Dr. Sohail Khan

Age: 37, Rawalpindi, Pakistan, Email: sohail.khan@gmx.net

Ph.D. in Electric Power Systems

Specialize in Artificial Intelligence for Energy Sector

Career Statement

Pursuing for a competitive position in a highly dynamic organization to utilize my acquired skills, experience, and knowledge, while being supported by highly skilled individuals as a team.

Profile

Motivated professional with international field experience of working in Power and Energy projects with emphasis on the application of Artificial Intelligence in making the solutions resilient and flexible to diverse operating conditions. Possesses a successful 11+ years track record of professional experience spanning over from power and energy sector, higher education sector, trainings, establishing a world class center of excellence and having executed diversified projects of international and national importance.

Skills & Personal Traits

- Leadership & Counseling
- Creative Thinking
- Strategic Vision, Planning & Implementation
- Project Management & Monitoring
- Policies development through dialogues & engagements
- Team Building & Nurturing
- Report Writing (Technical/ Business)
- Teaching and Trainings

Awards

- Chancellor Gold Medal and Campus Gold Medal from COMSATS University of Sciences and Technology, 2008
- Graduate Fellowship Award during MS Electrical Engineering 2008-2010
- PhD Scholarship Award from Austrian Institute of Technology 2013-2016
- PhD with Distinction Award from Technical University of Vienna 2016
- Principal Organizer of National Artificial Intelligence Forum 2021

Membership and Technical Affiliations

- Member & Reviewer, Institute of Electrical and Electronics Engineers (IEEE), since 2013
- Member, Pakistan Engineering Council since 2008
- Member, IEEE power and Energy Society since 2014
- Member, IEEE Industrial Electronics Society since 2014
- Reviewer, Electric Power Systems Research, Elsevier, since 2016.

International Projects and Research Initiatives

- **Batterie Stable, 2016-2018, Austria:** The aim of the project is to provide a battery storage system, in addition to the provision of system services, to contribute to system stabilization in networks with a high proportion of renewable energy input.

- **LEAFS - LV Loads and Storage Integration, 2015-2018, Austria:** This project evaluates the effects of increased costumer and energy market driven utilization of energy storage systems and load flexibility on power distribution grids.

- **DeCAS - Demonstration of Coordinated Ancillary Services, 2015-2019, Pan-European:** The project aims to research and analyse system services such as demand response and coordination of individual Volt/Var control concepts crossing traditional boundaries from high voltage, medium voltage to low voltage.

- **INTERPLAN- 2017-2020, Pan-European:** INTERPLAN is a project that aims to provide an integrated operation planning tool towards the pan-European network, to support the EU in reaching the expected low-carbon targets, while maintaining network security.

- **Erigeneia 2018-2020, Pan-European** - Enabling rising penetration and added value of photovoltaic generation by implementation of advanced storage systems.

- **PoSyCo - Power System Cognification, 2019-2021, Austria:** Posyco's ambitious functional goal is the conceptualization and laboratory proof of concept of a 'soft-protection' system as an add-on for protection and control mechanisms in low and medium voltage grids.

- **FlexGrid, 2019-2022, Pan-European:** Flexibility to energise future grid architecture: A holistic power system architecture includes all electrical equipment, customer plants and the market, all merged into one single structure, this ensures a reliable, safe and economical smart power system operation.

National Projects and Research Initiatives

SPCAI: Sino-Pak Center for Artificial Intelligence

- **Establishment of SPCAI, Pakistan (2020-2023):** SPCAI is a center of excellence in Artificial Intelligence (AI) that is sponsored by the Ministry of Information Technology and Telecommunication (MoITT) under the Public Sector Development Program (PSDP). SPCAI is being executed, maintained, and operated by PAF-IAST. As administrator of the center I have been completely involved in achieving the key targets set forth in the project.

- **INTERACT, 2021-2022, SPCAI, Pakistan:** The goal of this project is to develop and test a prototype energy management system for buildings that minimize the cost of energy and ensure the availability of the energy supply. It is assumed that a PV system and storage have been installed at the building.

- **AI-SOLARCAST, 2021-2022, SPCAI, Pakistan:** Develop an AI-based forecasting tool that provides accurate forecasts of the solar energy specific to the region and geographical coordinates in Pakistan

- **Specialized Incubator for AI and IoT Applications, SPCAI, Pakistan (2022-).** The specialized incubator project is proposed under Pakistan Science Foundation (PSF). Presently this project is in the approval phase from PSF that required complete planning on how the incubator will be function from nurturing the start-ups from the initial stage to supporting the mature start-ups.

