

IEEE PES T&D LA 2012

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 MONTEVIDEO URUGUAY



SERRA DE
LOS CARACOLAS
MALDONADO
URUGUAY



Power Engineering Society and Uruguay Section
Joint PES / I&M Uruguay Chapter



PROCEEDINGS OF THE:

2012 Sixth IEEE/PES Transmission and Distribution: Latin America Conference and Exposition (T&D-LA)

Date: September 3-5, 2012

Location: Radisson Montevideo Victoria Plaza Hotel & Conference
Centre, MONTEVIDEO URUGUAY

Web Site: <http://www.ieee-tdla.org/>
Contact: info@ieee-tdla.org

ISBN 978-1-4673-2671-1
IEEE Catalog Number: CFP12TLA-CDR
Conference Record Number: 19779
Copyright ©2012

COPYRIGHT NOTICE:

2012 Sixth IEEE/PES Transmission and Distribution: Latin America Conference and Exposition (T&D-LA)

Copyright and Reprint Permission: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved. Copyright ©2012 by IEEE.

ISBN 978-1-4673-2671-1

IEEE Catalog Number: CFP12TLA-ART

Conference Record Number: 19779

For additional copies of this publication contact: info@ieee-tdla.org

Sexta Conferencia y Exposición Latinoamericana de Transmisión y Distribución de energía eléctrica, IEEE/PES 2012.

Derechos reservados. ©2012 IEEE

**SIEMENS****TEYMA**

WELCOME MESSAGE

Dear IEEE colleagues, Engineers, members of the Latin American power and energy community, it is a big pleasure to welcome you to our

2012 Sixth IEEE PES Transmission and Distribution Conference and Exposition Latin America.

The T&D LA 2012 is being jointly cosponsored by the IEEE Power and Energy Society and the IEEE Uruguay Section, and was organized by the volunteer Members of the joint PES-I&M Power and Instrumentation and Measurements Chapter of the IEEE Uruguay.

This is the sixth time we meet together for this Conferences, the first ones were held in 2002 and 2004 in Sao Paulo. Caracas, and Bogota were the next hosting cities, and in 2010 it went back to Sao Paulo. Now, for the first time in Uruguay we are proud to host an IEEE Conference of major significance.

Mounting Energy Prices make the growth of our Latin American difficult. The sustainable development is a big technical challenge we Engineers have to solve. There is consensus that renewable energies are becoming increasingly more important in electric power generation and they are being a significant part of our Energy Matrix, bringing new challenges for the management and dispatch of generation resources in the system and for the grid operation. Recognizing this context we proposed "Renewable Energies in a Developing Continent" as the theme of this Conference, and your presence confirms the need and interest to study and solve the issue.

We look forward to a joint meeting of academia, power utilities, industry, technology providers, consultants, and government officials for a stimulating and motivating conference. Keynote lectures by distinguished professors will initiate the sessions; papers with new research, recent technologies from the learned academia, industry experiences and education will be presented in oral and poster sessions.

We are very pleased with the positive response received to our call for papers. The conference secretariat received over 280 proposals which were carefully peer-reviewed by the international panel of distinguished professionals that formed our technical Committee.

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

In addition to the accepted papers from Uruguay and our neighbor countries Argentine and Brazil, dozens of papers from other countries, specially from Colombia, Chile, Ecuador, Mexico, Costa Rica, U.S.A., Canada, Germany, Jordan, China, India just to mention a few of them.

It is stricit justice to mention the labor of the technical Committee, the support from the University and the reviewers whose disinterested work results in the technical quality of the Conference, this is our contribution to the search for "Excellence for the Benefit of the Humanity" that is our goal and guidance in the IEEE.

We also hope that you find the opportunities for meeting friends and colleagues, and the hospitality of our country will make your stay pleasant and fruitful.

We extend our thanks to the Government of Uruguay for recognizing the importance of this Conference, to the Presidency and its Ministries of Industry and Energy and Tourism.

We also want to express our thanks to the Industry, to the patrons of the Conference, which with their contributions have made possible the organization of this event.

And a very special mention to the electric Utility UTE (Usinas y Trasmisiones Electricas) for their significant support, and also for celebrating their 100 Anniversary this year. It's has been a century providing electrical Energy for the development of Uruguay.

On behalf of the organizing committee of T&D LA 2012, its a pleasure and an honor to welcome you to our country and our Conference, and we sincerely hope it will be a rewarding experience for all.

Juan Carlos Miguez, General Chair T&D LA 2012 Montevideo, Uruguay



DECLARADA DE INTERES NACIONAL
POR LA PRESIDENCIA DE LA REPUBLICA



DECLARADA DE INTERES MINISTERIAL
POR EL MINISTERIO DE INDUSTRIA, ENERGIA Y MINERIA



DECLARADA DE INTERES TURISTICO
POR EL MINISTERIO DE TURISMO Y DEPORTE

TEMATICA:

- *Sistemas SCADA, estándares IEC 60850 y 61850*
- *Vehículos eléctricos: su integración e impacto en la red*
 - *Energía y medio ambiente*
- *Eficiencia energética, gestión de la energía, estándar ISO 50001*
 - *Mercados energéticos e integración regional*
- *Almacenamiento de energía, centrales de bombeo y baterías*
- *Medición, monitoreo y visualización de sistemas de potencia*
- *Operación, mantenimiento, gestión de activos y monitoreo de condición*
- *Protección y control de sistemas con integración de energías renovables*
- *Protección y Control de sistemas eléctricos con integración de energías renovables*
 - *Planificación, simulación y modelado de energías renovables*
 - *Energía Solar, biomasa, maremotriz y cogeneración*
 - *Integración eólica con recursos hidroeléctricos*

TOPICS:

- Communications SCADA, IEC 60850-5-101 and IEC 61850, cyber security in distributed generation and development of standards
 - Electric vehicles, their integration into the grid and their impacts
 - Energy and environment
- Energy management systems and the future ISO 50001 standard for energy management
 - Energy Market and regional integration
- Energy storage systems, including pumped storage, batteries and flywheels
 - Measurement, monitoring and visualization of power systems
- Operations and maintenance, asset management and condition monitoring
- Protection and control of systems with the integrated new renewable resources
 - Renewable planning, modeling and simulation
 - Solar energy, biomass generation, tidal power and co-generation
 - Wind turbines and wind/hydro resource integration

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

COMMITTEE:

Conference Chair

Juan Carlos Miguez, IEEE Region 9

Conference Vice Chair

Prof. Ruben Chaer, UDELAR and IEEE PES Chair
Uruguay

Technical Program Chair

Dr. Daniel Slomovitz, UTE and IEEE PES Uruguay

Special Technical Chairs

Prof. Hugh Rudnick, University of Chile.
Prof. George Gross, University of Illinois

Finance Chair

Marisa León, ADME and IEEE PES Uruguay

Technical Secretariat

Andres Cardozo, Laboratorio de UTE
Gonzalo Aristoy, Laboratorio de UTE
Maria Ines Camacho, Laboratorio de UTE

Publication Chair

Pablo Thomasset, UTE and IEEE PES Uruguay

Technical Committee

Álvaro Giusto, IIE-FING-UDELAR, Uruguay
Álvaro Portillo, Consultor, Uruguay
Ángela Cadena PhD Universidad de los Andes Mercados
Dr Luis Ochoa, University of Manchester
Dr Rodolfo Garcia Colon, Mexico

Eduardo Caicedo PhD Universidad del Valle
Eduardo Orduña, Universidad Nacional de San Juan
Emilio Barocio, PhD, Universidad de Guadalajara
Enzo Coppes, IIE-FING-UDELAR, Uruguay
Estrella Parra MSc Universidad Nacional

Fernando Augusto Moreira Ph.D., University of Bahia
Glauro N. Taranto, COPPE/UFRJ -BRASIL
Gonzalo Casaravilla, IIE-FING-UDELAR, Uruguay
Herivelto de Souza Bronzeado, Ministério da Integração
Nacional - BRASIL
Javier Rosero PhD Universidad Nacional

Jorge Vidart, TILSOR S.A.
Juan Carlos Gomez, Univ. de Rio Cuarto, Argentina
Luiz Augusto Barroso, PSR - BRASIL
Marcelo Castelli, Universidad de Montevideo
Marcos Andrade, Universidad de Montevideo
Mario Ríos PhD, Universidad de los Andes
Michel Artenstein IIE-FING-UDELAR, Uruguay
Nelson M Segoshi, IEEE/PES Regional 9, Latin America
Rafael Hirsch, IIE-FING-UDELAR, Uruguay

Renato Cespedes PhD, Universidad Nacional Redes

Tomás Di Lavello, IIE-FING-UDELAR, Uruguay
Virginia Echinope, IIE-FING-UDELAR, Uruguay

TECHNICAL TOURS:

Three technical tours have been organised:

Technical Tour 1:

UTE Parque Eólico Sierra de los Caracoles + Punta del Este

(Wind Farm 10 x 20 MW)

Date: Thursday, 5th at 9:00AM

Aprox. duration: 7 hours

Cost: U\$ 70.

