

INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY AND POWER QUALITY (ICREPQ'06)

WELCOME TO ICREPQ'06

On behalf of the Steering Committee I want to give you a very warm welcome to ICREPQ'06 and to Mallorca.

Our International Programme Committee has selected a high quality 84 papers (among 136 proposals) from which 76 will be presented at the Conference, 24 at oral sessions and 52 at poster sessions, along the three days of the ICREPQ'06. All of these are the papers included at the final programme. Also it will be presented two invited papers along two plenary sessions: "**Generator protections: new functionalities from advanced multifunction protection relays**" by Manuel Járrega Dominguez, Schneider Electric. "**The Politransformer Concept: A Multi-voltage Substation Power Transformer**" by Miguel Oliva Navarrete, ABB Power Technology, S.A. and an Opening Ceremony Speech: "**Balearic Islands's Energy Policy**" by Jaume Sureda. Director General de Energía. Balearic Island Government.

ICREPQ'06 cover the whole range of problems and solutions concerning specially with renewable energies and power quality and all the papers have directly influence about these two fields of research and practical work.

We would like to thank all the authors, session chairmen, participants without papers and at the International Program Committee members who have made important contributions by reviewing the proposals.

In addition to the technical sessions, a number of social events have been arranged. On Wednesday evening (5th April, 20:30 H) we will be held a Reception with aperitif at the Bellver Castle and on Thursday (6th April, 20:30 H) the Conference Banquet at the "Bahía Mediterráneo" Restaurant where we will deliver presents to those companies/institutions that collaborate with the organisation of the Conference and on Friday (from 15:00 H to 20:00 H) we have arranged an excursion for all the participants to Valldemossa.

I hope you will find the conference intellectually stimulating, that you will make many fruitful personal contacts here and that you will thoroughly enjoy your visit to Palma de Mallorca and the surrounding area.

Best regards.
Sincerely,

Prof. Manuel Pérez-Donsi6n
Chairman of the Steering Committee

OBJETIVES AND TOPICS.

The intention of the organisers is to give an opportunity to academics, scientists, engineers, manufacturers and users from all over the world to come together in a pleasant location to discuss recent development in the areas of Renewable Energy and Power Quality.

The International Conference on Renewable Energy and Power Quality (ICREPQ'06) will be structured in:

- **Plenary Sessions:** in one auditorium for all the participants
- **Oral Sessions:** Renewable Energy and Power Quality simultaneously in two rooms
- **Posters Sessions:** In 45-minute periods during the coffee breaks.

1. RENEWABLE ENERGY:

Topics include, but are not limited to:

- Wind Energy, Small Hydro Energy, Solar Energy, Photo-voltaic Energy, Ocean Energy, Geothermal, Biomass,...
- Classical and special electrical generators: Theory, design, analysis, losses, efficiency, heating and cooling, vibration and noise, modelling and simulation, control strategies, protection systems, maintenance, mechanical behaviour, new methods of testing, parallel Operation, stability,...
- Power plants. Distributed generation. Fuel cells. Co-generation. Hybrid Systems. Original solutions,...
- Energy conversion, conservation and energy efficiency. Energy saving policy. Energy storage. Batteries,...
- Energy and the environment. Ecological balance. Ecosystem,...
- Application of the renewable energy. Best practice projects.
- Legislation in the area of renewable energy.
- Biomass combustion techniques. The energy use of agricultural and forest residues. Production and the energy exploitation of bio-gas.
- Interconnection and transport problems.
- Planning and control of the power system take into account the renewable energy.
- Economic analysis of the power system take into account the renewable energy.
- Regulation/deregulation of the power market. Influence of the renewable energy.
- Models and simulation of the power systems. Models and estimation of loads. Software tools.
- Application of the telecommunications, internet, artificial intelligence for the Renewable energy.
- Security assessment and risk analysis in renewable energy.
- Electric vehicles.

2. POWER QUALITY:

Topics include, but are not limited to:

- Power Quality in Distribution.
- Economic Studies of the Power Quality
- Quality of the voltage wave
- Low-frequency conducted disturbances: Voltage deviations, voltage fluctuations (flicker), voltage dips and short interruptions, harmonics transient over-voltages, voltage unbalance (imbalance), temporary power-frequency variations.
- Sources, effects and mitigation methods of electromagnetic disturbances.
- Measurements of the power quality in networks and industrial installations.
- Equipment, procedures and measurement methods. Standards.
- Quality of the voltage wave measurements in the laboratory. Equipment, procedures and measurement methods and text. Laboratories. Standards
- Modelling and simulation of the power quality. Software tools.

- Transmission of the disturbances
- Filtering techniques
- Power factor compensation. Capacitor switching techniques
- Optimisation techniques
- Telecommunication, internet and artificial intelligence applications.
- Permanent monitoring techniques and online diagnosis
- Intelligent energy delivery systems. Uninterrupted power supplies
- Expert systems applications
- Devices, equipment and power systems. Control centres
- Specific problems and studies cases
- Power quality standards
- Power quality influence in deregulated markets

INTERNATIONAL PROGRAM COMMITTEE

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Kladas, A. (Greece)	

CHAIRMAN OF THE STEERING COMMITTEE

Donsión, M.P.