Professional Experience

Administrator and Senior Faculty/Associate Professor

Sino-Pak Center for Artificial Intelligence, Pak-Austria Fachhochschule – Institute of Applied Sciences & Technology   *October. 2020 – to date*

Administratively leading the Sino-Pak Center for Artificial Intelligence with the support of Ministry of Information Technology and Telecommunication, Pakistan and in collaboration with Austrian and Chinese universities.

Role & Responsibilities

- Initiating and managing the technological infrastructure development for Sino-Pak Center for Artificial Intelligence (SPCAI).
- Strategic planning and development activities related to the establishment of SPCAI research laboratories
- Establishment of research lab portfolios and developing plans for their sustainability
- Establishment of High-Performance Computing laboratory with Lenovo Global solutions
- Industrial and flagship events management aiming to establish SPCAI as leading organization in Pakistan and Internationally
- Liaison with international partners for academic program development and forging industrial collaborations.
- Principal Investigator of Smart City and Urban Planning lab at SPCAI
- Academically leading MS in Artificial Intelligence program at SPCAI
- Academically leading MS in Advanced Power System Analysis program at PAF-IAST
- Leading project INTERACT: Intelligent Forecasting and Control of Energy Storage For Smart Buildings.
- Organizing specialized and general trainings in the field of Artificial Intelligence and Power Systems
- Organizing industrial liaison meetings and events
- Managing SPCAI portfolio and facilitating cross teams' interactions

Dr. Sohail has developed the SPCAI portfolio consisting of 10 research laboratories:

No.	Clusters of Excellence and Research Laboratories
Cluster of Intelligent Infrastructure	
1	Smart City, Urban planning Lab
2	Smart Agriculture Lab
Cluster of Intelligent Systems	
3	Intelligent Field Robotics Lab
4	Intelligent Systems Design Lab
Cluster of Machine Learning	
5	Computer Vision lab
6	Deep Learning Lab
Cluster of Safety and Security	
7	Intelligent technologies for Natural Disaster Management & Rescue Operations Lab
8	Internet of Things Lab
Smart Health and Biosciences	
9	Intelligent Biomedical Applications Lab
10	Neuro-Computation Lab

Scientist

Austrian Institute of Technology, GmbH, Vienna, Austria   *Sep. 2016 – Sept. 2020*

Worked extensively of the R&D activities in providing solutions to the energy utilities, policy recommendations and technical analysis of electricity networks in promoting the renewable energy integration in Austria and in Europe from the platform of the AIT which is the national research lab of Austria.

Role & Responsibilities

- Conducting research and development for Europe-wide international projects with multi-disciplinary technical expertise in the areas of renewable energy integration and smart grid applications.
- Developing project collaboration with EU partner institution and industries in the national and international funded projects.
- Developing software and hardware in loop solutions to test the designed hypothesis in library scale environment.
- Publishing the research results in internationally renowned journals and reports

Researcher

Austrian Institute of Technology, GmbH, Vienna, Austria   *March. 2013 – Aug. 2016*

Worked as researcher in Complex Energy Systems research group under Prof. Peter Palensky, principal scientist at AIT.

Role & Responsibilities

- Research work on the doctoral dissertation titled "Assessment and Allocation of Operational Flexibility from Distribution System Resources".
- Research work on the cyber physical aspects of future energy system with emphasis on the application of Functional Mock-up Interface (FMI) between widely adopted software tools for modeling cyber/physical components of energy systems.
- Collaboration with the AIT Energy and Thermal Systems department in implementation of the research work in prospective projects.
- Publishing the research work in high impact factor journals/transactions and conferences.

Lecturer

COMSATS Institute of Information Technology, Islamabad, Pakistan   *Feb. 2012 – Feb. 2013*

Worked as lecturer in department of electrical engineering teaching courses to electric machines and micro-controller-based systems to undergraduate students in electrical engineering. Achieving funding for the project titled ``Design of re-configurable guidance system for autonomous robot" from National ICT R&D Fund, Pakistan.