Minimum: 10 persons

*Incluye: traslado ida y vuelta con espera, paseo guiado por Punta del Este.
Almuerzo (entrada, plato, postre y agua), desde USD 45 por persona, adicionales.*

Includes: round trip transportation, guided tour of Punta del Este.
Lunch (appetizer, main course, dessert and water), from US\$ 45 per person extra.

Technical Tour 2:

UTE - Central Termica Punta del Tigre

(Gas Thermal Power Plant)

Date: Thursday, 5th at 9:00AM

Aprox. duration: 4 hours

Cost: U\$ 30.

Minimum: 10 persons

Technical Tour 3:

UTE - Despacho Nacional de Carga en Melilla

(National Load Dispatch Center in Melilla)

Date: Thursday, 5th at 02:00PM

Aprox. duration: 3 hours

Cost: U\$ 25.

Minimum: 10 persons

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

CONFERENCE LOCATION:

Radisson Montevideo Victoria Plaza Hotel & Conference Centre.

Plaza Independencia 759

Montevideo - Uruguay

ZIP CODE 11100

Telephone: +598-2-902-0111 Fax: +598-2-902-1628

LOCATION MAP:



CONFERENCE ROOMS:

The Opening/Closing Ceremony and Plenary Sessions (LECTURES) will be held in the **Conference Room** at the 4th Floor (Sala de Conferencias en el 4to Piso).

The Oral Sessions will be held in the Conference Room at the 4th Floor (Sala de Conferencias en el 4to Piso), and **Cezanne, Gauguin and Renoir Room**.

The Poster Sessions will be at the **Picasso Room** at the 4 Floor (Sala Picasso, 4to piso).

The Tutorials, Set 5, will be held in the **Conference Room** at the 4th Floor (Sala de Conferencias en el 4to Piso).

CONFERENCE ROOMS PLANS: 4th FLOOR



RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

CONFERENCE PROGRAM AT A GLANCE:

	Monday, 3rd	Tuesday, 4th	Wednesday, 5th		
8:00	Registration				
8:15					
8:30					
8:45					
9:00		Opening	Keynote: Hugh Rudnick	Parallel Oral Sessions	Tutorial
9:15					
9:30					
9:45					
10:00	Parallel Oral Sessions				
10:15					
10:30					
10:45					
11:00	Keynote: George Gross		Parallel Oral Sessions	Tutorial	
11:15					
11:30					
11:45					
12:00		Parallel Oral Sessions			
12:15					
12:30					
12:45					
13:00					
13:15					
13:30					
13:45					
14:00					
14:15	Parallel Oral Sessions				
14:30					
14:45		Parallel Oral Sessions		Tutorial	
15:00					
15:15					
15:30					
15:45					
16:00					
16:15					
16:30					
16:45	Parallel Oral Sessions	Poster Session		Tutorial	
17:00					
17:15					
17:30					
17:45					
18:00					
18:15					
18:30					

DETAILED PROGRAM:

Monday 3/9/2012

08:00-09:00 Registration

Conference Room: Opening Session

09:00-10:30 Welcome and Opening Presentations

WELCOME Message -

*Juan Carlos Miguez, General Chair***"The Power and Energy Society and the challenge of the new technologies"***Dr. Noel Schulz - Presidente de la Sociedad de Potencia y Energia del IEEE***"Política Energética: Uruguay 2030"***Dr. Ramón Mendez, Director Nacional de Energía***"Antel y las Redes Inteligentes"***Carolina Cosse - Presidente de ANTEL***"Expansión de la Generación e Infraestructura Eléctrica 2012-2020"***Dr. Gonzalo Casaravilla - Presidente de UTE*

10:30-11:00 Coffee break

11:00-12:30 Keynote Presentation:

**Prof. George Gross: "Renewable Energy Integration: The Grand
Challenges and Opportunities Towards A Sustainable Energy Future"**

12:30-14:00 Lunch

14:00-16:00 Parallel Oral Sessions:

*Conference Room: Renewable Energy planning, modeling and simulation*361 *D. S. Ramos, E. Guarnier, and L. T. Witzler*

Using the seasonal diversity between renewable energy sources to mitigate the effects of Wind generation uncertainties.

368 *D. Larrosa, G. Casaravilla, R. Chaer*

Evaluation of contractual arrangement of new energy sources for generation expansion in Uruguay and its impact on the risk matrix of the utility costs.

- 355** *Miguel A. Velásquez, IEEE Student Member, Camilo Táutiva and Ángela I. Cadena*
Technical and Economic Assessment of Distributed Generation to Increase Energy Coverage in Rural Areas

- 238** *F. K. Miguel, Copel, Doutorando USP; D. S. Ramos, Doutor Poli – USP; J. R. Securato, Doutor FEA – USP*

Aplicação da Teoria de Portfólio de Markowitz para a Carteira de Investimentos Eólicos no Brasil

- 137** *Jorge E. Mendoza, Member IEEE, Miguel. E. López e Ítalo Chiarella*
Un modelo para la Localización de la Generación Distribuida Considerando Fuentes de Energía Renovables

Room 2 Measurement, monitoring and visualization of power system

- 293** *S. Pérez-Londoño, L. Rodríguez-García, Y. Uliyanov López*
Effects of Doubly Fed Wind Generators on Voltage Stability of Power Systems

- 305** *L. Rodríguez-García, S. Pérez-Londoño and J. Mora-Flórez*
A Methodology for Composite Load Modeling in Power Systems Considering Distributed Generation

- 142** *Juan M. Ramirez, Member, IEEE, Javier Vargas Marin, Rosa E. Correa Gutierrez*
A tendency in large power systems operation

- 317** *G. J. Lopez, Student Member, IEEE, J.D. Restrepo, J. Castano, I.A. Isaac, H.A. Cardona, and J.W. Gonzalez, Senior Member, IEEE*
New Indices for the Angular Analysis of the Electrical Power Systems based on PMU Measurements

- 167** *D. Montenegro, Student Member, IEEE, M. Hernandez and G. A. Ramos, Member, IEEE*
Real Time OpenDSS framework for Distribution Systems Simulation and Analysis

- 191** *D. Montenegro, Student Member, IEEE, and G. A. Ramos, Member, IEEE*
Smart Diagnosis of Power Quality Disturbances Using Bayesian Networks

Room 3: Wind turbines and wind/hydro resource integration

- 286** *I. A. Isaac, J. W. Gonzalez Member, IEEE, H. Cardona, G. Lopez and H. Biechl*
Large Scale Integration of Wind Energy in Colombia: Electrical Analysis-Part II

- 174** *Fernando Berrutti, Non Member Álvaro Giusto, Non Member Michel Artenstein, Senior Member IEEE*
Modal analysis of the Uruguayan power system incorporating large-scale wind generation

- 235** *S. M. Nesci, and J. C. Gómez, Senior Member*
Effect of the Excitation Type and Level on the Short-Circuit Current Supplied for Induction Generators

- 194** *Jorge Naccarino and Nicolás Yedzejewski*
Implementation of AGC in Uruguay – Operational Challenges and Solution Approach

- 298** *Ling Wei*
The aggregating model of the hybrid wind farm with fixed speed and double fed Induction generators

Room 4: Operations and maintenance, asset management and condition monitoring

- 308** *C.G. Gonzales, I.N. Silva, R.A. Flauzino, R.A.S. Fernandes, D.H. Spatti*
Análise Espectral e Correlação entre Medidas Elétricas e Acústicas para Ensaio de Descargas Parciais em Transformadores de Transmissão

