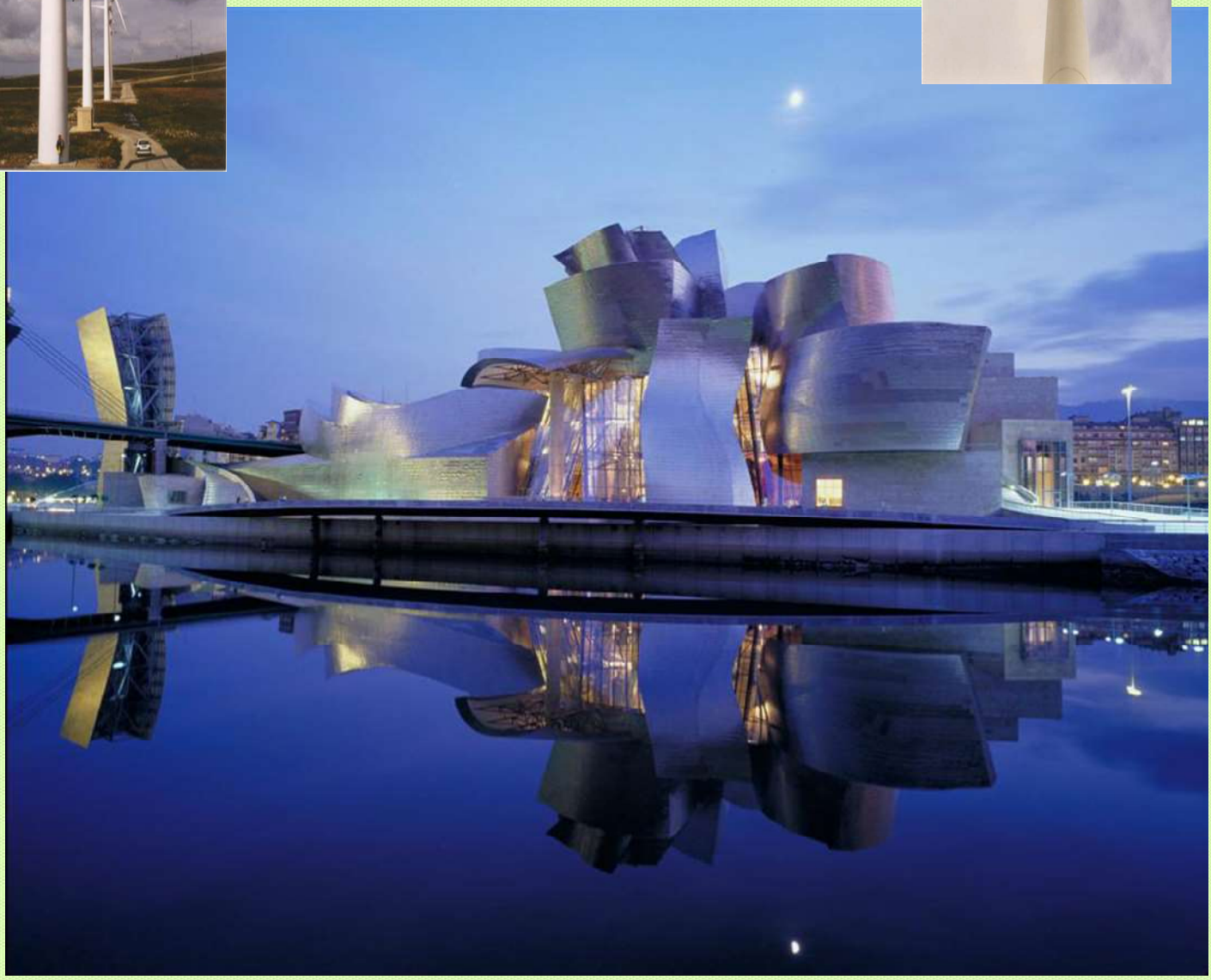
European Association for the Development of Renewable Energy, Environment and Power Quality

ICREPQ'13

INTERNATIONAL CONFERENCE ON RENEWABLE ENERGIES AND POWER QUALITY

Bilbao, 20 – 22 of March 2013



INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY AND POWER QUALITY

(ICREPQ'13)

WELCOME TO ICREPQ'13

On behalf of the Steering Committee and the Local Organizing Committee we want to give you a very warm welcome to ICREPQ'13 and to Bilbao

Our International Programme Committee has selected a high quality 322 papers (among 403 proposals) from which 248 will be presented at the Conference, 109 at oral sessions and 139 at poster sessions (dialogue), during the three days of the ICREPQ'13. All of these papers are included in the final program. Also six keynotes will be presented in plenary sessions.

ICREPQ'13 covers the whole range of problems and solutions especially concerning with renewable energies and power quality and all the papers have direct relation with these two fields of research and practical work.

We would like to thank all the authors, session chairmen, participants without papers and the International Scientific 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 (March 20th, 19:00 H) we will hold a Civic Reception with an aperitif and on Thursday (March 21th, 21:00 H) the Conference Dinner in the "Hotel Carlton", where we will deliver some diplomas to those companies/institutions that have collaborated with the organisation of the Conference. We'll have all the lunches in one room of the "Silken Gran Hotel Domine" and on Friday March 22th, after 15:00 H, we'll have organised one excursion for to visit different interesting places of the centre of Bilbao.

We hope that 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 Bilbao and the surrounding area.

Best regards,

Prof. Manuel Pérez-Donsión
Chairman of the Steering Committee

Prof. Inmaculada Zamora Belver
Prof. Javier Mazón Sain-Maza
Co-Chairmen of the Local Committee

ORGANISED BY:
The International Conference on Renewable Energies and Power Quality (ICREPQ'13), will be organized by:

- European Association for the Development of Renewable Energy, Environment and Power Quality (EA4EPQ)
- University of Vigo.
- University of Basque Country

CONFERENCE LANGUAGE
The Conference language is English. All papers and presentations should be made in English.

OBJECTIVES 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´13) is structured in:

- **Plenary Sessions:** Presentations of 45 minutes in one room for all the participants
- **Special Oral Sessions and Standard Oral Sessions:** Presentations of about 15 minutes for each paper (12 minutes for the presentation and 3 minutes for questions). Simultaneously in three rooms.
- **Posters Sessions:** In 45-minute periods during the coffee breaks.

1. RENEWABLE ENERGY:

- Wind Energy, Small Hydro Energy, Solar Energy, Photovoltaic Energy, Ocean Energy, Geothermal, Biomass, Cogeneration,…
- 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, transmission system, stability,...
- Power plants. Distributed generation. Fuel cells. Co-generation. Hybrid Systems. Microgrids. Smart grids. 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 energies.
- Biomass combustion techniques. The energy use of agricultural and forest residues. Production and the energy exploitation of bio-gas. Environment. Social importance…
- Interconnection and transport problems.

- Planning and control of the power system take into account the renewable energy. Stability. Protection…
- Economic analysis of the power system take into account the renewable energy.
- Electricity Market Structures. Regulation/des-regulation 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 communications, internet, artificial intelligence for the renewable energy.
- Security assessment and risk analysis in renewable energy.
- Electric vehicles.
- Electrical Machines & Drives, Power electronics and Control strategies for renewable energy applications.
- Monitoring and Diagnostics of electrical machines & drives, Tools for Diagnostics, Test for Predictive Maintenance in Renewable…
- Sensors and actuators for renewable energy applications.
- Renewable Energies Teaching.

2. POWER QUALITY:

- Electromagnetic compatibility (EMC).
- Power Quality in Transport and Distribution. FACTS
- Economic Studies of the Power Quality.
- Low-frequency conducted disturbances: Voltage deviations, voltage fluctuations/flicker, voltage dips and short interruptions, harmonics and inter-harmonics, transient over-voltages, voltage unbalance (imbalance), temporary power-frequency variations.
- Sources, effects and mitigation methods of the disturbances.
- Measurements of the power quality in networks, industrial installations and Laboratories. Equipment, procedures and measurement methods. Standards.
- Modelling and simulation of the power quality. Software tools.
- Transmission of the disturbances.
- Filtering techniques.
- Power factor compensation. Capacitor switching techniques.
- Optimization techniques.
- Communication, internet and artificial intelligence.
- 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 influence in deregulated markets.
- High frequency disturbances (radiated).
- Data security and electromagnetic pulses.
- Protection against natural and intentional EMI.

LOCAL ORGANIZING COMMITTEE

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José Ignacio San Martín Díaz
Pablo Eguia López
Esther Torres Iglesias
Garikoitz Buigues Beraza

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Bargallo Perpiña, R. (Spain)
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Bendl, Jiri (Czech Republic)
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Iwaszkiewicz, J. (Poland)
Jeong Se Suh (Rep. of Corea)
Jokinen, T. (Finland)
Jigeng Li (China)
Jimoh, Adisa (South Africa)
Jyotirmoy Roy (UK)
Kádár Péter (Hungary)
Kiss, Péter (Hungary)
Kladas, A. (Greece)
Lee, Poh Seng (Singapore)
Lemos Antunes, C. (Portugal)
Levi, Emil (U.K.)
Llombart Estopiñan, A. (Spain)
Machado e Moura,A. (Portugal)
Mañana Canteli, M. (Spain)
Martinez, André (France)
Narsimhulu, Sanke (India)
Niemenmaa, Asko (Finland)
Nocera, Francesco (Italy)
Oraee, Hashem (Iran)
Ozdemir, Engin (Turkey)
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Pratomo, Hariyo PS (Indonesia)
Predescu, Mihai (Romania)
Redondo Gil, C. (Spain)
Ribeiro, Hugo (Portugal)
Rusek, Jan (Poland)
Saadate, S. (France)
Salay Naderi, M. (Australia)
Salmerón-Revuelta, P. (Spain)
Sashi, Paul (UK)
Sekhar Dash, Subhransu (India)
Shibli, Murad (Arab Emirats)
Sinha, Ashoke Kumar (India)
Schlemmer, Erwin (Austria)
Souto, José A. (Spain)
Stan, Sergiu-Dan (Romania)
Stenzel, Jürgen (Germany)
Stumberger, Gorazd (Slovenia)
Turschner, Dirk (Germany)
Tegopoulos, J.A. (Greece)
Tekwani, P. (India)
Tlusty, Josef (Czech Republic)
Torrente Lujan, E. (Spain)
Tudorache, Tiberiu (Romania)
Ubong, Etim (USA)
Vaccaro, Alfredo (Italy)
Valouch, V. (Czech Republic)
Vergura, Silvano (Italy)
Vinnikov, Dmitri (Estonia)
Vitale, Gianpaolo (Italy)
Zamora Belver, I (Spain)
Zobaa Ahmed (UK)

STEERING COMMITTEE

Manuel Pérez Donsión (Chairman)
Ramón Bargalló Perpiña
Manuel Burgos Payán
Francisco Cavallé Sesé
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Antonio Espín Estrella
Mario Mañana Canteli
Miguel Martínez Melgarejo
Mariano Sanz Badía

SPONSORSHIP

Sincere thanks are expressed to the organisations listed below who have given valuable support to ICREPQ'13:

- EA4EPQ
- University of Vigo
- University of the Basque Country
- AEDIE
- CIRCUTOR
- Sidilab
- Opal-RT

ICREPQ'13 PROGRAM OF ACTIVITIES

Tuesday March 19th, 2013	
16:30 – 19:30	**Registration "ICREPQ'13 Secretariat"** **Registration and Documentation. It's important that all the participants seize their documentation during this day.**

Room A: Mitxelena
Room B: Baroja
Room C: Oteiza
Plenary sessions PL in Room A (Mitxelena)
Poster P in Hall of Entry

Wednesday March 20th, 2013									
9:00 – 12:30	**Registration "ICREPQ'13 Secretariat"**								
9:15 – 10:00	**Opening Ceremony ROOM A "Mitxelena"**								
10:00 - 10:45	**PL1**	Mª Angeles Santamaría. Iberdrola Renewables. "***A key element for a massive deployment of RES: sustainability***"							
	EXTRA TIME FOR DISCUSSION								
10:45 – 11:30	**Posters Session at Hall of Entry (Session P1) Coffee Break**	*Poster Session **P1***							
		205	214	215	217	224	229		
		230	232	233	237	243	245		
		250	252	255	257	258	261		
		316	317	439	452	465	489		
		527	573	601	603				
11:30 – 13:00	**ROOM A**			**ROOM B**			**ROOM C**		
	*Oral Session **A1***			*Oral Session **B1***			*Oral Session **C1***		
	267	344	346	256	280	282	219	238	270
	504	550	585	297	320	331	284	285	337
13:00 – 15:00	**Welcome Lunch "Silken Gran Hotel Domine"**								
15:00 – 15:45	**ROOM A "Mitxelena" Plenary Sessions PL2**								
	PL2	Pedro Rodríguez. Abengoa Research. "***Technology Overview for Large PV and Solar Thermal Plants***"							
15:45 – 16:30	**Poster Session at Hall of Entry (Session P2) Coffee Break**	*Poster Session **P2***							
		254	264	268	273	276	277		
		279	281	290	300	304	305		
		308	310	315	318	324	327		
		328	340	350	351	357	358		
		364	366	405	570				
16:30 – 18:00	**ROOM A**			**ROOM B**			**ROOM C**		
	*Oral Session **A2***			*Oral Session **B2***			*Oral Session **C2***		
	225	241	306	335	336	341	360	468	472
	325	342		469	477	483	500	507	510
	EXTRA TIME FOR DISCUSSION								
19:00	**Welcome Civic Reception**								

