European Commission

Enlargement and Integration Action Activity Workshop on Costs, Benefits and Impact Assessment of Smart Grids for Europe and Beyond

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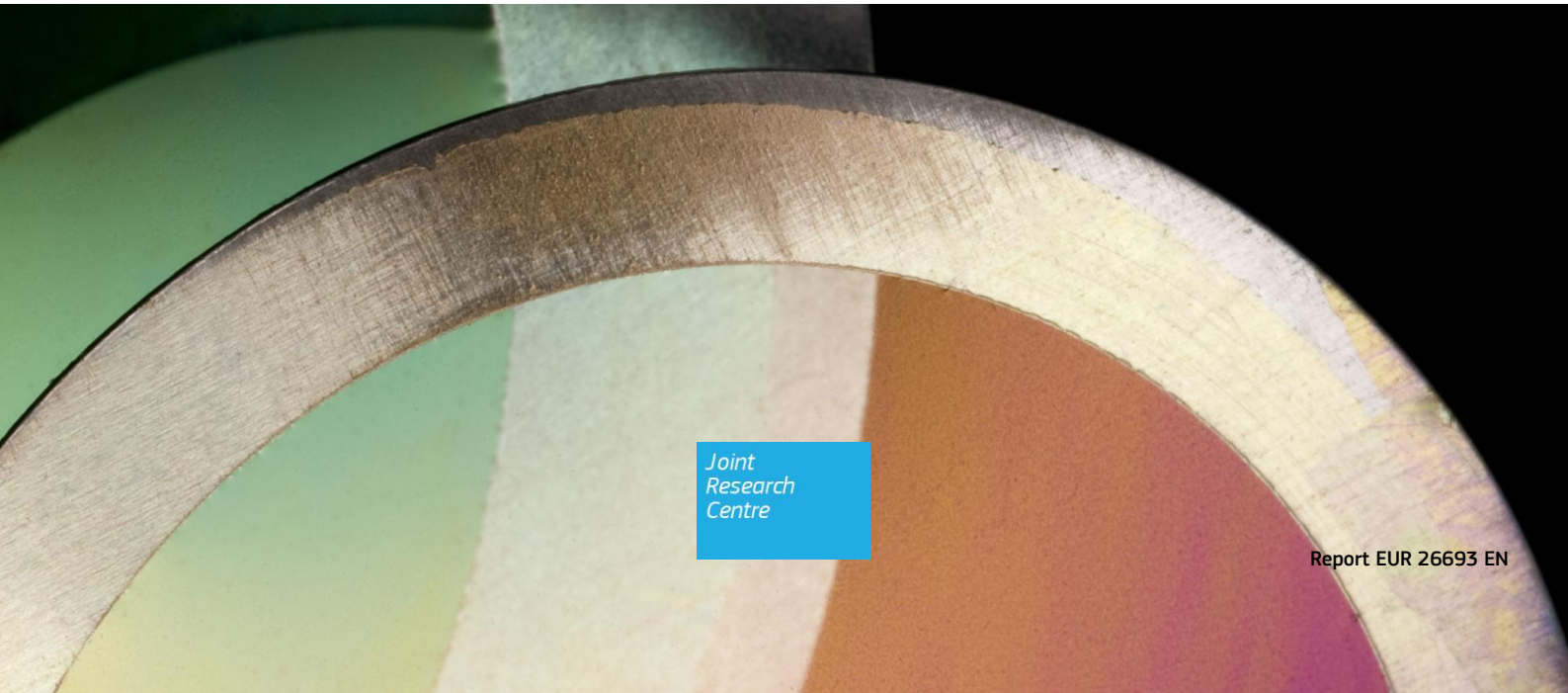
2014



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Abstract

Smart Grids are a key component of the European strategy toward a low-carbon energy future. Growing environmental and energy security concerns represent a major driver for the renovation and improvement of existing energy infrastructure. In this context, Enlargement and Integration countries will have to face substantial investments in the coming years to upgrade and modernise their energy networks towards smart power grids.
Wind and solar electricity retain the greatest potential to contribute and increase the shares of renewable electricity production; however, current electricity transmission and distribution systems do not generally appear adequate to reliably cope with large-scale penetration of such variable renewables based generating plants (whether centralised or distributed). Significant investments will need to be mobilized. Most energy investments are long life and capital intensive, therefore investment decisions taken now will have an impact for many years. When planning the electricity system of the future, it is necessary to adopt an integrated approach to assess the interrelated physical, environmental, cyber, social, economic and policy challenges where a fair allocation of short term costs and long term benefits among different players is a precondition for reducing uncertainties and incentivize investments.
In this context the workshop will discuss how these developments can provide examples and opportunities for E&I countries to build smart grids and will present and discuss approaches and methodologies for cost – benefit analysis that should include all the costs and benefits that smart grid projects can bring to the energy system at large and to society. The workshop will discuss the impacts of smart grids not only in monetary terms, but also through the identification of externalities and social impacts that can result from the implementation of Smart Grid. The workshop will benefit from the on-going experience in Enlargement and Integration Countries on smart grid developments.

Report
of
Enlargement and Integration Action Activity

Workshop
on
Costs, Benefits and Impact Assessment of Smart Grids for Europe and Beyond

23-25 April 2014, Antalya/Turkey

Venue: Ramada Plaza Hotel

Organized by

European Commission, Joint Research Centre, Institute for Energy and Transport

Petten, Netherlands,

http://iet.jrc.ec.europa.eu/

Energy Security Unit

Action: – Smart Electricity Systems and Interoperability (SESI)

http://ses.jrc.ec.europa.eu

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1. Report Summary

European Commission, Enlargement and Integration Action Activity workshop on “Costs, Benefits and Impact Assessment of Smart Grids for Europe and Beyond” started by registration in the morning on 23 April, 2014 between 09:30 and 10:00 at the Ramada Plaza Hotel, Antalya/Turkey.

There were 59 attendees from companies, institutions and universities in 17 different countries, which created necessary conditions for fruitful gathering and discussions. Participants came from Turkey, Algeria, Egypt, Montenegro, Rep. of Macedonia, Romania, Bulgaria, Israel, Russia, Bosnia Herzegovina, Serbia, Croatia and Serbia. There were four Keynote speakers from Netherlands, Hungary, Greece and Belgium.

The three day workshop program was started at 9.00 am and ended at 17.00. There were four sessions every day, two in the morning and two in the afternoon. In total, 33 different topics were presented during three days of JRC workshop.

The very broad range of topics discussed included: theft and loss of energy, wind energy systems, virtual power plants, assessment of smart grid projects, types of wind turbines and their impacts, maximum power transfer, stability problem of grid system, renewable energy capacities in Europe, standards, comparisons of energy demand and production, wavelet technology, SCADA project, automatic meter reading project, meter to cash cycle project, smart grid feasibility project, smart energy aware system project and power line communication (PLC) project of BASKENT DSO, information security issues in smart grid, reducing the theft energy project and social projects of ARAS EDAS DSO, DC energy distribution, DC/AC connection by means of rectifying inverting assembly, real time simulation, electrical vehicles as storage and generator, low/medium/high speed charging systems, electrical vehicle standards, power generation and distribution, efficiency, balance and unbalance systems, power factor corrections, automatic load balancing system, renewable energy, telecommunications, smart grid in cloud, smart energy clouds, advance energy measurement and management system, undersea interconnection between Italy and Montenegro, demand side management, regulated prices and tariffs, self-consumption and peak management potential, energy saving against a margin of illumination, energy storage, STATCOM, active power filtering, multi-level converters, current sharing reactor technique, weight effective and fault tolerant solution, super capacitors, flywheels, batteries, energy modelling, wind power control, matrix converter, field oriented control.

All these subjects were presented by 33 speakers based on the schedule given below on each day. There was a chair person assigned to each session. The participants asked questions to presenters after 15 minutes presentations. In most of the cases, discussions were carried on during coffee breaks.

JRC IET gave an overview of the activities done. The policy support role of JRC was expressed clearly to audience. Then, real time smart grid studies at JRC were followed by cost benefit analysis of smart grids and smart metering in European Union.

The emphasis of the workshop was on practical guidance and information exchange, based on lessons learned and providing instructive examples of successful implementation of smart metering systems and smart power grids, renewable energy integration and cost benefit analysis of smart grids both inside and outside of the EU. To this end, the discussions and questions were mainly concentrated on the smart metering, integration of renewable energies with smart grid, energy policies, energy storage, and vehicle to grid connection, monitoring of grid systems as well as smart houses, vulnerabilities on smart grids, power line communication, information security issues on smart grid, smart energy clouds and modelling of different scenarios of the smart grid systems. Theft and loss of energy were also important part of the workshop discussed by giving examples especially from east part of Turkey and Bulgaria. Particularly intensive and interesting discussion has been conducted on the “Real Time Smart Grid Studies at JRC” and “Cost-Benefit Analysis for Smart Grids and Smart Metering Projects in EU”.

The workshop effectively concluded by promoting fruitful discussions among all participants and the main discussion converged towards identification of critical aspects on the way to successful implementation of costs, benefits and impact assessment of smart grids for the enlarge Europe and beyond.

Some of the highlights include:

Despite technological maturity, one of the most challenging tasks in smart grid development is on the electricity consumer acceptance and effective use of smart metering technology as a necessary step towards smart grid deployment. Other important issues included:

- Data privacy and security on the way to adopt smart metering and smart grid systems
- Standardization to ensure interoperability

- Adequate regulatory mechanisms to allow for proper allocation of benefits among affected stakeholders (i.e. benefits to be properly passed to the consumers).

Lessons learnt from the workshop:

Given the amount of stimulating topics addressed and the exceptional interest of the attendees, the workshop provided effective benefits such as exchange of ideas for all participants coming from companies, universities and institutions. Moreover, it is also important to mention the great contributions and increasing interests of DSOs to JRC workshop and activities.

Workshops feedback received by the attendees:

Vast numbers of important and beneficial reactions were received from the attendees after workshop. They shared their contentment and gratitude for organizing the workshop, and sent their eagerness and wishes for further collaboration with JRC on smart grid.

Different aspects of smart grid starting from production of energy, transmission, distribution, end users, integration with renewable energy, energy storage, smart house, electrical vehicles, smart metering, cost-benefit analysis, environment effects, monitoring, social effects and technological effects were discussed in detail by 59 attendees with 33 presentations which can be found on the web sitehttp://ses.jrc.europa.eu in pdf and ppt formats. Photographs taken during workshop are included on this web site.

2. Material distributed to the Workshop participants

Costs, Benefits and Impact Assessment of Smart Grids for Europe and Beyond

Smart Grids are a key component of the European strategy toward a low-carbon energy future. Growing environmental and energy security concerns represent a major driver for the renovation and improvement of existing energy infrastructure. In this context, Enlargement and Integration countries will have to face substantial investments in the coming years to upgrade and modernise their energy networks towards smart power grids.

Wind and solar electricity retain the greatest potential to contribute and increase the shares of renewable electricity production; however, current electricity transmission and distribution systems do not generally appear adequate to reliably cope with large-scale penetration of such variable renewables based generating plants (whether centralised or distributed). Significant investments will need to be mobilized. Most energy investments are long life and capital intensive, therefore investment decisions taken now will have an impact for many years. When planning the electricity system of the future, it is necessary to adopt an integrated approach to assess the interrelated physical, environmental, cyber, social, economic and policy challenges where a fair allocation of short term costs and long term benefits among different players is a precondition for reducing uncertainties and incentivize investments.

In this context the workshop will discuss how these developments can provide examples and opportunities for E&I countries to build smart grids and will present and discuss approaches and methodologies for cost – benefit analysis that should include all the costs and benefits that smart grid projects can bring to the energy system at large and to society. The workshop will discuss the impacts of smart grids not only in monetary terms, but also through the identification of externalities and social impacts that can result from the implementation of Smart Grid. The workshop will benefit from the on-going experience in Enlargement and Integration Countries on smart grid developments.