- 139** *Tajudeen H. Sikiru, Adisa A. Jimoh, Yskandar Hamam, John T. Agee and Roger Ceschi*
Classification of networks based on inherent structural characteristics

- 185** *A. F. Tristão Neto, G. P. L. Cunha, M. V. B. Mendonça, A. L. Ferreira Filho*
A Comparative Evaluation of Methods for Analysis of Propagation of Unbalance in Electric Systems

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

- 205** *Julio C. Lopez, Graduate Member, IEEE, Jose I. Munoz, Javier Contreras, Senior Member, IEEE, and J.R.S. Mantovani, Member, IEEE*
Optimal Reactive Power Dispatch Using Stochastic Chance-Constrained Programming
- 273** *T. N. Santos, A. L. Diniz, Member, IEEE*
Alternative Approaches to Consider DC-Power Flow with Losses in a Linear Program for Short Term Hydrothermal Scheduling
- 245** *J. von Haebler and M. Osthues and G. Blanco and C. Rehtanz*
Investment Strategies in Distribution System Planning as a Portfolio of Real Options

16:00-16:30 Coffee Break

16:30-18:10 Parallel Oral Sessions:

Room 1: Renewable Energy planning, modeling and simulation

- 147** *Sebastian Maier and Alexandre Street, Member, IEEE*
Model for the economic feasibility of energy recovery from municipal solid waste in Brazil
- 197** *Nelson L. S. Oliveira e Benemar A. de Souza, Member, IEEE*
Effects of the Exponentially Decaying DC Offset in the Phasor Estimation Algorithms Performance
- 209** *D. Piasson, S Member, IEEE R. B. Rodrigues, A. A. P. Biscaro, S Member, IEEE and J. R. S. Mantovani, Member, IEEE*
A Proposal for Reliability Evaluation of Components on Electric Power Distribution System Integrating Probabilistic models and Fuzzy Inference Systems
- 211** *Christoph Hahn, Member, IEEE, and Peter Lehn, Senior Member, IEEE*
Modelling and Control Design for a High Power Resonant DC-DC Converter
- 217** *Rodrigo O. Pedrosa, Ivan J. S. Lopes, Membro IEEE*
Influência dos Parâmetros das Descargas Atmosféricas e da Modelagem da Linha de Transmissão na Absorção de Energia dos Para-raios de ZnO

Room 2: Measurement, monitoring and visualization of power systems

- 148** *N. J. Castrillón, Member, IEEE, and D. G. Colomé*
Small Signal Stability Sensitivity to Generation Dispatch through Participation Factors
- 272** *R. O. Souza, J. C. Silva Student Member IEEE, L. R. A. Gabriel Filho, C. P. Cremasco, M. C. Bovolato, L. F. Bovolato.*
Metodologia e Análise do Potencial Eólico de São João do Cariri-PB
- 145** *Diana P. Montoya, Student Member, IEEE. Juan M. Ramirez, Member, IEEE.*
Reconfiguration and optimal capacitor placement for losses reduction
- 267** *J. C. Cepeda, Graduate Student Member, IEEE, D. O. Ramirez, and D. G. Colomé*
Probabilistic-based Overload Estimation for real-time Smart Grid Vulnerability Assessment
- 247** *Carlos A. Juarez and D. Graciela Colomé*
Improvement of Interarea Oscillation Damping using Wide Area Supplementary Control

Room 3: Electric vehicles, their integration into the grid and their impacts

- 149** *D. Q. Oliveira, P. B. Leite Neto, O. Saavedra, L. F. N. Delboni, B. I. L. Lima*
The Impacts of Plug-in Electric Vehicles and Renewable Power Penetration on Distribution Power Systems
- 358** *Jonas C. Lima, Elizete M. Lourenço, Marciano Morozowski Filho*
Efeitos da Conexão de Veículos Elétricos em Redes de Distribuição como Carga e como Reserva de Energia

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

- 262** *Gabriel Eirea, Fernando Chiaramello, Francisco Souza, Sergio Santana Negrín*
Simulación de un Sistema de Propulsión Eléctrico para EV
- 281** *Mauricio Riveros Gonzalo Paredes Luis Vargas*
Impact of Electric Vehicles on the Reconfiguration Requirements of a Distribution Network: The Santiago City Case
- 300** *Ivan V. A. Veiga and Rafael Zymler and Rafael A. Shayani and Dianne M. Viana and Marcos V. M Orrico*
Impacto de un parque Vehicular Electrico en los requerimientos de reconfiguracion de la red de media tensión de Santiago
- 203** *Diego Oroño and Virginia Echinoppe and Alfonso Gonzalez Pío*
Impacto de la incorporación de vehículos híbridos y eléctricos en el sistema eléctrico uruguayo
- Room 4: Operations and maintenance, asset management and condition monitoring*
- 166** *Renato Cespedes, SM IEEE*
A Reference Model for the Electrical Energy System Based On Smart Grids
- 261** *Simone S. F. Souza Student, Member, Marina Lavorato, Member, IEEE, e Ruben Romero, Senior, Member*
GRASP Especializado Aplicado ao Problema de Reconfiguração de Sistemas de Distribuição
- 309** *J.C. Carneiro, CPFL, J. A. Jardini, Fellow-IEEE, and J. L. P. Brittes, Unicamp.*
Substation Power Transformer Risk Management: Reflecting On Reliability Centered Maintenance and Monitoring
- 138** *Tajudeen H. Sikiru, Adisa A. Jimoh, Yskandar Hamam, John T. Agee and Roger Ceschi*
Voltage profile improvement based on network structural characteristics
- 123** *R. E. Kerguelen and S. R. Zárate and J. Rosero*
Characterization of Magnetic Core Losses in Distribution Transformers

Tuesday 4/9/2012

*Conference Room: Keynote Presentation***09:00-10:00 Keynote Presentation**

Prof. Hugh Rudnick: "Desafíos técnicos, económicos, ambientales y sociales de la expansión de los sistemas eléctricos en América Latina"

10:00-11:00 Parallel Oral Sessions:*Conference Room: Energy Market and regional integration*

- 168 **T. E. Del Carpio-Huayllas, St Member, IEEE, D. S. Ramos, Senior Member, IEEE, R.L. Vasquez-Arnez**
Feed-in and Net Metering Tariffs: An Assessment for their Application on Microgrid Systems
- 265 **T. A. Felix, St Member, IEEE and P. Cuervo, Senior Member, IEEE**
A Combined Market of Energy and Reserve Operating with Payment Minimization and Uncertain Generation Availability
- 162 **Juan D. Molina, Graduate St Member and Hugh Rudnick, Fellow, IEEE**
Investment in Renewable Transmission Assets: ¿Who pays in the Chilean System?

Room 2: Renewable planning, modeling and simulation

- 225 **J. L. B. Zamperin, St Member, IEEE, e L. D. Colvara**
Análise da Estabilidade Transitória do Gerador de Indução pelo Monitoramento da Tensão Interna após um Curto-Circuito: em Condições de Carregamento Leve e Pesado
- 328 **M. S. Zambelli, Member, IEEE, M. S. Lopes and S. Soares, Senior Member, IEEE**
Long-Term Hydropower Scheduling using Model Predictive Control Approach with Hybrid Monthly-Annual Inflow Forecasting
- 366 **E. Cornalino, A. Gutierrez, G. Cases, M. Draper and R. Chaer.**
A valorization of the short-term forecasting of wind power

Room 3: Protection and control of systems with the integrated new renewable resources

- 160 **N. Granda, St Member, IEEE, and D. G. Colomé**
A New Strategy for Controlled Power System Islanding
- 171 **J. G. Moreno, St Member, IEEE, F. E. Pérez, Graduate St Member, IEEE, and E. A. Orduña, Member, IEEE.**
Protection Functions for Distribution Networks with Distributed Generation Applying Wavelet Transform
- 195 **Gustavo Revel, Member, IEEE, Andres E. Leon, Member, IEEE, Diego M. Alonso, Member, IEEE, and Jorge L. Moiola, Senior Member, IEEE**
Frequency Regulation and Inter-area Oscillation Damping using Variable-speed Wind Generators