LOCAL ORGANISING COMMITTEE

Coll Mayor, D. (Chairman)
 García-Moreno, E.
 Martínez, V.
 Moià, A.
 Picos, R.

SPONSORSHIP

Sincere thanks are expressed to the organisations listed below who have given valuable support to ICREPQ'06:

- Balearic Islands Government
- University of the Balearic Islands
- GesaEndesa
- Schneider Electric Española, S.A.
- ABB
- Circutor
- Ministerio de Educación y Ciencia (MEC)

- AEDIE
- Vestas Eólica SAU
- IEEE
- Indielec
- Cedrat

TECHNICAL CO-SPONSORSHIP

The ICREPQ'06 has also counted with the invaluable Technical Co-Sponsorship of IEEE .



SOCIAL EVENTS

- **Reception and Aperitif:** 5th of April at 20:00 H at Bellver Castle.
- **Conference Banquet:** 6th of April at 20:30 H at “Bahía Mediterráneo” Restaurant.

AUTHORS

Oral Presentations.

Each speaker of an oral presentation has an available time of 15 minutes (12 minutes for the presentation and 3 minutes for questions) and must be in the session room 10 minutes before of the beginning of the session for to test the audiovisual equipment and for to exchange opinions with the Session Chairman.

Poster Presentations.

The poster must be put on the pin board that you previously can chose about 15 minutes before of the beginning of the session and it must be take off 15 minutes after of the end of the session. The author(s) must be stay near the poster along the 45 minutes of the session duration for to answer all the questions that the audience or the chairman could formulate. The maximum available surface for each poster will be 0,90 m x 0,90 m (width x high).

CHAIRMEN SESSIONS

On behalf of the International Program Committee, Steering Committee and the Organising Committee of the ICREPQ'06 and take into account their eminent position in the world of science we have selected 19 session chairmen. It is an honour for us their collaboration for to chair the sessions of ICREPQ'06 and their contribution would be greatly appreciated. We wish to express our warmer thanks.

Traditionally the Chairman of each Session is independent in organising the Session. Nevertheless it is of special importance that the different sessions chairmen preparing questions about the papers of his session in order to get a more dynamic one. Furthermore we expect of the session chairmen the following:

- Plenary sessions.

That each plenary session should not exceed 45 minutes including presentation and discussion, (35 minutes for presentation and 10 minutes for questions).

-Oral sessions.

That each oral paper presentation should not exceed 15 minutes including presentation and discussion, (12 minutes for presentation and 3 minutes for questions).

-Poster sessions.

The author(s) of a poster presentation must be stay near the poster along the 45 minutes of the session duration and in order to get a more dynamic session it is important that along this period of time each of the chairmen of the poster session formulate questions to the authors and check that all is OK.

TABLE I. Chairmen Session distribution

Wednesday 5 April, 2006		
11:45-12:30	POSTER SESSION C1	Antonio Pina Martins
		Jiri Klima
		Francisco Castro Díaz
15:15-16:15	ORAL SESSION A1	Drago Dolinar
	ORAL SESSION B1	Mario Mañana Canteli
16:15-17:00	POSTER SESSION C2	Viktor Valouch
		Ramón M ^a . Mujal Rosas
		José M ^a . Arrieta Albizu
17:00-18:00	ORAL SESSION A2	Daniel Van Dommelec
	ORAL SESSION B2	Francisco J. Arcega
Thursday 6 April, 2006		
9:30-10:15	PLENARY SESSION PL1	Blas Hermoso Alameda
10:15-11:00	POSTER SESSION C3	Jan Rusek
		Fredemar Rüncos
		M ^a . Dolores Gutiérrez Ochoa
15:15-16:00	PLENARY SESSION PL2 (Spanish)	Debora Coll Mayor
16:00-16:45	PLENARY SESSION PL3 (Spanish)	Luis Ignacio Eguiluz Moran
Friday 7 April, 2006		
9:45-10:30	PLENARY SESSION PL4	Shahrokh Saadate
11:00-12:00	ORAL SESSION A3	Toni Dropulic
	ORAL SESSION B3	André Martínez

SECRETARIAT

Along the ICREPQ'06 we will have open an active Secretariat place near the session rooms with the following timetable:

SECRETARIAT TIMETABLE	
Wednesday 5th of April	09:00 –12:30 H
	15:00 – 18:00 H
Thursday 6th of April	09:00 --12:30 H
	15:00 – 17:30 H
Friday 7th of April	09:45 --12:30 H