- Member of board evaluating **Final Year Project** for Electrical Engineering projects.
- Member, **Board of Studies for BS program** of Department of Electrical Engineering.
- Supervised as department committee member in **administrative matters** of the department.
- Engaged with the **senior faculty-hiring program** of the university

Lecturer

Heavy Industries Taxila Education City University, Pakistan   *Oct. 2010 – Jan. 2012*

Entered into institute with difficulties in service, organization and staffing issues. Performed structured and team orientated efforts in the management of departmental tasks. Taught courses of electric machines and microprocessor systems and Interfacing to undergraduate students in electrical engineering.

Junior Engineer

Nautica Group, Pakistan   *Mar. 2008 – Aug. 2008*

Developed RFID based door lock system integrated with enterprise software for an international hotel chain. A complete embedded solution was developed that was integrated with the web-services and that could write to the RFID cards complying with the safety protocols and organizational requirements.

Education

Ph.D. in Electrical Engineering   Mar. 2013 – Sept. 2016
Technical University of Vienna – Austria

Thesis: Assessment and Allocation of Operational Flexibility in Power Systems with Distributed Resources
Advisors:
Prof. Wolfgang Gawlik (Professor, Vienna University of Technology, Austria)
Prof. Peter Palensky (Professor for intelligent electric power grids at TU Delft)

M.Sc. Electrical Engineering   Sept. 2008 – Aug. 2010
National University of Sciences and Technology (NUST), Islamabad – Pakistan

Thesis: Nonlinear Adaptive Flight Control System for Unmanned Aerial Vehicle
Advisors: Prof. Khalid Munawar

B.Sc. Electronics Engineering   Mar. 2004 – Mar. 2008
COMSATS Institute of Information Technology (CIIT), Abbottabad – Pakistan

Technical Skills

Power System Simulation Platforms	DIgSILENT PowerFactory -- Power system studies
	Siemens Sincal -- Power system studies
	Neplan -- Power system studies
	Combined simulation of Matlab, Python and PowerFactory.
	Matlab -- Optimization toolboxes and power system toolbox simulation.
Simulation Platforms for Programming	Pycharm IDE for Python -- Object oriented programming in Python.
	Microsoft Visual Studio -- C++ programming.
	Pyomo -- Constraint programming and optimization.
Programming Languages	C/C++, Python – Main tool used for algorithm and systems development
	Matlab scripting – Algorithm design, combined simulation
	DSL for DIgSILENT PowerFactory – power systems simulation
	Modelica for dynamical systems modeling

Hardware Platforms	ATMEL, PIC and ST micro-controllers.
	Beagleboard based robotic systems.
	Digital Signal Controllers like dsPIC33F programming
	Micro-controller training boards like EasyPIC v5, v7 training boards
AI Related Skills	**Supervised Learning: Algorithms and case-studies experience**
	Linear regression: Optimize the price points of energy delivery
	Logistic regression: Classify the customers based on the energy consumption
	Linear/Quadratic Discriminant analysis: Predicting the profile in the energy market analytics
	Decision tree: Understand the product attributes that can make a solution more likely as successful.
	Naïve Bayes: Create classifiers to filter the data based on set of requirements
	Support vector machine: Predict how likely an event in energy system is going to occur
	Random Forest: Predict the power usage in the electric distribution grid
	Unsupervised learning: Algorithms and case studies experience
	K-means and hierarchical clustering: clustering the distribution networks based on the common properties for generating representative networks from large data
	Re-enforcement learning:
	Balance the load of electricity grids in varying demand cycles
	Convolution Neural Network and Recurrent Neural Network in the area of Deep Learning: Creating a machine learning model that can be used to forecast the environmental parameters like solar irradiance.

International Talks and Keynotes

Austrian Institute of Technology	AIT poster presentation at PhD workshop in Hirschegg, Austria 2013
	UF Seminar by EES, Vienna, Austria 2015
	AIT Poster Award Presentation, Vienna, Austria 2014, 2015
Conference presentations	CES presentation at IST, Vienna, Austria 2015
	Energie Informatik Zürich, Switzerland 2014
	MSCPES Berlin, Germany 2014
	IECON Vienna, Austria 2013
Public lectures	OpenSource Tools in Power Systems Research at UET Taxila, and HITEC University, Pakistan. 2015
	Power system stability challenges at NUST, Pakistan 2018
	DigSilent PowerFactory workshop, US Pakistan Center for Advanced Studies in Energy USPCASE – NUST, 2019