Room 4: Operations and maintenance, asset management and condition monitoring

- 251** *L.N. Velasco, J.C. Oliveira, L.C.G. Freitas, C.A. Rocha, A.P. Finazzi, F.N. Lima, H.C. Martins, W.J. Araújo.*
Estudos Avaliativos sobre o Desempenho dos Métodos para o Diagnóstico do Estado Operacional de Cabos Isolados
- 259** *Jayme Nunes Sarmento e Fernando Augusto Ferreira de Mello, UNIFACS*
Método para Compensação do Desequilíbrio de Corrente em Cabos Singelos Conectados em Paralelo
- 256** *Pablo Larghero Viera and Gabriela and Bonessi and Aldo Rondoni and Álvaro Giusto*
Análisis del Comportamiento de un Generador Síncrono Ante el Cambio de Configuración de la Red por Maniobras o Fallas
- 199** *H. R. Chamorro and J. F. Jimenez*
Load Sharing Control based Petri Nets Applied to Low Voltage Microgrids

11:00-11:30 Coffee Break

11:30-13:10 Parallel Oral Sessions:

Conference Room: Energy Market and regional integration

- 278** *Paul M. Sotkiewicz and J. Mario Vignolo, Member, IEEE*
The Value of Intermittent Wind DG under Nodal Prices and Amp-mile Tariffs
- 329** *Rolando M. Pringles, Member, IEEE, and José L. Rueda, Member, IEEE*
Optimal Transmission Expansion Planning using Mean-Variance Mapping Optimization
- 215** *P. Gavela, Member, IEEE, S.Chamba, Member, IEEE, R. Reta and A. Vargas, Senior Member, IEEE*
Guidelines for Transmission Expansion Planning in a Regional Electricity Market Superposed to Imperfect National Markets
- 102** *Ángel Vaca and Paul Vásquez, Member IEEE*
Metodología para la Estimación del Costo de la Energía No Suministrada -Aplicación en Ecuador-
- 277** *J. Mario Vignolo, Member IEEE and Pablo Ferrari and Juan Palacio*
Impacto de la metodología de asignación de los costos de transmisión en el desarrollo de la generación renovable

Room 2: Renewable planning, modeling and simulation

- 219** *P. A. Souza, UNIFACS, G. A. Abril, UNIFACS, D. Barbosa, UNIFACS/UFBA e K. F. da Silva, UNIFACS/UFBA*
Simulação dos Impactos da Variação do Vento na Turbina Tipo DFIG Utilizando o ATPdraw
- 353** *R. Tapia Olvera, Member, IEEE, O. Aguilar Mejía, St Member, IEEE, J. M. Ramírez Arredondo, Member, IEEE, and A. Valderrabano Gonzalez, Member, IEEE*
On-Line Simultaneous Tuning for Back to Back Converter
- 360** *Ivan Enrique Zuñiga, St Member, IEEE, and Yenny Fernanda Botina*
Technical Economic Study for the Implementation of Autonomous Photovoltaic Systems in the Residential Sector of Colombia
- 363** *E. Cornalino, E. Coppes and Ruben Chaer,*
Modeling and simulation of the electricity generation system of Uruguay in 2015 with high penetration of wind power
- 335** *Wladimir Páez and Pablo Cuervo*
Bilevel Linear Model of Multiperiod Payment Minimization in Unit Commitment

Room 3: Protection and control of systems with the integrated new renewable resources

- 236 **F. Restrepo, Student Member, IEEE, and D. G. Colomé**
Sensitivity Analysis of the Very Low Frequency Oscillatory Mode
- 325 **V. N. Obadowski, St M, IEEE, T. L. Riechel, M. F. Cruz, St M, IEEE, P. E. M. Ugoski, C. M Richter, Member, IEEE, S. L. S. Severo, Member, IEEE, A. A. P. Lerm, Member, IEEE, M. O. Oliveira, Member, IEEE, M. C. R. Paz, St M, IEEE, A. S. Bretas, SM, IEEE, D. T. Franco, Member, IEEE, and W. de F. Ciarelli**
A New Method to Minimize Harmonic Components on PWM Signals Based on Lagrange Multipliers
- 282 **Luciano S. Barros and Welington S. Mota and Luiz G. Q. Silveira Junior and Phelipe S. Oliveira**
DFIG Rotor Side Control through Gain-Scheduling Designed by Genetic Algorithm
- 115 **H. Schuster, D. Schweer, and A. Moser Member, IEEE**
Cost-Efficient Combination of Transmission Network Reinforcement and Power Generation Redispatch

Room 4: Measurement, monitoring and visualization of power systems

- 279 **Patricio A. Benalcázar, Mauricio E. Samper, Member IEEE, y Alberto Vargas, Senior Member IEEE**
Redes Inteligentes de Distribución: Paradigmas para la Supervisión, Operación y el Despacho
- 165 **Antonio Fonseca, Member, IEEE**
Voltage Stability Analysis by Monitoring Voltage – Impedance Ratio applied to Ecuadorian Power System
- 181 **A. Santos, G. Aristoy, D. Slomovitz, Senior Member, IEEE**
A Step-Up Calibration for Standard Current Transformers
- 230 **A. V. Festa, D. Motter, T. R. Kempner, M. Oleskovicz, Member, IEEE, e D. V. Coury, Member, IEEE**
Redes Neurais Artificiais Aplicadas na Identificação das Áreas Envolvidas em Situações de Curtos-Circuitos em Sistemas de Distribuição
- 312 **Mayk Coelho, Aurelio Oliveira, and Secundino Soares**
Optimal Power Flow in DC Constrained Operating Reserve Through Interior Point Methods

13:10-14:30 LUNCH

14:40-16:20 Parallel Oral Sessions:

Room 1: SCADA & Protection and control of systems with new renewable resources

- 170 **J. R. Munsch, C. Sena, A. Giusto**
Intentional Islanding in Power Systems with Dispersed Generation
- 290 **C. Orozco-Henao, J Mora-Flórez Member, and S. Pérez-Londoño, IEEE.**
A robust method for single phase fault location considering distributed generation and current compensation
- 324 **M. F. Cruz, Student Member, IEEE, T. L. Riechel, V. N. Obadowski, Student Member, IEEE, P. E. M. Ugoski, C. M. Richter, Member, IEEE, S. L. S. Severo, Member, IEEE, A. A. P. Lerm, Member, IEEE, M. O. Oliveira, Member, IEEE, M. C. R. Paz, Student Member, IEEE, A. S. Bretas, Senior Member, IEEE, D. T. Franco, Member, IEEE, and W. de F. Ciarelli**
A Supervisory System for Real-Time Oscillography of Synchronous Generators
- 252 **H.A. Santana, Student Member, IEEE, R. Rincón and M.C. Janssen, Member, IEEE**

192 **Modelado Gráfico de una Central Hidroeléctrica Basado en IEC 61850-7-410/510**

B.C.Musarra and J.A. Jardini

Automação de subestações - Sistema automático de alívio de carga

Room 2: Renewable Energy planning, modeling and simulation

239 **Alejandro Navarro, Graduate Student Member, IEEE, Luis F. Ochoa, Senior Member, IEEE, and Pierluigi Mancarella, Member, IEEE**

Learning from Residential Load Data: Impacts on LV Network Planning and Operation

250 **Carlos Adrian Correa, Ricardo Andres Bolaños, Alejandro Garces Member IEEE**

Optimal Operation of Microgrids in the Colombian Energy Market

343 **Igor Soares dos Santos, Pedro Bezerra Neto, M_arcio C. F. V. dos Santos and Osvaldo R. Saavedra**

Long-Term Tidal Hydro-Thermal Coordination

107 **H. Goodarzi Student Member, IEEE and M.-R. Haghifam, Senior Member, IEEE**

Comparison certainty and uncertainty data to determine the place and capacity distributed generation resources

Room 3: Operations and Maintenance, asset management and condition monitoring

179 **Fernando L. R. Mussoi and Raimundo C. G. Teive, Member, IEEE**

Distribution System Project Selection based on the Power Quality Value

182 **J. C. Gonzales, Student Member, IEEE, E. E. Mombello, Senior Member, IEEE.**

Automatic Detection of Frequency Ranges of Power Transformer Transfer Functions for Evaluation by Mathematical Indicators

268 **André R. Gonçalves, Student Member, IEEE, Celso Cavellucci, Member, IEEE, Christiano Lyra Filho,**

Senior Member, IEEE, Fernando J. Von Zuben, Senior Member, IEEE

An Extremal Optimization approach to parallel resonance constrained capacitor placement problem

356 **Marcos Leone-Filho, IEEE Member Takaaki Ohishi**

A GA based methodology for improving real-time voltage profile for large power grids.