Wednesday 5 April 2006			
9:00 – 11:00	<p align="center">Registration “ICREPQ’06 Secretariat”</p>		
11:00 – 11:45	<p align="center">Opening Ceremony ROOM A “GesaEndesa” Debora Coll-Mayor. Chairman of the Local Organizing Committee Manuel Pérez Donsión. Chairman of the Steering Committee Jaume Sureda. DGE, Balearic Island Government Avelí Blasco. Head of the Balearic Island University</p>		
	OCS:	<p align="center">Balearic Islands’s Energy Policy Jaume Sureda. Director General de Energía Balearic Island Government</p>	
11:45 – 12:30	<p align="center">Posters Session at Room C (Session C1) Coffee Break</p>		ROOM C “ABB”
			<i>Poster Session C1</i> 201 206 214 217 220 221 226 229 231 242 245 248 253 256 257 264 271 403
13:00 – 15:00	<p align="center">Lunch</p>		
	ROOM A “GesaEndesa”	ROOM B “Schneider”	
	<i>Oral Session A1</i> 236 250 273 299	<i>Oral Session B1</i> 251 262 267 274	
15:15 – 16:15	<p align="center">ROOM C “ABB”</p>		<i>Poster Session C2</i> 215 223 241 270 426 432 463 466 469 470 475 480 483 485 488 490
<p align="center">EXTRA TIME FOR DISCUSSION</p>			
16:15 – 17:00	<p align="center">Poster Session at Room C (Session C2) Coffee Break</p>		
	ROOM A “GesaEndesa”	ROOM B “Schneider”	
	<i>Oral Session A2</i> 292 293 295 400	<i>Oral Session B2</i> 276 287 297 473	
17:00 – 18:00	<p align="center">EXTRA TIME FOR DISCUSSION</p>		
19:30 – 22:00	<p align="center">Welcome Civic Reception at Bellver Castle</p>		

Thursday 6 April 2006		
	ROOM A “GesaEndesa” Plenary sessions PL1	
9:30 – 10:15	PL1	<i>Generator protections: new functionalities from advanced multifunction protection relays</i> Manuel Járrega Dominguez, Schneider Electric.
EXTRA TIME FOR DISCUSSION		
10:15 – 11:00	Posters Session at Room C “ABB” (Session C3) Coffee Break	<i>Poster Session</i> C3 277 279 280 282 285 296 401 411 416 431 435 439 442 445 447 449 452 455
	ROOM A “GesaEndesa” Round Table	
11:00 – 12:30	Free time	
13:00 – 15:00	Lunch	
	ROOM A “GesaEndesa” Plenary sessions PL2, PL3	
15:15 – 16:45	PL2	<i>Gesa y la I+D+i</i> (Spanish) Joan Frau, GesaEndesa
	PL3	<i>Nuevos requerimientos de conexión a red para los parques eólicos</i> (Spanish) Jorge Martínez García, Vestas Eólica SAU
EXTRA TIME FOR DISCUSSION		
16:45 – 17:30	Coffee Break	
17:30- 20:00	FREE TIME	
20:00 -22:30	Conference Banquet at “Bahía Mediterráneo” Restaurant (Optional)	

Friday 7 April 2006						
	ROOM A “GesaEndesa” PLENARY SESSION PL4					
9:45-10:30	PL4	<i>The Politransformer Concept: A Multi-voltage Substation Power Transformer.</i> Miguel Oliva Navarrete, ABB Power Technology, S.A.				
EXTRA TIME FOR DISCUSSION						
10:30 – 11:00	Room C “ABB” Coffee Break					
	ROOM A “GesaEndesa”			ROOM B “Schneider”		
	<i>Oral Session A3</i>			<i>Oral Session B3</i>		
11:00-12:00	405	427	430	408	410	418
	491			444		
EXTRA TIME FOR DISCUSSION						
	ROOM A “GesaEndesa”					
12:00 – 12:30	Conclusions and time for the next conference (ICREPQ'07)					
13:00 – 15:00	Farewell Lunch					
15:00 – 19:00	Mallorca Island Excursion for all the participants. Excursion to Valldemossa					

Wednesday 5 April 2006

ROOM A "GesaEndesa"

11:00 - 11:45 OPENING CEREMONY

Opening Ceremony Speech (OCS): "**Balearic Islands's Energy Policy**"
Jaume Sureda. Director General de Energía. Balearic Island Government

ROOM C "ABB"

