7723586

Payment is accepted by : Credit card (MasterCard, Eurocard, Visa), check (drawn in a French bank for payment in France or a Greek bank for payment in Greece).

Registrations will be accepted during the Symposium. The fees should be paid on arrival.

CANCELLATIONS

Cancellations and replacements will be accepted up April 1st according to the conditions specified on the registration form.

TECHNICAL ORGANIZING COMMITTEE

Colin Ray	(GB)	Chairman of the Symposium, Chairman of SC C1
Evangelos Dialynas	(GR)	Co-Chairman, Chairman Greek NC of CIGRE
Jean Kowal	(FR)	Secretary General of CIGRE
Sture Larsson	(SE)	Chairman SC C2
Prabha Kundur	(CN)	Chairman SC C4
Angelo Invernizzi	(IT)	Chairman SC C6
Johan Smit	(NL)	Past Chairman SC D1
Ernst Gockenbach	(GER)	Chairman SC D1
Nikolaos Vovos	(GR)	Greek Member SC C2
Georgios Georgantzis	(GR)	Greek Member SC C4
Nikolaos Hatziaargyriou	(GR)	Greek Member SC C6
Dimosthenis Agoris	(GR)	Greek Member SC D1

OPENING SESSION, Thursday 14th (9.00 a.m.-11.00 a.m.)

POST OPENING SESSION
Thursday 14th (11.30 a.m. – 1.30 p.m.)

- 001 Emerging technologies for electrical power systems in the new ERA, J.J. SMIT (The Netherlands), B.M. PRYOR (United Kingdom), D.P. AGORIS (Greece), E. GOCKENBACH (Germany)
- 002 Overview of the first report of WG C1.03 "Impact on Transmission Planning of uncertainty..." L. BRYANS (Northern Ireland)
- 003 Development of Grid Code Provisions for Wind Generators in Ireland, P. SMITH, E.FAGAN, J. McARDLE, M. STRONGE (Ireland)
- 004 Connection of wind turbines to the HV and EHV grid. Experience with the new guidelines of the German association of electricity network operators K. STASCHUS, H. KÜHN, W. WINTER, M. LÖSING (Germany)
- 005 Protection issues in planning of distribution network including distributed generation, K. MAKI, P. JARVENTAUSTA, S. REPO (Finland)
- 006 New system power quality indices for distribution networks in presence of embedded generation, G. CARPINELLI, P. CARAMIA, A. RUSSO, P. VERDE (Italy)

PARALLEL SESSIONS

SESSION I a
TECHNOLOGIES/DESIGN/ISSUES
Thursday (3.00 p.m.-5.00 p.m.)

- 100 Advanced fluidized-bed combustion / gasification of non-fossil fuels for power generation in Greece, G. TARALAS, M.G. KONTOMINAS (Greece)
- 101 Comparison between AC PV modules topologies for decentralised grid connected applications, A. Ch. KYRITSIS, J.C. KOBOUGIAS, D.S. KLIMIS, E.C. TATAKIS (Greece)
- 102 Electrical generation technologies applied in the micro-grid's design, J.I. SAN MARTIN, I. ZAMORA, A.J. MAZON, J.M. ARRIETA, V. APERRIBAY, S. DIAZ (Spain)
- 103 Interconnection of Greek islands with dispersed generation via HVDC light technology, C. PAPADOPOULOS, P. PAPAGEORGIOU (Greece), L. STENDIUS, J. AHSTROM, M. HYTTINEN, S. JOHANSSON (Sweden)
- 104 Modeling of grid-connected fuel cell plants, D. GEORGAKIS, S. PAPATHANASSIOU (Greece)
- 105 Photovoltaics system characteristics-applications- impact on utility systems-penetration to the Greek electric power market, A.D. GEORGOPOULOS, K.N. TSIROULIS, I.C. VITELLAS (Greece)
- 106 Increasing the maximum connecting capacity for photovoltaic systems in low voltage networks using short-time storage systems, J. SCHEFFLER, M. BODACH, W. HILLER, T. FLEMMING H. MEHLICH (Germany)
- 107 Computer system design analogies for synthesis of sustainable distributed generation systems, Kai STRUNZ (USA)

SESSION I b
TECHNOLOGIES/DESIGN/ISSUES
Friday (9.00 a.m. - 11.00 a.m.)