3. Participants Profile

Participants will preferably come from national administrations, academia, research institutes and industry. Particularly:

- National energy policy makers,
- National experts on energy, renewable energy, smart grid,
- Peoples from electrical vehicles, energy power systems and its applications,
- Representatives of smart grid products, systems, and services.
- Government institutions (Universities, research centres, colleges, municipalities, etc)
- University professors, students, staff, specialists,

4. Eligible Country List for Workshop

The New Member States

- Bulgaria
- Romania
- Croatia

Candidate Countries

- Iceland
- Montenegro
- Serbia
- The Former Yugoslav Republic of Macedonia
- Turkey

Potential Candidate Countries

- Albania
- Bosnia and Herzegovina
- Kosovo under UN Security Council Resolution 1244

FP7 Associated Countries

- Albania
- Bosnia & Herzegovina
- Croatia
- Faroe Islands
- Iceland
- Israel
- Liechtenstein
- Norway
- Republic of Moldova
- Switzerland
- The Former Yugoslav Republic of Macedonia
- Serbia
- Turkey

European Neighbourhood Policy Countries

- Algeria
- Armenia
- Azerbaijan
- Belarus
- Egypt
- Georgia
- Israel
- Jordan
- Lebanon
- Libya
- Moldova
- Morocco
- Occupied Palestinian Territory
- Syria
- Tunisia
- Ukraine

and

- Russia

5. Schedule

Day 1: Wednesday, 23 April 2014						
09:00-09:30				Petten	Netherlands	Registration
						Moderator: İlhami Çolak
09:30-09:45			JRC	Petten	Netherlands	Welcome, JRC IET
09:45-10:00	İlhami	ÇOLAK	JRC	Petten	Netherlands	Real Time Smart Grid Studies at JRC
10:00-10:30	Silvia L.	VITIELLO	JRC	Petten	Netherlands	Cost Benefit Analyses for Smart Grids and Smart Metering
10:30-11:00	**Coffee Break**					
						Moderator: Şeref Sağıroğlu
11:00-11:15	Halil İbrahim	BÜLBÜL	Gazi University	Ankara	Turkey	Introduction of the GURER Group Studies on Smart Grid
11:15-11:30	Ramazan	BAYINDIR	Gazi University	Ankara	Turkey	
11:30-11:45	Uraz	YAVANOĞLU	Gazi University	Ankara	Turkey	Information Security Issues on Smart Grid
11:45-12:00	Medine	ÇOLAK	Gazi University	Ankara	Turkey	
12:00-12:15	Özlem	MİLLETSEVER	Gazi University	Ankara	Turkey	Energy Investments and Smart Grid Issues of Turkey
12:30-13:30	**Lunch Break**					
						Moderator: Goce Arsov
13:30-14:15	Vincenzo	GIORDANO	Tractebel	Brussels	Belgium	**Keynote Speech:** Assessment of Smart Grid projects
14:15-14:30	Petre-Marian	NICOLAE	University of Craiova	Craiova	Romania	Special Issues on Smart Grid
14:30-14:45	Hacı Mehmet	ŞAHİN	Gazi University	Ankara	Turkey	Effect of University Technology Transfer Offices (TTO) on University-Industry-Government Cooperation with Energy Sector
14:45-15:15	**Coffee Break**					
						Moderator: Marija Mirosevic
15:15-15:30	Abdulkadir	KÖKER	ARAS EDAS	Erzurum	Turkey	Introducing ARAS EDAS Distribution System Operation (DSO) Company
15:30-15:45	Zeljko	TOMSIC	University of Zagreb	Zagreb	Croatia	Virtual Power Plant as a model for competitiveness of small producers and organizers of virtual power plants on the markets for electricity and gas
15:45-16:00	Okan	BENLİ	Baskent Distribution Company (DSO)	Ankara	Turkey	Impact Assessment of Smart Grid Investments and Developments in Turkish Electricity Distribution Sector

Day 2: Thursday, 24 April 2014						
						Moderator: Güngör Bal
09:00-09:45	Constantinos	VOURNAS	National Technical University of Athens	Athens	Greece	**Keynote Speech:** Smart-Grid Aspects in Power Systems Research
09:45-10:00	M. Cengiz	TAPLAMACIOĞLU	Gazi University	Ankara	Turkey	Stability Problem on Smart Grids, Short Review
10:00-10:15	Mohamed Hassan	SAIED	Abu Qir Fertilizers & Chemical Industries Company	Alexandria	Egypt	Offshore wind technology foundations: Challenges and Opportunities
10:30-11:00	**Coffee Break**					
						Moderator: Mehmet Timur Aydemir
11:00-11:15	Constantin	FILOTE	Stefan cel Mare University	Suceava	Romania	Metrics, Costs and Benefits Analysis for Smart Grid Systems
11:15-11:30	Amos	LASKER	AMRAV	Tel Aviv	Israel	Smart Grid in Israel - Cost Benefit Analysis
11:30-11:45	Stanislav	YORDANOV	Technical University of Varna	Varna	Bulgaria	Reduction of grid losses with implementation of SMART metering system
11:45-12:00	Maria	IMECS	Technical University of Cluj-Napoca	Cluj-Napoca	Romania	Power Electronic Converter Controlled Energy Flow – Modelling, Simulation and Implementation
12:30-13:30	**Lunch Break**					
						Moderator: Slobodan Mirchevski
13:30-13:45	Yasser Gaber Abdel-Razek	DESSOUKY	Arab Academy for Science and Technology and Maritime Transport	Alexandria	Egypt	Smart Electric Grids Three-Phase Automatic Load Balancing Applications using Genetic Algorithms
13:45-14:00	Vladimir A.	KATIĆ	University of Novi Sad	Novi Sad	Serbia	Electric Vehicles Energy Supply Infrastructure in an Urban Area
14:00-14:15	Alperen Mustafa	ÇOLAK	Çankaya University	Ankara	Turkey	Power Line Communication System Design and Control for Home Automation
14:15-14:30	Stanimir	STOYANOV VALTCHEV	Faculty of Science and Technology, UNL	Lisbon	Portugal	Renewable Energy and Telecommunications in Smart Grid
14:30-15:00	**Coffee Break**					
						Moderator: İbrahim Sefa
15:00-15:15	Igor	KOVAČEVIĆ	Consultant	Potgorica	Montenegro	The smart energy concept: the demand side potential
15:15-15:30	Melike Selcen	AYAZ	Gazi University	Ankara	Turkey	Cost Benefit Analysis of Wind Turbines in Smart Grid Systems
15:30-15:45	Valery	MELESHIN	CJS "Electro C"	Moscow	Russia	AC and DC Smart Grids in Russia. Technical Solutions in Lighting and Other Applications
15:45-16:00	Maxim	DYBKO	Novosibirsk State Technical University	Novosibirsk	Russia	Multilevel Converters in Parallel Connection for Active Power Filters and Energy Storages for Smart Grids

Day 3: Friday, 25 April 2014						
						Moderator: Youcef Soufi
09:00-09:45	Istwan	NAGY	Budapest Univ. of Technology and Economics	Budapest	Hungary	**Keynote Speech:** Impact Assessment of Microgrids Supplied by Renewable Energy
09:45-10:00	Güzay	PAŞAOĞLU	Istanbul Technical University	Istanbul	Turkey	Large-scale deployment of Electrical Vehicles in Germany by 2030, An analysis of grid-to-vehicle and vehicle-to-grid concepts
10:00-10:15	Sedat	SÜNTER	Firat University	Elazig	Turkey	Wind Turbine Driven Doubly-Fed Induction Generator with Matrix Converter on the Rotor Side
10:15-10:45	**Coffee Break**					
						Moderator: Lale Tükenmez Ergene
10:45-11:30	Paul	BAUER	Technical University	Delft	Netherlands	**Keynote Speech:** Integration of renewable energy sources and electric mobility (storage) in DC networks and future DC transmission grid
11:30-11:45	Ahmed Ali	DAOUD	Port Said University	Port Said - Port Fouad	Egypt	Optimizing Stochastic Economic Dispatch of Wind/Solar DG Grid
11:45-12:00	İlhami	ÇOLAK	JRC	Petten	Netherlands	Discussion and Closing
12:00-13:30	**Lunch Break**					

6. CVs and Abstracts of Presenters

Speaker: İLHAMİ ÇOLAK, JRC, Netherlands

Biography: Ilhami Colak graduated from the Department of Electrical and Electronics Education of Gazi University in 1985. He received his Master of Science (MSc) Degree from the Institute of Science and Technology of Gazi University in 1988 and his Master of Philosophy (MPhil) Degree from the Department of Electrical and Electronics Engineering of Birmingham University in Birmingham, UK in 1991 and his Doctor of Philosophy (PhD) Degree from the Department of Electrical Engineering of Aston University in Birmingham, UK in 1994. He became a full Professor at Gazi University in 2005. He served as a Head of Electrical and Electronics Engineering department, Director of Vocational High Schools. His main research area covers electrical machines, power electronics, distance education, artificial neural networks, alternating energy sources, smart grids and automatic control. He has published around 40 research papers in SCI Journals and more than 110 international conference papers. He is a member of IEEE PES, IAS, IES and PELS. He has been in organizing committee of 16 different international conferences. He is the Editor-in-Chief of International Journal of Renewable Energy Research, IJRER. He is currently working for European Commission Joint Research Centre in Petten, Netherlands until May 1, 2014.

Real Time Smart Grid Studies at JRC

Abstract: Smart grid experimental capabilities to evaluate performance of power networks integrating new generation and storage technologies through hardware/software simulation and benchmark against real cases have been expanded continuously at JRC. A laboratory has been set up equipped with an advanced power system real-time simulator (OPAL-RT eMEGAsim), in order to study transients for high power applications and perform integration tests of complex systems with physical Hardware-in-the-Loop (HIL) simulation. eMEGAsim is scalable from 6 to 64 processors and uses fast 10 Gbits/s communications links, allowing to simulate power system models with small time steps (tens of micro seconds). The real time simulator can be used, among others, for: Large AC Power Grid Simulation, Smart Grids and Electric Vehicles interoperability testing, Global Control development, prototyping and testing, Closed-loop Protection System Testing, Electromagnetic Transient Studies with Multi-terminal HVDC Systems and FACTS, HIL Testing of Physical and Prototype FACTS and HVDC Controllers, Integration Testing of Multiple Voltage Source FACTS and HVDC Systems. Interdependencies and resilience of integrated European power & ICT system with respect to failures caused by different threats and multiple contingencies have also been investigated at JRC.

Speaker: SILVIA L. VITIELLO, JRC, Netherlands

Biography: Silvia Vitiello conducts research on economic and regulatory issues related to smart grids deployment with the "Smart Electricity Systems and Interoperability" group at the European Commission, Institute of Energy and Transport, Joint Research Centre.
She is an economist, with degrees from Università Bocconi, Italy (including a double degree programme issued jointly with HEC Paris, France) and Katholieke Universiteit Leuven, Belgium.
Her experience spans from research institutions, as Fondazione Eni Enrico Mattei and Italian National Energy Agency (ENEA), to public institutions as the Delegation of Lombardy Region to EU and the National Regulatory Authority (AEEG), with her main focus being European electricity markets.

Cost Benefit Analyses for Smart Grids and Smart Metering

Abstract: JRC is among the leading research centres in EU in the application of Cost Benefit Analysis (CBA) to Smart Grid projects. The presentation will focus on the general theoretical framework for Cost Benefit Analysis of power grids and then to the concrete applications to selected cases.
In particular, the first case will deal with the application of CBA to the smart grid project realised in the city of Evora, Portugal.
Then, the presentation will focus on the evaluation through CBA and Key Performance Indicators to the project proposals labelled "Projects of Common Interest".
To conclude, the insights from the process of defining national plans for Smart Metering roll-out, defined through Cost Benefit Analyses, will be presented.