339 **Victor Hugo Hinojosa and Edwin Varela**

Application of the FIR and SRA methodology to short-term load forecasting in central power system from Chile

Room 4: Measurement, monitoring and visualization of power systems

348 **J. G. Calderón-Guizar, Senior Member, IEEE**

Placement of PMUs for Tracking Inter-Area Modes in the Mexican System

322 **Mayk Coelho, Aurelio Oliveira e Anesio Santos Jr.**

Uma Formulas, ̃ao Para Métodos de Pontos Interiores Com Barreira Logarítmica Modificada Aplicada no Fluxo de Potencia Otimizado CC

258 **Diego M. Ferreyra, A. Carina Sarmiento, and Claudio A. Reineri**

Erroneous Data Detection in the Harmonic State Estimation of a Radial Distribution System with Distributed Generation

223 **Rafael Cuerda Monzani and Afonso J. Prado and S. Kurokawa and L. F. Bovolato and J. Pissolato Filho**

Eigenvalue analysis considering a non-transposed three-phase system with the presence of two ground wires

336 **M.KONDALU and Dr. P.S.Subramanyam**

Estimation of Re-striking Transient Overvoltages in a 132KV Gas insulated Substation

16:20-18:30 Coffee Break and POSTER SESSION

POSTER SESSION

16:30-18:30 Tuesday 4 Set. Picasso Room

Communications SCADA, IEC 60850-5-101 and IEC 61850, cyber security in distributed generation and development of standards

- P1: Automação da supervisão de chaves seccionadoras
Paper ID: 331 A. L. de Oliveira e H. Y. Kim e L. C. Magrini e J. A. Jardini e M. A. Kviatkowski

Electric vehicles, their integration into the grid and their impacts

- P2: Evaluación Económica y Ambiental del Uso de Vehículos Eléctricos: el Caso de Bogotá-Colombia
Paper ID: 354 Ricardo Delgado and Angela Cadena and Monica Espinosa and Catalina Pena
- P3: Modelado de la demanda de energía del parque automotor híbrido- eléctrico
Paper ID: 161 Diego Oroño and Carlos Tutté and Gonzalo Hermida

Energy and environment

- P4: Environmental Impact Assessment (EIA) for Electrical Infrastructure
Paper ID: 246... Andres Aldana
- P5: Flujo de carga radial trifásico a cuatro hilos empleando anderson mixing scheme
Paper ID: 216... Camilo Acosta and Ricardo Hincapié and Mauricio Granada and Antonio Escobar and Ramón Gallego
- P6: Reubicación del Parque de Transformadores en Sistemas de Distribución Usando Algoritmos Genéticos
Paper ID: 313... J. A. Salazar, E. A. Quintero, and A. Molina

Energy management systems and the future ISO 50001 standard for energy management

- P7: Implementation of the Standard ISO 50001 in Colombian Industries: Preliminary Diagnosis (Extended abstract)
Paper ID: 287... Idi Isaac and Jorge Gonzalez and Hugo Cardona and Gabriel Lopez and Marcela Reyes and Marcela Ruenes and Viviana Suarez

Energy Market and regional integration

- P8: Actualidad del Mercado Eléctrico Mayorista Argentino: Reformas Regulatorias
Paper ID: 292... L. Javier Barrionuevo and Ricardo Rubio Barros
- P9: Alternativas de Abastecimiento de Gas Natural para el Suministro Económico al Sistema Eléctrico Argentino
Paper ID: 311... Ricardo Rubio-Barros, Diego Ojeda-Esteybar, y Alberto Vargas
- P10: An Evaluation of the HVDC and HVAC Transmission Economic
Paper ID: 159... T. Sousa, M. L. dos Santos, J. A. Jardini, R. P. Casolari and G.L.C. Nicola
- P11: Análise da Influência dos Parâmetros de Linhas de Transmissão de 230 kV na Determinação de sua Largura de Faixa de Segurança
Paper ID: 202... Claudenir J. Souza e Ivan J. S. Lopes
- P12: Coordinación de los Despachos de los Sistemas Eléctricos y de Gas Natural
Paper ID: 303... Ricardo Rubio-Barros, Diego Ojeda-Esteybar, Osvaldo Año y Alberto Vargas
- P13: Estratégia ótima de contratação de um fundo de fontes renováveis e Alocação de quotas individuais via teoria de jogos cooperativos
Paper ID: 163... Delberis, A. Lima and Lucas Freire and Alexandre Street

P14: Integrated Operational Planning of Hydrothermal Power & Natural Gas Systems: the Argentine Case

Paper ID: 275... Diego M. Ojeda-Esteybar and Ricardo G. Rubio-Barros and Alberto Vargas

P15: Search algorithm for optimal locations of generation units in liberalized power systems

Paper ID: 180... H. Schuster First and J. Sprey Second and A. Moser Third

Energy storage systems, including pumped storage, batteries and flywheels

P16: Distributed Energy Storage Systems For Applications In Future Smart Grids

Paper ID: 124... Marcelo G. Molina

Measurement, monitoring and visualization of power systems

P22: Algoritmo híbrido e inteligente para a análise das condições operativas de transformadores de potência no contexto da qualidade da energia elétrica

Paper ID: 176... Jáder F. D. Breda and Mário Oleskovicz and Daniel Barbosa

P23: Avances en el Sistema Patrón Para Mediciones de Potencia y Energía de UTE

Paper ID: 169... Andrés Cardozo and Leonardo Trigo and María Inés Camacho and Daniel Slomovitz

P24: Comparative Evaluation between Computational Models for Representing the Three-Phase Induction Motor Subjected to Voltage Unbalance

Paper ID: 243... D. L. R. Hollanda and M. L. S. Almeida and J. M. Matos and A. L. Ferreira Filho

P25: Correlação entre Registros Oscilográficos de Proteção e Qualidade da Energia Elétrica dispondo da Dynamic Time Warping

Paper ID: 296... H. M. G. C. Branco and U. C. Netto and M. Oleskovicz and D. Coury

P26: Critical Analysis And Performance Tool Load Flow

Paper ID: 128... Marcelo A. Saavedra, Raúl Sanhueza

P27: DC Power Flow Optimization with a Parallel Genetic Algorithm

Paper ID: 315... André Gomes and Maury Gouvêa

P28: Metodologia para especificação de subestações baseada na modularidade funcional – uma oportunidade para o uso pleno dos IEDs

Paper ID: 307... J. L. P. Brittes and J. A. Jardini and E. F. Nunes

P29: Métodos de Pontos Interiores Aplicados ao Problema de Pré-Despacho com Simulação de Manobras Programadas

Paper ID: 321... S. M. S. Carvalho and C. Lyra and A. R. L. Oliveira

P30: Modelo de Orientação a Objetos Aplicado ao Projeto e Desenvolvimento de Uma Ferramenta Computacional para Manipulação e Visualização de Arquivos Oscilográficos

Paper ID: 274... Athila Q. Santos and Diego C. Grillo and Ulisses C. Netto and Daniel Barbosa and Denis V. Coury and Mario Oleskovicz

P31: New Method for Comparison of Chopped Waveforms in Impulse Transformer Tests

Paper ID: 350... Daniel Slomovitz and Gabriel Slomovitz and José Joskowicz

P32: Slow and Fast Transients in Four Phase Transmission Systems

Paper ID: 155... Sérgio Kurokawa and Eduardo C. M. Costa and Ivan S. Brandt and Luiz F. Bovolato and José Pissolato

P33: Implementación De Un Sistema De Monitoreo Y Control Remoto Inalámbrico De Una Instalación Solar Fotovoltaica

Paper ID: 116... Martin Andreoni and Francisco Galdeano Mantiñan and Marcelo G. Molina

Operations and maintenance, asset management and condition monitoring

P35: Architecture of a Distributed System for Acquiring Knowledge in Supporting Decision Making in Operation/Maintenance of Electric Power Plants