11:45 -12:30 Poster Session C1 - Coffee Break

Chairmen: Antonio Pina Martins, Jiri Klima, Francisco Castro Díaz

- 201 ***Review of the islanding phenomenon problem for connection of renewable energy systems.***
Hector Beltran, Francisco Gimeno, Salvador Seguí-Chilet and Jose M. Torreló
Instituto de Tecnología Eléctrica, València (Spain).
- 206 ***Analytical investigation of induction motor drive under DC-link voltage ripple in voltage source inverter.***
J. Klima
Technical Faculty of CZU, Prague (Czech Republic)
- 214 ***Optimization of a wind turbine using permanent magnet synchronous generator (PMSG).***
Jan Vergauwe¹, André Martinez², Alberto Ribas³
¹KAHO St Lieven, Gent (Belgium).
²EIGSI La Rochelle, La Rochelle (France)
³Departamento de Ingeniería Eléctrica, UCO, Córdoba (Spain)
- 217 ***Effects of the circulating sheath currents in the magnetic field generated by an underground power line.***
J.R. Riba Ruiz¹, X. Alabern Morera²
¹EUETII "L'Escola d'Adobeira", UPC, Igualada (Spain)
²Department d'Enginyeria Elèctrica, UPC, Terrassa (Spain)
- 220 ***Power control of a variable speed wind turbine driving an DFIG.***
D. Aouzellag¹, K. Ghedamsi¹, E.M. Berkouk²
¹Electrical Engineering Department, A. Mira University, Bejaïa (Algeria)
²Control Process Laboratory, E.N.P., Algiers (Algeria)
- 226 ***Cogeneration in electrical microgrids.***
I. Zamora¹, J.I. San Martín², A.J. Mazón¹, J.J. San Martín², V. Aperribay², J.M^a. Arrieta²
¹Escuela Técnica Superior de Ingeniería de Bilbao, UPV, Bilbao (Spain)
²Escuela Universitaria de Ingeniería Técnica Industrial de Eibar, Eibar (Spain)
- 229 ***Robust converter synchronization to a weak grid through a DFT-based Method.***
António P. Martins, José C. Ferreira
Faculty of Engineering of the University of Porto, Porto (Portugal)

- 231 ***The influence of renewables and international trade on investment decisions in the grid of the future.***
S. Cole, D. Van Herterem, L. Meeus, R. Belmans
Katholieke Universiteit Leuven, Leuven-Heverlee (Belgium)
- 242 ***Sea energy conversion: Problems and possibilities.***
G. Buigues, I. Zamora, A.J. Mazón, V. Valverde, F.J. Pérez
E.T.S.I.I., University of Basque Country, Bilbao (Spain)
- 245 ***FACTS devices in distributed generation.***
Melchor Gómez, Oihane Abarrategui, Inmaculada Zamora
Depart of Electrical Engineering, University of the Basque Country, Bilbao (Spain)
- 248 ***Multiobjective H_2/H_∞ control of a pitch regulated wind turbine for mechanical load reduction.***
Fabien Lescher^{1,2}, Jing Yun Zhao¹, André Martinez¹
¹ERPA-EIGSI, La Rochelle (France)
²LAGIS-Ecole Centrale de Lille, Lille (France)
- 253 ***Effect of using external vertical fins in phase change material modules for domestic hot water tanks.***
Albert Castell¹, Cristian Solé¹, Marc Medrano¹, Joan Roca¹, Daniel García², Luisa F. Cabeza¹.
¹Dept. d'Informàtica I Eng. Industrial, Universitat de Lleida, Lleida (Spain)
²Engineering Projects Dept., Polytechnic University of Catalonia, Terrassa (Spain)
- 256 ***Insulator pollution in transmission lines.***
José A. Ramos Hernanz¹, José J. Campayo Martín¹, Joseba Motrico Gogeoascoechea¹, Inmaculada Zamora Belver²
¹Escuela Universitaria de Ingeniería, (UPV-EHU), Victoria-Gasteiz (Spain)
²Escuela Técnica Superior de Ingeniería (UPV-EHU), Bilbao (Spain)
- 257 ***Prediction of the thermal behaviour of an office building using TRNSYS with proposal and evaluation of improvement actions.***
R. Pujol-Nadal, V. Martínez-Moll, A. Moià-Pol
Department of Physics, Universitat de les Illes Balears, Palama de Malloca (Spain)
- 264 ***Power market: effects of the imperfect competition.***
Carlos Redondo Gil, Ana M. Alonso Sánchez, Luis A. Esquibel Tomillo, Álvaro Fernández Suárez.
Industrial and Computer School of Engineerings, University of Leon, León (Spain)
- 271 ***Competition at an energy open market in the EU and its consequences on the renewable energy segment.***
O. Abarrategui Ranero, D.M. Larruskain Eskobal, M. Gómez Perez
EUITIMOP, University of the Basque Country, Barakaldo (Spain)
- 273 ***Using ultracapacitors in photovoltaic systems. A technical proposal.***
José Antonio Domínguez Vázquez, Fernando Martínez Rodrigo, José Miguel Ruiz, Santiago Lorenzo Matilla
Depart. of Electronic Technology, ETSII, Valladolid University, Valladolid (Spain)
- 403 ***Influence of wind generator in voltage dips.***
E. Belenguer¹, N. Aparicio¹, J.L. Gandía¹, S. Añó²
¹D. of Industrial Engineering and Design, Universitat Jaime I, Castelló (Spain)
²D. of Electrical Engineering, Universidad Politécnica de Valencia (Spain)