- 110 Integration of protection, control, monitoring and remote communication into one intelligent electronic device for small hydro-power plants- pilot installations, G. STRANNE, U. NYGREN, S. BODE, M. CALLAVIK, L. WIKTORSSON, M. LINDBERG (Sweden)
- 111 Transient stability studies comparing synchronous and doubly fed induction generators, J. EEK, T. GJENGEDAL, K. UHLEN (Norway)
- 112 PowerTAINER for dispersed electrical power generation, C. CORNELISSEN, A. SCHNETTLER, C. MEYER, R. DE DONCKER, T. SCHEERMESSE, K. HAMEYER (Germany)
- 113 Control optimization for a variable speed wind turbine, M. TSILI, A. SOLDATOS, S. PAPATHANASSIOU, A. KLADAS, C. POURNARAS (Greece)
- 114 Active and reactive power management in a grid connected variable speed permanent magnet generator wind turbine equipped with asynchronous brake, A. HANIOTIS, K. TATIS, A. KLADAS (Greece)
- 115 Controlling the dispersed generation using the Internet techniques, A.M. ZAJACZKOWSKI, M. SMOLINSKI (Poland)
- 116 On grid performance of a superconductor dynamic synchronous condenser, Swarn S. KALSI (USA)
- 117 Modeling, control and stability of wind turbines with doubly fed induction generator, G. TSOURAKIS C. VOURNAS (GREECE)

SESSION II a
IMPACT ON DISTRIBUTION AND TRANSMISSION DEVELOPMENT
Thursday (3.00 p.m.-5.00 p.m.)

- 200 Wind generation and flexible electric load management issues for the system operation in Crete, T. PAPAZOGLU, G. SANTIPANTAKIS, M. PAPAZOGLU (Greece)
- 201 Large scale integration of distributed generation into the Western Danish power system. Present and future technical and economical impacts and challenges, J. PEDERSEN, P. BORRE ERIKSEN (Denmark)
- 202 Integration of wind generation in small isolated systems : the case of Giglio island, S. BARSALI, R. GIGLIOLI, A. BEDINI, A. ILICETO (Italy)
- 203 Study of the effect of tidal generation on the Irish grid system : resource and emissions, G. BRYANS, B. FOX, P. CROSSLEY M. O'MALLEY (United Kingdom)
- 204 Assessment of isolated energy systems based on wind power and hydrogen storage in an Arctic environment, A.L.H. EIDE, M. KORPAAS, T. GJENGEDAL (Norway)
- 205 Design of wind and hydrogen stand-alone power systems using a probabilistic method, L.N. GRIMSMO, M. KOPAS; T. GJENGEDAL (Norway)
- 206 Connection of RES power stations to the Greek system, V.V. PASCHALIDES (Greece)
- 207 Integration of wind power into the French power system, J. VERSEILLE, J-L. JAVERZAC, S. CHATELLIER (France)

SESSION III a
IMPACT ON SYSTEM OPERATION AND CONTROL CENTRES TOOLS
Friday (9.00 a.m.-11.00 a.m.)

- 300 Studies and progress towards intermittence management on a small system, L. BRYANS (United Kingdom)
- 301 Maximal use of renewables in small isolated power systems, J.S.G. EHNBERG, E. AGNEHOLM (Sweden)
- 302 Economic scheduling functions of a micro-grid participating in energy markets, A. TSIKALAKIS, N. HATZIARGYRIOU (Greece)
- 303 Two-stage optimization of a single CHP node, E. CARPANETO, F. FRESCHI, M. REPETTO (Italy)
- 304 On the properties of stochastic power sources in combination with local energy storage, B. KLOECKL (Switzerland)
- 305 Ancillary services provided by dispersed generation, Régine BELHOMME, G. ROBERT (France)
- 306 The Management and Control of Distributed Energy Resources, T.E. JONES, G.C. JAMES (Australia)

*Final order of Papers presentation will be
set by the Session Convener

SESSION II b
IMPACT ON DISTRIBUTION AND TRANSMISSION DEVELOPMENT
Friday (11.30 a.m.- 1.30 p.m.)