Thursday March 21th, 2013

9:00 – 12:30	**Registration "ICREPQ'13 Secretariat"**										
	ROOM A "Mitxelena"										
9:15 – 10:00	**PL3**	Remus Teodorescu. Green Power Laboratory of Aalborg University. Denmark. ***"Trends and Technology in Wind Turbines"***									
10:00 – 10:45	**PL4**	Alex McEachern. Power Sandards Lab. USA. ***"Unexpected Links: Power Quality and Energy Conservation"***									
	EXTRA TIME FOR DISCUSSION										
10:45– 11:30	**Poster Session at Hall of Entry (Session P3) Coffee Break**	*Poster Session* ***P3***									
		235	370	373	374	376	378				
		379	382	383	384	385	387				
		394	398	399	400	406	408				
		409	415	417	418	422	423				
		425	427	574	594	598					
11:30 – 13:00	**ROOM A**			**ROOM B**			**ROOM C**				
	Oral Session ***A3***			*Oral Session* ***B3***			*Oral Session* ***C3***				
	275	390	412	490	492	495	220	292	355		
	424	542	588	516	534	540	367	377	514		
	EXTRA TIME FOR DISCUSSION										
13:00 – 15:00	**Lunch "Silken Gran Hotel Domine"**										
	ROOM A "Mitxelena" Plenary Sessions PL5										
15:00 –15:45	**PL5**	Maurizio Cirrincione. University of Technology of Belfort-Montbéliard. France. ***"Linear Neural Networks applied to Power Converters and AC Electrical Drives"***									
15:45 – 17:15	**ROOM A**			**ROOM B**			**ROOM C**				
	Oral Session ***A4***			*Oral Session* ***B4***			*Oral Session* ***C4***				
	442	449	456	262	362	363	211	212	223		
	459	506	582	365	403	521	247	295	555		
	EXTRA TIME FOR DISCUSSION										
17:15 – 18:00	**Poster Session at Hall of Entry (Session P4) Coffee Break**	*Poster Session* ***P4***									
		242	286	431	433	435	436				
		437	440	445	447	450	453				
		455	464	470	471	478	482				
		485	486	487	493	494	496				
		499	505	592							
18:00 - 19:45	**ROOM A**				**ROOM B**				**ROOM C**			
	Oral Session ***A5***				*Oral Session* ***B5***				*Oral Session* ***C5***			
	200	240	266	369	248	428	460	461	201	260	322	323
	372	411	576		491	565	600		430	454	479	
	EXTRA TIME FOR DISCUSSION											
21:00	**Conference Dinner** (Optional) ***Hotel CARLTON***											

<table>
<tr><th colspan="10">Friday March 22th, 2013</th></tr>
<tr><td>9:00 – 12:30</td><td colspan="9">Registration
"ICREPQ'13 Secretariat"</td></tr>
<tr><td></td><td colspan="9">ROOM A "Mitxelena" Plenary Sessions PL6</td></tr>
<tr><td rowspan="2">9:15-10:00</td><td>PL6</td><td colspan="8">Salvador Ceballos. Tecnalia Research & Innovation. "Grid integration of offshore wind farms using HVDC links: HVDC-VSC Technology overview"</td></tr>
<tr><td colspan="9">EXTRA TIME FOR DISCUSSION</td></tr>
<tr><td rowspan="6">10:00 – 10:45</td><td colspan="2" rowspan="6">Poster Session at Hall of Entry (Session P5) Coffee Break</td><td colspan="7">Poster Session P5</td></tr>
<tr><td>509</td><td>512</td><td>518</td><td>520</td><td>522</td><td colspan="2">525</td></tr>
<tr><td>529</td><td>532</td><td>544</td><td>545</td><td>546</td><td colspan="2">548</td></tr>
<tr><td>549</td><td>551</td><td>552</td><td>553</td><td>558</td><td colspan="2">561</td></tr>
<tr><td>564</td><td>566</td><td>567</td><td>572</td><td>575</td><td colspan="2">584</td></tr>
<tr><td>589</td><td>591</td><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="4">10:45 – 12:15</td><td colspan="3">ROOM A</td><td colspan="3">ROOM B</td><td colspan="3">ROOM C</td></tr>
<tr><td colspan="3">Oral Session A6</td><td colspan="3">Oral Session B6</td><td colspan="3">Oral Session C6</td></tr>
<tr><td>333</td><td>396</td><td>528</td><td>249</td><td>299</td><td>348</td><td>330</td><td>353</td><td>388</td></tr>
<tr><td>578</td><td>579</td><td></td><td>480</td><td>498</td><td>515</td><td>402</td><td>404</td><td>446</td></tr>
<tr><td colspan="9">EXTRA TIME FOR DISCUSSION</td></tr>
<tr><td rowspan="3">12:15– 13:00</td><td colspan="9">ROOM A "Mitxelena"</td></tr>
<tr><td colspan="9">CLOSING SESSION</td></tr>
<tr><td colspan="9">Conclusions and time for the next conference (ICREPQ'14)
Awards for the three best posters</td></tr>
<tr><td>13:00 – 15:00</td><td colspan="9">Farewell Lunch "Silken Gran Hotel Domine"</td></tr>
<tr><td>15:00 – 18:00</td><td colspan="9">Excursion for to visit the centre of Bilbao</td></tr>
</table>

Room A: Mitxelena
Room B: Baroja
Room C: Oteiza
Plenary sessions PL in Room A (Mitxelena)
Poster P in Hall of Entry

ORAL SESSIONS		
A1	Special Session 1	**Control and integration of wind energy systems**
B1	Special Session 8	**Harmonics and Power Quality-1**
C1	Special Session 4	**Solar Technologies-1**
A2	Special Session 17	**Renewable energies for developing countries-1**
B2	Special Session 8	**Harmonics and Power Quality-2**
C2	Special Session 4	**Solar Technologies-2**
A3	Special Session 17	**Renewable energies for developing countries-2**
B3	Special Session 8	**Harmonics and Power Quality-3**
C3	Special Session 6+12	**Sustanaible Energy Mix & Net Zero Energy Building**
A4	Special Session 16	**Power Quality and Renewable Energy-1**
B4	Special session 2	**Microgrids and Smart grids**
C4	Standard oral session	**Standard Oral Session-1**
A5	Special Session 16	**Power Quality and Renewable Energy-2**
B5	Standard oral session	**Standard Oral Session-2**
C5	Standard oral session	**Standard Oral Session-3**
A6	Special Session 11	**Power Electronics for Renewable Energy Systems**
B6	Speciasl Session 10+18	**Ocean Energy & Strategic Energy Planning**
C6	Standard oral session	**Standard Oral Session-4**

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. We suggest that the speakers of one oral presentation prepare their material in Power Point.

Poster Presentations

The posters must be numbered, on the up left corner, with the number of the paper and it will be put, about 15 minutes before of the beginning of the session, on the pin board that you previously can chose and it must be take off 15 minutes after of the end of the session. The author(s) must be stay near the poster during the 45 minutes of the session duration for to answer all the questions that the audience or the chairmen could formulate. The maximum available surface for each poster will be **900 mm x 1500 mm** (width x high). You must select your poster size take into account this maximum available surface (Perhaps an A0 size, **841×1189** mm (width x high), could be apropriate). Put on the pin board separated sheets of the paper are not allowed.

SESSION CHAIRMEN

On behalf of the International Scientific Committee, Steering Committee and the Organising Committee of the ICREPQ'13 and take into account their eminent position in the world of science we have selected 49 session chairmen. It is an honour for us their collaboration for to chair the sessions of ICREPQ'13 and their contribution would be greatly appreciated. We wish to express our warmest thanks.

Traditionally the Chairmen of each Session are independent in organising the Session. Nevertheless it is of special importance that the different session chairmen prepare some questions about the papers of their session in order to get a more dynamic one. Furthermore we expect of the session chairmen the following:

Plenary sessions

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

Oral sessions

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 during 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 sessions formulate questions to the authors and check that all is OK. The chairmen also file up a sheet with puntuactions for each presented poster and then take into account these evaluations the Organizers will deliver during the Closing Session a present to the three best posters

Chairmen Session distribution

Wednesday 20th March, 2013		
10:00-10:45	**PLENARY SESSION PL1**	Inmaculada Zamora Belver
10:45-11:30	**POSTER SESSION P1**	José A. Güemes Alonso
		Jin-Hong Kim
		Juraci de Castro Nóbrega
		Frk Martin
		Sebastien Jackes
11:30-13:00	**ORAL SESSION A1**	Mohamed A.H. El-Sayed
	ORAL SESSION B1	Liliana Tenti
	ORAL SESSION C1	Cristoph Hahn
15:00-15:45	**PLENARY SESSION PL2**	Mihail Predescu
15:45-16:30	**POSTER SESSION P2**	Przemyslaw Janik
		José Ignacio San Martín Díaz
		Carlos Ariño Vicente
		Anxel Kölling
		Pantelis Botsaris
16:30-18:00	**ORAL SESSION A2**	Mircea Ion Buzdugan
	ORAL SESSION B2	Etim Ubong
	ORAL SESSION C2	Noah Pflugradt
Thusday 21th March, 2013		
9:15-10:00	**PLENARY SESSION PL3**	Mario Mañana Canteli
10:00-10:45	**PLENARY SESSION PL4**	Dan András
10:45-11:30	**POSTER SESSION P3**	Emilio Jiménez Macias
		Marialis Çelo
		Antonio Chaves Neto
		Bon-Gwar Gu
		Anssi Mäkinen
11:30-13:00	**ORAL SESSION A3**	Pere Andrada
	ORAL SESSION B3	Tiberiu Tudorache
	ORAL SESSION C3	Antonio Gagliano
15:00-15:45	**PLENARY SESSION PL5**	Gianpaolo Vitale
15:45-17:15	**ORAL SESSION A4**	Peter Kadar
	ORAL SESSION B4	Aurelian Craciunescu
	ORAL SESSION C4	Wolf-Gerrit Fruh
17:15-18:00	**POSTER SESSION P4**	Antônio Neto Piccinni
		Kohei Nishida
		Claudia Popescu
		Jan Svec
		Gergely György Balázs
18:00-19:45	**ORAL SESSION A5**	Janis Kalnacs
	ORAL SESSION B5	Gorazd Stumberger
	ORAL SESSION C5	Dorina Ionescu
Friday 22th March, 2013		
9:15-10:00	**PLENARY SESSION PL6**	Carlos Redondo Gil
10:00-10:45	**POSTER SESSION P5**	Jan Iwaszkiewicz
		Leszek Wolski
		Mª. Rosa Alves Duque
		Etim Ubong
		Dario Zaninelli
10:45-12:15	**ORAL SESSION A6**	Mario J. Duran Martínez
	ORAL SESSION B6	Roberto Cesar Betini
	ORAL SESSION C6	Masakazu Kato

Wednesday March 20th 2013

9:15-10:00 OPENING CEREMONY **ROOM A "Mitxelena"**

10:00-10:45 Plenary Session PL1 **ROOM A "Mitxelena"**

Chairman: **Inmaculada Zamora Belver**

A Key element for a massive deployment of RES: sustainability
Mª. Angeles Santamaría. Iberdrola Renewables

Wednesday March 20th 2013
10:45-11:30 Poster Session P1 – Coffee Break **Hall of Entry**

Chairmen: **José Antonio Güemes Alonso, Jin-Hong Kim, Juraci de Castro Nóbrega, Frk Martin, Sebastien Jackes**

205 **Biofuels production and consumption: a decade of comparison, from 2000 to 2010**
Roberto G. Pereira(1), Valdir de J. Lameira(2), Silvano Vergura(3)
1. Fluminense Federal University, TEM/PGMEC/MSG/PGEB. Brazil
2. Researcher at Energy Economics. INESC Coimbra. Portugal
3. Department of Electrotechnics Politecnico di Bari. Italy

214 **The influence of network characteristics and environmental conditions on voltage dip performance in MV networks**
L. Tenti, R. Chiumeo, C. Gandolfi, L. Garbero
RSE S.p.A. Ricerca sul Sistema Energetico, Milano. Italy

215 **Optimization of efficiency and energy saving in public lighting with multi-objective evolutionary algorithms**
D. Gómez Lorente, O. Rabaza, A. Espín Estrella, A. Peña García
Department of Civil Engineering
E.T.S.I.C.C.P., University of Granada. Spain

217 **Development with Green Job, Renewable Energy and Sustainability and Power Quality**
Roberto C. Betini
Departamento Acadêmico de Eletrotécnica - Universidade Tecnológica Federal do Paraná, Curitiba. Brasil

224 **Prediction of cetane number of biodiesel from its fatty acid ester composition using Artificial Neural Networks**
R. Piloto(1), Y. Sanchez(1), L. Goyos(1), S. Verhelst(2)
1. Faculty of Mechanical Engineering, Technical University of Havana. Cuba
2. Department of Flow, Heat and Combustion Mechanics, Faculty of Engineering, Ghent University. Belgium

229 **Simulation model of a protection scheme for active distribution networks**
F. Belloni(1), C. Chiumeo(1), C. Gandolfi(1), S. Pugliese(2)
1. Ricerca sul Sistema Energetico – RSE S.p.A. Milano. Italy
2. A2A Reti Elettriche S.p.A., Milano. Italy

230 **A Study of Cycle Analysis and Turbine Design for Obtaining Small-Scaled Power from the Organic Rankine Cycle Using R245fa**
S. Cho(1), C. Cho(2), C. Kim(3)
1. Department of Aerospace and System Engineering, Gyeongsang National University. S. Korea
2. R&D Center, Sun-Tech, Sooncheon, Jeonna. S. Korea
3. Dept. of Mechanical Engr., Changwon National University, Gyeongam. S. Korea

232 **Voltage assessment of distribution network with large penetration of PVs by probabilistic approach**
T. Hiratsuka(1), K. Nozaki(1), M. Kato(1), Y. Hirata(2)
1. Department of Electrical and Electronic Engineering, Tokyo Denki University,Tokyo. Japan
2. Institute of Industrial Science, The University of Tokyo. Japan

233 **Sustainable development by Sahara Solar Breeder plan: Energy from the desert of Algeria, a Green Energy Dream grows in the Sahara**
A. Boudghene Stambouli(1), H. Koinuma(2), S. Flazi(1), Z. Khiat(1), Y. Kitamura(3)
1. University of Science and Technology of Oran, USTO-MB. Algeria
2. Graduate School of Frontier Science, University of Tokyo. Japan
3. Institute for Arab Economies Research. Japan

237 **Influence of the State-of-Charge Control on the Size of the Energy Storage Systems to be introduced in PV Power Plants**
H. Beltran, R. Vidal, J.C. Alfonso Gil, C. Ariño, E. Perez, E. Belenguer
Department Industrial Systems Engineering and Design. E.S.T.C.E.
Universitat Jaume I Castelló de la Plana. Spain

243 **Dynamic PMSM Motor Model with Turn Short Fault for Wind Power Generation**
Bon-Gwan Gu, Jun-Hyuk Choi, In-Soung Jung
Korea Electronics Technology Institute. Gyeonggi-do. Korea

245 **Impact of strength of fault current path on the operation of decoupled double synchronous reference frame – phase locked loop**
A. S. Mäkinen, H. Tuusa
Department of Electrical Energy Engineering, Tampere University of Technology. Finland

250 **Feasibility of Residential Wind Energy Generation in Puerto Rico**
R. Darbali Zamora, A. J. Díaz Castillo
Department of Electrical and Computer Engineering, University of Puerto Rico

252 **Design of a Low Cost House using Local Material Coupled to Mechanical- Earth Tube Ventilation System**
K. Ghali, N. Ghaddar, G. Chehab, I.Srour
Department of Mechanical Engineering, American University of Beirut. Lebanon

255 **Reduction of irreversible capacity in Lithium-ion batteries**
J. Libich, J. Vondrák, M. Sedlaříková
Department of Electrical and Electronic Technology, Brno University of Technology, Faculty of Electrical Engineering and Communication, Brno. Czech Republic