Wednesday 5 April 2006

**ROOM A "GesaEndesa"
15:15 – 16:15 Oral Session A1**

Chairman: Drago Dolinar

- 236 ***Variable speed turbine based wind farm including storage system connected to a power grid or islanded.***
A. Davigny, B. Robyns
Ecole des Hautes Etudes d'Ingénieurs, Lille (France)
- 250 ***Evaluation of the renewable energy application in Mediterranean hotels: Case study: the Balearic Islands' hotels.***
A. Moiá-Pol¹, Michalis Karagiorgas², V. Martínez-Moll¹, R.Pujol¹, Carles Riba-Romeva¹
¹Department of Physics, University of Balearic Islands (Spain)
²Centre for Renewable Energy Sources (CRES), Pikermi (Greece)
³Centre de Sisseney d'Equips Industrials, UPC, Barcelona (Spain)
- 273 ***Using ultracapacitors in photovoltaic systems. A technical proposal.***
José Antonio Domínguez Vázquez, Fernando Martínez Rodrigo, José Miguel Ruiz, Santiago Lorenzo Matilla
Depart. of Electronic Technology, ETSII, Valladolid University, Valladolid (Spain)
- 299 ***Gas based steady state analysis of parallel-operated three phase self-excited induction generators***
A.I. Alolah, M.A. Alkanhal
EE Dept – College of Eng. – King Saud University, Riyadh (Saudi Arabia)
ETSICC y P., Universidad Politécnica de Madrid (Spain).

Wednesday 5 April 2006

**ROOM A "Schneider"
15:15 – 16:15 Oral Session B1**

Chairman: Mario Mañana Canteli

Power quality improvement of wind turbines using doubly-fed induction machines.

251 C. Saniter¹, R. Grune¹, A. Wood², R. Hanitsch¹

¹Department of Electrical Engineering, Technical University of Berlin, (Germany)

²University of Canterbury, Christchurch (New Zealand)

Effect on power quality of the high power electric traction (Double domain computer simulation vs. site measurements).

262 András Dán , Péter Kiss

Budapest University of Technology and Economics, Budapest (Hungary)

ATP prediction of voltage sag effect on sensitive loads.

267 J. Cardona, J. Barros

E.T.S. Náutica, University of Cantabria, Santander (Spain)

Optimum PI controllers of active power filters for harmonic voltage mitigation in multibus industrial power systems.

274 Josef Tlustý¹, Viktor Valouch²

¹Faculty of Electrical Engineering, Prague (Czech Republic)

²Institute of Thermomechanics, Academy of Sciences of the Czech Republic Praha (Czech Republic).

Wednesday 5 April 2006

**ROOM C "ABB"
16:55 -17:00 Poster Session C2 - Coffee Break**

Chaimen: Viktor Valouch, Ramón M^a. Mujal Rosas, José M^a. Arrieta Albizu

- 215 ***An improved technique for the estimation of local frequency, fundamental component phasor and instantaneous symmetrical components.***
José C. Ferreira, António P. Martins
Faculty of Engineering of the University of Porto, Porto (Portugal)
- 223 ***The polymer electrolyte membrane fuel cell as electric energy source, steady state and dynamic behavior***
R. A. Costa¹, J. R. Camacho², S. C. Guimarães Jr², and C. H. Salerno²
¹FEB, School of Electricla Engineering, Barretos (Brazil)
²Universidade Federal de Uberlândia, Uberlândia (Brazil)
- 241 ***Low-cost orientation system for a concentrating solar collector with static reflector and tracking receiver***
V. Martinez, B. Alorda, A. Moia, R. Pujol
Departament of Physics, Universitat Illes Balears, Mallorca (Spain)
- 270 ***DSP filter design for flexible alternating current transmission systems.***
O. Abarategui Ranero, M. Gómez Perez, D.M. Larruskain Eskobal
EUITIMOP, University of the Basque Country, Barakaldo (Spain)
- 426 ***Study of an ordinary home electrical consumption in order to make it more energy-efficient.***
António Manuel L. Quadros Flores
Energy Systems Group, ISEP, Instituto Superior de Engenharia do Porto (Portugal)
- 432 ***Development of a low-harmonic vector hysteresis current controller.***
J. F. Sanz^{1,2}, J. Sallán^{1,2}, M. Alonso¹, M. Sanz^{1,2}, J. L. Villa²
¹Fundación CIRCE, Zaragoza (Spain).
² Department of Electrical Engineering, University of Zaragoza (Spain)
- 463 ***A dynamic model based on a network of magnetically coupled reluctances for asynchronous motor fault analysis.***
F. Pedrayes, C.H. Rojas, M.F. Cabanas, M.G. Melero, G.A. Orcajo, J.M. Cano
Electrical Engineering Department, University of Oviedo, (Spain).
- 466 ***A three-phase grid-connected inverter for photovoltaic applications using fuzzy MPPT.***
Jaime Alonso-Martínez, Santiago Arnaltes
Department of Electrical Engineering, Universidad Carlos III de Madrid (Spain).