- 210 Maximizing distributed generation capacity of small hydro plants in a distribution network, A. DAGOUMAS, N. LETTAS, G. PAPAGIANNIS, P. DOKOPOULOS, A. ZAFIRAKIS, S. FACHOURIDIS, K. MANOUSARIDIS (Greece)
- 211 A method with fuzzy game theory to determine a limit of dispersed generation in a distribution system planning, P.H.R.P. GAMA, M. GOUVEA, G.L. TORRES (Brazil)
- 212 Meshed distribution networks to increase the maximum allowable distributed generation capacity, G. CELLI, F. PILO, G. PISANO (Italy)
- 213 Connection of generators and other customers, W.L. KLING (The Netherlands) on behalf of WG C6.02
- 214 Planning and operation of distribution systems in the presence of dispersed generation, C.L.T. BORGES, D.M. FALCAO (Brazil)
- 215 High voltage lines planning for distributed generation connection considering the potential of renewable energy sources, D. AGORIS, M. PSALLIDAS, E. PYRGIOTI, K. TIGAS, V. KILIAS, P. STRATIS, A. NERIS (Greece)
- 216 A critical study on the impact of strategic planning of interconnected system using Distributed Generation Systems, Carlos SALZMAN (Argentina)
- 217 Modification Ireland's distribution code due to embedded wind generation, T. HEARNE (Ireland)

SESSION II c
IMPACT ON DISTRIBUTION AND TRANSMISSION DEVELOPMENT
Friday (3.00 p.m. - 5.00 p.m.)

- 220 The role of power electronic converters as intelligent interfaces in distributed power systems : stochastic steady state analysis, G. PAPEFTHYMIU, J. MORREN, P.H. SCHAVEMAKER, W.L. KLING, L. VAN DER SLUIS (The Netherlands)
- 221 Analysis of voltage profile on LV distribution feeders with DG and maximization of DG integration limit, F. VIAWAN, A. SANNINO (Sweden)
- 222 Using stability index to determine penetration level of distributed generation, V. VAN THONG, L. DE WOLF, J. DRIESEN, R. BELMANS (Belgium)
- 223 Optimal location of dispersed generators for reliability improvement of distribution networks, I. TRISTIU, M. EREMA, C. BULAC, L. TOMA (Romania)
- 224 Calculation of the fault level contribution of distributed generation according to IEC standard 60909, Th. BOUTSIKA, S. PAPATHANASIOU, N. DROSSOS (Greece)
- 225 Reactive power allocation and voltage control of wind farms using optimal power flow approach, X.P. ZHANG, L. YAO, C. SASSE, P. CARTWRIGHT (United Kingdom)
- 226 A probabilistic load flow for unbalanced electrical distribution systems with wind farms, P. CARAMIA, G. CARPINELLI, M. PAGANO, P. VARILLONE (Italy)
- 227 Design and implementation of control schemes to increase wind penetration at north eastern Greece, J. KABOURIS, D. MICHOS (Greece)
- 228 Utility Grid Connection and Modelling Requirements related to wind power, Steven STAPLETON (United Kingdom)

SESSION III b
IMPACT ON SYSTEM OPERATION AND CONTROL CENTRES
TOOLS
Friday (11.30 a.m.- 1.30 p.m.)