257 **Improvement of the electric energy quality by the use of active power filters**
Julian Wosik, Marian Kalus, Artur Kozłowski, Bogdan Miedzinski
Institute of Innovative Technology EMAG, Katowice. Poland

258 **Challenges in Future Distribution Grids - A Review**
M. Arnold(1), W. Friede(1), J. Myrzik(2)
1. Bosch Thermotechnik GmbH, Wernau. Germany
2. Institute for Energy-Systems, Energy-Efficiency and Energy-EconomicsTU Dortmund University. Germany

261 **Properties of Electrolytes for Li – ion Batteries with Higher Fire Safety**
J. Maca, M. Frk, M. Sedlarikova
Department of Electrical and Electronic Technology, Brno University of Technology. Czech Republic

316 **A Study on Brushless DC Motor for Air Fan Module of Fuel Cell Power Pack**
J. M. Seo(1,2), J. H. Kim(1), I. S. Jung(1) H. K. Jung(2)
1. Intelligent Mechatronics Research Centre, Korea Electronics Technology Institute. Gyeonggi-do.
2. Department of Electrical Engineering and Computer Science, Seoul National University. Korea

317 **A DC-DC Converter using the Renewable Energies for Battery Charger**
Jin-Hong Kim, Jun-Hyuk Choi
Korea Electronics Technology Institute, Gyeonggi-do. South Korea

439 **A Case Study on High Power Compensator of the Power Grid Irregularities for Industrial Appliances**
A. Jan Iwaszkiewicz(1), B. Jacek Perz(1), C. Leszek Wolski(1), M. Perez Donsión(2)
1. The Electrotechnical Institute, Gdansk Branch, Poland
2. Electrical Engineering Department, Vigo University, Spain

452 **Turkey's Municipal Solid Waste and Urban Waste Water Treatment Sludge Electrical Energy Potential**
M. Ozcan(1), S. Ozturk(1), M. Yıldırım(2)
1. Faculty of Engineering, Electrical Engineering Department, Kocaeli University.Turkey
2. Faculty of Technical Education, Electronics and Computer Education Department
Kocaeli University. Turkey

465 **Wind speed forecasting using Singular Systems Analysis**
C. Skittides, W.-G. Früh
Institute of Mechanical, Process and Energy Engineering, School of Physical Sciences and Engineering
Heriot-Watt University, Riccarton, Edinburgh.United Kingdom

489 **Energy Storage Requirements to match Wind Generation and Demand applied to the UK network**
W.G. Früh
Institute of Mechanical, Process and Energy Engineering, School of Physical Sciences and Engineering, Heriot-Watt University. United Kingdom

527 **Applicability Analysis of Single-Machine Equivalent Method for Modeling Wind Farm Containing Full-Converter Wind Turbine Generators with PMSG**
Su Xunwen(1,2), Xu Dianguo(1), Bu Shupo(3), Zheng Shuang(2)
1. School of Electrical Engineering and Automation, Harbin Institute of Technology. China
2. School of Electrical and Information Engineering,Heilongjiang Institute of Science and Technology. China
3. Department of electronics and Communication Engineering,Suzhou Institute of Industrial Technology. China

573 **Harmonic Penetration Analyses for DC-Link Frequency Converter Drive Systems by Considering the Motor-Side Converter as an Ideal Current Generator**
G. Gy. Balázs, I. Schmidt, P. Kiss
Department of Electric Power Engineering. Budapest University of Technology and Economics Budapest. Hungary

601 **Design and Deployment of the Askaryan Radio Array South Pole Autonomous Renewable Power Stations (AARPS)**
D.Z. Besson(1), D.M. Kennedy(1), K. Ratzlaff(2), R. Young(2)
1. Department of Physics and Astronomy, University of Kansas. USA
2. Instrumentation Design Laboratory, University of Kansas. USA

603 **DGFACTS comparative in wind power to solve LVRT requirements**
M. Gómez Pérez(1), E. Jiménez Macías(2), E. Martínez Cámara(3), J. Ramos Hernanz(1)
1. Electrical Engineering Department, University of the Basque Country (UPV/EHU). Spain
2. Electrical Engineering Department, Technical School of Industrial Engineering, University of La Rioja. Logroño. Spain
3. Grupo Eólicas Riojanas, Departamento de I+D. Logroño. Spain

Wednesday March 20th 2013
11:30-13:00 Special Oral Session A1 ROOM A "Mitxelena"
Control and integration of wind energy systems

Chairman: **Mohamed A. H. El-Sayed**

267 **Evaluation of the Smoothing Effect of Wind Power Generator Aggregation on Power System Operation**
T. Shimamura, D. Yamashita K. Koyanagi, Y. Nakanishi, R. Yokoyama
Graduate School of Environment and Energy Engineering Waseda University,Tokyo .Japan

344 **On-line estimation of induction generator parameters using adaptive neuro-fuzzy inference systems for wind energy conversion systems**
A. Mesemanolis, C. Mademlis
Department of Electrical and Computer Engineering Aristotle University of Thessaloniki
Aristotle University of Thessaloniki. Greece

346 **Control and simulation of a stand-alone wind-hydrogen generation system**
S. Carr(1), F. Zhang(1), K. Thanapalan(2), J. Maddy(1), A. Guwy(1)
1. Sustainable Environment Research Centre (SERC) Renewable Hydrogen Research and Demonstration Centre, University of Glamorgan. United Kingdom
2. Sustainable Environment Research Centre. Faculty of Advanced Technology. University of Glamorgan. United Kingdom

504 **High-resolution CFD modelling of Lillgrund Wind farm**
A.C.W. Creech(1), W.-G. Früh(2), E. Maguire(3)
1. Institute of Energy Systems, School of Engineering, University of Edinburgh. United Kingdom
2. Institute of Mechanical, Process and Energy Engineering, School of Physical Sciences and Engineering, Heriot-Watt University. United Kingdom
3. Vattenfall United Kingdom, Research & Development New Renewables. United Kingdom

550 **Mapping of wind climate in urban environment**
Péter Kádár
Óbuda University, Department of Power Systems, Budapest. Hungary

585 **Wind Power Determination for maximun Power Point Tracking in Lab-scale Multi-MW Wind Energy Systems**
Gregorio Martinez(1), Luis Parras(1), Mario J. Duran(2), C. Pino(1)
1. Department of Fluid Mechanics, E.T.S.I.I., University of Málaga. Spain
2. Department of Electrical Engineering, E.T.S.I.I., University of Málaga. Spain

13:00 – 15:00 Welcome Lunch "Silken Gran Hotel Domine"

Wednesday March 20th 2013
11:30-13:00 Special Oral Session B1 ROOM B "Baroja"
Harmonics and Power Quality-1

Chairman: **Liliana Tenti**

256 **Polyphase Drive Systems Configuration aiming EMI Mitigation**
G. Winnischofer(1), C.A.F. Sartori(1,2)
1. Laboratory of Applied Electromagnetism LMAG – PEA/EPUSP Electric Energy and Automation Engineering Department Polytechnic School of the University of São Paulo. Brazil
2. Nuclear Energy Research Institute / National Nuclear Energy Commission – IPEN/CNEN-SP. Brazil

280 **Improved Stucture for Three-Phase Four-Wires Hybrid Active Power Filters**
Lucas Frizera Encarnação(1), João Amin Moor Neto(2), Mauro Sandro dos Reis(3), Mauricio Aredes(3)
1. Universidade Federal do Espírito Santo, Depto. Engenharia Elétrica. Brasil
2. CEFET/RJ, Depto Engenharia Elétrica. Brasil
3. Universidade Federal do Rio de Janeiro, Programa de Engenharia Elétrica. Brasil

282 **Case studies on voltage distortion not covered by harmonic standards**
F. Pazos, I. Lumbreras, B. Guerra
Departamento de Protecciones y Asistencia Técnica. Iberdrola Distribución Eléctrica. Bilbao. Spain

297 **Estimation of insulation thermal overcapacity in medium voltage and low voltage conductors and transformers due to stationary disturbances**
I. C. Duran, O. G. Duarte, A. Pavas
Department of Electrical and Electronic Engineering. University National of Colombia

320 **Verification tests of a novel ferroresonance detection technique**
V. Valverde, G. Buigues, A.J. Mazón, I. Zamora, A. Etxegarai
Department of Electrical Engineering. Faculty of Engineering of Bilbao, UPV-EHU. Spain

331 **Harmonic emission study of individual wind turbines and a wind park**
Kai Yang(1), Snezana Cundeva(2), Math Bollen(1), Mats Wahlberg(1)
1. Luleå University of Technology.Department of Engineering Sciences and Mathematics Skellefteå. Sweden
2. University Ss Cyril and Methodius Faculty of Electrical Engineering and IT, Skopje. Macedonia

13:00 – 15:00 Welcome Lunch "Silken Gran Hotel Domine"

Wednesday March 20th 2013
11:30-13:00 Oral Special Session C1 **ROOM C "Oteiza"**
Solar Technologies-1

Chairman: **Cristoph Hahn**

219 **Desing and Testing of a Solar Parabolic Concentrating Collector**
Eltahir Ahmed Mohamed
Mech. Engineering Department, University of Nyala. Sudan

238 **Thermal, mechanical and hydrodynamic analysis to optimize the design of molten salt central receivers of solar tower power plants**
Maria Reyes Rodríguez Sanchez, María Venegas Bernal, Carolina Marugán Cruz, Domingo Santana
Department of Thermal and Fluid Engineering. Carlos III University of Madrid. Spain

270 **Biophotonic Combined Energy System (BCES)**
Udo Hellwig(1), Birgit Kamm(2), Franz Wildenauer(1), Axel Kölling(3), Stefan Kieseler(4)
1. University of Applied Science Wildau. Germany
2. BIOPOS Forschungsinstitut Bioaktive Polymersysteme e. V. Teltow. Germany
3. ERK Eckrohrkessel GmbH, Berlin. Germany
4. Berlin University of Technology, Energy Processing and Conversion Technologies of Renewable Energies. Germany

284 **Connective Day-Ahead Prediction of Solar Radiation based on Online Measurements**
Y. Kobayashi(1), R.Watanabe(1), Y. Hida(1), R. Yokoyama(1), T. Funabashi(2)
1. Graduate School of Environment and Energy Engineering, Waseda University. Tokyo. Japan
2. Meidensha Corporation. Tokyo. Japan

285 **Analysis for Short Period Forecasting of PV Output using Hemispherical Photograph**
Yusuke Imanishi(1), Ryo Watanabe(1), Yusuke Hida(1), Ryuichi Yokoyama(1), Kenji Iba(2)
1. Graduate School of Environment and Energy Engineering Waseda University. Japan
2. Department of Electrical Engineering, Meisei University, Tokyo. Japan

337 **Solar heating system's performance for the heating season 2011/12 in Madrid**
P. de Agustin, M. Izquierdo, E. Martin
Instituto de Ciencias de la Construcción Eduardo Torroja (CSIC). Madrid. Spain

13:00 – 15:00 **Welcome Lunch "Silken Gran Hotel Domine"**

Wednesday March 20th 2013
15:00-15:45 Plenary Session PL2 **ROOM A "Mitxelena"**

Chairman: **Mihail Predescu**

Technology Overview for Large PV and Solar Thermal Plants
Pedro Rodríguez. Abengoa Research

Wednesday March 20th 2013
15:45-16:30 Poster Session P2 – Coffee Break **Hall of Entry**

Chairmen: **Przemyslaw Janik, José Ignacio San Martín Díaz, Carlos Ariño Vicente, Anxel Kölling, Pantelis Botsaris**

254 **Experimental and numerical simulation of a storage tank connected to a flat-plate solar collector**
A. Álvarez(1), M. Baz(2), O. Cabeza(3), J.L. Ferrín(4), M.C. Muñiz(4), L.M. Varela(5)
1. Departamento de Ingeniería Naval y Oceánica. Escuela Politécnica Superior, Universidad de La Coruña. Spain
2. Máster Universitario en Energías Renovables e Sostenibilidad Energética, Universidad de Santiago de Compostela. Spain
3. Departamento de Física, Universidad de La Coruña. Spain
4. Departamento de Matemática Aplicada, Universidad de Santiago de Compostela. Spain
5. Departamento de Física de la Materia Condensada, Universidad de Santiago de Compostela.

264 **A novel approach to select HVDC - controller parameters by using a decoupling filter**
C. Hahn, A. Müller, M. Luther
Electrical Energy Systems University of Erlangen – Nuremberg. Germany

268 **Energy generation based on piezoelectric transducers**
J. Ortiz(1), N. Zabala(1), P. M. Monje(1), V. Cokonaj(2), G. Aranguren(1)
1. Electronic Design Group.University of the Basque Country. Faculty of Engineering of Bilbao.Spain
2. AERnnova Engineering Solutions Ibérica S.A Madrid. Spain

273 **Comparative Study of Current Controllers for Shunt Active Power Compensators used in Smart Grids Applications**
J.C. Alfonso Gil, C. Ariño, H. Beltran, E. Perez
Department of Engineering of Industrial Systems and Design, Universidad Jaume I de Castellón. Spain

276 **Methodology to calculate mooring and anchoring costs of floating offshore wind devices**
L. Castro Santos, S. Ferreño González, V. Diaz Casas
Department of Naval and Oceanic Engineering. Integrated Group for Engineering Research (GII), University of A Coruña, Ferrol. Spain

277 **Mooring for floating offshore renewable energy platforms classification**
L. Castro Santos, S. Ferreño González, V. Diaz Casas
Department of Naval and Oceanic Engineering
Integrated Group for Engineering Research (GII), University of A Coruña, Ferrol, A Coruña. Spain

279 **On line monitoring of transmission line**
A. K. Sinha, Manish Yadav, K. Tudu, H. Rathore, B. Kumar
Department of Electrical Engineering NIT Silchar. India

281 **Impact of the cell temperature on the energy efficiency of a single glass PV module: thermal modeling in steady-state and validation by experimental data**
S. Jacques, A. Caldeira, Z. Ren, A. Schellmanns, N. Batut
GREMAN – UMR-CNRS 7347, University of Tours. France

290 **Control and management of a fuel cell microgrid. Energy efficiency optimization**
J.I. San Martín(1), I. Zamora(2), F.J. Asensio(2), J. García Villalobos(2), J.J. San Martín(1) V. Aperribay(1)
1. Escuela de Ingeniería de Eibar. Spain
2. Escuela Técnica Superior de Ingeniería de Bilbao. Department of Electrical Engineering, University of the Basque Country (UPV/EHU). Spain