Paper ID: 327... S. L. S. Severo and A. A. P. Lerm and E. O. Lippe

- P36:** Experiencias de monitoreo de equipos de Extra Alta Tensión como guía para el mantenimiento.
Paper ID: 332... E. Brioso and C. Chiarella and A. Salafia
- P37:** Field Pole Spares Bid for Tenders Specification Guide for a Salient Pole Hydro Generators
Paper ID: 146... Pablo Juan Thomasset Trakalo
- P38:** Fluxo De Potência Harmônico Em Sistemas De Distribuição
Paper ID: 234... Paulo V. V. Pinto, UFBA and André L. C. Valente, UFBA
- P39:** Optimizaci3n Multiobjetivo de Filtros Pasivos
Paper ID: 222... Jandecy Cabral Leite and Ignacio P3rez Abril and Maria Emilia de Lima Tostes and Roberto Celio Lim3o de Oliveira
- P40:** Otimização da Agenda de Manutenção em Sistemas de Distribuição
Paper ID: 310... J.F.R. Silva and I.N. Silva and R.A. Flauzino and D.H. Spatti and R.A.S. Fernandes
- P41:** Recomposição de Redes de Distribuição de Energia Elétrica a partir de Técnicas de Chaveamento: Revisão e Proposição
Paper ID: 337... José Luiz da Silva Jr., Manoel Firmino de Medeiros Jr., Max Chianca Pimentel Filho, Clóvis Bôsko Mendonça Oliveira
- P42:** Teleprotection Commands Management System to Evaluate Equipment Conditions
Paper ID: 141... F. Crispino and L. Ogiboski and L. A. Murakami and L. C. Magrini
- P43:** Uma Abordagem para Armazenamento, Integração e Análise de Dados Provenientes de Ensaio em Transformadores de Transmissão Baseada em Sistemas Inteligentes
Paper ID: 318... C. G. Gonzales, I. N. Silva, R. A. Flauzino, R. A. S. Fernandes e D. H. Spatti
- P44:** Validity of Using a Global Repair Service Model in Power System Reliability Studies
Paper ID: 103... Carlos Julio ZAPATA, and Mario Alberto RIOS

Protection and control of systems with the integrated new renewable resources

- P46:** A Região de Estabilidade na Análise em Duas Escalas de Tempo dos Sistemas Elétricos de Potência
Paper ID: 207... Edwin Choque P. and Luís F. C. Alberto and Newton G. Bretas
- P47:** Ajuste inteligente da coordenação de relés direcionais de sobrecorrente em sistemas malhados frente a variações na topologia de operação.
Paper ID: 253... F. B. Bottura and M. Oleskovicz and D. V. Coury and S. A. de Souza and M. J. Ramos
- P48:** Disparo Automático de Carga Calculado Mediante Algoritmos – DAC-CMAG
Paper ID: 304... Michelle Guichon, Magdalena Melo and Ana Carolina Nieto and Mario Vignolo and Nicolás Yedrezjewski
- P49:** Estimación de Fasores em Relés Numéricos por Meio do Método de Ajuste de Curvas
Paper ID: 178... Chrystian D. L. da Silva and Ghendy Cardoso Jr. and Paula D. Kruse
- P50:** Geração Alternativa Em Sistemas De Distribuição: Análise De Estabilidade De Tensão
Paper ID: 342... F.B. Araujo and R.B. Prada
- P51:** IDA - PBC Control of Shunt Active Filters for Harmonics Compensation
Paper ID: 153... Federico M. Serra and Cristian H. De Angelo and Daniel G. Forchetti
- P52:** Métodos de Rejeição de Cargas por Subfrequência Aplicados em uma Planta Industrial: uma Comparação
Paper ID: 214... José Luiz Gazola and Fernando Augusto Moreira and Alexandre César de Castro
- P53:** Sistema de Aterramento com Cabo Contrapeso Representado por Linhas de Transmissão com Circuitos PI; em Cascata empregando o Aplicativo “Matlab”
Paper ID: 210... Jose Saverio Spozito Junior and Luiz Fernando Bovolato and Sérgio Kurokawa and Afonso José do Prado
- P54:** Uncovering Non-Steep Wavefronts for High-Speed Fault Detection and Location
Paper ID: 344... Rommel Aguilar and Fabián Pérez and Eduardo Orduña and Christian Rethanz

Renewables planning, modeling and simulation

- P57:** Active Power Regulation of Auxiliary Generation Units in Hydroelectric Power Plants Using Power Electronic Switching

- Paper ID: 326... M. C. R. Paz and M. O. Oliveira and A. S. Bretas and M. F. Cruz and T. L. Riechel and V. N. Obadowski and P. E. M. Ugoski and C. M. Richter and A. A. P. Lerm and S. L. S. Severo and D. T. Franco and W. de F. Ciarelli*
- P58:** Actualización de datos de cobertura del suelo del modelo wrf-para el pronóstico de la energía eólica
Paper ID: 186... Andrés Flevaris (aflevaris@gmail.com), Germán Gadea (ggadea@gmail.com), Juan Souteras (jsouteras@gmail.com). Este proyecto fue tutorado por Sergio Nesmachnow (sergion@fing.edu.uy), co-tutorado por Alejandro Gutiérrez (aguti@fing.edu.uy), Gabriel Cazes (agcm@fing.edu.uy).
- P59:** Alternative Model of Three-Phase Transmission Line Theory-Based Modal Decomposition
Paper ID: 306... Rodrigo Cleber da Silva and SÁrgio Kurokawa and Anderson Ricardo Justo de Araújo
- P60:** An Analytical Model For Three-phase Transmission lines Developed Directly in the Phase Domain
Paper ID: 154... C. G. Carvalho and S. Kurokawa and J. Pissolato
- P61:** Analysis of Electromagnetic Transients in Three-Phases Transmission Line using the Modal Decomposition
Paper ID: 330... Anderson Ricardo Justo de Araújo and Rodrigo Cleber Silva and Sérgio Kurokawa
- P62:** Avaliação Comparativa do Desempenho de Motores CC e CA para Representação de Turbinas Eólicas em Estruturas Laboratoriais
Paper ID: 229... Alex Reis and Fernanda Hein da Costa and Guilherme Leal Xavier and Elias Barbosa de Alvarenga and José Carlos de Oliveira and Geraldo Caixeta Guimarães
- P63:** Diffusing Distributed Generation in the CQR Sub-network of the Colombian Power System: A System Dynamics Approach
Paper ID: 151... Adriana Arango-Manrique and Sandra Carvajal-Quintero and Santiago Arango-Aramburo
- P64:** The Schedule Control of Nuclear Power Construction Phase of Project Approval and Administrative Licensing
Paper ID: 352... Naren Mandula and Liu Li-rong and Zheng Long and Wu Yun-na
- P65:** Modelación Simplificada de Turbinas Eólicas
Paper ID: 255... L. J. Ontiveros, P. E. Mercado
- P66:** Models of Optimal Power Flow using Network Flow Method
Paper ID: 257... Cassio H. Fujisawa and Marcius F. Carvalho and Secundino Soares and Anibal T. Azevedo and Elma P. Santos and Takaaki Ohishi
- P67:** Operación en isla de un generador sincrónico conectado a una red de Distribución
Paper ID: 291... David Bonjour and Nicolás Yedrzejewski
- P68:** Parallel Particle Swarm Optimization Applied to the Static Transmission Expansion Planning Problem
Paper ID: 132... Santiago P. Torres and Carlos A. Castro
- P69:** Parque eólico Achiras: variaciones del viento y su impacto sobre la tensión
Paper ID: 212... Marcos Galetto y Luis Aromataris
- P70:** Pitch Angle Control for Wind Turbines Using Fuzzy Logic
Paper ID: 226... Ana Vitoria A. Macedo and Wellington S. Mota
- P71:** Risk Based Assessment of Wind Farms Fault Ride-Through Capability
Paper ID: 177... A. D. Del Rosso, Member, IEEE, and M. Anello
- P72:** UML FOR THE DESIGN OF THE BIODIGESTER AUTOMATION
Paper ID: 129... ALEJANDRO ARIAS and ALONSO CHICA

Solar energy, biomass generation, tidal power and co-generation

- P73:** Recent Advances in Solar Resource Assessment in Uruguay
Paper ID: 254... Rodrigo Alonso Suárez and Pablo Toscano and Ricardo Siri and Pablo Musé and