Speaker: Costas VOURNAS, National Technical University of Athens, Greece

Biography: Constantine (Costas) Vournas received the Diploma of Electrical and Mechanical Engineering from the National Technical University of Athens (NTUA) in 1975, the M.Sc in Electrical Engineering from the University of Saskatchewan, Saskatoon, Canada in 1978, and the NTUA Doctor of Engineering degree in 1986. He is currently Professor in the Electrical Energy Systems Laboratory of the School of Electrical and Computer Engineering of NTUA. He has published more than 100 papers in International Journals and Conferences and has co-authored the book “Voltage Stability of Electric Power Systems”. His research interests are in the area of power system dynamics, stability, and control and include voltage stability and security analysis, wind generator integration in power systems, novel control applications in the distribution and transmission grid, as well as the effect of deregulation on power system operation and control. He is Fellow of IEEE since 2005, member of CIGRE and the Technical Chamber of Greece.

Smart-Grid Aspects in Power Systems Research

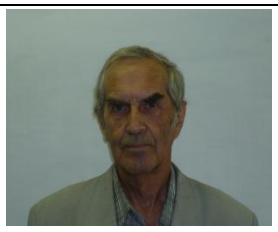
Abstract: This talk outlines some aspects of the speaker’s research, which contribute towards the development of a Smart Grid environment for modern and future power systems. These are:

1. Integration of Renewable Energy Sources and in particular Wind Generation in autonomous and in interconnected power systems. Example studies for the Hellenic Interconnected Power System and for the autonomous power system of the island of Crete are briefly presented. The main conclusion of these studies is that technical problems have technical solutions and thus there exists no pre-specified limit of wind integration based on stability consideration. Of course, as penetration levels

increase, more requirements are set that the Wind Generators have to provide.

2. Revisiting the voltage control practice at the bulk power delivery substations and distribution systems form the point of view of increasing maximum power transfer and voltage stability limits. Novel technologies are available as well as an increasing number of components connected to the grid through power electronics converters that are capable of supplying reactive power and thus voltage control at no (or negligible) extra cost.
3. Voltage stability monitoring and Emergency Control. It is nowadays technically feasible to protect a power system from unexpected severe events that would otherwise lead to system collapse and blackout. Real-time monitoring of instability conditions methods will be presented, as well as methods for system integrity protection through load reduction varying from scheduled demand response to firm load shedding.

Speaker: Valery I. Meleshin, JCS "Electro C", Russia



Biography: Valery Meleshin graduated the Department of Aviation Automatics of Moscow Aviation Institute (Technical University - MAI) in 1960. He received his Doctor of Philosophy (PHD) Degree from Faculty of Electrical and Electronics Engineering of MAI in 1968 and Degree Doctor of Technical Sciences (the second Russian grade) from Moscow Energy Institute, speciality Power Electronics in 1988. He became a Professor of Moscow Aviation Institute in 1991. His main research areas cover power electronics, digital and analogous control of power converters and inverters, investigations of features power devices. V. Meleshin many years has been working with Moscow Aviation Institute as a lecturer and a researcher. He is an author of the books "Transistor Conversion Technique" (in Russian), published by "Technosphera", Moscow, in 2005 and 2006 years and "Control of Power Conversion Designs" (in Russian), published in 2011, the same publishing house. He has published more than 100 works in Russian journals and Proceedings of the largest International Power Electronics Conferences – APECs, TELESCON, INTELEC and others. In nineteenths, almost 10 years he was a chief of the large research group working with the USA companies AT&T and Lucent Technologies in area of power electronics. Two last publications in proceedings of the International Conferences:

V.I. Meleshin and co-authors "Efficient and Adaptive Energy Recycling Load", IECON 2008, p.p. 723-728, Orlando, Florida, U.S.A.

V.I. Meleshin and co-authors "Efficient Three-Level Boost Converter for Various Applications", EPE-PEMC 2012 ECCE Europe, DS1e 9-1-8, Novi Sad Serbia.

He is a member of IEEE PES and PELS. At the moment he works with CJS "Electro C", Moscow, as a Leading Research Officer.

AC and DC Smart Grids in Russia. Technical Solutions in Lighting and Other Applications

Abstract: In the report existing variants and perspective technologies of energy saving in the control nets of Light Smart Grid (LSG) are presented. Actual items of building LSG and economical evaluation different variants of technologies are considered. Perspective technologies for realization of pilot projects have been picked out thoroughly.

Some countries use 3 kV DC voltage for supplying railways. Several auxiliary power converters operating with 3 kV supply line and exploited in modern Russian electrical locomotives are considered. Power systems technology of telecom equipment is facing tough challenges due to efficiency requirements and increasing power density. In the report several technology challenges and trends are briefly discussed.

Speaker: VINCENZO GIORDANO, BELGIUM

Biography: Vincenzo Giordano is a project engineer within the Smart Power System team of Tractebel Engineering. He has eight years of experience in the energy field, with a core expertise on automation and control applications. He has a diverse and rich background with experiences ranging from techno-economic studies and research activities on Smart Grids to the actual implementation of industrial automation projects.

For three and a half years, he worked as project engineer on advanced automation projects (average value 10M€) in petrochemical plants for a multinational engineering company (Technip), contributing to engineering design, project management and field work supervision.

For three years he then worked as scientific officer at the Joint Research Centre (JRC) of the European Commission (EC), where he was in charge of carrying out studies on Smart electricity Grids. In this context, he developed a high-level expertise on Smart Grids and he notably led JRC work on quantitative assessment of Smart Grid projects (cost benefit and KPI analysis in the framework of the EC Smart Grid Task Force) and was the coordinator of the JRC inventory of European Smart Grid projects. In these assignments, he worked in close collaboration with distribution system operators, transmission system operators, regulators and manufacturers at European level. This experience allowed him to gain a broad understanding of the current technical and economic challenges in the transition to a smart electricity system. He has been the leading author of several JRC reports on Smart Grids and has been an invited speaker to Smart Grid conferences.

Since February 2013, Vincenzo has joined Tractebel Engineering in the Smart Power System team where he is providing consulting services as expert on a number of smart grid projects. Notably, he is currently the coordinator of the GdFSuez Smart Observatory, providing a yearly overview of the main trends and developments in the Smart Energy domain worldwide.

Vincenzo holds a Master in Electrical Engineering (2001) and a PhD in Intelligent Systems - Control Engineering (2005) from Politecnico di Bari, Italy. In 2004-2005, he was visiting researcher at the University of Texas and at the Singapore Institute of Manufacturing Technology.

Assessment of Smart Grid projects

Abstract: The presentation will first frame the context by discussing concrete examples of impacts and benefits of Smart Grid implementations and it will then provide case studies of approaches followed to carry out techno-economic assessment of Smart Grid projects.

Speaker: PETRE-MARIAN NICOLAE, ROMANIA

Biography: Petre – Marian Nicolae graduated from the Electrotechnics Faculty of Craiova University in 1982. He received the Ph.D. degree in Electrical Engineering from "Politehnica" University of Bucharest in 1997, and is presently Full Professor (since 2001) in Electrical Engineering, Energetic and Aeronautics Dept., University of Craiova. He served as a Head of Electrical Engineering Department (2004-2011) of Craiova University. He served as a Ph. D. Supervisor (since 2010) and the person in charge in the Doctoral School Council of Engineers (for Ph.D. students and supervisors) – for Electrical Engineering area (at University of Craiova Level) – since 2011. He has worked on distorting and/or non-symmetrical regimes, transient regimes, unconventional technologies, power systems (including system with localized power), power converters and electrical drives for urban transportation systems, power quality, energy efficiency, superconductivity, electromagnetic compatibility, energy sources and smart grids. He was a Director for more than 37 research scientific contracts, including research themes developed in partnership with the industrial companies. He developed some laboratories for teaching purposes (for Electrical Circuits and Data Acquisition Systems in three-phase area, Electromagnetic Compatibility) and for research (Power Quality and Electromagnetic Compatibility, Modelling and Simulation in Electrical Engineering). He has published 45 research papers in SCI Journals, more than 100 international conference papers (55 from them in IEEE Xplore Database (35 in ISI Web of Science)) and 51 papers at national conferences. He is a member (Senior Member since 1999) of IEEE IAS, EMC, IMS, IES, VTC and PES. He is a member of more Technical Committees from IEEE EMC Society (e.g. TC 7 – Low Frequency). He has been a reviewer as a member in the team of reviewers for IEEE Power and Energy Society: reviewer for publications IEEE Transactions on Energy Conversion (since 2000), IEEE Transactions on Power Systems (since 2003), and IEEE Transactions on Power Delivery (since 2004). He served as a member in Editorial Board at the Journal of Circuits, Systems, and Computers (2011-2012). He is the Coordinator of the research team and the Coordinator of Research Center of Electrotechnics in Transportation and Energy Efficiency - ELTRES. He was rewarded with the Romanian Academy Prize in 2000, and respectively with the Romanian Engineers Association Prize in 1998. In 2005 and 2006 he and the team coordinated by him was rewarded with the "Prize for Excellence in Scientific Research" by the National Authority for Research. He received John Howard Memorial University Grant Award from IEEE EMC Society in 2012. He is currently working for European Commission as Expert for HORIZON 2020.

Special Issues on Smart Grid

Abstract: Building smart grids for energy transmission must take into account the wider range of consumers considering both the consumed powers and respectively the frequency used by consumers. The issues raised by electromagnetic interferences associated to the new smart grids should be solved by the new architecture. They should consider both the power sources (not only the renewable ones, but also the classic ones), transportation grids, stations/substations for transformation and consumers. New challenges related to smart grids' simulation, their integration in the economic and social environment and the solving of some problems of electromagnetic compatibility and biocompatibility should also be considered. The connection of new consumers to grid (e.g. batteries for electrical vehicles, urban transportation systems with electrical drives, electrical trains etc.) represent the cause for new problems of power quality in smart grids and are associated to problems of low frequency Electromagnetic Compatibility. The lack of appropriate norms for the frequency ranges 2 (3) kHz....9 kHz or 150 kHz generate the required frame for issuing new research directions, such as: standardization for the mentioned frequency range, finding new solutions for the unpleasant effects' diminishing, creating an appropriate electromagnetic environment for human beings. There will be presented some aspects related to non-sinusoidal regimes which occur in the transformation chain from power sources to supplying substations used at public transportation systems. Some compensation measures will be discussed.

Speaker: URAZ YAVANOGLU and MEDINE COLAK, GUTIC, Turkey

Biography: Uraz YAVANOGLU was born in Ankara, capital city of Turkey. He is research assistant of Gazi University Department of Computer Engineering. He received his M.Sc. degree from Gazi University Department of Computer Engineering and still continues his Ph.D. in Gazi University Faculty of Technology. His research interests are Artificial Intelligence, Data Mining, Information Security, Forensic Analysis and Computer Graphics. He is leading researcher of Gazi University Technology and Innovation Center (GUTIC).

Biography: Medine COLAK was born in Ankara, Turkey. She has received BSc degree from Cankaya University Department of Computer Engineering and currently continues her M.Sc. in Gazi University Department of Computer Engineering. Her research interests are Information Security, Artificial Neural Networks, Pattern Recognition, and Biometrics. She is a researcher of Gazi University Technology and Innovation Center (GUTIC).