300 **Energy conversion using Pd-based catalysts in direct ethanol fuel cell**
A. M. Sheikh(1), P. S. Correa(1), E.Leal da Silva(1), I. D. Savaris(1), S. C.Amico(2), C. F.Malfatti(1)
1. Metallurgical Department (DEMET), Pros-graduation Program in Mining Metallurgical and Materials Laboratory of Corrosion Research (LAPEC). Brazil
2. Laboratory of Polymer Materials (LAPOL) 2 Federal University of Rio Grande do Sul (UFRGS). Brazil

304 **Characterization of Paramagnetic Species in Seeds by Electron Paramagnetic Resonance (EPR)**
V. M. Barbana, C. L. B. Guedes, E. Di Mauro
Laboratory of Fluorescence and Electron Paramagnetic Resonance (LAFLURPE),
CCE, State University of Londrina, Londrina. Brazil

305 **Electromagnetic analysis of an axial flow machine with permanent magnets for use in wind turbines**
F. J. A. Linard(1), D. S. Oliveira Jr(1), R. S. T. Pontes(1), V.P.B. Aguiar(2), T.R. Fernandes Neto(1)
1. Department of Electrical Engineering PPGEE, Federal University of Ceará. Brazil
2. Department of Energy Engineering, Federal University of the Semi-Arid. Brazil

308 **Analysing low-voltage grids using a behaviour based load profile generator**
N. Pflugradt(1), J. Teuscher(2), B. Platzer(1), W. Schufft(2)
1. Technical Thermodynamics. Faculty of Mechanical Engineering Chemnitz University of Technology. Germany
2. Power and High-Voltage Engineering. Faculty of Electrical Engineering and Information Technology. Chemnitz University of Technology. Germany

310 **Fabrication of bulk heterojunction solar cells by a modified spray-mist coating method**
J.H. Lee(1), S. Yoshikawa(2), T. Sagawa(1)
1. Graduate School of Energy Science, Kyoto University. Japan
2. Institute of Advanced Energy, Kyoto University. Japan

315 **Performance prediction of a solar hot water system with change of circulating pump efficiency in solar collectors**
Youn Cheol Park, Le Minh Nhut
Department of Mechanical Engineering Jeju National University. Korea

318 **Detection of Induction Motors Rotor/Stator Faults Using Electrical Signatures Analysis**
Somaya A. M. Shehata, Hamdy S. El-Goharey, Mostafa I. Marei, Ahmed K. Ibrahim
Department of Electrical Power and Machines Engineering, Ain-Shams University, Cairo, Egypt

324 **Reliability Assessment of the Power System Backup Protection in Smart Grid Control Center Using Phasor Measurement Units (PMU)**
A.R.Motavalian, N.Moadabi, G. B. Gharehpetian
Electrical Engineering Department, Amirkabir University of Technology, Tehran. Iran

327 **Energy Planning Methodologies**
Tarlis Tortelli Portela, J. Lafay
Program in Electrical Engineering (PPGEE), UTFPR. Brazil

328 **Control Strategy of PWM Rectifiers Connected to Unbalanced Grids**
Martin Bejvl(1), Jan Švec(2), Josef Tlustý(2), Viktor Valouch(2)
2. Department of Electric Power Engineering Faculty of Electrical Engineering, CTU Prague. Czech Republic
1. Institute of Thermomechanics, Academy of Sciences of the Czech Republic Prague. Czech Republic

340 **Clustering daily solar radiation from Reunion Island using data analysis methods**
P. Jeanty(1), M. Delsaut(2), L. Trovalet(1), H. Ralambondrainy(2), J.D. Lan-Sun-Luk(1), M. Bessafi(1), P. Charton(2), J.P Chabriat(1)
Université de la Réunion,Île de la Réunion
1. Laboratoire d'´Energetique d'´Electronique et Procédés, Université de la Réunion
2. Laboratoire d'Informatique et de Mathématiques, Université de la Réunion

350 **Performance characterization of a PV system using wavelet transform and genetic algorithm**
P. Janik(1),P. Kostyla(1), J. Rezmer(1), J. Szymanda(1),T.Sikorski(1), Z. Wacławek(1), D. Lehmann(2)
1. Department of Electrical Engineering.Wroclaw University of Technology. Poland
2. Faculty of Mechanical, Electrical and Industrial Engineering, Brandenburg University of Technology, Cottbus. Germany.

351 **A comprehensive approach to classify reactive power consumption in transmission technologies**
S. Höhn, A. Semerow, M.Luther
Electrical Energy Systems. University of Erlangen-Nuremberg. Germany

357 **Combined control methods of the steering and traction system of in-wheel electric vehicle for a double lane-change in a low friction coefficient environment**
Chang-Hun-Oh, Ji-Won-Kim, Jong-Moo-Kim
Electric Motor Research Center, KERI. Republic of Korea

358 **Energy simulation and feasibility of a Ground-Source Heat Pump coupled with a Phase Change Material energy storage system for heat supply**
J. M. García-Alonso, F. Aguilar, E. Montero
Department of Electromechanical Engineering. Escuela Politécnica Superior. University of Burgos. Spain

364 **Charging management for full electric vehicles in the mobility-on-demand-concept "fahrE" using local renewable energy**
D. Kühnert, W. Schufft
Power Systems and High-Voltage Engineering. Faculty of Electrical Engineering and Information Technology. Chemnitz University of Technology. Germany

366 **Islanded Operation and Control of Offshore Wind Farms Connected through a VSC-HVDC Link**
Enrique Belenguer(1), Ricardo Vidal(1), R. Blasco Giménez(2), Héctor Beltrán(1),J.C. Alfonso, C. Ariño(1)
1. Department. of Industrial Engineering Systems ,Universitat Jaume I Castellón de la Plana. Spain
2. Department of Systems Engineering and Control, Universitat Politècnica de València. Spain

405 **Application of Differential Evolution as method of pitch control setting in a wind turbine**
F. Oterino-Echavarri(1), E. Zulueta(2), J. Ramos-Hernanz(3), I. Calvo(2), J.M. Lopez-Guede(2)
1. Department of Electronic Technology, E.U.I. Vitoria-Gasteiz, UPV/EHU. Spain
2. Department of System Engineering and Automation, E.U.I. Vitoria-Gasteiz, UPV/EHU. Spain
3. Department of Electrical Engineering, E.U.I. Vitoria-Gasteiz, UPV/EHU. Spain

570 **Low Voltage Ride Through Characterization of Wind Energy Conversion Systems**
Hamdy S. K. El-Goharey, Mostafa I. Marei, Mohamed G. S. Zaghloul
Department of Electrical Power and Machines Engineering, Ain-Shams University, Cairo, Egypt

Wednesday March 20th 2013
16:30-18:00 Special Oral Session A2 ROOM A "Mitxelena"
Renewable energies for developing countries-1

Chairman: **Mircea Ion Buzdugan**

225 **Engine performance of a single cylinder direct injection diesel engine fuelled with blends of Jatropha Curcas oil and standard diesel fuel**
R. Piloto(1), M. Errasti(1), N.Ferrer(1), E. Melo(1), L. Goyos(1), S. Verhelst(2)
1. Faculty of Mechanical Engineering, Technical University of Havana. Cuba
2. Department of Flow, Heat and Combustion Mechanics, Faculty of Engineering, Ghent University. Belgium

241 **Electricity Generation by Use of Urban Solid Waste**
Possoli, L.(1), Coelho, V. L.(1), Ando Junior, O. H.(1,2), Neto, J. M.(1), Spacek, A. D.(1,2), Oliveira, M. O.(2), Schaeffer, L(.2), Bretas, A. S(2)
1. Department of Electrical Engineering ***SATC,*** Beneficent Association of Santa Catarina Coal Industry. Brazil
2. School of Engineering. UFRGS, Federal University of Rio Grande do Sul. Brazil

306 **Renewable Energy Policy and Legitimacy: a Developing Country Case**
Juan L. Espinoza (1), Edgar A. Barragán(2)
1. Department of Electrical Engineering, Faculty of Engineering, University of Cuenca. Ecuador
2. Faculty of Engineering, Universidad Politécnica Salesiana. Cuenca. Ecuador

325 **How Sahara Contribute to Sustainable Energy Production?. Sustainable development of Sahara countries, energy export and desert cultivation & repopulation**
S. Flazi(1), A. Boudghene Stambouli(2), Z. Khiat(1)
1. Department of Electrical Engineering
2. Department of Electronics. University of Sciences and Technology of Oran Mohamed Boudiaf (USTO-MB).

342 **Experimental investigation on mass transfer for regeneration of liquid desiccant**
S. Bouzenada(1), T. Salmon(2), L. Fraikin(2), A. Kaabi(1), A. Léonard(2)
1. Department of Climatic Engineering, Faculty of Engineering Sciences, University Mentouri Constantine. Algeria
2. Department of Applied Chemistry, Laboratory of Chemical Engineering, University of Liège. Belgium

19:00 Welcome Civic Reception Bilbao Council

Wednesday March 20th 2013
16:30-18:00 Special Oral Session B2 **ROOM B "Baroja"**
Harmonics and Power Quality-2

Chairman: **Etim Ubong**

335 **Power Quality of Supply Characterization in the Portuguese Electricity Transmission Grid**
L. Campos Pinto, A. Tavares
Management Support Department of the Operation and Maintenance Direction
REN – Rede Eléctrica Nacional, S.A. Sacavém. Portugal

336 **GestInc- The Incidents Data Base**
L. Campos Pinto, J. Lobo, A. Tavares
Management Support Department of the Operation and Maintenance Direction
REN – Rede Eléctrica Nacional, S.A. Sacavém. Portugal

341 **Power Quality analysis in Renewable Energy Systems Supplying Distribution Grids**
N. Golovanov(1), G.C. Lazaroiu(1), M. Roscia(2), D. Zaninelli(3)
1. Department of Power Systems.University Politehnica of Bucharest. Romania
2. University of Bergamo. Italy
3. Politecnico di Milano. Italy

469 **Automatic Analysis System of Network Incidents**
J. Javier Ferro(1), Hugo Gurendez(2), David MacDonald(2), Javier Amantegui(2), Cesáreo Fernández(3)
1. Department of Telecomunications and Telecontrol.Iberdrola ingeniería y construcción S.AU. Spain
2. Department of Proteccions and Technical Asistance. Iberdrola Distribución S.A. Spain
3. Institute for Research in Technology. Universidad Pontificia de Comillas, Madrid. Spain

477 **Effect of Numerous PV Inverters on Power Quality Connected to the Same LV Network in a Suburban Area**
G. Gy. Balázs, P. Kiss
Department of Electric Power Engineering. Budapest University of Technology and Economics. Hungary

483 **Impact of the new electric arc furnace on the level of flicker in surrounding transmission and distribution power system**
Ana Tomasović Teklić(1), Ivan Periša(2), Davor Škrlec(3)
1. Končar Electrical Engineering Institute. Zagreb.Croatia
2. HEP – Distribution System Operator.Zagreb. Croatia
3. Faculty of Electrical Engineering and Computing. Zagreb. Croatia

19:00 **Welcome Civic Reception** **Bilbao Council**

Wednesday March 20th 2013
16:30-18:00 Oral Special Session C2 **ROOM C "Oteiza"**
Solar Technologies-2

Chairman: **Noah Pflugradt**

360 **Modular Design of DC-DC Converters for EV battery fast-charging**
Rómulo Antão, Tiago Gonçalves, Rui Escadas Martins
Department of Electronics, Telecommunications and Informatics, Universidade de Aveiro. Portugal

468 **Electric Power Generation Using Buoyancy-Induced Vortices**
Mark W. Simpson(1), Arne J. Pearlstein(2) Ari Glezer (1)
1. Woodruff School of Mechanical Engineering, Georgia Institute of Technology Ferst Drive Atlanta
2. Department of Mechanical Science and Engineering, University of Ilinois at Urbana-Champaign

472 **Assessment of the Performance and Defect Investigation of PV Modules after Accelerated Ageing Tests**
J.A. Tsanakas(1), M. Karoglou(2), E.T. Delegou(2), P.N. Botsaris(1), A. Bakolas(2), A.Moropoulou(2)
1. Democritus University of Thrace, School of Engineering, Department of Production Engineering and Management, Faculty of Materials, Processes and Engineering. Greece
2. National Technical University of Athens, School of Chemical Engineering, Department of Materials Science and Engineering. Athens. Greece

500 **Solar-driven gas turbine power plants**
A. Medina(1), S. Sánchez-Orgaz(2), A. Calvo Hernández(3)
1. Departamento de Física Aplicada, Universidad de Salamanca. Spain
2. Departamento de Física, Ingeniería y Radiología Médica, ETSII de Béjar, Universidad de Salamanca. Spain
3. Departamento de Física Aplicada and IUFFYM, Universidad de Salamanca. Spain

507 **Back-pass non-perforated unglazed solar collector: performance and evaluation**
M A Paya-Marin(1), J B P Lim(1), B Sen Gupta(1), R M Lawson(2)
1. School of Planning, Architecture and Civil Engineering Queen's University Belfast. United Kingdom
2. Faculty of Engineering and Physical Sciences, University of Surrey. United Kingdom

510 **Experimental Assessment of PV Panels Front Water Cooling Strategy**
Loredana Dorobanţu, Mihai Popescu, Claudia Popescu, Aurelian Crăciunescu
Faculty of Electrical Engineering, University Politehnica of Bucharest. Romania

19:00 **Welcome Civic Reception** **Bilbao Council**

Thursday March 21th 2013

Thursday March 21th 2013
9:15-10:00 Plenary Session PL3 **ROOM A "Mitxelena"**

Chairman: **Mario Mañana Canteli**

Trends and Technology in Wind Turbines
Remus Teodorescu. Green Power Laboratory of Aalborg University. Denmark

Thursday March 21th 2013
10:00-10:45 Plenary Session PL4 **ROOM A "Mitxelena"**

Chairman: **Dan András**

Unexpected Links: Power Quality and Energy Conservation
Alex McEachern. Power Standards Lab. USA

Thursday March 21th 2013
10:45-11:30 Poster Session P3 – Coffee Break **Hall of Entry**

Chairmen: **Emilio Jiménez Macias, Marialis Çeo, Antonio Chaves Neto, Bon-Gwar Gu, Anssi Mäkinen**

235 **Optimal Power Sharing of an Inverter-Based Autonomous Microgrid**
M. A. Hassan(1,2), M. A. Abido(1)
1. Electrical Engineering Department King Fahd University of Petroleum & Minerals, Dhahran. Saudi Arabia
2. Electrical Engineering Department, Faculty of Engineering, Mansoura University. Egypt

370 **Using a flywheel associated to PV plant in order to increase the integration of PV into island electrical grid**
Abbezzot, C.(1), Tran, T.(2), Poggi, P.(1), Serre-Combe, P.(3), Perrin, M.(3), Muselli, M.(1)
1. University of Corsica, CNRS UMR 6134 SPE Ajaccio. France
2. Laboratory for Solar Systems (L2S), National Institute of Solar Energy (CEA-INES) Le Bourget-du-Lac. France
3. Laboratory for Electricity Storage (LSE), National Institute of Solar Energy (CEA-INES) Le Bourget-du-Lac. France