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY

SIERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY*Gonzalo Abal***P74: Small Scale Renewable Energy System for Power Injection to the Grid***Paper ID: 362... Luiz Tadeu Rosa de Moraes Junior and Sérgio Henrique Lopes Cabral***Wind turbines and wind/hydro resource integration****P75: Analysis of Performance of the Device FACTS: With a Focus on Transient Stability***Paper ID: 276... J. C. Silva and M. M. Marques and L. D. Colvara***P76: Diseño de estabilizadores de potencia en parques eólicos a partir de señales remotas***Paper ID: 175... Fernando Berrutti and Alvaro Giusto***P77: Identification of Voltage Control Areas in Power Systems with Large Scale Wind Power Integration***Paper ID: 201... W. M. Villa and J. L. Rueda and S. Torres and W. H. Peralta***P78: Integración de Aerogeneradores en Redes Eléctricas: Análisis y Simulación del Desempeño en Régimen y Frente a Grandes Perturbaciones***Paper ID: 289... Rafael Hirsch***P79: Wind farm interconnection analysis: A case study.***Paper ID: 295... Yuri Solis Stypulkowski and Roberto Chouhy Leborgne***P80: Solar base Load Generation.***Paper ID: 136... Ghassan Halasa*

Wednesday 5/9/2012

09:00- 10:40 Parallel Oral Sessions:

Room 1: Renewable planning, modeling and simulation

- 338** *Álvaro Fleury Francisco Arteiro Dalton Brasil Paulo Gomes* Angelo Franceschi*
Integration of Wind Power Plants into the Electric System - The Brazilian Experience
- 367** *M. C. Pimentel Filho, UNP-Laureate, M. F. Medeiros Jr., UFRN and J. L. Silva Jr., DEE/UFRN*
Optimal Power Flow Calculation Method for Distribution Systems with Distributed Generation
- 365** *D. Larrosa, E. Coppes, G. Casaravilla and R. Chaer*
Differences between the operations of the generation power system of Uruguay operated minimizing the Expected Value vs. minimizing the Value at Risk of the future operating costs.
- 184** *José Ignacio Afonso, Michel Arstenstein Alvaro Giusto*
Voltage dip analysis in the Uruguayan transmission network in high penetration wind generation scenarios
- 119** *H. Goodarzi, St Member, IEEE and M.-R. Haghifam, Senior Member, IEEE*
Comparison of different objective functions to determine optimal the location and capacity of distributed generation with uncertainty data

Room 2: Wind turbines and wind/hydro resource integration

- 173** *Fernando Berrutti, Álvaro Giusto, Michel Arstenstein, Senior Member IEEE*
Dynamic characterization of wind farms and their impact in power systems oscillations
- 359** *Eliana Cornalino, UTE, y Martín Draper, UTE.*
Análisis de indisponibilidades de un parque eólico
- 193** *Alejandro Gutierrez and Gabriel Cazes Boezio*
Seasonal Validation of Operative Forecasts of Wind Power in Uruguay, after one year of their Operative Publication
- 196** *Daphne Schwanz, Regis E. Henke, and Roberto Chouhy Leborgne, Member, IEEE*
Wind Power Integration in Southern Brazil: Steady-State Analysis.
- 143** *Daniel Pérez Benech, UTE, Uruguay, and José Cataldo, University of the Republic, Uruguay.*
Analysis of the Uruguayan large scale wind energy generation and its energetics complementary, after a year of operation

Room 3: Operations and maintenance, asset management and condition monitoring

- 341** *F. A. S. Borges, R. A. S. Fernandes, Member, IEEE and I. N. Silva, Member, IEEE*
Extração de Características Relevantes para a Detecção e Classificação de Distúrbios de Qualidade da Energia Elétrica
- 357** *H. Díaz, and F. A. García*
Convex Optimization Solution to Secure Power Dispatch
- 105** *C. J. Zapata, Member IEEE, J. Urrea*
Assessing the Service Rendered by a Power Distribution Control Center
- 183** *A. A. Romero, Member, IEEE, E. E. Mombello SM, IEEE, and G. Rattá, SM, IEEE*
An Overview on Power Transformer Management: Individual Assets and Fleets

- 240** *J. C. Gonzales, St Member, IEEE, E. E. Mombello, Senior Member, IEEE.*
Diagnosis of Power Transformers through Frequency Response Analysis by Poles and Zeros Shifts Identification

Room 4: Energy and environment & Solar energy, biomass generation, tidal power and co-generation

- 221** *A. Borchardt, L. Di Chiara y V. Echinope*
Análisis De La Expansión y de la Generacion del Sistema Eléctrico Uruguayo
- 218** *A. Arias, R. A. Hincapié, M. Granada, R. A. Gallego*
Optimal scheduling of vegetation maintenance underneath overhead power distribution lines
- 213** *C. A. Wall, Grad Std Member, IEEE, P. L. Arnera, SM, IEEE, and M. B. Barbieri, SM, IEEE.*
Implementation of a tool for magnetic field mitigation using passive loops
- 190** *Andres. A. Ovalle, IEEE St Member, H. R. Chamorro, IEEE St Member and G. Ramos, IEEE Member*
Improvements to MPPT for PV Generation based on Mamdani and Takagi-Sugeno Fuzzy techniques
- 198** *Maria Isabel Arteaga Orozco and Yuri Ulianov Lopez*
Power Quality Performance of a Grid-Tie Photovoltaic System in Colombia

10:40-11:00 Coffee Break

11:00- 13:00 Parallel Oral Sessions:

Room 1: Special Conference 11:00 to 11:40

HVDC, Nueva tendencia en interconexiones: presente y futuro de la tecnología
Rafael Bonchang, ALSTHOM France

Room 1: Solar energy, biomass generation, tidal power and co-generation

- 126** *Ghassan Halasa and Nasri Rabadi*
Wind-Diesel Hybrid System for Space Heating Case Study: Amman-Jordan
- 334** *R. Carnieletto, J.B. Parizzi, F.A. Farret, C.G. Ribeiro*
Feasibility Evaluation of the Use of Secondary Energy for Hydrogen Generation
- 187** *J. A. Santos, St Member, IEEE, A. B. Piardi, St Member, IEEE, J. R. Pesente, Member, IEEE, R.H. Salim, Member, IEEE, R. B. Otto and R. A. Ramos, SM, IEEE*
A Comparative Analysis between Two Approaches for the Simulation of Power System Electromechanical Transients

Room 2: Energy Market and regional integration & Energy management systems and the ISO 50001 standard for energy management

- 233** *H. C. Avila e D. A. Alves*
Avaliação da Capacidade de Transferência Considerando as Restrições de Intercâmbio Entre Áreas
- 270** *R. S. Ferreira, St Member, IEEE, M. M. Carvalho, St Member, IEEE, L. A. Barroso, SM, IEEE, B. Bezerra, L. M. Thomé, M. V. Pereira, Fellow, IEEE*
Impacts of Causal Transmission Losses Allocation on Generation Pricing for Long-Term Contracts in Brazil
- 224** *J. A. Jardini, Fellow IEEE, J. L. P. Brittes, Unicamp, and Patrícia O. da Silveira, FDTE*
Consumer Loading Characterization Based on Measurement Campaigns - A Prospective Approach

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY

SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

269 *G. Batista and M. León and D. Cohn and A. Rodriguez and M. Pedrana and E. Coppes*
Proceso de Gestión Energética en presencia de importantes cantidades de generación distribuida

369 *Bruno Vuan and Eduardo Hernández*
Energía in UPM

370 *Bruno Vuan and Eduardo Hernández and Hernán Castro*
Energy Efficiency System at modern Pulp Mill

Room 3: Energy storage systems, including pumped storage, batteries and flywheels & Protection and control of systems with the integrated new renewable resources

164 *Sandra Ximena Carvajal Quintero, Member, IEEE, Juan David Mar'in Jim'enez, and Santiago Arango Aramburo*

Feasibility of Intentional Islanding operation with Small Hydropower Plants

248 *A. Bedoya-Cadena, C. Orozco-Henao, J. Mora-Flórez, Member IEEE*

Single Phase to Ground Fault Locator for Distribution Systems with Distributed Generation

263 *A. Herrera-Orozco, S. Pérez-Londoño and J. Mora-Flórez, Member, IEEE*

Load modeling for fault location in distribution systems with distributed generation.