- 469 ***Energy management of stand-alone power systems with renewable energy sources.***
 S. D'Arco¹, R. Rizzo¹, D. Coll-Mayor², P. Tricoli¹
¹Depart of Electrical Engineering, University of Naples "Federico II", Napoly (Italy)
²University of the Balearic Islands, Palma de Mallorca (Spain)
- 470 ***Torque fluctuation and critical clearing time in wind power generation by induction machines.***
 Luigi Piegari¹, Renato Rizzo¹, Debora Coll-Mayor²
¹Department of Electrical Engineering, University of Naples "Federico II", Napoly (Italy)
²University of the Balearic Islands, Palma de Mallorca (Spain)
- 475 ***Influence of the power quality instrument class on the accurate of the PQ measurement.***
 Manuel Pérez-Donsión, Santiago Álvarez-Lorenzo
 Department of Electrical Engineering, University of Vigo (Spain)
- 480 ***A future micro-grid implementation based on renewable distributed resources for a clean green energy production.***
 F. Marín, A.B. Rey, A. Guerrero, F. de A. Ruz
 E.T.S.I.I., Technical University of Cartagena (Spain)
- 483 ***Internalisation of externalities in the Spanish power generation sector. Impact of the national plan of allocation of emissions in the cost of generation.***
 F. Delgado, A. Ortiz, C.J. Renedo, M. Mañana, F. Ortiz, L.I. Eguiluz
 Department of Electrical Engineering, ETSIIT, University of Cantabria, Santander (Spain)
- 485 ***Preliminary steady state and dynamic analysis of a microgrid system***
 A. Madureira, C. Moreira, J. Peças Lopes
 Faculty of Engineering of Porto University and Power Systems Unit of INESC Porto (Portugal)
- 488 ***Optimization of photovoltaic solar electric power for renewable energy generation and DSM strategies in singular apartment buildings***
 J.C. Sáenz-Díez Muro, J.M. Blanco-Barrero, E. Jiménez-Macias, M. Pérez de la Parte, J.I. Latorre Biel
 E.T.S.I.I., University of La Rioja, Logroño (Spain)
- 490 ***SolAgua, a non static compound parabolic concentrator (CPC) for residential and service buildings***
 P. Gata Amaral^{1,2}, E. Ribeiro¹, R. Brites¹, F. Gaspar¹
¹School of Technology and Management, Polytechnic Institute of Leiria (Portugal)
²Institute for Systems and Computer Engineering of Coimbra (Portugal)

Wednesday 5 April 2006

**ROOM A "GesaEndesa"
17:00 – 18:00 Oral Session A2**

Chairman: Daniel Van Dommelec

- 292 ***Analysis of state of MV distribution system before and after connection of small wind farm Ravna1***
Toni Dropulic, Mate Lasic, Jandro Simic
Končar Electrical Engineering Institute, Zagreb (Croatia)
- 293 ***Technique-economical viability of repowering of small hydroelectric power plant considering the social insert and environmental preservation.***
Oscar A. Maldonado, Paulo A. Panuncio, Dinara F. Silva, José Luz Silveira
Universidade Estadual "Julio de Mesquita Filho", Guaratinguetá (Brazil)
- 295 ***Short-term prediction of the power production of wind turbines.***
Á. Székely, T. Barbarics
Faculty of Electrical Engineering, Budapest University of Technology and Economics, Budapest (Hungary).
- 400 ***The impact of induction generator and PWM inverter with energy storage on weak grids.***
H. Bludszuweit, J. A. Domínguez, M. García
Department of Electrical Engineering, University of Zaragoza (Spain)

Wednesday 5 April 2006

**ROOM B “Schneider”
17:00 – 18:00 Oral Session B2**

Chairman: Francisco Javier Arcega Solsona

- 276 ***Interharmonics injected into power system by a squirrel-cage induction machine in normal and faulty operation conditions.***
Jan Rusek
AGH University of Science and Technology, Krakow (Poland)
- 287 ***Power quality measurement of MV distribution system after connection of small power plant Jakusevec.***
Mate Lasic¹, Marko Sporec², Irena Klaric²
¹Končar Electrical Engineering Institute, Zagreb (Croatia)
²HEP-Operator distribucijskog sustava d.o.o., DP Elektra Zagreb (Croatia)
- 297 ***Comparison of the effect of output filters on the total harmonic distortion of line current in voltage source line converter – simulation study.***
Pasi Peltoniemi, Riku Pöllänen, Markku Niemelä, Juha Pyrhönen
Department of Electrical Engineering, Lappeenranta University of Technology, Lappeenranta (Finland).
- 473 ***Frontier methodology to fix quality goals in electrical energy distribution companies***
R. Ramirez, A. Sudrià, A. Sumper, J. Bergas, R. Villafàfila
CITCEA-UPC, Universidad Politècnica de Catalunya, Barcelona (Spain)

19:30 – 22:00 Welcome Civic Reception at Bellver Castle

Thursday 6 April 2006

**ROOM A “GesaEndesa”
9:30 – 10:15 Plenary Session PL1**

Chairman: Blas Hermoso Alameda

PL1: *Generator protections: new functionalities from advanced multifunction protection relays*

Manuel Járrega Dominguez, Schneider Electric.