373 **Large and Small Signal Analysis for Bridgeless High PFC Converter Operating in DCVM**
Nasrullah Khraim(1), Abbas A. Fardoun(1), Esam Ismail(2)
1. Electrical Engineering Department, University of United Arab Emirates. UAE
2. Electrical Engineering Department, College of Technological Studies. Kuwait

374 **A Compression Method for Power Quality Data**
R. E. Dapper(1), C. D. P. Crovato(2), A. A. Susin(1), S. Bampi(1)
1. Department of Electrical Engineering,Federal University of Rio Grande do Sul. Brazil
2. Feevale University, Rio Grande do Sul. Brazil

376 **Modelling and Simulation of Hierarchical Control for AC Inductive Microgrids**
A. Martin Villate(1), J. Vadillo(1), J.P. Fossati(1), L. Arrizubieta(2), I. Cerro(2)
1. Electronics and Commkunications Department. CEIT and Tecnun. University of Navarra. Spain
2. JEMA. Spain

378 **Examination of Wind direction in Manjil and Control of the V47 Wind Turbine Yaw angle versus the variation of Wind direction**
F. Sharif(1),A. Yazdizadeh(2), A. Ali Abadi(3)
1. P.W.U.T Power and Water University of Technology. Tehran. Iran
2. Department of Control Engineering of P.W.U.T University.Tehran. Iran
3. Power Plant Projects Management Co (MAPNA). Tehran. Iran

379 **Short time voltage variations analysis for the new Brazilian distribution procedures (PRODIST) and for the IEC 61000-4-30**
G. S. Wojichowski(1), C. D. P. Crovato(2), R. C. Leborgne(1)
1. Department of Electrical Engineering, Universidade Federal do Rio Grande do Sul. Brazil
2. Feevale University. Rio Grande do Sul. Brazil

382 **The Method of Checking Equations for Energy Resources Flows Data Validating**
Vladislav O. Samoylenko, Andrew V. Pazderin
Department of Automated Electrical Systems,Boris Yeltzin Ural Federal University. Russia

383 **IGCC: An Alternative to the use of Mineral Coal**
Neto, J. M.(1), Ando Junior, O. H.(1), Spacek, A. D.(1), Oliveira, M. O. (2), Schaeffer, L. (2), Bretas, A. S.(2)
1. Department of Electrical Engineering, ***SATC,*** Beneficent Association of Santa Catarina Coal Industry. Brazil
2. School of Engineering, UFRGS, Federal University of Rio Grande do Sul. Brazil

384 **Efficiency Evaluation of Filters Applied in Thermoeletrics from the Analysis of Process Variables**
Neto, J. M.(1), Pauletti, F.(2), Ando Junior, O. H.(1), Spacek, A. D.(1), Oliveira, M. O. (2), Schaeffer, L. (2) Bretas, A. S.(2)
1. Department of Electrical Engineering, ***SATC,*** Beneficent Association of Santa Catarina Coal Industry. Brazil
2. School of Engineering, UFRGS, Federal University of Rio Grande do Sul. Brazil

385 **Porous Ni Electrodes for Hydrogen Production from Water Electrolysis**
I. D. Savaris(1), C. S. Torres(1), A. M. Sheikh(1), F. Weschenfelder(2), L. Schaeffer(2), C. Malfatti(1)
1. Metallurgical Department (DEMET), Pros-graduation Programme in Mining Metallurgical and Materials, Laboratory of Corrosion Research (LAPEC) Federal University of Rio Grande do Sul (UFRGS). Brazil
2. Metallurgical Department (DEMET), Pros-graduation Programm in Mining Metallurgical and Materials, Metal Forming Laboratory (LdTM) Federal University of Rio Grande do Sul (UFRGS) Brazil

387 **Analysis of PRIME PLC Smart Metering Networks Performance**
A. Fernandez Olivera(1), A. Sendin Escalona(2), I. Urrutia Galdos(1), J. Mateo Arenas(1), P. Angueira Buceta(3), JJ. Ferro Vázquez(1)
1. Telecommunications Department. Iberdrola Engineering and Construction S:A.U.Spain
2. Control Systems and Telecommunications Division Iberdrola Networks.Bilbao. Spain
3. Electronics and Telecommunications Department,University of the Basque Country (UPV/EHU) Bilbao. Spain

394 **3 to 69 hours wind speed forecasting using artificial neural networks for the Brazilian Northeast region**
F. D. L. Silva, P. C. M. Carvalho, A. R. Paula, A. P. S. Braga
Department of Electrical Engineering, Federal University of Ceará. Brazil

398 **Effects of Increased Photovoltaic Penetration on the Operation of Isolated Microgrids in Brazilian Amazon Region**
C. Gonçalves, J. P. A. Vieira, M. E. L. Tostes, , D. J. A. Vieira, B. C. Bernardes, U. H. Bezerra
Laboratório de Simulação de Sistemas Elétricos de Potência, Universidade Federal do Pará (UFPA). Brasil

399 **Evaluation of Alternative Disposal and Replacement of Fluorescent Lamps**
Carlessi, F(1), Oliveira, M. O.(2), Ando Junior, O. H.(1,3), Neto, J. M.(1), Spacek, A. D.(1,3), Coelho, V. L.(3), Schaeffer, L.(3), Bordon, H.(2), Perrone O.E.(2) Bretas, A. S.(3)
1. Department of Electrical Engineering, ***SATC,*** Beneficent Association of Santa Catarina Coal I Industry. Brazil
2. Energy Study Center to Development-CEED UNaM, National University of Misiones. Argentina
3. School of Engineering, UFRGS, Federal University of Rio Grande do Sul. Brazil

400 **A New Cost-Effective Wind Farm Structure with HVDC Link Preserving Technical Advantages of Advanced offshore Wind Farms**
Ali Shamsnia, Mostafa Parniani
Center of Excellence in Power System Management and Control, Department of Electrical Engineering. Sharif University of Technology. Tehran. Iran

406 **Accuracy and Data Compression Trade-Offs for Power Quality Disturbance Representation with DWT and PCA techniques**
L.B. Soares(1), R. E. Dapper(3), C. Crovato(2), S. Bampi(1), A. A. Susin(1,3)
1. Informatics Institute – Microelectronics Program (PGMicro) Federal University of Rio Grande do Sul (UFRGS). Brazil
2. Feevale University- ICET. Brazil
3. Electrical Engineering department, Federal University of Rio Grande do Sul (UFRGS). Brazil

408 **Use of reservoirs in the Brazilian semiarid region for installation of PV plants**
R.M.C.Corrêa(1), P.C.M.Carvalho(1), E.M.Sacramento(2), J.C.Araújo(3)
1. Department of Electrical Engineering,Federal University of Ceará. Brazil
2. Federal Institute of Education, Science and Technology of Ceará. Brazil
3. Department of Agricultural Engineering, Federal University of Ceará. Brazil

409 **Energetic Modeling of Ánibal Solar Vehicle for Murcia Solar Race Competition**
N. Gómez ,J. Lopez-Hellín, J. Faxas, , A. Guerrero
Department of System Engineering and Automation, E.T.S.I.I., Technical University of Cartagena (UPCT). Spain

415 **Relationship between cetane number and calorific value of biodiesel from Tilápia visceral oil blends with mineral diesel**
Oliveira L. E., Da Silva M. L. C. P.
Department of Chemical Engineering, EEL-USP – University of São Paulo. Brazil

417 **Renewable Alternative Energy Resources: A Case for the Tropics and Developing Renewable Energy Programs in America**
Okhio, C. B, Misoc, F, Asgill, A, Taofeek Orekan
Southern Polytechnic State University, Marietta. U.S.A.

418 **Production of Biodiesel from WVO Using Small Scale Continuous Ultrasonic Processor** Justin Wood, Jared Slayton,Seth Parrott, Ahmed ElSawy
Department of Manufacturing and Engineering Technology, College of Engineering, Tennessee Technological University. USA

422 **Construction and Comparison of the Efficiency of Water Heating Systems Using low Cost Solar Collectors**
Marcelo G. Martins(1), Francisco X. L. Silva(2), Antonio M. J. C. Neto(3), Gabriel G. da Silva(3), Francisco das Chagas Marques(4), Nélio T. Machado(5)
1. Federal Institute of Education, Science and Technology of Pará. Brazil
2. University of Amazon– UNAMA. Brazil
3. Instituto de Ciências Exatas e Naturais, Universidade Federal do Pará. Brazil
4. State University of Campinas, UNICAMP. Brasil
5. Faculty of Chemical Engineering-UFPA, Pará. Brazil

423 **A Three-Phase Microgenerator Based Solution for Power Harvesting Applications**
M. Alves(1), J. M. Fonseca(2), J.M. Dias Pereira(1,3)
1. ESTSetúbal-LabIM/IPS. Portugal
2. Universidade Nova de Lisboa, Faculdade de Ciências e Tecnologia, Caparica. Lisboa
3. Instituto de Telecomunicações, Instituto Superior Técnico, Lisboa. Portugal

425 **Design and Implementation of a High Temperature Control Monitoring Applied to Micro Thermoelectric Generators**
Sandro C. S. Juca(1), Paulo C.M. Carvalho(2), Renata I.S. Pereira(2), Dmitry Petrov(3), Ulrich Hilleringmann(3)
1. Federal Institute of Education, Science and Technology of Ceará/IFCE, LAESE Laboratory, Telecommunications Area. Brazil
2. Federal University of Ceará-UFC, Department of Electrical Engineering. Brazil
3. Universität Paderborn—UPB. Germany

427 **Solar energy in Brasil**
C. A. V. Carneiro(1,2), J. C. S. Oliveira(1)
1. Mechanical and Materials Engineering Department IME, Military Institute of Engineering, Rio de Janeiro. Brazil
2. Mechanical Engineering Department, COPPE/UFRJ, Federal University of Rio de Janeiro. Brazil

574 **The Effect of Ply Waviness for the Fatigue Life of Composite Wind Turbine Blades**
U.I.K. Galappaththi(1), Anthony Pickett(2), Milos Draskovic(2), Mark Capellaro(2), A.M. De Silva(1)
1.School of Engineering and Built Environment, Glasgow Caledonian University, Glasgow. United Kingdom
2. Institute of Aircraft Design, University of Stuttgart. Germany

594 **In-Cylinder Heat Transfer in an Ericsson Engine Prototype**
A. Fula(1,2), P. Stouffs(1), F. Sierra(2)
1. Laboratoire de Thermique, Energétique et Procédés. University de Pau et des Pays de L´Adour. France
2. Facultad de Ingeniería, Laboratorio Máquinas Térmicas y Energías Renovables. University of Colombia

598 **Study of optimization design criteria for stand-alone hybrid renewable power systems**
M. Martínez Díaz(1), R. Villafáfila(2), D. Montesinos Miracle(1), A. Sudrià Andreu(1,2)
1. CITCEA-UPC, Department d´Enginyeria Elèctrica, Universitat Politècnica de Catalunya. ETS d´Enginyeria Industrial de Barcelona. Spain
2. CITCEA-UPC, Department d´Enginyeria Elèctrica, Universitat Politècnica de Catalunya. EU d´Enginyeria Tècnica Industrial de Barcelona. Spain

Thursday March 21th 2013
11:30-13:00 Special Oral Session A3 **ROOM A "Mitxelena"**
Renewable energies for developing countries-2

Chairman: **Pere Andrada**

275 **Effects of Environmental and Climatic Conditions on PV Efficiency in Qatar**
F. Touati, A. Massoud, J. Abu Hamad, S.A. Saeed
Department of Electrical Engineering, Qatar University, Doha. Qatar

390 **Micro-generation and micro combined heat and power generation using "free" low temperature heat sources through Organic Rankine cycles**
J. Navarro-Esbrí(1,2), B. Peris(1), R. Collado(2), F. Molés(1)
1. ISTENER Grupo de investigación de Ingeniería de los Sistemas Térmicos y Energéticos, Universidad Jaume I de Castelló. Spain.
2. Expander-Tech, Universidad Jaume I de Castelló. Spain

412 **Production of ethylic biodiesel from Tilápia visceral oil**
Oliveira L. E., Barboza J. C. S., Da Silva M. L. C. P.
Department of Chemical Engineering. EEL-USP, University of São Paulo. Brazil

424 **The Impact of Small HPP's in the Energy Balance of Albanian Power System**
M.Çelo(1), E.Zeqo(1), A.Ibrahimi(1), R.Bualoti(2)
1. Albanian Power Corporation,Tirana. Albania
2. Department of Electric Power System, Faculty of Electrical Engineering,Polytechnic University of Tirana. Albania

542 **Modelling and Design of Indirect Solar Dryers for Batch Drying**
L. Blanco-Cano, A. Soria-Verdugo, L.M. García-Gutiérrez, U. Ruiz-Rivas
Department of Thermal and Fluids Engineering. E.P.S., Carlos III University of Madrid. Spain

588 **Effect of Acceptance angle on the design and performance of a heat pipe based compound parabolic collector at Kano, Nigeria**
B. Abdullahi, R.K. AL-Dadah, S. Mahmoud
School of Mechanical Engineering, University of Birmingham. United Kingdom

13:00 – 15:00 **Lunch "Silken Gran Hotel Domine"**

Thursday March 21th 2013
11:30-13:00 Special Oral Session B3 **ROOM B "Baroja"**
Harmonics and Power Quality-3

Chairman: **Tiberiu Tudorache**

490 **Power Quality versus Electromagnetic Compatibility in Adjustable Speed Drives**
M. I. Buzdugan, H. Bălan
Department of Electrical Engineering, Technical University of Cluj-Napoca. Romania

492 **Comparison between active power filter with selective control and conventional control for Harmonic in photovoltaic systems**
J. Osorio, J. Montana
Department of Electrical and Electronic Engineering, Universidad del Norte, Barranquilla. Colombia

495 **A New Approach in Defining Harmonic Indices in Utility Application**
H. Mokhtari(1), A. Shahab(1), M. Poshtan(2)
1. Department of Electrical Engineering, Sharif University of Technology, Tehran. Iran
2. EECE Department, American University in Dubai. UAE

516 **Measurement of Power Quality Effects and Energy Efficiency of Various Light Technologies**
L. Arsov(1), M. Cundeva-Blajer(1), I. Iljazi(2)
1. Ss. Cyril and Methodius University, Faculty of Electrical Engineering and Information Technologies, Skopje. R. Macedonia
2. South Eastern European University-Tetovo. R. Macedonia