Information Security Issues on Smart Grid

Abstract: This presentation addresses security issues in smart grid and related subjects. Security concerns become integral part of the life. In smart grid, technological opportunities bring simplicity, stability and reliability in many ways. Nowadays, we processed our highly secure data on cloud, developed secure software for power plants, try to stop industrial espionage over internet, design reliable structures with standardization, overcome vulnerabilities in enterprise networks. By the way, security concerns are highly volatile topic in smart grid field. Governments try to prevent cyber-attacks from rest of the world. There are ongoing researches about Cyber security capability maturity model, Cyber security risk management, counter terrorism, household security, threats etc. The presentation discussed benefits and cost analysis of smart grids in perspective of cyber security risks assessments. Participants have opportunity to get security awareness and gain experience from experts to protect energy resources, production, distribution and management.

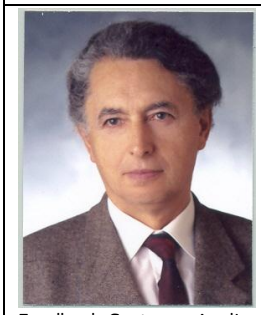
Speaker: Ozlem MILLETSEVER, Turkey

Biography: Ozlem MILETSEVER was born in Ankara, Turkey. She received her B.Sc. degree from Gazi University Department of Computer Engineering. Her research interests are Information Security, Pattern Recognition, Biometric and Artificial Neural Networks. She is pursuing MSc. degree in Hacettepe University Department of Computer Engineering and double MSc. in Gazi University Department of Computer Engineering. She is also researcher in Gazi University Technology and Innovation Center also known as GUTIC.

Energy Investments and Smart Grid Issues of Turkey

Abstract: This presentation address smart grid on economic aspects of Turkey's energy investments. Energy is an important need for the economic development of the country. The energy requirements are increased due to population growth of Turkey. It was decided that this study is done after these requirements and Turkey energy policy were evaluated. 3 topics were discussed for the system. Natural gas, export, and transmission line length are estimated by developed decision support system. These resources and management skills are highly important for smart grid operations. Smart grid is an intelligent structure in production, distribution and management for energy security such as protection of natural resources. This presentation discussed smart grid costs and possible investments of Turkey Electricity Distribution Company and its benefits.

Speaker: ISTVÁN NAGY, BUTE, Hungary



Biography: He studied at the Technical University of Budapest (TUB), 1949-53. He earned the degree of Diploma Electrical Engineer with distinction (corresponding to MSc degree) in Faculty of Electrical Engineering, TUB. He continued his study at TUB for three more years from 1953 to 1956 as PhD student in English terminology and earned the degree of Candidate of Technical Sciences from the National Scientific Qualification Board (NSQB). He received the degree of Doctor Tech. from TUB in 1960. After submitting his dissertation and thesis he was bestowed the degree of Doctor of Technical Sciences again by the NSQB in 1975. He was elected as corresponding member of the Hungarian Academy of Sciences (HAS) in 1993 and as full member of HAS in 1998. He was associated with the Research Institute of Automation and Computation, HAS from 1957 to 1990 first in full time but from 1976 only in part time. First he was a research worker later head of the Department of Power Electronics. He was appointed as full professor at TUB in 1975 and was head of the Department of Electrical Engineering from 1976 to 1996. His main research area Power Electronics, Automatic Electric Drives, Variable Structure Nonlinear Feedback Systems, Application of Bifurcation and Chaos Theory He has published 8 in Hungarian (H), Handbooks: (Contributor) 6 in English (E), 5 published in USA, 1 published in Japan and 1 in (H). Referred papers in Archival Journals are as follows: 44 in (E) and 39 in (H). Papers in technical Conference Proceedings: more than 200 in (E) and 12 in (H). Nonscientific Journal papers around 20. Patents: 13 (H). Technical reports: 34 in (H). Lectures abroad at Universities and Industries: 84. He has more than 700 known independent citations for his publications. His a member of IEEE PES, IAS, IES and PELS. President of the Hungarian CIGRÉ Committee, Member of the CIGRÉ Society based in Paris, France; Chairman of PEMC-Council based in Budapest, Hungary; Member of the European Power Electronics (EPE). Membership in Journal Editorial Boards: ICRERA; Praise Worthy Prize.

Impact Assessment of Microgrids Supplied by Renewable Energy

Abstract: First the presentation lists the reasons of growing interest for renewable energies including wind, solar, hydraulic, biomass, geothermal etc. energies dealing with their theoretical limitation and technical feasibilities in global sense. Many trends are becoming apparent in electric distribution driven from both the demand side where better reliability and efficiency are desired, and from the supply side where the integration of generation from renewables and peak shaving have to be accommodated. One main trends is the application of Microgrid Renewable (MR, Green) systems. MR systems are cluster of micro sources, storages and loads, many cases controllable loads. Microgrid Renewable Distribution System connected to a local utility power grid can incorporate various energy sources beside the ones just mentioned such as fuel cell, internal combustion engines, micro turbines, energy from CHP, hydro, tidal and wave energies etc. to supply local loads and interchange energy with Smart grid.

The presentation addresses the control of MR. There are three main aggregate control features connected with MR. The first one coordinates the controllable entities of MR. It incorporates power limit control, power frequency control and ramp rate limit control. The second control features are in stand-alone mode when the distribution of active and reactive power among the sources and loads, the stable operation have to be taken care of. Usually the voltage regulation is performed by voltage droop and the power sharing by frequency droop. Finally most cases the connection is done via power converters when required bidirectional ones providing the highly desired individual control.

After surveying the global wind and photovoltaic installations and their exponential growth, the main solution and the control of the turbine and generator side are briefly treated in the wind power. In the photovoltaic field the cell technologies, their efficiency, lifespan, applications, the limitations of their application in distribution networks are discussed together with solar power stations.

Speaker: PAVOL BAUER, TU DELFT, Netherlands

Biography: Pavol Bauer received his Masters in Electrical Engineering at the Technical University of Kosice ('85), Ph.D. from Delft University of Technology ('95) and title prof. from the president of Czech Republic at the Brno University of Technology (2008). Since 1990 he is with Delft University of Technology, currently holding position of a head of DC systems and Storage group. From 2002 to 2003 he was working partially at KEMA (Arnhem) on different projects related to power electronics applications in power systems. P. Bauer published over 60 journal and 300 conference papers in his field (with H factor 22), he is an author or co-author of 6 books, he holds international patents and organized several tutorials at the international conferences. He has worked on many projects for industry concerning wind power, power electronic applications for power systems such as Smarttrafo etc. and participated in several Leonardo da Vinci EU projects as project partner (ELINA, INETELE, E-Pragmatic) and coordinator (PEMCWebLab.com-Edipe, SustEner). He is a Senior Member of the IEEE, former chairman of Benelux IEEE Joint IAS/PELS/PES chapter, member of the Power Electronics and

Motion Control (EPE-PEMC) council, Member of the Executive Committee of European Power Electronics Association (EPE) and also member of international steering committee at numerous conferences.

Integration of Renewable Energy Sources and Electric Mobility (storage) in DC Networks and Future DC Transmission Grid

Abstract: DC versus AC connection for integration of renewable energy sources and storage (Electric Vehicles) is addressed in the presentation. Several examples of DC grids and systems with high efficiency will be shown. Development of power electronics technology for DC grids and challenges , solutions and challenges for Electric mobility (charging with renewable energy, inductive charging) related to smart cities are suggested. DC systems and (micro) grids for integration of Renewable Energy Sources and Energy Storage in applications such as smart (green) cities; electric mobility; utilization, reliability and controllability of DC grids are briefly discussed. HV/MV DC Transmission Networks for large scale implementation of Renewable Energy Sources (solar, wind, wave), optimization and controllability of HVDC transmission grids are addressed too.

Speaker: SEDAT SÜNTER, Firat University, TURKEY

Biography: Sedat Sünter graduated from the Department of Electrical Engineering of Firat University in 1986. He received his Master of Science (MSc) Degree from the Institute of Science and Technology of Firat University in 1989. He studied at The University of Nottingham, UK and received a PhD degree in Electrical and Electronic Engineering working in the area of power electronic systems in 1995. He became a full Professor at Firat University in 2006. He served as a Vice Dean of Engineering Faculty in Firat University. He is the group leader of Electrical Machines. His main research area covers Power electronic converters (especially matrix converters and multi-level converters) and modulation strategies, variable speed drive systems, modelling and simulation. He has published more than 60 research papers and conference papers in SCI Journals and national and international conferences.

Wind Turbine Driven Doubly-Fed Induction Generator with Matrix Converter on the Rotor Side

Abstract: A wind energy conversion system which consists of a variable speed wind turbine with doubly-fed induction generator (DFIG) fed by a matrix converter is considered. Stator of the wind turbine driven generator is directly connected to the grid while the rotor is connected via slip-rings to the output of a matrix converter. The matrix converter is supplied from the grid and replaces the conventional two back-to-back converters used for the control of a DFIG. Modeling of the energy conversion system considers super-synchronous and sub-synchronous operating conditions which are achieved by means of the matrix converter. In order to decouple the active and reactive power, stator field oriented control is applied. Speed mode control is adopted for maximum wind energy extraction, provided that the wind speed and pitch angle of the turbine are known for each sampling period. Consequently, a 2-D lookup table calculating the reference speed by means of interpolation/extrapolation is introduced. Promising simulation results demonstrating the control performance of the wind energy conversion system are presented.

Speaker: Ahmed Daoud, PICO, PSU, Egypt

Biography: Ahmed Daoud graduated from the Department of Electrical Power Engineering of Suez Canal University, Egypt in 1991. He received his Master of Science (MSc) Degree from faculty of engineering, Suez Canal University in 1996 and his Ph.D. Degree from the Department of Electrical Engineering of Suez Canal University with a joint supervision of Arizona State University, EE Dept., USA in 2002. He served as a project coordinator at EE dept., Arizona State University for NSF funded project "Prediction Agent for Power system Stability". He also participated in SPID project of EPRI (1999-2001). He was a power system laboratory designer. He is the coordinator of EU funded research at Port Said University (PSU). He is also the executive director of Port Said University International Collaboration Office (PICO). He is a consultant for ILO office in Egypt. He participated in many conference and workshops. His research interests includes: Network analysis, power system stability, distributed generation, renewable energy sources, smart grids, power system economics and computer application in power system. He also interested in Entrepreneurship and Social Entrepreneurship. He has published around 20 research papers in refereed Journals and international conferences. He has been in organizing committee of 5 different international conferences. He is a chapter author for International Labor Organization (ILO) social entrepreneurship training manual.

Optimizing Stochastic Economic Dispatch of Wind/Solar DG Grid

Abstract: In solving the electrical power system economic dispatch (ED) problem, the goal is to find the optimal allocation of output power among the various generators available to serve the system load. Keen interest in the development of renewable distributed generation (DG) has been observed worldwide. This paper develops a model to include both the wind/solar in the non-convex and complex ED problem. To better represent the conditions in real power systems, the model takes into account cost of modern thermal units with multiple valves and factors for both overestimation and underestimation of available wind and photovoltaic power. In this study, particle swarm optimization (PSO) algorithm has been implemented to obtain the minimum cost of power delivered by the DG grid. The costs of both wind and solar power include weighted cost that depends on the stochastic nature of wind speed and solar irradiance, penalty costs for not using all available power and reserve requirement costs due to the available power being less than scheduled power. Since the wind speed and solar irradiance are random variables, a weibull probability density function (pdf) is utilized to represent their stochastic nature. The optimization problem is numerically solved for two cases involving three non-convex conventional generators, two wind generators and two PV generators in order to show the feasibility of proposed framework. The results show that the total system cost depends on factors of weibull pdf for both wind energy conversion system (WECS) and photovoltaic system (PVS).