Speaker at Industrial Event by Medical Imaging and Diagnostic Lab at Comsats, October 26, 2021

Research Articles

Journal publications:

1. Bosetti, H., Khan, S., Aghaie, H., & Palensky, P. (2014). Survey, illustrations and limits of game theory for cyber-physical energy systems. *at-Automatisierungstechnik*, *62*(5), 375-384.
2. Khan, S., Gawlik, W., & Palensky, P. (2015). Reserve capability assessment considering correlated uncertainty in microgrid. *IEEE Transactions on Sustainable Energy*, *7*(2), 637-646.
3. Bosetti, H., & Khan, S. (2017). Transient stability in oscillating multi-machine systems using Lyapunov vectors. *IEEE Transactions on Power Systems*, *33*(2), 2078-2086.
4. Khan, S., Bletterie, B., Anta, A., & Gawlik, W. (2018). On Small Signal Frequency Stability under Virtual Inertia and the Role of PLLs. *Energies*, *11*(9), 2372.
5. Zeb, Muhammad Zulqarnain, et al. "Optimal Placement of Electric Vehicle Charging Stations in the Active Distribution Network." *IEEE Access* 8 (2020): 68124-68134.
6. Khan, Sohail, Paul Zehetbauer, and Roman Schwalbe. "Evaluation of sensitivity based coordinated volt-var control and local reactive power for voltage regulation and power exchange across system boundaries in smart distribution networks." *Electric Power Systems Research* 192 (2021): 106975.

Conference publications:

1. Khan, S., Shahzad, M., Palensky, P., & Jahangir, K. (2013, November). Dynamics of wind-turbine driven Self-Excited Induction Generator with online parameter calculation. In *IECON 2013-39th Annual Conference of the IEEE Industrial Electronics Society* (pp. 5271-5275). IEEE.
2. Khan, S., Bosetti, H., Palensky, P., & Gawlik, W. (2014, April). A Replicator Dynamics method for the Unit Commitment problem. In *2014 Workshop on Modeling and Simulation of Cyber-Physical Energy Systems (MSCPES)* (pp. 1-4). IEEE.
3. Khan, S., Shahzad, M., Habib, U., Gawlik, W., & Palensky, P. (2016, March). Stochastic battery model for aggregation of thermostatically controlled loads. In *2016 IEEE International Conference on Industrial Technology (ICIT)* (pp. 570-575). IEEE.
4. Latif, A., Khan, S., Palensky, P., & Gawlik, W. (2016, April). Co-simulation based platform for thermostatically controlled loads as a frequency reserve. In *2016 Workshop on Modeling and Simulation of Cyber-Physical Energy Systems (MSCPES)* (pp. 1-6). IEEE.
5. Khan, S., Latif, A., Python based scenario design and parallel simulation method for transient rotor angle stability assessment in PowerFactory. In *2019 IEEE PowerTech Milano* (pp. 1-6). IEEE.
6. Melios Hadjikypris, M., Khavari, AM., Shalaby, M., Graditi, G., Ciavarella, R., Di Somma, M., Valenti, M., Brunner, H., Henein, S., Khan, S., Ringelstein, J. Innovative grid operation planning tool for the system operators. In *8th International Conference on the Integration of Renewable and Distributed Energy Resources (IRED), 2018*.
7. Khan, Sohail, and Aadil Latif. "Python based scenario design and parallel simulation method for transient rotor angle stability assessment in PowerFactory." *2019 IEEE Milan PowerTech*. IEEE, 2019.
8. Khan, Sohail, Sawsan Henein, and Helfried Brunner. "Optimal Energy Interruption Planning and Generation Re-dispatch for Improving Reliability during Contingencies." *2020 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT)*. IEEE, 2020.

International Reports

1. Khan, S. Anta, A., Power System Dynamics Analysis Inertia and frequency stability in the future grid, Independent research 2018 (project: batteriestable), Link.
2. Simulation platform for experience exchange, deliverable 5.1, Demonstration of Coordinated Ancillary Services (DeCAS), Khan, S., Thie, N., Herman, L., Zehetbauer, P., Schwalbe, R., Kadam, S. 2019 (project: DeCAS), Link.
3. INTERPLAN showcases, Deliverable D1.5, integrated operation planning tool towards the pan-european network (interplan), 2019.
4. INTERPLAN use cases, Deliverable D 3.2, integrated operation planning tool towards the pan-european network (interplan), 2018.