206 *E. Choque. P. Luís F. C. Alberto Newton G. BRETAS*

La Importancia de la Región de Estabilidad en el Análisis de Estabilidad de Medio Plazo en Sistemas Eléctricos de Potencia

220 *G. M. Toccaceli, P. E. Battaiotto, M. G. Cendoya and R. R. Peña.*

RDG in Weak Grid for Desalination Plant. System Topology and Control Strategy

140 *Jun Yang and Wenjia Zhang*

Analysis of Polygonal Distance Relay's Character on Transmission Line Including SMES

KEY NOTE LECTURE (Sep 3, 11:00, Conference Room, 4th Floor):

Renewable Energy Integration: The Grand Challenges and Opportunities Towards A Sustainable Energy Future

By: Prof. George Gross (*), University of Illinois at Urbana-Champaign

The marked technology advances in renewable generation have been key drivers of the progress in the implementation of renewable resources over the past two decades, leading to major reductions in their costs and improved performance records. As the concerns for a cleaner environment and energy independence grow, there is a far more deliberate push to broaden geographical reach of the grid integration of renewable resources by taking advantage of the smart grid functionalities. However, the highly variable nature of such resources and their intermittency characteristics create many new challenges in all aspects of power system planning, operations, control and analysis as well as market operations and design. These challenges range from the need to develop simulation tools to quantify the reliability, economic and environmental benefit impacts of these resources to the development of effective forecasting and scheduling tools for their operations.

The wider implementation of the variable resources raises the need for the implementation of storage technology on a much broader basis than exists today. Also, the empowerment that the smart grid imparts to customers to actively participate in meeting the supply-demand balance requires the effective integration into the grid of these so-called demand response resources and their effective coordination with the renewable and storage resources. A key barrier to overcome is the limited transfer capability of the grid and the imperative to expand the transmission network to bring to market the vast amounts of renewable energy that can be harnessed.

In this presentation, we focus on some of the most daunting challenges and associated opportunities to make possible the effective integration of renewable energy resources on a sufficiently wide basis so as to provide a sustainable path toward meeting future energy needs. We examine the rapid changes in the renewable development and discuss the recent regulatory developments aimed at facilitating their progress. We provide various illustrative examples from wind forecasting, to the issues in cyber security, control schemes, analysis of the reliability, economic and environmental benefit impacts and in systems with integrated renewable, storage and demand response resources, and data analytics issues with the huge amounts of data collected, stored and processed in the smart grid. In addition, we stress the contribution of power system engineers to the formulation of effective policies to facilitate such integration efforts.

(*) George Gross is a professor of Electrical and Computer Engineering with an appointment as professor in the Institute of Government and Public Affairs. His major research activities are in power system analysis, economics and control and electric utility regulatory policy. He has a keen interest in the interdisciplinary aspects of these areas.

His professional activities include work as an Expert for the United Nations Industrial Developing Organization Technical Missions. Prof. Gross has numerous publications in international refereed journals and has lectured at many universities around the world. Prior to coming to the University of Illinois as the Grainger Professor of Electrical and Computer Engineering in 1993, Prof. Gross held several management positions at Pacific Gas & Electric Company in San Francisco for nearly two decades. Gross received his B.Eng.(Honors) in Electrical Engineering at McGill University in 1969, and his M.S. and Ph.D. from University of California, Berkeley in 1971 and 1974 respectively. An IEEE Fellow in 1988.

KEY NOTE LECTURE (Sep 4, 09:00, Conference Room, 4th Floor):**Desafíos técnicos, económicos, ambientales y sociales de la expansión de los sistemas eléctricos en América Latina.****By: Dr. Hugh Rudnick (*), Pontificia Universidad Católica de Chile**

América Latina, una región rica en recursos energéticos, enfrenta diversos desafíos, uno de los cuales es la alta tasa de crecimiento del consumo, que requiere cuantiosas inversiones en infraestructura para abastecerlo; otro siendo la necesidad de extender la cobertura energética a una importante parte de su población que subsiste con precarios medios.

En ese contexto, está cada vez siendo más complejo expandir la infraestructura energética y eléctrica en la región, donde a los desafíos técnicos, económicos y financieros que ello implica se suman restricciones ambientales y conflictos con las comunidades y con poblaciones indígenas. Ejemplos diversos se encuentran en Brasil, Centro América, Colombia, Perú y Chile, entre otros.

La presentación realizará una descripción de los desafíos técnicos, económicos, ambientales y sociales de la expansión energética de América Latina, con especial atención a los sistemas eléctricos.

(*) Hugh Rudnick es Profesor Titular en la Facultad de Ingeniería de la Pontificia Universidad Católica de Chile. Ha realizado investigaciones y publicaciones en el sector energético y eléctrico, con más de trescientos artículos en revistas indexadas y conferencias técnicas internacionales.

Desde su empresa consultora Systep Ingeniería, ha realizado contribuciones a los procesos de desregulación del sector eléctrico, así como consultorías con empresas y gobiernos en América Latina, Norteamérica y Europa, así como para el PNUD, UNCTAD y el Banco Mundial.

Rudnick es Ingeniero Civil Electricista de la Universidad de Chile y Doctor of Philosophy de The Victoria University of Manchester, Gran Bretaña. Fellow del IEEE en 2000.

TUTORIAL (Sep 5, 09:00 - 18:00):

FACTS: its role in the connection of wind power to networks

By Dr. César Angeles-Camacho & Dr. Claudio F. Fuerte-Esquivel

Given the randomness of the wind resource for high levels of penetration, power system stability must be strictly controlled to ensure the security and thus the continuity of electric service. Wind generation is not considered safe in planning calculations for the operation of the power system, coupled with the problem of planning and variability, the inability to store and/or transporting the primary source of energy: wind.

Power electronics is an enabling technology, providing the needed interface between the electrical source and the electrical load. It is a ubiquitous technology which has affected every aspect of electrical power networks, not just transmission but also generation, distribution and utilization. The FACTS concept is based on the incorporation of power electronic devices and methods into the high-voltage side of the network, to make it electronically controllable. Since FACTS devices are able to response quickly to voltage fluctuations and provide dynamic reactive power compensation, there is mounting evidence that they would be very successful when considering the effects of a varying source of energy, such as wind generation, on a network.

Table of Content

1. Introduction
2. Power electronics
3. Flexible ac Transmission Systems – FACTS
4. Wind Generation: Grid Integration Technical Problems
5. FACTS role on Wind Integration to power Systems
6. Study Cases
7. Conclusions

About the proponents:

César Angeles-Camacho was born in México. He obtained the BSc and the MSc degree from the Instituto Tecnológico de Morelia, in Mexico, in 1992 and 2000, respectively. In 2005, he obtained his PhD degree from the University of Glasgow, Glasgow, Scotland. He joined the institute of engineering of the Universidad Nacional Autónoma de México in 2005 as a lecturer and researcher. His research interests include modelling and simulations of FACTS, custom power controllers and Wind Generation – Impact on the Power Networks, Transmission and Distribution System. Claudio R. Fuerte-Esquivel (M'1991, SM'07) received his BEng degree (Hons) from Instituto Tecnológico de Morelia, México in 1990, his M.Sc. degree (Summa Cum Laude) from Instituto Politécnico Nacional, México in 1993, and his Ph.D. degree from the University of Glasgow, Scotland, UK in 1997. Currently, he is a professor at Universidad Michoacana, where his research interests lie in the dynamic and steady-state analysis of FACTS containing Renewable Energy Resources as well as in the interdependency between energy infrastructures.

This tutorial is issued free of charge courtesy of the National Autonomous University of Mexico.

It will be in Spanish with English material, with a duration of 6 hours.

Please register for it at info@ieee-tdla.org

IEEE PES T&D LA 2012

RENEWABLE ENERGIES IN A DEVELOPING CONTINENT

September 3-5, 2012 | MONTEVIDEO URUGUAY



SERRA DE
LOS CARACOLLES
MALDONADO
URUGUAY

ESPONSORES: PATRONS:

www.ute.com.uy  La energía que nos une	www.adme.com.uy 	www.elektrobras.com  Eletrobras
siemens.com.uy 	www.wartsila.com 	www.abb.com 
www.upmuruguay.com.uy 	www.anii.org.uy 	www.saltogrande.org 
www.schandy.com 	www.ursea.gub.uy 	www.alstom.com 
www.sowitec.com 	www.grupojrp.com 	www.enercon.de/en-en/ 