Speaker: Prof. VLADIMIR KATIC, University of Novi Sad, Serbia

Biography: Prof. VLADIMIR KATIĆ, Ph.D. is a Professor of the University of Novi Sad, the Faculty of Technical Sciences, Novi Sad, Serbia. He received B.Sc. degree from University of Novi Sad in 1978, and M.Sc. and Ph.D. degrees from University of Belgrade in 1981 and 1991, respectively, all in Electrical Engineering. From 1978 he is with the Faculty of Technical Sciences, University of Novi Sad, where he is currently Professor, Head of the Power Electronics and Converters Group and Vice-Dean.

He is the author or co-author of several scientific monograph and text books: "Real-Time Modelling of Power Electronics Converters" (2011), "Power Quality" (2007), "Renewable Sources of Electrical Energy" (2007), "Microprocessor Applications in Power Engineering" (2006), "Control of Power Converters" (2006), "Electric Power Quality - Harmonics" (2002), etc. Prof. Katić published research results in more than 400 scientific papers as author or co-author in international and national journals and conferences proceedings. He has participated or was the main researcher in 54 national and international R&D projects. He is in the Editorial Boards of several scientific journals, reviewer of many the most prestigious journals and Member of Program or Steering Committees of more than 75 International Conferences around the World. He chaired numerous international and national conferences, among which EPE-PEMC 2012 ECCE Europe and International Symposium on Power Electronics – Ee are the most known.

Prof. Katić is a Senior Member of the IEEE (USA). He is also Founder and the President of the Power Electronic Society of Serbia (Novi Sad, Serbia), a Member of European Power Electronics Association (EPE) Executive Council (Brussels, Belgium), a Member of Power Electronics and Motion Control (PEMC) Executive Council (Budapest, Hungary), a Member of the Presidency of National Society of ETRAN (Belgrade, Serbia), a Member of Board of Directors of the European University Foundation, a Member of CIGRE (Paris, France) and National Committee of CIGRE (Belgrade, Serbia), and a Founder and a Member of the Executive Board of National Committee of CIRED (Novi Sad, Serbia).

The main fields of scientific and research interest of Prof. Katić are power quality, renewable energy sources, power electronics, electric vehicles and transportation and standardization in electrical engineering.

Electric Vehicles Energy Supply Infrastructure in an Urban Area

Abstract: Electric propulsion in passenger vehicles is seen as a way for environmental protection, decreasing of GHG emission and wider introduction of distributed energy sources in future smart grids. For faster spreading of electric vehicles (EV) usage, electric energy supply infrastructure need to be built and available. In the presentation, an urban area is considered for distributing of number of EV chargers with different charging modes (from slow, medium to fast charging). A method for public chargers location and distribution will be presented. Two sub-urban areas are considered – city centre and collective settlement area. In both cases, nowadays driver habits in driving and parking are taken into account, as well as duration of public parking usage. Further on, actual electric distribution network and transformer stations position and size are considered as a part of charging infrastructure. The usage of electric car batteries as a public storage units and their application as distributed generators as a part of smart grids will be considered, also. The presentation will be addressed to case study of Novi Sad city.

Speaker: Yasser Gaber Dessouky, AASTMT, Egypt

Biography: Yasser Gaber A. Dessouky is the director of scientific research, innovation and technology transfer in the Arab Academy for Science, Technology and Maritime Transport, AASTMT, Alexandria Egypt. He is a professor in the Electrical and Control Engineering in (AASTMT) since 2006. He got his Ph.D. from Heriot-Watt University, UK in July 1998. He was the Vice Dean for International Affairs from August 2008 to Jan. 2011, and the Program Chair, Electrical & Control Eng. Department from Feb. 2011 to Sept. 2012. He is the AASTMT focal point to the Ministry of Scientific Research, RDIN. He is a Senior Member in IEEE and Member in IET, the Chair of Industry Relations Subcommittee, IEEE Alexandria and the representative, BEIE/IET Alexandria Subsection. He is Member of the board of Reseau Mediterraneen des Ecoles d'Ingenieurs (RMEI), France. Professor Dessouky is an Editorial board member for many Journals and a consultant with the two Industrial Companies, Alexandria. He is a leading and working in many Scientific Research projects such as one ErAfrica, one RDI and two Tempus Projects funded by the EU. He has a patent from the Patent Office in UK. He supervised many MSc and PhD projects and Peer Reviewed in many international journals, Transactions and Conferences. He has more than 50 papers in international conferences and journals.

Smart Electric Grids Three-Phase Automatic Load Balancing Applications using Genetic Algorithms

Abstract: Smart Electrical Grids require nowadays a large interest in the electrical load distribution balancing problem.
This problem is a well-known for not having an optimal solution for large-scale systems, where the number of single phase consumers connected to three phase systems increases especially in very large-scale electrical distribution systems.
This presentation presents a new control technique for an automatic circuit phase change as well as an optimization approach using Genetic Algorithms (GA) used to enhance the solution of electrical load distribution balancing problem. In the first part of the presentation, the system under study is introduced, as well as the various solutions adopted. In the second part, a GA formulation and implementation of the solution is presented. The efficiency of the GA solution is also discussed.

Speaker: Guzay Pasaoglu, Istanbul Technical University, Turkey

Biography: Guzay Pasaoglu is currently Assistant Professor in Istanbul Technical University, Institute for Energy. Previously she worked 4 years, between 2008 and 2013, as a Scientific Researcher at the European Commission, DG Joint Research Center, Institute for Energy and Transport. She has PhD degree from the Department of the Industrial Engineering, Bogazici University. She has been mainly involved in the integrated assessment of energy technology innovations in power markets and road transportation and its impact on policy making. Her activities include scientific and technical research and integrated energy-environment-economy modelling.

Large-scale Deployment of Electrical Vehicles in Germany by 2030, an Analysis of Grid-to-Vehicle and Vehicle-to-Grid Concepts

Abstract: This study analyses the impact of battery electric vehicles (BEV) on the future German power system, and to that, it projects the BEV hourly load profile by car size (mini, small, compact and big).By means of an optimization power plant dispatching model, the study assesses the optimal BEV charging/discharging strategies through grid-to-vehicle (G2V) and vehicle-to-grid (V2G) schemes. Two scenarios are tested, assuming1.1 million passenger cars in 2030 (low case) and 4.8 million cars (high case). Results show that the additional 2% of power demand required to power these BEV does not hamper the system stability provided an optimal scheme G2V is applied. Moreover, such BEV deployment can contribute to further integrate wind and solar power generation. Applying a V2G scheme would increase capacity factors of base and mid load power plants, a higher integration of intermittent renewables, resulting in a decrease in the system costs. The evaluation of the profitability of BEV shows that applying V2G schemes are not viable economic options due to high battery investment cost. Car owners would obtain modest profits up to 6 euros by year and even losses for a higher number of BEVs,for scale reasons. For BEV to become part of the power system, further incentives would be necessary to make the business model attractive to car owners.

Speaker: IGOR KOVACEVIC, Consultant, Podgorica, Montenegro

Biography: Dr. Igor Kovacevic is independent consultant in sustainable energy. His experience is coming from private and public sectors to research institutions across Europe. His fields of specialization are: energy, renewable energy and energy efficiency, heat and mass transfer, whereas scientific fields are: phase-change processes, modeling and simulations and numerical methods. He graduated at the Faculty for Mech. Eng. of the Univ. of Montenegro with focus on energy fields. Mr. Kovacevic received his M.Sc. at the Faculty for Mech. Eng. of the Univ. of Ljubljana with focus on Energy storage. He was a researcher in the Lab. for Multiphase Processes of the Univ. of Nova Gorica, where he received his D.Sc. in the field of numeric modeling of phased transformations in aluminum alloys. During the period 2008-2012, Dr. Kovacevic was the Head of the Department for RES and EE in Government of Montenegro. He created some of the first procedures for development of RES projects in Montenegro, as well as RES and EE legislations and contributed to the preparation of key policy strategies and plans for Montenegrin energy sector. Among other, dr. Kovacevic was in Board of Governors - JRC in the name of Montenegro. Dr. Kovacevic published c/a 20 scientific and conference papers in advanced numerical methods and modeling of phase transformations in materials with the citation index c/a 40. Further, he has had a large number of lectures related to energy at the international conferences, forums and seminars.

The smart Energy Concept: the Demand Side Potential

Abstract: The short overview of energy sector in Montenegro is presented. Montenegro, as the constructing party of the Energy Community and the candidate country for European Union, is under the extensive reform in energy sector. The one of the major project in electricity is replacing the old measurement equipment with a new, and smart one. Elektroprivreda AD, as the major player in energy sector, has been continuously developing the distribution system with establishing of advanced measurement infrastructure for distinct reading and management. Advanced measurement infrastructure recently established in Montenegro is demonstrated and the its capabilities are presented. Possibilities for advanced measurement management for distribution system, on the one side, and the final consumers, on the other, are presented. The link with decentralized alternative electricity generation with the new advanced distribution infrastructure is explained

Speaker: Abdulkadir KÖKER, Aras EDAS, Turkey

Biography: Abdulkadir KÖKER graduated from the Department of Electronic Engineering of Kayseri Erciyes University in 1984. He served as a member of board and supervisory, one of the first private electricity distribution company of Turkey, Electricity Turkish Corporation Company (KCETAS) between 1995 and 1999. His main field covers SCADA, master planning ve geographic information system (CBS) and remote indicating electrical counter. He served as the project manager of private hospital, call center, OSB infrastructure project management and application. He served as a member of board Boğaziçi Electricity Distribution Company (BEDAŞ) between 2012 and 2013.
He is currently working as the General Manager of Aras EDAŞ since 23.07.2013.

Introducing ARAS EDAS Distribution System Operation (DSO) Company

Abstract: The size of region, number of subscribers, electricity consumption, subscriber's profile, investment needs of region and the investments, improve the quality of services, regional sustainability approach and our targets.

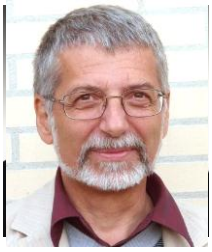
Speaker: CONSTANTIN FILOTE, Stefan cel Mare University, Romania

Biography: Constantin Filote received a B.Sc. diploma in Electronics and Telecommunications, in 1988, and Ph.D. degree in Electrical Engineering, in 1997, from "Gh Asachi" Technical University of Iassy. In 1992, he joined the Department of Electrical Engineering and Computer Science of Stefan cel Mare University of Suceava, Romania, where he is currently Associate Professor, since 1998. He served as a Head of Computer Science and Automation Department (1998-2004), Vice-Dean of Electrical Engineering and Computer Science Faculty (2004-2008), and president of Higher education, Quality and Strategy Commission of the Senate of Stefan cel Mare University, since 2008. His main research area covers power electronics, digital signal processing, renewable energy sources, power quality, smart grids and robust control. He is author and coauthor of more than 100 technical papers published in scientific conference proceedings and journals (44 ISI Web of Science), 1 national patent (CNCS prize), 1 EPO patent application, 10 OSIM application patents, and 9 books and book chapters. He is member of IEEE PES, IAS, IES, PELS and Romanian Inventors Federation. He has worked as project manager and researcher in several national and international research grants (FP7, LIFE+, EUROSTARS, EUREKA, CBC).