534 **Who pays for harmonic network losses caused by PV inverters?**
J. Kiss, A. Dán
Department of Electric Power Engineering, Budapest University of Technology and Economics. Hungary

540 **Analysis of Importance of Components in Power Systems using Time Sequential Simulation**
G. Vancells, S. Herraiz, J. Melendez
eXiT. Control Engineering and Intelligent Systems Research Group. Institute of Informatics and Applications. University of Girona. Spain

13:00 – 15:00 **Lunch "Silken Gran Hotel Domine"**

Thursday March 21th 2013
11:30-13:00 Special Oral Session C3 **ROOM C "Oteiza"**
Sustanaible Energy Mix & Net Zero Energy Building

Chairman: **Antonio Gagliano**

220 **Analysis of Constructive Technologies for improving Energy Performance of Buildings**
A. Gagliano, F. Nocera, F. Patania, A.Galesi, M. Detommaso
Department of Industrial Engineering, Engineering Faculty, University of Catania. Italy

292 **Evaluation of Renewable Energy Technologies in a net Zero Energy Office Building in Germany**
L. Spitalny(1), D. Unger(1), J. Maasmann(1), P. Schwerdt(2), B. Van Reeth(3), A. Thiemann(4), J.M.A. Myrzik(1)
1. Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund University. Germany
2. Fraunhofer Umsicht, Energy Efficiency Technologies, Oberhausen. Germany
3. Daikin Europe NV, Environment Research Center, Brussels. Belgium
4. TecneXum GmbH, ZEFFLE. Germany

355 **Design standards for residential N-ZEBs in mild Mediterranean climate**
G. Caruso(1), G. Evola(1), G. Margani(2), L. Marletta(1)
1. Department of Industrial Engineering, University of Catania. Italy
2. Department of Architecture, University of Catania. Italy

367 **Intelligent Management of Alternative Energy Sources Based on Fuzzy Logic**
Christian G. Quintero M., José Ledesma, Jamer R. Jimenez Mares
Department of Electrical and Electronic Engineering, Universidad del Norte. Colombia

377 **Integrated Gasification of Biomass Residues (IBGCC)**
Axel Kölling(1), Udo Hellwig(2), Mario Nowitzki, Nikolai Sachno, Lucca Viscuso(3)
1. ERK Eckrohrkessel GmbH. Berlin. Germany
2. University of Applied Science, Wildau. Germany
3. Le Mont-Kessel GmbH & Co. Wildau. Germany

514 **Energetic sustainability of the building substitution: the rewards and the facilitations of the Italian Piano Casa**
V. Sapienza(1), A. Gagliano(2), R. Chiaramonte(3)
1. Department of Architecture.DARC, University of Catania. Italy
2. DII, University of Catania. Italy
3 Professional engineer. Catania. Italy

13:00 – 15:00 **Lunch "Silken Gran Hotel Domine"**

Thursday March 21th 2013
15:00-15:45 Plenary Session PL5 **ROOM A "Mitxelena"**

Chairman: **Gianpaolo Vitale**

Linear Neural Networks applied to Power Converter and AC Electrical Drives
Maurizio Cirrincione. University of Tecnology of Belfort-Montbéliard. France

Thursday March 21th 2013
15:45-17:15 Special Oral Session A4 ROOM A "Mitxelena"
Power Quality and Renewable Energy-1

Chairman: **Peter Kadar**

442 **Modular Multilevel Converter Control Strategy with Fault Tolerance**
Remus Teodorescu(1), Emanuel-Petre Eni(1), Lazslo Mathe(1), Pedro Rodríguez(2)
1. Aalborg Universty.
2. Abengoa. Spain

449 **Comparative study of power transmission modelling in large scale AGC power system**
Elyas Rakhshani(1), Toni Mir Cantarellas(1), Pedro Rodriguez(1,2), Remus Teodorescuc(3)
1. ABENGOA Reseach. Spain
2. Technical University of Catalonia, Department of Electrical Engineering. Spain
3. Aalburg University. Department of Energy Technology. Denmark

456 **Control of an active filter based three level grid connected converter for wind turbine applications**
Antoni Mir Cantarellas(1), Cristian Sintamarean(2), Elyas Rakhshani(1), Pedro Rodriguez(1,3), Remus Teodorescub(2)
1. ABENGOA Research. Spain
2. Department of Energy Technology. Aalborg University. Denmark
3. Department of Electrical Engineering.Technical University of Catalonia. Barcelona. Spain

459 **A New, Ultra-Low-Cost Power Quality and Energy Measurement Technology –Bringing SmartGrid on the Factory and Automation Floor**
A. Alex McEachern, B.Andreas Eberhard
Power Standards Lab (US)

506 **A Computational Contribution to Analyse the Connection of Independent Power Producer at the Grid**
L. M. Peres(1), M. L. R. Chaves(1), G. C. Guimarães(1), F. A. M. Moura(2)
1. Universidade Federal de Uberlândia – UFU. School of Electrical Engineering. Brazil
2. Universidade Federal do Triângulo Mineiro, Department of Electrical Engineering Uberaba, MG. Brazil

582 **Influence of the Fictitious Grid on Flicker Assessment of Grid Connected Wind Turbines**
K. Redondo, A. Lazkano, P. Saiz, J.J. Gutierrez, I. Azcarate, L.A. Leturiondo
Department of Communications Engineering, University of the Basque Country UPV/EHU, Bilbao. Spain

Thursday March 21th 2013
15:45-17:15 Special Oral Session B4 **ROOM B "Baroja"**
Microgrids and Smart grids

Chairman: **Aurelian Craciunescu**

262 **Microgrid Protection: Technical challenges and existing techniques**
G. Buigues(1), A. Dyśko(2), V. Valverde(1), I. Zamora(1), E. Fernández(1)
1. Department of Electrical Engineering, Faculty of Engineering of Bilbao, UPV-EHU. Spain
2. Department of Electronic and Electrical Engineering, University of Strathclyde, Glasgow. United Kingdom

362 **Towards optimal post-fault self-healing in future smart distribution grids**
Florin Capitanescu, Ilya Bilibin, Juergen Sachau
Interdisciplinary Centre for Security, Reliability, and Trust (SnT), University of Luxembourg

363 **Power Quality improvement in LV smart grid by using the Open UPQC device**
G. Accetta(1), G. D'Antona(2), D. Della Giustina(1), R. Faranda(2)
1. A2A Reti Elettriche SpA. Brescia. Italy
2. Politecnico di Milano, Dipartimento di Energia. Milano. Italy

365 **Control and synchronization of microgrids in *d-q* frame**
E. Planas(1), A. Gil-de-Muro(2), J. Andreu(1), J. L. Martín(1), I. Kortabarria(1)
1. Apert Research Team, Department of Electronic Technology,University of the Basque Country, UPV/EHU. Bilbao. Spain
2. Tecnalia, Energy Unit, Parque Tecnológico de Bizkaia, Derio. Spain

403 **Design of a Virtual Power Plant in the presence of microrenewables and electric vehicles in a microgrid concept for real-time simulation as part of a Remote Lab**
C. S. Ioakimidis(1,2), K. N. Genikomsakis(2), A. Aragonés(1), A. Escuredo(1), F. Sánchez(1)
1. Department of Industrial Technologies, University of Deusto. Spain
2. Deusto Institute of Technology, DeustoTech Energy, University of Deusto. Spain

521 **Stability Analysis of Distributed Multi-Converter System**
M. Zadeh, M. Molinas
Department of Electrical Power Engineering, Norwegian University of Science and Technology-NTNU.Trondheim. Norway

Thursday March 21th 2013

15:45-17:15 Oral Session C4 **ROOM C "Oteiza"**

Standard Oral Session-1

Chairman: **Wolf-Gerrit Fruh**

211 **Modeling and Control of Micro Grid Powered by Maximum Power PV Array and Fixed Speed Wind Energy Conversion System**
M.M.A.Mahfouz(1) Mohamed A. H. El-Sayed(2)
1. Department of Electrical Power and Machines, Faculty of Engineering, Helwan University, Cairo. Egypt
2. College of Engineering and Petroleum, Kuwait University. Kuwait

212 **Research and development of a virtual instrument for measurement, analysis and monitoring of the Power Quality**
J.Esim(1), I.J. Oleagordia(1), S. Loureiro(2)
1. Departmemt of Electronic Technology
2. Department of Electrical Engineering. E.U.I.T.I of Bilbao, University of the Basque Country (UPV/EHU). Spain

223 **Heat Transfer Effects on Hydrogen Production by Steam Methane Reforming Process in a Packed bed Reactor**
Parham Sadooghi, Reinhard Rauch
Department of Chemical Engineering.Vienna University of Technology. Austria

247 **State and Prospects of Energy in Cuba**
Jose Antonio Suarez(1), Pedro Anibal Beatón(1), Ronoldis Faxas(1), Jose Luz Silveira(2), Ronney Mancebo Boloy(2)
1. Faculty of Mechanical Engineering, University of the Orient. Santiago de Cuba. Cuba.
2. Laboratório de Otimição de Sistemas Energéticos. Faculdade de Engenharia. Universidade Estadual Paulista. Brasil

295 **Simulation of Magnetizing Inrush Current of Three-Phase Three-Legged Transformers by Direct Measurement of Coils Inductance**
C. Sánchez-Martos(1), M. Gómez-González(2), F. Jurado(2)
1. Department of Electrical Engineering University of Jaén. Spain
2. Department of Electrical Engineering. EPS Linares. University of Jaén. Spain

555 **Case study of energy efficiency and electric power quality**
Caio Gomes de Oliveira, Fujio Sato, Ernesto Ruppert Filho, Marcio Massakiti Kubo
School of Electrical and Computer Engineering, Campinas State University (FEEC/UNICAMP).Brazil

Thursday March 21th 2013
17:15-18:00 Poster Session P4 – Coffee Break **Hall of Entry**

Chairmen: **Antônio Neto Piccinni, Kohei Nishida, Claudia Popescu, Jan Svec, Gergely György Balázs**

242 **An Efficient Fuzzy Logic Based Maximum Power Point Tracking Controller for Photovoltaic Systems**
Muhammad Sheraz, M.A.Abido
Department of Electrical Engineering
King Fahd University of Petrolium and Minerals Dhahran. Saudi Arabia

286 **Geothermal reservoirs: From vapour dominated to conductive systems**
M. R. Duque
Department of Physics of the University of Évora. Portugal

431 **Distributed Generation Penetration Impact on Distribution Networks Loss**
A. Sheikhi, A. Maani, F. Safe, A.M. Ranjbar
Department of Electrical Engineering, Sharif University of Technology, Tehran. Iran

433 **Cross-sectional temperature field of a solar collector's absorber in the case of annular pipe**
P.Shipkovs(1,2), G.Kashkarova(1), K.Lebedeva(1), M.Vanags(1), A.Snegirjovs(1,2), V.Barkans(1)
1. Energy Resources Laboratory. Institute of Physical Energetics, Riga. Latvia
2. Riga Technical University. Latvia

435 **A Review and Comparison of FACTS Optimal Placement for Solving Transmission System Issues**
A. Hernandez(1), M.A. Rodriguez(1), E. Torres(2), P. Eguia(2)
1. Department of Power Grid Automation – Power Electronics, Ingeteam Power Technology - Technology. Parque Tecnológico Bizkaia. Spain
2. Department of Electrical Engineering. E.T.S.I.-Bilbao, University of the Basque Country (UPV/EHU). Spain

436 **Testing and Validation of a 200 kVA SSSC Prototype for Power Flow Control**
A. Hernandez(1), M.A. Rodriguez(1), E. Torres(2), P. Eguia(2)
1. Dept. of Power Grid Automation – Power Electronics, Ingeteam Power Technology. Spain
2. Department of Electrical Engineering, E.T.S.I.-Bilbao, University of the Basque Country UPV/EHU. Spain

437 **i.Sare: The Future Grid**
Luis Galo Corzo(1), Ibon Cerro(1), Eneko Sansinenea(1), Giovanna Santamaría(1) Joseba Zubizarreta(2), Leire Arrizubieta(1)
1. Department of R&D. Jema Energy S.A. Spain
2. Department of Engineering. Jema Energy S.A. Spain

440 **Modelling solar data: reasons, main methods and applications**
M. de Simón-Martín(1), M. Díez-Mediavilla(2), C. Alonso-Tristán(2)
1. Department of Electrical Engineering and Systems and Automatics, E.I.I.I., León University. Spain
2. Department of Electromechanical Engineering, E.P.S., Burgos University. Spain

445 **Study of Dynamic Viscosity and Density of Aprotic Solvents for Lithium – ion Batteries**
M. Frk, J. Maca, Z. Rozsivalova
Department of Electrical and Electronic Technology, Brno University of Technology. Czech Republic

447 **Prospects of Solar Power Generation in Dry Regions: The case of Arar in KSA**
S.A. Sawallha(1), J.O. Jaber(2), T. Abu Mansour(1)
1. Faculty of Engineering, Northern Border University, Kingdom of Saudi Arabia
2. Faculty of Engineering Technology, Al-Balqa' Applied University, Amman. Jordan

450 **Application of a Hybrid Energy System Combining RES and H2 in an Office Building in Lavrion Greece**
I. Paspaliaris(1), M. Taxiarchou(1), A. Peppas(1), P.G. Benardos(1), S. Carosio(2), G. Urbano(2), A. Monero(2), R. De Laurentiis(2)
1. School of Mining and Metallurgical Engineering, Laboratory of Metallurgy National Technical University of Athens. Grecee
2. D'Appolonia S.p.A, Genoa. Italy

453 **Voltage collapse study using metaheuristic approach (Improved PSO)**
Taleb Chahrazed, Arif Salem
Laboratory of Analysis and Control Systems Energy and Power Systems LACoSERE. Electrical Engineering Department. University of Laghouat, Algeria

455 **Obtaining the characteristics curves of a photocell by different methods**
JA. Ramos Hernanz(1), JJ. Campayo(1), E. Zulueta(2), O. Barambones(2), P. Eguía(3) I. Zamora(3)
1. Department of Electrical Engineering, E.U.I., Vitoria-Gasteiz, University of the Basque Country Spain
2. Department of Systems Engineering and Automatic, E.U.I., Vitoria-Gasteiz, University of the Basque Country. Spain
3. Department of Electrical Engineering. E. T. S. de Ingeniería de Bilbao, University of the Basque Country. Spain

464 **Logic for Risk Assessment using Risk Matrix**
Ossama Y. Abul-Haggag, Walied Barakat
Cairo University, Faculty of Engineering- Electrical Power & Machines Department. Egypt

470 **Comparison of the Harmonic Distortion of Current Source and Voltage Source Inverters**
S. Köning, G. Herold
Electrical Energy Systems, University of Erlangen. Germany
University of Erlangen-Nuremberg