**ROOM C “ABB”
10:15 -11:00 Poster Session C3 - Coffee Break**

Chairmen: Jan Rusek, Fredemar Runcos, M^a. Dolores Gutiérrez Ochoa

- Setting up a grid simulator.***
277 A. Notholt¹, D. Coll-mayor², A. Engler¹
¹Institut für Solare Energieversorgungstechnik (ISET), Kassel (Germany)
²Department of Physics, University of Balearic Islands (Spain)
- 279 ***Speed control of run-of-river variable speed hydro plants.***
J. Fraile-Ardanuy, J.R. Wilhelmi, J. Fraile-Mora, J.I. Pérez, I. Sarasua
ETSICC y P., Universidad Politécnica de Madrid (Spain).
- 280 ***Micro-grid powered by photovoltaic and micro turbine.***
Ph. Degobert¹, S.Kreuawan², X. Guillaud²
¹Ecole Nationale Supérieure d'Arts et Métiers, Centre d'Etudes et de Recherches,
Lille (France)
²Ecole Centrale de Lille (France).
- 282 ***A little plant of reverse osmosis fed by an isolated electrical system.***
A. Pulido, N. Angulo, J. Romero, C. Quintana, M. Morán
Dpto. De Ingeniería Eléctrica, Universidad de las Palmas de Gran Canaria , Las
Palmas de Gran Canaria (Islas Canarias) (Spain)
- 285 ***Comparison of energy potential of the eucalyptus globulus and the eucalyptus nitens.***
S. Pérez, C.J. Renedo, A. Ortiz, M. Mañana, D. Silió, J. Peredo.
ESTI Industriales y Telecomunicación, University of Cantabria, Santander (Spain)
- 296 ***Power transmission capacity upgrade for overhead lines.***
D.M. Larruskain, I. Zamora, O. Abarrategui, A. Iraolagoitia, M.D. Gutiérrez, E.
Loroño, F. de la Bodega.
EUITI, University of the Basque Country, Campus of Bizkaia, Bilbao (Spain)

- 401 ***Pre-feasibility study of a grid connected wind-PV hybrid system with energy storage and power prediction.***
Hans Bludszweit, José Antonio Domínguez, José Luis Bernal
Department of Electrical Engineering, University of Zaragoza (Spain)
- 411 ***The influence of harmonics from non-linear loads in the measuring transformers of electrical substations.***
Oscar Armando Maldonado Astorga, José Luz Silveira, Julio Carlos Damato.
Laboratory of High Voltage and Electric Power Quality, São Paulo State University, unesp, São Paulo (Brazil)
- 416 ***A simplified electrical model of small PEM fuel cell.***
E. Andrea, M. Mañana, A. Ortiz, C. Renedo, L.I. Eguíluz, S. Pére, F. Delgado
Department of Electrical Engineering, ETSIT, University of Cantabria, Santander (Spain)
- 431 ***Hysteresis controller based on a circular error area table applied to a variable speed renewable energy system.***
J. F. Sanz^{1,2}, J. Sallán^{1,2}, M.A. Alonso¹, M. Sanz^{1,2}, J. L. Villa²
¹Fundación CIRCE, Zaragoza (Spain).
² Department of Electrical Engineering, University of Zaragoza (Spain)
- 435 ***Analysis by finite element method of the crosstalk errors associated to the geometrical parameters for current transducers.***
F.J. Arcega, J.S. Artal; J. Letosa, A. Usón
Department of Electrical Engineering, Escuela Universitaria de Ingeniería Técnica Industrial, University of Zaragoza (Spain)
- 439 ***Project and current energy situation in the Basque Country***
E. Zulueta¹, M.D. Gutierrez², I. Manero¹
¹UPV-EHU, University of the Basque Country, E.U. de Ingeniería de Victoria-Gasteiz (Spain)
²UPV-EHU, University of the Basque Country, E.U.I.T.I. de Bilbao (Spain)
- 442 ***Analysis of the power production of a wind farm with consumption associated for desalted water for agriculture, in Gran Canaria.***
A. Pulido¹, J. Lozano², N. Angulo¹, J. Romero¹, L. Darías¹
¹Dpto. De Ingeniería Eléctrica, Universidad de las Palmas de Gran Canaria , Las Palmas de Gran Canaria (Islas Canarias) (Spain)
²Solaires Canarias, SI, , Las Palmas de Gran Canaria (Islas Canarias) (Spain)
- 445 ***Comparative efficiency of switched reluctance and induction motor drives for slowly varying loads.***
P. Andrada, B. Blanqué, J.I. Perat, M. Torrent, E. Martinez, J.A. Sánchez
GAECE, Grup d'accionaments elèctrics amb commutació Electrònica, Departament d'Enginyeria Elèctrica UPC-EPS d'Enginyeria de Vilanova i la Geltrú (Spain).
- 447 ***Legislative tendency to incorporate renewable energy in the Spanish Electric Power Production Market.***
Mabel Gámez, Ricard Bosch
Department of Electrical Engineering, E.T.S.E.I.B., Polytechnic University of Catalonia, Barcelona (Spain).
- 449 ***Mathematical approach to THD optimisation in multilevel convertors.***
A. Jan Iwaszkiewicz, B. Jacek Perz
The Electrotechnical Institute, Gdansk Branch, Gdansk (Poland).