Metrics, Costs and Benefits Analysis for Smart Grid Systems

Summary: The Smart Grid Systems cover five Smart Grids Architecture Model (SGAM) interoperability layers: Business, Function, Information, Communication, and Component. The Smart Grid Plane is defined for the application of the Smart Grid Conceptual Model according to the principle of separating the Electrical Process (Bulk Generation, Transmission, Distribution, Distributed Energy Resources-DER, and Customers Premises), and the Information Management (Process, Field, Station, Operation, and Enterprise).
The Transmission System Operators (TSO) and Distribution System Operator (DSO) should be able to obtain flexibility from DER and consumers to solve grid constrains. There are significant challenges in attempting to collect field information to determine the benefits of Smart Grid, convert the information in metrics, compare the benefit with the cost (benefit-to-cost ration) and build new business case.
We believe that for variation system conditions a "traffic-light" concept could be used to select the appropriate actions. Under normal "green light" conditions, market procedure will be used by the DSOs to operate. In insecure "yellow light" states, a set of market-based procedures will be used by the DSOs to adapt the production and/or consumption to the smart grid situation. Direct load management or emergency DER should be undertaken by DSOs, in emergency "red-light" conditions.
At Stefan cel Mare University, we have developed the same applications of IEC 61499 connected with IEC 61850, to introduce system level design for control in smart grid systems. The Function Blocks (FB) is a specific builder for Intelligent Electronic Devices (IED). The electrical schemes are simulated in real time, with MATLAB, to be connected and interfaced with FB of the IEC 61499 standards. Such an interface among graphical blocks of Simulink from MATLAB, and FB from IEC 61499 will simplify the design and implementation of control algorithms in smart grids systems.

Speaker: STANIMIR VALTCHEV, FCT/UNL, Portugal



Biography: S. Valtchev had multifaceted professional route. In 1974 he was awarded as the best graduate in the Technical University Sofia (TUS). Later he serviced military radars and lead projects involving cardio signals and therapy by deeply applied HF interference. In 1977 he returned to TUS, constructing highly stabilized HV laser supplies. In 1980-1987 he worked in the Laboratory for Robots of TUS being also Assistant Director of the Centre of Robotics (i.e. Faculty of Robotics), constructing uninterruptible power supplies, measuring equipment, etc. During 1987 and 1991-1992 he worked in TU Delft, as Assistant Professor. Since 1988 he taught at TUS Power Supply and Power Converters, being Vice Dean, responsible for the international students of TUS. Working on high-frequency resonant power converters published in numerous conferences and journals (IEEE Meritorious Paper Award, 1997). In 1994 he was invited to Portugal to lead a project, finished at a high scientific level, originating many promotions in Lisbon (IST). He lives in Portugal, teaching various subjects, consulting various institutions in Portugal, Bulgaria, Russian Federation and in the Netherlands, editor of university journals abroad, organizer of conferences, reviewer of IEEE Transactions, invited full professor in Bulgaria. His research includes energy conversion at various power levels, energy harvesting, wireless energy transfer, electric vehicles, energy management and storage, some radar technology and biosensors. He is fluent in English, Dutch, Portuguese, Russian, and Bulgarian with some knowledge in other languages.

Renewable Energy and Telecommunications in Smart Grid

Abstract: Since the early XIX century, the technology progress was accented on the communication: the telephone invented before the HV transformer, the radio - before the wireless energy... It is time to join the worldwide web of computers, the cloud computing, the huge databases, all this technology to the energy necessities. The modern communications with their zettabyte pace need to help now the energy system. The bad news is that the energy system is still operating roughly as the computing of a 1950s UNIVAC, but the good news is that the INTELEC specialists know how to do this in the Telecom Energy world. Now the INTELEC society is obliged to apply the knowledge to the energy system. The telecommunications have the instrument for interconnection of different energy players; the energy production is more and more distributed and individualized because of the renewable energy production. Being the renewable energy an important fundament of the telecommunication power supplies (AC and DC), together with the unavoidable energy storage, it is natural that the hybrid power supplies in the telecom world are models of future smart grids that everybody talks of, but we still have our centralized energy system. Here an effort is done to concentrate the attention of the colleagues on the topics discussed at the last INTELEC conferences and not only there...

Speaker: Alperen Mustafa COLAK, Cankaya University, Turkey

Biography: Biography: Alperen Mustafa Colak was born in Birmingham, England. He is a student at Cankaya University. His department is electronic and communication engineer. His research interests are Information Security, Smart Grid Cards, Power Line Communication, Renewable energy.

Power Line Communication System Design and Control for Home Automation

Abstract: Power line communication (PLC) is a technique that transfers data through an established electrical network. System uses the current electrical cables to provide data transfer between transmitter and receiver systems. By this way, there is no need to use an additional wireless or wired system. Input is given and output is obtained from the socket in electrical network. Thanks to this system, the automation of devices that are used in offices such as air-conditioner, refrigerator, lightening, etc. is provided. This study is carried out by simulating a DA motor's control on an energy network. 140 kHz transmitter and receiver are designed for this study. Microcontroller controlled simulation studies are carried out by a programme which was prepared in CCS C programming language

Speaker: Amos LASKER, Israeli Smart Energy Association, Israil

Biography: Amos LASKER, founding partner of Amrav, and Chairman of the Israeli Smart Energy Association (ISEA) has enormous professional experience in the energy, utilities, telecommunications and high-tech fields. Prior to the creation of Amrav he served as President & CEO of the Israel Electric Company. He also founded and directed a number of prominent Israeli telecommunications companies, including The Med Group, Globescom, and Gvanim Cable TV. Amos has held management roles at a number of leading companies, including Keren Electronics, Telrad Industries, and Israel Aircraft Industries. Amos holds a B.A. in Economics, an M.A. in the Philosophy of Science and an M.B.A. from Tel Aviv University. Additionally, Amos has served on the boards of directors of various companies, primarily in the telecommunications and energy sectors.

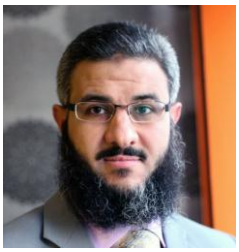
Smart Grid in Israel - Cost Benefit Analysis

Abstract: The Israeli Smart Energy Association (ISEA) took upon itself to prepare a comprehensive document analyzing all aspects of the Enhanced Smart Meter deployment: Technology, Engineering, Regulation, Legal, Marketing, Economic (CBA), and role of the local industry.

This paper was prepared by ISEA members on a voluntary basis. It was not financed by any stakeholder nor sponsored by any governmental or private entity.

The CBA report examines the implementation of enhanced smart metering in Israel. The report serves this purpose by providing a coherent assessment of the quantifiable costs and benefits related to a nation-wide enhanced smart metering deployment in Israel. The use of the term enhanced points to the content of the entire system, specifically (1) smart meters, (2) communication components enabling real time, two ways communication the consumer and the infrastructure, (3) support software systems including billing system, (4) use of feedback enabling technology and (5) new and advanced tariff systems that embeds the potential of consumption pattern changes. The report includes: Macro assumptions and methodology, Capex, OPEX, Benefits, results in terms of MPV & IRR, and sensitivity analysis.

Speaker: MOHAMED SAIED, Abu Qir Fertilizers Co. (AFC), Egypt



Biography: Mohamed Saied was born in K. El-Sheikh, Egypt, on 1973. He graduated from the Electrical Engineering Dept., Faculty of Engineering, Alexandria University, Egypt in 1995. By July 2000, he got his M.Sc. degree, and by July 2007 he received the Ph.D. degree from the same department. His PhD specialty is the direct torque control of induction machines using multilevel inverters. By April, 2010, Dr. Mohamed finished the PostDoc training matrix for PhD holders from the Faculty and Leadership Development Centre, Alexandria University, Egypt. Dr. Saied is an IEEE member since 2007, and published 13 technical papers in refereed journals and conferences. His research fields of interest cover; AC-drives, direct torque control of Induction and synchronous machines, HVDC transmission, power quality, active power filters, harmonic elimination, PWM modulation techniques, multi-level voltage source and DC/DC converters, wind and solar renewable energy, and deadbeat control. He has published over 13 technical papers in refereed journals and conferences. As a lecturer since 2008, Dr. Mohamed is responsible for designing and delivering several electrical power and automatic control courses in different Engineering faculties in Egypt. He is an advisor for more than 5 M.Sc. dissertations.

In addition to his academic background, Dr. Mohamed is working for Abu-Qir Fertilizers & Chemical Industries Co., Alexandria Egypt. He is now the general manager of the Electrical Engineering Dept. He has 17 years of industrial experience, that he is a consultant for several factories science 1995. He is studying now for the professional certificate of Business Administration, in the Arab Academy for Science and Technology.

Offshore wind Technology Foundations: Challenges and Opportunities

Abstract: Wind energy, commonly recognized to be a clean, environmental friendly, and relatively inexpensive renewable energy resource that can reduce our dependency on fossil fuels, has developed rapidly in recent years. Its mature technology and comparatively low cost make it promising as an important primary energy source in the future. A wind farm is a collection of wind turbines used to generate electricity by capturing wind power. Large wind farms can contain several hundred wind turbines and cover hundreds of square kilometres. While onshore wind farms are developed, offshore ones have also attracted people's attention in recent years.

However, there are potential environmental and economic impacts due to the installation and operation of wind turbines that cannot be

ignored impacts. For example, the space needed for the turbines is becoming scarce, which makes offshore wind an attractive choice. Therefore, offshore wind power has recently been widely focused on and developed, as it is reliable, intensive, and its source is abundant and offers vast offshore areas. In this 15 minutes speech, the advantages versus the disadvantages of offshore wind turbines will be outlined. Different challenges of offshore wind farms technology, including foundation types, cost of constructing, as the towers, foundations, underwater cabling, installation, maintenance, and repairing processes are also highlighted compared to the onshore technology.

Speaker: ŽELJKO TOMŠIĆ, University of Zagreb Faculty of Electrical Engineering and Computing

Biography: Prof.dr. Željko Tomšić is working at the University of Zagreb Faculty of Electrical Engineering and Computing (FER) since 1991. From 2004 to 2008 he had the position of Assistant Minister for Energy and Mining in the Ministry of Economy. From 2008 to 2009 he was Member of HEP d.d. Management Board.

He was enrolled in 1976 at the Faculty of Electrical Engineering and Computing, University of Zagreb, from which he received his Dipl.Ing. degree in 1981, a MSC degree in 1990 (Energy Management in Industry) and a PhD degree in 2001 in the field of planning the Generation Capacity of Electric Power System (Method for the Analysis of Electric Power System Sustainable Development Various Options).

Member of the European Union research and development Programme Committee – Energy: Seventh Framework Programme (FP7) and Horizon 2020.

As professor at the FER his teaching subjects are: Energy Consumption Measuring and Analysis, Economics of Energy, Energy, Environment and Sustainable Development, Energy-Economic Models for Construction of Electricity System, Energy Management and Energy Efficiency and 'Environmental Impact of Electric Power System, Planning of Construction of Generating Plants in Uncertain Conditions.

Scientific research and professional activities are conducted in the area of energy, environment and economy in energy, especially focusing on electric power system planning, distributed generation, VPP, environmental protection, energy management in industry and buildings, economy in energy management.

He was written more than 100 R&D papers and he is co-author of book "Power Plants and Environment". Leader many research and scientific projects for Croatian and International institutions.

He is a member of Croatian Electrical Engineering Society (Vice-president); Full Member of the Croatian Academy of Engineering, Department for Energy Systems (HATZ); IEEE senior member; Croatian Nuclear Society (HND); European Nuclear Society (ENS); Croatian Energy Society (HED); Croatian CIGRE.

He has been in organizing committee of 17 different international conferences.

Virtual Power Plant as a model for competitiveness of small producers and organizers of virtual power plants on the markets for electricity and gas

Abstract: Production of electricity using renewable energy sources and energy-efficient sources of energy that are connected to the electricity distribution network is still not competitive electricity to the production from conventional sources of electricity. Strong technological development of new models of distributed energy resources reduce the cost of their production and with help of economies of scale create the conditions for their increasing application in practice. The idea is to connect through virtual power plant different types of distributed energy sources and using advanced information infrastructure and smart grids to enable more efficient use of distributed energy resources. The concept of virtual power plant will allow greater flexibility of management in order to increase economic viability of their increasing use. Existing customers of electricity and gas, now also in the role of small power producers and organizers of virtual power plants in addition to buy electricity and gas on electricity and gas markets will be able to sell electricity and energy services on the electricity and gas markets. Development and application of new technologies will encourage the development of new energy services which will have a positive impact on the overall competitiveness of all participants in the markets for electricity and gas, and also to increase the overall efficiency of electricity supply and gas supply systems. This idea is illustrated with virtual power plant that consists of micro-cogeneration units that they aim is to participation in the power market. A virtual power plant will forward the different price signals from the energy markets to the micro-CHP systems and optimize their production in order to produce the large quantities electricity for the power markets.