471 **Electric drives for light e-scooters**
P. Andrada, B. Blanqué, E. Martinez, M.Torrent, J.A. Sánchez, J.I. Perat
Electronically Commutated Drives Group (GAECE), Departament d'Enginyeria Elèctrica (DEE),
Escola Politècnica Superior d'Enginyeria de Vilanova i la Geltrú (EPSEVG).
Universitat Politècnica de Catalunya (UPC), BARCELONATECH. Spain

478 **Power electronics applied to voltage control in rural distribution networks with penetration of distributed generation**
J. Arrinda(1), J. A. Barrena(1), M. A. Rodriguez(2), S. Malo(2)
1. Department of Power Electronics of Mondragon Unibertsitatea. Gipuzkoa. Spain
2. Ingeteam, Parque Tecnologico Bizkaia. Spain

482 **Single or dual axis trackers, control systems and electric drive losses for photovoltaic applications**
S. Seme(1), G. Štumberger(2)
1. University of Maribor, Faculty of Energy Technology. Slovenia
2. University of Maribor, Faculty of Electrical Engineering and Computer Science. Slovenia

485 **Analysis of the Energy Quality in a Building Acclimated Through a System of Evaporative Cooling Operated by Frequency Converters**
Arnulfo Barroso de Vasconcellos(1), Douglas Pinto Sampaio Gomes(1),
Jéssica Romeiro de Carvalho(1), Manoel Alexandre de Oliveira(1),Teresa Irene Ribeiro de Carvalho Malheiro(2)
1. Federal University of Mato Grosso - UFMT. Brazil
2. Federal Institute of Education, Science and Technology of Mato Grosso – IFMT. Brazil

486 **Energy Efficiency and Power Quality in Low Income Consumer Units**
Arnulfo Barroso de Vasconcellos(1), Jéssica Romeiro de Carvalho(1), Manoel Alexandre de Oliveira(1), Douglas Pinto Sampaio Gomes(1) Teresa Irene Ribeiro de Carvalho Malheiro(2)
1. Federal University of Mato Grosso – UFMT. Brazil
2. Federal Institute of Education, Science and Technology of Mato Grosso-IFMT. Brazil

487 **Analisys of Energy Efficiency and Power Quality in Use of LEDs in Traffic Signaling System: The Case Study- Cuiabá- Mato Grosso**
Arnulfo Barroso de Vasconcellos(1), Jéssica Romeiro de Carvalho(1), Manoel Alexandre de Oliveira(1), Douglas Pinto Sampaio Gomes(1),Teresa Irene Ribeiro de Carvalho(2)
1. Federal University of Mato Grosso – UFMT. Brazil
2. Federal Institute of Education, Science and Technology of Energy Efficiency and Power Quality in Low Income Consumer Units Mato Grosso – IFMT. Brazil

493 **New Approach to Assess Unbalance and Harmonic Distortion in Power Systems**
Patricio Salmerón, Alejandro Pérez, Salvador P. Litrán
Department of Electrical Engineering. E.T.S.I., Huelva University. Spain

494 **Control strategy to improve the power factor with a hybrid filter**
Salvador P. Litrán, Patricio Salmerón, Alejandro Pérez Vallés
Departamento de Ingeniería Eléctrica y Térmica. Escuela Técnica Superior de Ingeniería, Huelva University. Spain

496 **Impact of Corrective Switching in Wind Farms Operation**
Manoel F. de Medeiros Júnior(1), Arrhenius V. da Costa Oliveira(2), Marcus V. Costa de Oliveira(2)
1. Department of Computer Engineering and Automation, Federal University of Rio Grande do Norte Brazil
2. Department of Electrical Engineering, Federal University of Rio Grande do Norte. Brazil

499 **Conducting Organic Polymers Modified by Incorporation of Semiconductor (POC/SM)-Synthesis and Electrochemical characterization of composite materials**
B. Nessark(1), S. Abaci(1), F. Habelhames(1), L. Lamiri(1), K. Lmimouni(2)
1. Laboratoire d'Electrochimie et Matériaux, Département de Génie des Procédés Faculté de Technologie, Université Ferhat-Abbas, Sétif
2. Université des Sciences et Technologies de Lille, IEMN-UMR CNRS. France

505 **Cooperative Voltage Control of Distributed Generation and Grid Connected Converter in DC Microgrid**
Jong-chan Choi(1), Ho-young Jeong(2), Dong-jun Won(1), Seon-ju Ahn(3), Seung-il Moon(2)
1. Department of Electrical Engineering, Inha University, Incheon. Korea South
2. Department of Electrical Engineering, Seoul National University. Korea South
3. Department of Electrical Engineering, Chonnam University, Gwangju. Korea South

592 **High efficiency Bridgeless Unity Power factor CUK converter Topology**
Aysha Kemaidesh AL-Kaabi(1), Abbas A. Fardoun(1), Essam H. Ismail(2)
1. Electrical Engineering Department, University of United Arab Emirates. UAE
2. Electrical Engineering Department, College of Technological Studies. Kuwait

Thursday March 21th 2013
18:00-19:45 Special Oral Session A5 **ROOM A "Mitxelena"**
Power Quality and Renewable Energy-2

Chairman: **Janis Kalnacs**

200 **Energy and exegy analysis of the ejector refrigeration cycle**
M.M. Rashidi , A. Aghagoli
Department of Mechanical Engineering, Faculty of Bu-Ali Sina University, Hamedan. Iran

240 **Electric Propulsion Applied for Research Vessel**
Nóbrega, Juraci(1,2), Dan, T.C(2), Rubanenco, I(2)
1. DEMEC - Mechanic Engineering Department, Pernambuco University Brazil
2. ANAST – Naval Architecture Research Unit., Liège University. Belgium

266 **Optimal Allocation and Planning of SVR on Distribution Network Under Demand Growth**
Ryo Watanabe, Yusuke Imanishi, Yusuke Hida, Yosuke Nakanishi, Ryuichi Yokoyama
Department of Environmental and Energy Engineering ,Waseda University,Tokyo. Japan

369 **A laboratory evaluation of the effectiveness of voltage unbalance factor of opposite temperature analysis of a three-phase induction motor**
M. L. S. de Almeida, J. A. A. Cormane, A. L. Ferreira Filho
Department of Electrical Engineering UnB, Brasília University. Brazil

372 **Comparative Evaluation between Theoretical Models for Three-Phase Induction Motor under Voltage Unbalance**
D. L. R. Hollanda(1), M. L. S. de Almeida(1), A. L. Ferreira Filho(1), A. Goedtel(2)
1. Department of Electrical Engineering, UnB, Brasília University. Brazil
2. Centro Integrado de Pesquisa em Controle e Automação, UTFPR, Universidade Tecnológica Federal do Paraná. Brazil

411 **Comparative study of calorific value of rapeseed, soybean, jatropha curcas and crambe biodiesel**
Oliveira L. E., Da Silva M. L. C. P.
Department of Chemical Engineering, EEL-USP, University of São Paulo. Brazil

576 **Reduction of Zero Sequence Components in Three-Phase Transformerless Multiterminal DC-link based on Voltage Source Converters**
M. Nieves-Portana, M. Barragan-Villarejo, J.M. Maza-Ortega, J.M. Mauricio-Ferramola
Departamento de Ingeniería Eléctrica, Universidad de Sevilla. Spain

21:00 **Conference Dinner** (Optinal) **Hotel Carlton**

Thursday March 21th 2013

18:00-19:45 Oral Session B5 **ROOM B "Baroja"**

Standard Oral Sesión-2

Chairman: **Gorazd Stumberger**

248 **Active Earthing system for MV networks**
F.J. Pazos(1), A. Amezua(2), I. Gutierrez(2), J.M.Garcia(3), R.Toledo(3), G. Buigues(4), V. Valverde(4)
1. Iberdrola Distribución Eléctrica, S.A.U. Bilbao. Spain
2. Ormazabal. Igorre. Spain
3. Ingeteam Power Technology, S.A.Parque Tecnológico de Bizkaia, Zamudio. Spain
4. Faculty of Engineering of Bilbao, UPV/EHU. Bilbao. Spain

428 **Optimization of Biodiesel Production Process for Homogeneous Catalysis from Used Cooking Oil**
C. Guerrero(1) J. Parra(2), F. Sierra(3)
1. Chemical Engineering and Mechanical, Master in Environmental Engineering PhD in Chemical Engineering. Associate Professor, Universidad Nacional de Colombia.
2. Chemical Engineering (C), Universidad Nacional de Colombia
3. Doctor of Engineering, Universidad de Kassel. Associate Professor, Universidad Nacional de Colombia.

460 **On the Possibility of Using CHP from a 1.4 MW Direct Fuel Cell at Kettering University Engineering Building – A Demonstration Study**
Etim U. Ubong(1), Uwem Ubong(2), Vipul Laddha(1), Pouyan Pourmovahed(1)
1. Mechanical Engineering Department, Center of Fuel Cell Research & Powertrain Integration, Flint, MI. USA
2. Department of Environmental Chemistry, University Of Technology, A´Ibom State Uyo. Nigeria

461 **Combined Heat and Power (CHP) studies at the Flint Bio-Gas Complex Using a 1.4 MW Direct Fuel Cell – A Demonstration Study**
Etim U. Ubong(1), Uwem Ubong(2), 1Vipul Laddha(1), Pouyan Pourmovahed(1)
1. Mechanical Engineering Department, Center of Fuel Cell Research & Powertrain Integration, Flint, MI. USA
2. Department of Environmental Chemistry, University Of Technology, A´Ibom State Uyo. Nigeria

491 **Finite Element Analysis of a Three Speed Induction Machine**
L. Melcescu(1), T. Tudorache(1), M. Popescu(2),
1. University POLITEHNICA of Bucharest, Electrical Engineering Faculty, Electrical Machines Bucharest. Romania
2. National Institute for R&D in Electrical Engineering (ICPE-CA), Bucharest. Romania

565 **Design of Reactive Power Compensation Devices on the Base of Dynamical Simulation of Steelmaking Process**
A. Novitskiy, I. Konotop, D. Westermann
Department of Power Systems, Faculty of Electrical Engineering and Information Technology. Ilmenau University of Technology. Germany

600 **Appropriate methods to analyse power conversion harmonics**
P. Verzele, J. Knockaert, J. Desmet
Technical University College Howest, Gent University. Belgium

21:00 **Conference Dinner** (Optinal) **Hotel Carlton**

Thursday March 21th 2013
18:00-19:45 Oral Session C5 **ROOM C "Oteiza"**
Standard Oral Sesión-3

Chairman: **Dorina Ionescu**

201 **Role of Policies on Economic Feasibility of PV Projects**
M. H. Albadi, A. H. Al-Badi, A. S. Malik, A. M. Al-Lawati
Department of Electrical & Computer Engineering. Sultan Qaboos University. Sultanate of Oman

260 **On mesh sensitive calculations in 3D finite element modeling of electric machines**
Robert Kaczmarek(1), Pau Masgrau(2), Mehdi Saheli(3)
1. Department of Power & Energy Systems SUPELEC, Ecole Supérieure d'Électricité. France
2. POLYLUX S.L. Cerdanyola del Vallès. Spain
3. RENAULT / DELT'A/ Service Conception & Ingénierie Numérique. France

322 **An overview of renewable energy technologies and hydrogen economy**
Kary Thanapalan(1,2), Fan Zhang(2), Stephen Carr(2), Giuliano Premier(1,2) Alan Guwy(2), Jon Maddy(2)
1. Sustainable Environment Research Centre (SERC).Faculty of Advanced Technology University of Glamorgan. United Kingdom
2. Sustainable Environment Research Centre (SERC). Renewable Hydrogen Research & Demonstration Centre. University of Glamorgan. United Kingdom

323 **Investment Scenarios for Low Carbon Electricity in Europe**
B. Shoai Tehrani(1), P. da Costa(2)
1. Institut de Technico-Economie des Systèmes Energétiques, CEA Saclay, DEN/DANS/I-tésé and Laboratoire de Génie Industriel/ épocc, Ecole Centrale Paris. France.
2. Laboratoire de Génie Industriel / épocc, Ecole Centrale Paris. France

430 **Financial Analysis for a Multi-Carrier Energy System Equipped with CCHP**
A. Sheikhi(1),Sh. Bahrami(1) A.M. Ranjbar(1), S. Sattari(2), M. Adami(1)
1. Department of Electrical Engineering**,** Sharif University of Technology, Tehran. Iran
2. Department of Energy, Sharif University of Technology,Tehran. Iran

454 **Field Measurement Based PLS Model for Dynamic Rating of Overhead Lines in Wind Intensive Areas**
Sobhy M. Abdelkader, D. John Morrow, Jiao Fu, Stephen Abbot
School of Electronics, Electrical Engineering & Computer Science, Queen's University Belfast. United Kingdom

479 **PMSGs Solutions for Gearless Wind Conversion Systems with Battery Storage**
T. Tudorache(1), L. Melcescu(1), M. Popescu(2)
1. University POLITEHNICA of Bucharest, Electrical Engineering Faculty, Electrical Machines Romania
2. National Institute for R&D in Electrical Engineering (ICPE-CA), Bucharest. Romania

21:00 **Conference Dinner** (Optinal) **Hotel Carlton**

Friday March 22th 2013

9:15-10:00 Plenary Session PL6 — ROOM A "Mitxelena"

Chairman: **Carlos Redondo Gil**

Grid integration of offshore wind farms using HVDC links: HVDC-VSC Technology overview
Salvador Ceballos. Tecnalia Research & Innovation

Friday March 22th 2013
10:00-10:45 Poster Session P5 – Coffee Break — Hall of Entry

Chairmen: **Jan Iwaszkiewicz, Leszek Wolski, Mª. Rosa Alves Duque, Etim Ubong, Dario Zaninelli**

509 **Voltage Balance Monitoring Based on Voltage's Instantaneous Space Phasor Geometrical Loci**
Aurelian Crăciunescu(1), Gloria Ciumbulea(1), Cătălina Necula Dumitrică(2), Mihai Predescu(3)
1. Electrical Engineering Faculty,University *Politehnica* of Bucharest. Romania
2. Universitatea Valahia din Târgoviste, Facultatea de Ingenerie Electrică. Romania
3. Aeolus Energy International SRL. Romania

512 **Implementation of a controller for a static VAr compensator in large industrial networks**
Lj. Spasojević, I. Papič, B. Blažič
Faculty for Electrical Engineering, University of Ljubljana. Slovenia

518 **Oscillating rotary electrical machine for Stirling cycle heat pump and other devices of renewable energy**
S. Kudarauskas(1), J. Ulbikas(2), T. Razvanovičius(1)
1. Applied Research Institute for Prospective Technologies "ProTech". Vilnius. Lithuania
2. JSC "EuropaParama". Vilnius. Lithuania