3D unsteady flow simulation in an OWC wave converter plant

A. El Marjani¹, F. Castro², M. Bahaji¹, B. Filali¹

452 ¹Ecole Mohammadia d'Ingénieurs (EMI), University Mohammed V Agdal, Agdal
Rabat (Morocco).

²Depto. De Ingeniería Energética y Fluidomecánica, ETSII, Universidad de
Valladolid (Spain).

Optimisation of renewable energy system.

455 K. Mitchell, M. Nagrial, J. Rizk

School of Engineering and Industrial Design, University of Western Sydney
(Australia).

Thursday 6 April 2006

**ROOM A "GesaEndesa"
15:15 – 16:00 Plenary Session PL2 (Spanish)**

Chairman: Debora Coll Mayor

PL2: Gesa y la I+D+i (Spanish)
Joan Frau, GesaEndesa

**ROOM A "GesaEndesa"
16:00 – 16:45 Plenary Session PL3 (Spanish)**

Chairman: Luis Ignacio Eguiluz Moran

**PL3: Nuevos requerimientos de conexión a red para los parques
eólicos**
Jorge Martínez García, Vestas Eólica SAU

**20:00 – 22:30 Conference Banquet at "Bahía Mediterráneo"
Restaurant (Optional)**

Friday 7 April 2006

**ROOM A “GesaEndesa”
9:45 – 10:30 Plenary Session PL4**

Chairman: Shahrokh Saadate

PL4: *The Politransformer Concept: A Multi-voltage Substation Power Transformer.*

Miguel Oliva Navarrete, ABB Power Technology, S.A.

**ROOM A “GesaEndesa”
11:00 – 12:00 Oral Session A3**

Chairman: Toni Dropulic

405 ***A performance comparison between brush and brushless doubly fed asynchronous generators for wind power systems.***

R. Carlson¹, H. Voltolini², F. Runcos³, P. Kuo-Peng¹

¹GRUCAD/Universidade Federal de Santa Catarina, Florianópolis (Brazil)

²UTFPR, Ponta Grossa PR (Brazil)

³WEG Indústrias S.A., Jaraguá do Sul (Brazil)

High energy efficiency test system for induction heating generators.

V. Esteve¹, J. Jordán¹, E.J. Dede^{1,2}, E. Sanchis-Kilders¹, E. Maset¹

427 ¹Department of Electronic Engineering, ETSE, University of Valencia (Spain)

²Department of Research and Development, GH Electrotermia S.A., S. Antonio de Benageber (Spain)

430 ***Performance analysis of wind resource assessment programs in complex terrain.***

A. Llombart¹, A. Talayero², A. Mallet¹, E. Telmo¹

491 ***AEROSOL – a micro-scale domestic autonomous solar photovoltaic and wind power generation unit in an urban environment***

F.T. Oliveira, E. Ribeiro, P. Ferreira

School of Technology and Management, Polytechnic Institute of Leiria (Portugal)

Friday 7 April 2006

**ROOM B “Schneider”
11:00 – 12:00 Oral Session B3**

Chairman: André Martínez

- 408 ***Orthogonal decomposition of currents, power definitions and energy transmission in three-phase systems treated in the time domain.***
Gorazd Štumberger, Boštjan Polajžer, Matej Toman, Drago Dolinar
Faculty of Electrical Engineering and Computer Science, University of Maribor (Slovenia)
- 410 ***Field experiences in power quality problem solving in Spain.***
Z. Larrabe, J.M. López, G. Rojas
P.Q.C. Power Quality Control, Bilbao (Spain)
- 418 ***Implementation of a voltage sag characterization based on a DSP platform.***
A. Ortiz, M. Mañana, F. Ortiz, C. J. Renedo, F. Delgado, L.I. Eguiluz
Department of Electrical Engineering, ETSIT, University of Cantabria, Santander (Spain)
- 444 ***Fault tolerant shunt active power filter: topology reconfiguration using optimised fault detection algorithm.***
H. El Brouji¹, P. Poure², M.C. Benhabib¹, S. Saadate¹
¹Groupe de Recherches en Electrotechnique et Electronique de Nancy, GREEN-UHP, Nancy (France).
²Laboratoire d'Instrumentation Electronique de Nancy, Universite Henri Poincaré de Nancy (France).

**ROOM A “GesaEndesa”
12:00 – 12:30 Conclusions and time for the next conference
(ICREPQ'07)**

**15:00 – 19:00 Mallorca Island Excursion for all the
participants.
Excursion to Valldemossa**