Speakers: HALIL IBRAHIM BULBUL, Gazi University, Turkey
RAMAZAN BAYINDIR, Gazi University, Turkey

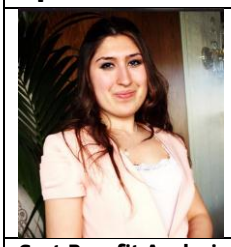
Biography: Dr. Halil Ibrahim Bulbul is currently working as a Assoc. Prof. at Department of Computer Education of Faculty of Industrial arts Education of Gazi University. He has been teaching various computer courses within the department. He received his Ph.D. degree from Ankara University, Ankara, Turkey, M.Sc. degree from California University of PA, U.S.A, in 1997 and 1990, respectively, and his B.S. degree from Gazi University, Ankara, Turkey, in 1985. His research interests include Computer Network, Computer hardware, Educational technologies, e-learning, web based education, distance education, educational software design, database management systems, machine learning, data maining and renewable energy systems.

Biography: Ramazan Bayindir is a Professor of the Technology Faculty, Department of Electrical & Electronics, Gazi University, Ankara, Turkey. He graduated from the Electrical Education Department, Technical Education Faculty in Gazi University, Ankara, Turkey, in 1992. He holds M.Sc. and Ph.D. degrees from the Gazi University, Ankara, received in 1998 and 2002, respectively. His main interests include power electronics, power factor correction, microcontroller programming, alternating energy sources and smart grids. He has published around 25 research papers in SCI Journals and more than 100 national and international conference papers.

Introduction of the GURER Group Studies on Smart Grid

Abstract: In this presentation, Gazi University Renewable Energy Research Group (GURER) activities on smart grid will be introduced. Main interests of GEMEC are renewable energy and its applications including smart grids, design, control and develop solutions at application progress of various electrical machines. Presentation starts by introducing the member of the group and follows by summarising the researchs, projects, publications and organizing activities. Especially the smart grid activities of GURER such as projects, international conferences and workshops organized publications of papers and journals will be highlighted.

Speaker: MELIKE SELCEN AYAZ, Gazi University, TURKEY



Biography: Melike Selcen Ayaz graduated from Faculty of Engineering, the Department of Electrical and Electronics Engineering of Sakarya University in 2012. She is currently a Research Assistant at Gazi University, the Department of Energy Systems Engineering since 2013. She is studying Master of Science (MSc) at Institute of Science and Technology of Gazi University. Her main research area covers renewable energy, wind energy, alternating energy sources and smart grids. She works with Prof.Dr.İlhami ÇOLAK in her MSc Thesis.

Cost Benefit Analysis of Wind Turbines in Smart Grid Systems

Abstract: Smart grid systems have gained a great popularity in these days all over the world. Although the technical infrastructure is an important issue, the economic benefits of the system should also be considered during design stage. Therefore, this study is focused on the evaluation of cost-benefit analysis (CBA) of smart grid systems. As a case study, wind turbines are examined in the study and a particular region in Turkey. The general approaches at CBA for wind turbines are to calculate and compare the benefits and costs. For this purpose, the comparison of different wind turbine models are examined by the cost of produced power at first. Then, efficient operating life of turbines and annual average operating capacity factors are considered. Finally some outcomes are given about CBA of wind turbines in the future smart grid systems.

Speaker: Maxim A. Dybko, NSTU, Russia

Biography: Maxim Dybko graduated from Department of Electrical Engineering and electronics in 2013. He received M. Sc. degree from Novosibirsk State Technical University (NSTU) in 2011 and PhD degree from Tomsk State University of Control Systems and Radioelectronics in 2013. Currently he works as a research assistant at the Department of Electrical Engineering and Electronics in NSTU and teacher of the Microelectronics Circuitry Fundamentals. His research interests are power electronics for energy storage systems, active power filters and STATCOMs, digital control systems based on FPGA and CPLD and mathematical modeling of the power converters with PWM control. Currently Maxim Dybko has published 22 papers.

Co-Author: Sergey V. Brovanov, NSTU, Russia

Biography: Sergey Brovanov graduated from Department of Power Electronics in 1987. He received the candidate of technical science degree from Novosibirsk State Technical University (NSTU) in 1998 and doctor of technical science degree from Tomsk State University of Control Systems and Radio electronics in 2012. Currently he is a head of the Computer Engineering Department in NSTU and a professor. The main research interests are power electronics for energy storage systems, active power filters, smart grid technologies, and mathematical modeling of the power converters with PWM control. He is authored more than 80 published journal papers and technical conference in the area of power electronics.

Multilevel Converters in Parallel Connection for Active Power Filters and Energy Storages for Smart Grids

Abstract: Energy conversion systems such as active power filters and energy storages (ESS) are being an intrinsic part of a smart grid. Energy storage systems are used to store the energy when it is in excess and to release it when needed to consumers. Moreover ESS provides reserved power supply when a fault occurs in a microgrid.

Active power filters (APF) are used to minimize the effect of the nonlinear and/or unbalanced loads to maintain higher power quality.

Both of the mentioned power conversion systems may have very similar structure and topology of the power converter used in it. If the rated power of such system is lied in the medium or high ranges (hundreds of kilowatts and higher) it is important to keep the systems energy quality performance at the acceptable level. By the acceptable level we mean higher efficiency, fault tolerance and power quality. It is proposed to use multilevel Neutral Point-Clamped (NPC) converters in parallel connection with a current sharing technique and common DC-link. Known phase-shifted PWM strategy is suggested for the gating signals generation. It is shown that such a modular topology allows increase of the AC stepped voltage quality, reduction of the total reactors weight, higher efficiency and fault tolerance compared to the topology based on a single multilevel converter with the same rated power.

Speaker: M. Cengiz TAPLAMACIOGLU, Gazi University, Turkey

Biography: M. Cengiz Taplamacıoglu graduated from the Department of Electrical and Electronics Engineering Department of Gazi University in 1983. He received his first Master of Science (MSc) Degree from the Institute of Science and Technology of Gazi University in 1985 Industrial Engineering and second Master of Science (MSc) Degree from the Department of Electrical and Electronics Engineering of Middle East Technical University (METU), Ankara Turkey 1996. He received his Doctor of Philosophy (PhD) Degree from the Department of Electrical, Electronics and Systems Engineering of Cardiff University in Cardiff, UK in 1993. He became a full Professor at Gazi University in 2000. He served as a Head of Electrical and Electronics Engineering Department between 2001 and 2012. He served as Dean of Faculty of Engineering and Vice Rector of Turkish Aeronautical Association University between 2012 and 2013. His main research area covers energy systems, high Voltage engineering, power systems and protection devices, measurement and modelling techniques electrical discharges, electrical field computation, HV measurement techniques, lighting technologies and projects, electrical machines, distance education, artificial intelligence based controllers and optimization algorithms, alternative energy sources and smart grids. He has published around 14 research papers in SCI Journals and more than 30 international conference papers. He has been in organizing and technical committees of different international conferences. He is currently working as full time Professor in Gazi University, Faculty of Engineering, Electrical and Electronics Engineering Department, Ankara, Turkey.

Stability Problem on Smart Grids, Short Review

Abstract: Brief explanation of Centralized, Decentralized and Distributed Generation: The electric power industry is exposed to the changes from being centralized generation into decentralized generation. Following, the advances in power generation, transmission, distribution, regulation and control techniques have created rapid growth in the utilization of distributed generation. Effects of Distributed generation on electricity market and distributed structure of this system including fuel cells, photovoltaic systems, wind turbines, micro turbines, synchronous generators and energy storage elements arises the problem how the measurement and control information receive and transmit between the control center and the field elements. Basic problem of distributed generation is; since the SCADA system developed for centralized generation has not this type of ability, a communication and automation networks need to be established. Fundamental figure of Smart grid system is two-way power flow and multi-stakeholder interactions. The main characteristics of Smart grid is a relatively new approach for the future power system that integrates electricity and communication on power system network which supplies digital information on the real time network operation for the operator and consumers. Requirements of Smart grid. Smart grid technology broadens power knowledge and involves interdisciplinary research area such as: communication, automation, sensor and control. Stability concept for power systems. Smart grid stability and related IEEE standards and Conclusions.

Speaker: Okan Benli, Başkent EDAŞ, Turkey

Biography: Okan Benli was graduated from Electrical & Electronics Engineering department of METU in 2002, and received EMBA degree in 2008. He has participated in SCADA and automation projects in energy, petroleum, natural gas and water distribution sectors. Since 2009, he has participated in various projects in Başkent EDAŞ and is R&D and Energy Automation Department Manager since 2012. The main research areas are Smart Grid, Energy Management Systems, e-Mobility, AMR, SCADA and GIS projects.

Impact Assessment of Smart Grid Investments and Developments in Turkish Electricity Distribution Sector

Abstract: The period of unbundling and privatization in Turkish electricity distribution sector actually has a history dating back to the mid-1980s. This major process had initiated with the vertical unbundling and restructuring of state-owned electricity company (TEK) and has been recently completed in 2013 together with the completion of privatization for 21 different electricity distribution companies. Among those regions, Enerjisa currently operates in 3 distribution regions.

Several projects have been completed since the privatization of Başkent Electricity Distribution Company in 2009, including SCADA, AMR, GIS and ERP projects including implementation and integration of these systems. These system installations had started with the prospect of transition from state-owned operations towards a private and efficient structure.

Such implementations have returned various technical and economic benefits. An integrated approach in network management and selection of applicable state-of-the-art technologies carried Başkent EDAŞ to a leading position within the distribution sector, motivating other utilities in selecting their own roadmap and initiating the necessary transition in their own regional networks. Experienced technical and social challenges during field installations of such major projects also increased the level of know-how within the company and set up the basis for upcoming developments and projects.

Speaker: STANISLAV YORDANOV, Technical University of Varna, Bulgaria

Biography: Stanislav Yordanov graduated from the Department of Power engineering and electrical equipping of Technical University, Varna in 2003. He received his Master of Science (MSc) Degree from the Technical University, Varna in 2003 and currently is a PhD student at the same University with a principal subject of his dissertation Optimization of distribution grid control with implementation of SMART metering systems. He is part of the management team of one of the biggest private electricity distribution companies in Bulgaria Energo-Pro Grid AD (former E.ON Bulgaria Grid AD) as he is taking responsibly over Energy Data and Meters Management Division. His main research area covers smart metering, smart grids, smart meters and intelligent consumption management, remote metering and metering device management. He has published few research papers in smart metering and energy data processes optimization and several domestic conference papers. He is a Project leader of the first ever SMART project realized in Bulgaria (started in 2009 by E.ON Bulgaria Grid for installation of 5 200 SMART meters). He is currently responsible for the roll out of above 80 000 SMART

meters/ 9 000 data concentrators i.e. the development and maintenance of the SMART metering system. Mr. Yordanov is participating in a work group responsible for the elaboration of the National Plan for the implementation of Smart Grids in Bulgaria in accordance with the EU Requirements and Policy.