520 **Effects of geometries on flow characteristics and reforming performance of a steam-methane reformer**
J. S. Lee(1), J. Seo(1), H. Y. Kim(1), S. Park(1), Y.Lee(2)
1. School of Mechanical Engineering, Korea University
2. Energy Efficiency Research Centre, Korea Institute of Energy Research. Korea

522 **Predictive Maintenance for intensive energy consuming plants, serviced by under-qualified staff. Case study**
Dorina Ionescu
Department of Mechanical Engineering Technology
Faculty of Engineering and Built Environment, University of Johannesburg .South Africa

525 **Content and Properties of Mechanically Sorted Municipal Wastes and Their Suitability for Production of Alternative Fuel**
J.Kalnacs(1), D.Arina(2), A.Murashov(1)
1. State Research Institute, Institute of Physical Energetics in Latvia
2. Latvia University of Agriculture. Latvia

529 **The impact of feeders in closed-loop arrangement on harmonic distortion and power losses**
K. Deželak(1), M. Rošer(2),R. Škof(2), T. Kastelic(3), G. Štumberger(1)
1. University of Maribor, Faculty of Electrical Engineering and Computer Science. Slovenia
2. Elektro Celje d.d. Slovenia
3. Elektro Primorska d.d. Slovenia

532 **Computational Performance Analysis of an Electromagnetic Dynamic Voltage Restorer: Physical Conception and Operational Approaches**
T. V. da Silva, F. P. Santilio, L. E. Vasconcelos, J. C. Oliveira
Department of Electrical Engineering, Federal University of Uberlândia. Brazil

544 **Rural Smart Grids: planning, operation and control**
I. Zubia, I. Arrambide, O.Azurza, P.M. García, J.J. Ugartemendia
Department of Electrical Engineering. UPV/EHU University of the Basque Country. Donostia-San Sebastián. Spain

545 **A real site application of a diagnose method at Estimating Insulated Cables Degradation using Non Linearity Indicators**
L. N. Velasco(1), A. Reis(1), J. C. Oliveira(1), L. C. G. Freitas(1), A. P. Finazzi(2), F. N. Lima(2), H.C. Martins(3), W. J. Araújo(3), J. M. Borges(3)
1. Federal University of Uberlândia (UFU), Faculty of Electrical Engineering – Uberlândia. Brazil
2. Federal University of Mato Grosso (UFMT), Electrical Engineering Department – Cuiabá. Brazil
3. Companhia Energética de Minas Gerais (CEMIG) – Belo Horizonte. Brazil

546 **Medium-voltage distribution feeders in closed-loop arrangement – neutral point grounding**
G. Štumberger(1), K. Deželak(1), M. Rošer(2), R. Škof(2), T. Kastelic(3)
1. University of Maribor, Faculty of Electrical Engineering and Computer Science. Slovenia
2. Elektro Celje d.d. Slovenia
3. Elektro Primorska d.d. Nova Gorica. Slovenia

548 **Power Flow Analysis of Distribution Systems with Large-Scale Wind and Conventional Energy Generation**
A. González(2), A. Madrazo(1), R. Robles(1), R. Domingo(1), M. Mañana(1), A. Arroyo(1), M.A.Cavia(1)
1. Department of Electrical and Energy Engineering, University of Cantabria, Santander. Spain
2. E.On Distribución, S.L. Santander

549 **Increasing Grid Integration of Wind Energy by using Ampacity Techniques**
A. Madrazo(1), A. González(2), R. Martínez(1), M. Mañana(1), E. Hervás(1), A. Arroyo(1), P.B. Castro(1), D. Silió(1)
1. Department of Electrical and Energy Engineering, University of Cantabria, Santande. Spain
2. E.On Distribución, S.L.Santander. Spain

551 **Review of electrical energy storage technologies for wind energy**
A.Berboucha, K.Djermouni ,K.Ghedamsi, D.Aouzellag
Laboratoire de Maitrise des Énergies Renouvelables, Université de Bejaia. France

552 **Small wind in urban sectors.Review of literature and dynamic model implementation**
Olatz Azurza, Pedro María García, Vicente Moreno, Julián Molina, Itziar Zubia
Department of Electrical Engineering. EUPD, University of the Basque Country, Donostia-San Sebastián. Spain

553 **Harmonic Distortion Index for Stationary and Transient States**
M.D. Borrás(1), A. López(2), J.C. Bravo(1), J.C. Montaño(2)
1. Department of Electrical Engineering. E.P.S., University of Seville. Spain
2. Department of Electronic Tecnology. E.P.S., University of Seville. Spain

558 **Developing a Supervisory Controller for Hybrid Power System: Fernando de Noronha Island Case**
Pedro Rosas(1), Caarem Studzinski, Vicente Simoni, Francisco Neves, Alécio Fernandes, Luiz H. A. Medeiros, Fabricio Bradaschia, Gustavo Azevedo, Felipe Guimaraes, Jimens Lima, André Victor, Lucas Cabral, Jose Arimateia, Carlos Soares(2)
1. Department of Electrical Engineering. Federal University of Pernambuco. Brazil
2. Companhia Energética de Pernambuco CELPE. Av. Joao de Barros, Recife, PE, Brazil

561 **Computational Assessment of Control Strategy for PMSG Wind Turbines aiming at Voltage Regulation on Connection Point**
A. Reis, L.N. Velasco J. C. Oliveira
Department of Electrical Engineering, Federal University of Uberlândia. Brazil

564 **Fluid-thermal analysis of the cooling capacity of a commercial natural ester in a power transformer**
Fernando Delgado(1), Inmaculada Fernández(1), Domingo Urquiza(2), Bekir Mumyakmaz(3), Abdurrahman Unsal(3)
1. Department of Electrical and Energy Engineering. E.T.S.I. Industriales y de Telecomunicación, Cantabria University, Santander. Spain
2. CEIS. Centro de Ensayos, Innovación y Servicios, Móstoles. Spain
3. Department of Electrical and Electronics Engineering, Dumlupinar University. Turkey

566 **Filtering Tecnniques: An historical overview and summary of current status**
J. Lazaro(2), J.F. Miñambres(1), M.A. Zorrozua(1)
1. Department of Electrical Engineering
2. Department of Applied Mathematics. E.T.S.I., Basque Country University (UPV/EHU), Bilbao. Spain

567 **Guide Vanes for Darreus Water Turbine in Tidal Current**
Koju Hiraki(1), Kohei Nishida(1),Ryo Wakita(1),Manabu Takao(2), Toshiaki Watanabe(3)
1. Kyushu Institute of Technology. Japan
2. Matsue College of Technology. Japan
3. National Fisheries University. Japan

572 **Influence of flux estimation in performance of direct torque control of PMSM**
P. Fernández(1), J. A. Güemes(2), A. Iraolagoitia(2)
1. Department of Electronics and Telecommunications
2. Department of Electrical Engineering. University of the Basque Country (EUITI), Bilbao. Spain

575 **New trends in datacenter energy efficiency: beyond PUE**
Redondo Gil, C.(1,2), Ruiz- Falco, A. (1,3), Martínez, J.M.(1)
1. Castile and León Technological Center for Supercomputing (FCSCL). University of León. Spain
2. Electrical Engineering & Systems Engineering and Automatic Control Department, Faculty of Industrial and Computer Engineering, University of León. Spain
3. Catón, S.L. Granada. Spain

584 **Load Dispatch and Replacing Diesel by Gas Power Plant to Reduce Production Cost of Power Generation in Bali Island**
IAD Giriantari, WG.Ariastina
Department of Electrical Engineering, Udayana University, Bali. Indonesia

589 **Strategic Quality Control Measures to Reduce Defects in Composite Wind Turbine Blades**
U.I.K. Galappaththi(1), A.M. De Silva(1), Milos Draskovic(2), M Macdonald(1),
1. School of Engineering and Built Environment, Glasgow Caledonian University, Glasgow, UK
2. Institute of Aircraft Design, University of Stuttgart, Germany

591 **Design and installation of a novel multi-point measurement system for a renewable energy grid**
J. Bruna(1), J.J. Melero(1), D. Cervero(1), R. Caballero(2), J. Díaz de Aguilar(2), M. Neira(2)
1. CIRCE- University of Zaragoza. Spain
2. CEM (Centro Español de Metrología). Madrid. Spain

Friday March 22th 2013
10:45-12:15 Special Oral Session A6 ROOM A "Mitxelena"
Power Electronics for Renewable Energy Systems

Chairman: **Mario J. Durán Martínez**

333 **Design and Simulation of A Single Current Sensor Maximum Power Point Tracker for Solar Hydrogen System**
F. Zhang(1), S. Carr(1), K. Thanapalan(1,2), J. Maddy(1), A. Guwy(1)
1. Sustainable Environment Research Centre (SERC) Renewable Hydrogen Research and Demonstration Centre.University of Glamorgan. United Kingdom
2. Sustainable Environment Research Centre. Faculty of Advanced Technology, University of Glamorgan. United Kingdom

396 **Overview of DC technology. Energy conversion**
O. Oñederra, H. Odriozola, E. Planas, I. López, V. López
Department of Electronics Technology, University of the Basque Country, Bilbao. Spain

442 **Modular Multilevel Converter Control Strategy with Fault Tolerance**
Remus Teodorescu(1), Emanuel-Petre Eni(1), Lazslo Mathe(1), Pedro Rodríguez(2)
1. Aalborg Universty.
2. Abengoa. Spain

528 **Development of a new mixed 5-level inverter for 3 kW household photovoltaic applications**
A. Caldeira, S. Jacques, A. Schellmanns, J.-C. Lebunetel, N. Batut, L. Gonthier
GREMAN – UMR-CNRS 7347, University of Tours. France

578 ***Limit Cycle Oscillation Analysis on the Design of Wind Power Harvester with Fluttering Aerofoil***
C. P. Pagwiwoko
Department of Mechanical, Materials and Manufacturing Engineering .Faculty of Engineering. University of Nottingham Malaysia Campus

579 **Efficiency Comparison of Grid Side Converters for DC Distribution Systems**
M. C. Di Piazza, G. Vitale
Consiglio Nazionale delle Ricerche, CNR – ISSIA UOS Palermo. Italy

Friday March 22th 2013
10:45-12:15 Special Oral Session B6 ROOM B "Baroja"
Ocean Energy & Strategic Energy Planning

Chairman: **Roberto Cesar Betini**

249 **Energy savings in HVAC systems by continuous monitoring. Results of a long term monitoring campaign on buildings**
J.Toniolo, C.Silvi, M. Masoero
Department of Energy, DENERG. Politecnico di Torino. Italy

299 **Marine Current Turbines and Generator preference. A technology review**
Astrid Røkke, Robert Nilssen
Department of Electric Power Engineering, Norwegian University of Science and Technology Trondheim. Norway

348 **A breaker-zone wave energy converter**
M. Negri, F. Clerici, S.Malavasi
D.I.I.A.R. Politecnico Di Milano. Italy

480 **Energy Simulation of Marine Currents through Wind Tunnel with use of Electromagnetic Brake**
Aldo A. Belardi, Antônio H. Piccinini
Department of Electrical Engineering.Centro Universitário da FEI São Bernardo do Campo. Brazil

498 **New algorithms for estimating the impact of wind turbines on telecommunication services**
I. Cascón(1), J. Cañizo(1), I. Angulo(1), D. de la Vega(1), D. Guerra(1), Y. Wu(2), A. Arrinda(1), I. Fernández(1), P. Angueira(1)
1. Department of Communications Engineering. ETSI Bilbao, University of the Basque Country (UPV/EHU). Spain
2. Communications Research Centre, Ottawa. Canada

515 **Fluid Structure Interaction of a loaded Darrieus Marine Current Turbine**
M. Belhache(1), S. Guillou(1), P. Grangeret(1), A. Santa-Cruz(1), F. Bellanger(2)
1. Laboratoire Universitaire des Sciences Appliquées de Cherbourg. France
2. IUT de Cherbourg-Octeville

Friday March 22th 2013

10:45-12:15 Oral Session C6 **ROOM C "Oteiza"**

Standard Oral Sesión-4

Chairman: **Masakazu Kato**

330 **Interaction of fault ride through requirements and loss of mains protection**
O. Raipala, A. S. Mäkinen, S. Repo, P. Järventausta
Department of Electrical Energy Engineering Tampere University of Technology. Finland

353 **Review of Modulation Algorithms for Neutral-Point-Clamped Multilevel Converter**
I. López(1), S. Ceballos(2), J. Andreu(1), I. Martínez de Alegría(1), I. Kortabarria(1)
1 Department of Electronic Technology.University of the Basque Country UPV/EHU, Bilbao. Spain
2. Energy Unit, Tecnalia, Parque Tecnológico de Bizkaia. Derio. Spain

388 **An overview of ultracapacitors applicability in high power applications**
V.M. López(1), J.L. Martin(1), I. Martínez de Alegría(1), O. Oñederra(1), H. Ibaiondo(2)
1. Department of Electronics Technology, Faculty of Engineering, University of the Basque Country (UPV/EHU) Bilbao. Spain
2. Ingeteam Power Technology S.A. Spain

402 **A Virtual Power Plant with the use of the Energy Box in a Smart Grid concept**
C. S. Ioakimidis(1,2,3), L. Oliveira(2),K.N. Genikomsakis(1), P. Ryserski(1)
1. Deusto Institute of Technology, DeustoTech Energy.University of Deusto. Spain
2. Department of Mechanical Engineering (IN+) Instituto Superior Tecnico (IST/UTL).Lisbon. Portugal
3. MIT Energy Initiative. Massachusetts Institute of Technology (MIT) Cambridge. USA

404 **Wind Power and Electricity Consumption Forecasting on a Smart House Location**
H. Eliasstam(1), K. N. Genikomsakis(2), C. S. Ioakimidis(2)
1. Department of Applied Physics and Electrical Engineering, Linköping University. Sweden
2. Deusto Institute of Technology, DeustoTech Energy, University of Deusto. Spain

446 **Test rig for stand-alone small power wind turbine emulation for variable wind and load**
C. Vlad, A. Burlibaşa, T. Munteanu, G. Gurguiatu, M. Barbu
Automatic Control and Electrical Engineering Department, Faculty of Automatic control, Computers, Electrical Engineering and Electronics "Dunărea de Jos" University of Galaţi. Romania

Friday March 22th 2013

12:15-13:00 CLOSING SESSION **ROOM A "Mitxelena"**

Conclusions and time for the next conference (ICREPQ'14)
Adwards for the three best posters

13:00 – 15:00 **Farewell Lunch "Silken Gran Hotel Domine"**

Friday March 22th 2013

15:00-18:00 EXCURSION FOR TO VISIT THE CENTRE OF BILBAO