- 310 Control and transient operation of grid-connected voltage source converter under unbalanced voltage conditions, H. AL NAS-SERI, M.A. REDFERN (United Kingdom)
- 311 Operator training for power systems highly penetrated with distributed generation, J. MATICS, C. ROGGATZ, G. KROST, U. SPANEL (Germany)
- 312 Stochastic transient stability of power systems with distributed energy systems, M. REZA, G. PAPEFTHYMIU, P.H. SCHAVEMAKER, W.L. KLING, L. VAN DER SLUIS (The Netherlands)
- 313 A Benchmark low voltage microgrid network, S. PAPATHANASIOU, N. HATZIARGYRIOU, K. STRUNZ (Greece)
- 314 Behaviour of a hybrid weak power system by connection and disconnection of a WECS, E. C. TSIMPLOSTEPHANAKIS, A.N. SAFACAS (Greece)
- 315 Concept and demonstration of loop power flow control for distribution systems, N. OKADA (Japan)

SESSION III c
IMPACT ON SYSTEM OPERATION AND CONTROL CENTRES
TOOLS
Friday 3.00 p.m. - 5.00 p.m.

- 320 Congestion management and transfer capability enhancement for regional transmission network with high penetration of wind generation using facts controllers, X.P. ZHANG, L. YAO, C. SASSE, P. CARTWRIGHT (United Kingdom)
- 321 Constraints management in local networks, W. MIELCZARSKI, T. SIEWIERSKI, M. SZYPOWSKI (Poland)
- 322 Impact of distributed generation on network management and balancing, W. MIELCZARSKI, M. SZYPOWSKI (Poland)
- 323 Description of a simulated micro-grid test facility and results from system testing under different load control strategies, A. NERIS, S. TSELEPIS, C. PROTOGEROPOULOS (Greece)
- 324 Voltage and reactive power control provided by DG units, J.A. PECAS LOPES, A. MENDONCA, N. FONSECA, L. SECA (Portugal)
- 325 Security assessment of interconnected systems having large wind power production; J.A. PECAS LOPES, H. VASCONCELOS (Portugal)
- 326 The influence of wind generation on the definition of reserve margins in a hydro-thermo electric system, P. PELACCHI, D. POLI, (Italy)

SESSION IV
IMPACT ON SYSTEM PERFORMANCE / WIDER ISSUES
CLOSING PANEL
Saturday (9.00 p.m. - 12.30 noon)

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| <u>POWER QUALITY</u> | 400 Power quality controller with EDLC connected in parallel to dispersed power sources, H. KONISHI, T. TAKAGI, N. YAMAMOTO, S. SUGIMOTO (Japan) |
| | 401 Grid-connected PV-systems and harmonics, J.F.G. COBBEN, H. OLDENKAMP, W.L. KLING, P.J.M HESKES (The Netherlands) |
| | 402 The impact of dispersed generation and voltage regulator operations on power quality, L. KOJOVIC (United States) |
| | 403 Impact of distributed generation on the reliability performance of power distribution systems, E.N. DIALYNAS, N. HATZIARGYRIOU, L.G. DAOUTIS, D. MICHOS (GREECE) |
| <u>ECONOMY</u> | 404 Potential of hydro-pumped storage in Egypt, M. EL-GAZZAR, M. EL-TANTAWY, M. EL-MAHALLAWY (Egypt) |
| | 405 Impacts of a wide-spread use of distributed generation by combined heat and power micro-units on electrical power distribution grids, V. PITZ, M. SCHWAN, E. HANDSCHIN, E. HAUPTMEIER, W. HORENKAMP, M. BRADNL, D. LEHMER (Germany) |
| | 406 Considerations for dispersed cogeneration of heat and power in low voltage networks, C. SCHULZ, M. KURRAT (Germany) |
| | 407 Evaluation of the value of energy storage capacity with different penetration level of wind generation, FURONG LI, HAIBIN WAN (United Kingdom) |
| | 408 A parametric cost-benefit analysis for the use of distributed generation technologies in the island of Cyprus, Andreas POULLIKKAS (Cyprus) |
| <u>ENVIRONMENT</u> | 409 Economic and environmental evaluation of high wind power penetration in the Greek interconnected energy production system, I. SKOTINOS, A. DIMEAS, A.G. TSIKALAKIS, N.D. HATZIARGYRIOU (Greece) |
| | 410 Environmental impacts from the renewables to electricity systems, T.D. TSOUTSOS, D.D. AGORIS (Greece) |