Books

1. Khan, S., Nonlinear Adaptive Flight Control System for Unmanned Aerial Vehicle: A Nonlinear Dynamic Inversion Based Approach. Saarbrücken, Germany: LAP LAMBERT Academic Publishing, 2011.

References

1. Prof. Dr. Peter Palensky
   Professor for intelligent electric power grids at Technical University Delft, Netherlands
   P.Palensky@tudelft.nl, palensky@ieee.org

2. Prof. Dr. Wolfgang Gawlik
   Professor for Energy Systems and Head of Research Group "Power Systems" at Institute of Energy Systems and Electrical Drives, Technical University of Vienna, Austria
   wolfgang.gawlik@tuwien.ac.at

3. Prof. Dr. Thomas Strasser
   Senior Scientist at Austrian Institute of Technology, Vienna, Austria
   thomas.strasser@ait.ac.at

4. Mr. Benoît Bletterie, Operational planning expert at the national control Center, Austrian Power Grid AG
   benoit.bletterie@gmail.com

5. Prof. Dr. Mohammad Mujahid
   Rector, Pak-Austria Fachhochscule: Institute of Applied Sciences and Technology
   mujahid@paf-iast.edu.pk, drmmujahid@outlook.com

1. Projects Completed

1.1 Project: Batterie Stable (National project, Austria)

Year: 2016-2018

Institute: AIT Austrian Institute of Technology

Project consortium: Netz Niederösterreich GmbH (Management), Austrian Institute of Technology, Technische Universität Wien, Institute of Energy Systems and Electrical Drives.

Description: The aim of the project is to provide a battery storage system, in addition to the provision of system services, to contribute to system stabilization in networks with a high proportion of renewable energy input.

Responsibilities:

I have performed software-based analysis on how fast the inverters providing virtual inertia in the future grid should be in order to ensure small signal frequency stability.

Achievements:

- Together with team I contributed in developing competences of simulating the impact of large scale inverter-based generation supplying virtual inertia on the stability of the grid.
- Published results in a high impact journal publication

1.2 Project: LEAFS - LV Loads and Storage Integration (National project, Austria)

Year: 2015-2018

Institute: AIT Austrian Institute of Technology

Project consortium: AIT-Austrian Institute of Technology GmbH (Management),

Fronius International GmbH, Siemens AG Österreich, Salzburg Netz GmbH, Netz Oberösterreich GmbH, Energienetze Steiermark GmbH, TU Wien - Energy Economics Group, Energieinstitut an der Johannes-Kepler-Universität, MOOSMOAR Energies OG.

Description:

This project evaluates the effects of increased costumer and energy market driven utilization of energy storage systems and load flexibility on power distribution grids. Technologies and operation strategies are developed that enable optimal use of distribution grid infrastructure by activating flexibilities using direct or indirect control also by the local grid operator or even incentives.

Responsibilities:

Performed software-based analysis on simulating distribution networks of four smart grid demonstration sites in Austria. Detailed simulation-based study to explore the impact of the energy storage at residential consumers. Design of strategies to control the charging process of the energy storage in order to reduce the reverse power infeed from the customers and to maximize the utilization of locally produced renewable energy from PV system in the domestic loads.

1.3 Project: DeCAS - Demonstration of Coordinated Ancillary Services (EU project)

Year: 2015-2019

Institute: AIT Austrian Institute of Technology

Project consortium: AIT-Austrian Institute of Technology GmbH (Management), Salzburg Netz GmbH (Austria), Siemens AG (Austria), TU Wien (Austria), RWTH Aachen (Germany), Hochschule Kempten (Germany), Allgäuer Überlandwerke (Germany), ABB (Finland), Univerza v Ljubljani (Slovenia)

Description:

The project aims to research and analyse system services such as demand response and coordination of individual Volt/Var control concepts crossing traditional boundaries from high voltage, medium voltage to low voltage, also regarding their respective market integration concepts. It will further include the integration of related monitoring and controls in process-control systems.

Responsibilities:

Preparation of power system network equivalents for testing the Volt/Var control strategies that covers LV, MV and HV. Management of the synthetic load and renewable energy profiles to recreate the real-life scenarios for the project partners. The synthetic network has been designed with the focus on replicability and scalability of the results at the end of the project.