Reduction of Grid Losses With Implementation of SMART Metering System

Abstract: The main benefits for the consumers and the grid companies that are usually pointed out when the topic of SMART grids is under discussion are:
the full control over electricity consumption that will gain the consumers;
helping the fight against global warming;
putting more renewable energy onto the electricity grid;
bring down operational costs for energy utilities and retailers.
A part of all benefits listed above the effective control of non-technical grid losses was detailed examined within a pilot project for the implementation of SMART metering in a small region in Bulgaria. A short review of a real case study will be presented, i.e. the main objectives, the cost/benefit analysis, the process of selecting the most suitable system from the technical point of view, as well the effective outcome that were reported after the closure of the project. Furthermore based on the current experience some general outcomes of the mass roll-out of SMART meters project in Bulgaria will be presented.

Speaker: HACI MEHMET SAHIN, Gazi University, Turkey

Biography: H. Mehmet Sahin graduated from the Department of Mechanical Engineering of Erciyes University in 1991. He received his Master of Science (MSc) Degree in 1994 and his Doctor of Philosophy (PhD) Degree in 1997, from the Institute of Science and Technology, Department of Mechanical Education of Gazi University. He became a full Professor at Gazi University in 2007. He is presently working as the Head of Energy Systems Engineering Department, the Director of Technology Transfer Office and as the adviser to rector of Gazi University since 2012. His main research area covers Thermodynamics, Heat & Mass Transfer, Energy and Exergy Analysis of Industrial Processes, Nuclear Energy and Reactor Design. He has published around 43 research papers in SCI Journals and more than 80 international conference papers. He is a member of Turkish Chamber of Mechanical Engineering. He has been in organizing committee of 7 different international conferences. He is Chairman of International Conference on Nuclear& Renewable Energy Resources, NURER (www.nurer2014.com).

Effect of University Technology Transfer Offices (TTO) on University-Industry-Government Cooperation with Energy Sector

Abstract: Accelerated transfer of knowledge, technology, know-how, and people from university to industry is a subject of great interest to academics, industry leaders, and policymakers in recent years in Turkey and some universities have established technology transfer offices (TTO). Advanced universities in Turkey have TTO on the agendas of their development plans in terms of promoting initiatives aimed at bridging between academic research and industry needs. Main aim of Gazi TTO is to convert university's scientific and technological know-how into economical values and societal benefits by acting as an intermediary for university-industry cooperation. There are supporting university policies and actions at Gazi University such as increasing effect of patents and industry projects in academic promotion, entrepreneurship courses added into different faculties' education programs, organization of different competitions encouraging innovation, entrepreneurship and industry relation, award system toward project applications, integration of R&D infrastructure under a more effective central laboratory and increasing cooperation with industrial zones and relevant governmental institutions toward technology transfer. Gazi TTO provides services mainly in 5 modules: 1- Information and Training, 2- Funding Programs, 3- University-Industry Joint Projects, 4- Intellectual Property Rights and 5- Entrepreneurship.
Gazi TTO has shown an imported success in recent years, while it has affected the University policies towards entrepreneurship and technology development. As an example, with the encouragement of Gazi TTO, effect of patents and industry projects in academic promotion has been increased. Another imported University-Industry-Government cooperation activity of Gazi TTO is the joint project carried with Ministry of Energy, Nuclear Energy Department. Next to global developments that make renewable energy sources more common spread, nuclear energy investment projects are also gaining impetus in Turkey. Accordingly, two nuclear plants will be established in the near future in Turkey. The Ministry has a concern of increasing national contribution towards these investments. However, our companies are mainly not ready for this new sector. Accordingly, the Ministry asked held from Gazi TTO, to increase the capacity of the relevant companies, so that they can participate in oncoming nuclear power plant tenders. This specific project shows that University TTO's can play an important role to support both private and public sector, and contribute the government policies. Consequently, Gazi TTO has been increased their activities of energy sectors particularly nuclear and renewable energy and smart grids systems.

Speaker: Maria IMECS, Technical University of Cluj, ROMANIA

Biography: She was graduated in 1970 (corresponding to MSc degree) from the Electrotechnics Faculty of the Polytechnical Institute of Cluj as promotion chief and with the Rector's Award for the Diploma Work. Industrial experience: 1970-71 research engineer in microelectronics I. P. R. S. Băneasa – Bucharest, 1971-75 designing engineer for foodstuff industry Tehnofrig-ICPIAF Cluj-Napoca. She is with Polytechnical Institute from 1975, lecturer since 1979, and with the Technical University of Cluj since 1990. She received the PhD degree in Electrical Engineering in the same university in 1989, and is presently Full Professor (since 1992) and PhD supervisor (since 1994) in Electrical Engineering with 10 supervised PhD theses of graduated doctoral students. She was head of department (1997-2008) at the Department of Electrical Drives & Robots; University Senate member (2000-08) at the Technical University of Cluj-Napoca;and she is Council member (since of 1990-actual) at the Faculty of Electrical Engineering. She is associated professor at the SAPIENTIA Hungarian University of Transilvania since 2003. She was with DAAD-Scholarship in 1991 at University of Erlangen-Nürnberg (Germany), Visiting Professor at the Aalborg University (Denmark) in 1998 and Pannon University Veszprem (Hungary) in 2012, Visiting scientific researcher in 1998 and 2007 at Aalborg

University, in 2003 and 2004 at Miskolc University (Hungary). She is co-author of 10 books (Vector Control of AC Drives in 2 volumes in English, Power Electronic Converters and Power Electronics in Romanian) and 6 national patents, author/co-author of 170 scientific papers presented and published at International Conferences and Journals, 80 scientific papers presented and published at National Conferences and Journals. Awards: "Traian Vuia" Award – Romanian Academy of Science in 1989; "Geniusz" Award" – Hungarian Association of Inventors in 1996 for the work: "Vector Control of Synchronous Generators"; "Professor Honoris Causae", in 2008 University of Miskolc; "Diploma of Hungarian Technical Scientific Society of Transilvania – EMT", Cluj, 2011, "Dennis GABOR - National Award of MVM Energetics 2012, Budapest. Professional membership: Founder member of the "National Electrical Drives Association" from Romania, since 1990; Member of AGIR (General Association of Engineers from Romania), since 1990; Sympathizing member of „Humboldt Club Transilvania", since 1996; Permanent member of EPE-PEMC and PEMC Council (European Power Electronics and Drive Association – Power Electronics and Motion Control Council), since 1998; Member of Public-law Association of Hungarian Academy of Science since 2000; Founder member of the "Romanian Medical Engineering and Biological Technology Association" in 2000; Founder member of "VDI-Freundkreis „Rumänien" in 2001. Reviewer and member of editorial boards: IEEE Transaction on Industrial Electronics (permanently invited reviewer since 1998), Member of editorial boards and reviewer: International Review of Electrical Engineering (IREE) Praise Worthy Prize Publishing House, Napoli; Acta Electrotehnica (Academy of Technical Science of Romania, TU of Cluj), Acta Universitatis Sapientiae of the Sapientia University.

Power Electronic Converter Controlled Energy Flow-Modelling, Simulation and Implementation

- **Abstract:** The controlled power flow is simulated between the 3-phsae ac grid and a local DC distribtion line fed by an autonomous vector controlled synchronous generator. More renewable energy sources supply DC energy, which can be used directly by consumers, without any conversion into AC power. On the other side the recent technological discoveries in the area of power electronic components and static converters create new possibilities for transmission and distribution of the DC energy. Consumers like controlled AC drives may save energy back to the utility AC power grid reducing the payback time of the investment. For the energy-flow control they need bi-directional power-electronic converters. Instead of the proper voltage-source (VS) DC-link static frequency converter for each AC drive, it is more efficient to use a common VS-DC link, i.e. a local DC voltage distribution line, which may be connected to the national AC grid by means of a higher power line-side rectifier, which is able to supply the PWM inverters of the AC motors and other consumers. The local DC distribution line may be fed from an autonomous synchronous generator (SG) by rectifying the produced AC energy. Both, the AC grid-side, and also the AC motor- and SG-side converters have to operate with sine wave currents. The square- or full-wave converters need passive or/and active current-filtering, like the so called GTO-thyristorized current-source inverters (CSI). The DC line is supplied from a local turbine driven SG by means of a rectifier. The vector control procedure improves the dynamic behavior at perturbations of the SG. The square-wave rectifier needs PAM current control in order to prevent the energy transfer through the SG-VSI active filter of the SG currents. The DC line is permanently connected to the AC publish grid by means of a 120°-wave rectifier-inverter converter assembly, equipped with an active filter and it is able for bi-directional power flow in order to balance the energy transfer in the DC distribution line, especially when the AC drives are braking. The modeling of AC-to-DC and DC-to-AC converters is based on circuit techniques, according to a similar method like the quadrupole theory. Each converter is composed of a current-model- and a voltage-model-based block, which are coupled together by means of the commutation-logic or PWM-logic "signals". The simulation was performed in MATLAB-Simulink® environment for energy-consuming and also energy- recovery operation of the DC distribution line during the regenerative braking of the AC drives. The simulation structures of the converter control for SG, AC motors and power flow between the AC grid and DC distribution line are suitable for easy implementation by means of the hardware platform with dSPACE controller board. The vector control structures of the AC drives and synchronous generator are already implemented. Future works will be focused on the implementation of the PWM-VSIs used for sine-wave current filtering and rectifying and achieving unity power factor.

7. List of Participants

	Last name	First name	Organisation	City	Country
1	LASKER	Amos	AMRAV	Tel Aviv	Israel
2	BAYINDIR	Ramazan	Gazi University	Ankara	Turkey
3	SAIED	Mohamed Hassan	Abu Qir Fertilizers & Chemical Industries Company	Alexandria	Egypt
4	MOUSSA	Mona Fouad	Arab Academy for Science and Technology and Maritime Transport	Alexandria	Egypt
5	DESSOUKY	Yasser Gaber Abdel-Razek	Arab Academy for Science and Technology and Maritime Transport	Alexandria	Egypt
6	FILOTE	Constantin	Stefan cel Mare University	Suceava	Romania
7	RYVKIN	Sergey	Russian Academy of Sciences	Moscow	Russia
8	TOMSIC	Zeljko	University of Zagreb	Zagreb	Croatia
9	BÜLBÜL	Halil İbrahim	Gazi University	Ankara	Turkey
10	ROSENOV YORDANOV	Stanislav	ENERGO-PRO Grid AD	Varna	Bulgaria
11	ÜSTÜN	Süleyman	Bornova Mimar Sinan Technical and Vocational High School	Izmir	Turkey
12	MIROSEVIC	Marija	University of Dubrovnik	Dubrovnik	Croatia
13	KONJIĆ	Tatjana	University of Tuzla, Fac. Of Electrical Engineering	Tuzla	Bosnia and Herzegovina
14	AYAZ	Melike Selcen	Gazi University	Ankara	Turkey
15	YEŞİLBUDAK	Mehmet	Nevsehir University	Nevsehir	Turkey
16	DAOUD	Ahmed Ali	Port Said University	Port Said	Egypt
17	YAVANOĞLU	Uraz	Gazi University	Ankara	Turkey
18	MIRCHEVSKI	Slobodan	SS Cyril and Methodius University	Skopje	Rep. of Macedonia
19	SAĞIROĞLU	Şeref	Gazi University	Ankara	Turkey
20	KATIĆ	Vladimir A.	University of Novi Sad	Novi Sad	Serbia
21	ÇOLAK	Medine	Gazi University	Ankara	Turkey
22	MİLLETSEVER	Özlem	Gazi University	Ankara	Turkey
23	DYBKO	Maxim	Novosibirsk State Technical University	Novosibirsk	Russia
24	AISSAOUI	Abdel Ghani	University of Bechar	Bechar	Algeria
25	IRMAK	Erdal	Gazi University	Ankara	Turkey
26	ÖZTOP	Celal	Trakya Electricity Distribution Company (DSO)	Ankara	Turkey
27	ŞAHİN	Hacı Mehmet	Gazi University	Ankara	Turkey
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This report and photos taken during the workshop can be found as on line at following link.

http://ses.jrc.ec.europa.eu/2014-events

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