1.4 INTERPLAN - Integrated operation planning tool (EU project)

Year: 2017-2020

Institute: AIT Austrian Institute of Technology

Project consortium: ENEA Italy (Management), AIT Austrian Institute of Technology GmbH (Austria), DERlab (Germany), University of Cyprus (Cyprus), Fraunhofer IEE (Germany), IEn (Poland)

Description:

INTERPLAN is a project that aims to provide an INTEgrated opeRation PLANning tool towards the pan-European network, to support the EU in reaching the expected low-carbon targets, while maintaining network security. INTERPLAN will provide a methodology for a proper representation of a "clustered" model of the pan-European network, with the aim to generate grid equivalents as a growing library able to cover all relevant system connectivity possibilities occurring in the real grid, by addressing operational issues at all network levels (transmission, distribution and TSOs-DSOs interfaces).

Responsibilities:

Participation in the work package 6 and 7 that deals with development of planning tool for the frequency and voltage stability assessment in the future grids having less inertia.

1.5 Erigeneia - Enabling rising penetration and added value of photovoltaic generation by implementation of advanced storage systems (EU project)

Year: 2018-2020

Institute: AIT Austrian Institute of Technology

Project consortium: University of Cyprus FOSS (Cyprus), Austrian Institute of Technology GmbH (Austria), Cybrotech Ltd (UK), Fronius International GmbH (Germany), ADM Elektrik Dagitim A.S (Turkey)

Description:

The Erigeneia project targets to enable the high penetration of PV technology and to utilize its potential value in the energy system by developing a local and central energy management system (EMS) that will combine photovoltaics (PV) with battery energy storage systems (BESS). The project will match the technical requirements imposed by the distribution system operators (DSO) with the upcoming new market regulations, capitalizing on the positive effects of PV and BESS combination. In addition, a tool for intra-hour energy forecasting will be developed and integrated into the EMS to provide a more accurate and reliable operation plan for the DSO.

Responsibilities:

Participation in the work package 4. I am main developer from AIT side and I work on development of Energy management system for homes in Cyprus that optimize the local energy production from PVs and also provide services to grid. For Turkey, I am responsible for the EMS concepts for buildings in the distribution network.

1.6 PoSyCo - Power System Cognification (Austrian funding agency project, FFG)

Year: 2019-2021

Institute: AIT Austrian Institute of Technology

Project consortium (Austrian companies): Aspern Smart City Research GmbH & Co KG, MOOSMOAR Energies OG, WIEN ENERGIE GmbH, WIENER NETZE GmbH, Technische Universität Wien, Technische Universität Graz, Siemens Aktiengesellschaft Österreich

Description:

PoSyCo – the Power System Cognification flagship project – aims for a blueprint of smart grid implementation of advanced functionalities from a system specific point of view. PoSyCo supports the 'Energiewende' (energy transition) and the cognification (increasing intelligence within system operation). PoSyCo's ambitious functional goal is the conceptualization and laboratory proof of concept of a 'SOFTprotection' system as an add-on for protection and control mechanisms in low and medium voltage grids. The project result will be a widely autonomous support system offering extendable functionality and their efficient system and process integration enabled by state-of-the-art industrial Internet of Things technology.

Responsibilities:

Responsible for developing scenarios that provoke active involvement of soft protection schemes in the ASPERN power network. Collaborating with Technical university Graz on developing control algorithms that perform optimal switching of protection settings to relieve the power grid from congestion.

1.7 FlexGrid - Flexibility to energise future grid architecture (EU project)

Year: 2019-2022

Institute: AIT Austrian Institute of Technology

Project consortium: Etra Investigacion Y Desarrollo Sa, Spain, Smart Innovation Norway As, Norway, Nord Pool Consulting As, Norway, Nodes As, Norway, University of Cyprus, Cyprus, Sveuciliste U Zagrebu Fakultet Elektrotehnike I Racunarstva, Croatia, Hrvatski Operator Prijenosnog Sustava Doo, Croatia, Wemag Ag, Germany, Badenova Ag & Co Kg, Germany, Danmarks Tekniske Universitet, Denmark, Ait Austrian Institute of Technology Gmbh

Description:

A holistic power system architecture includes all electrical equipment, customer plants and the market. All merged into one single structure, this ensures a reliable, safe and economical smart power system operation. The EU-funded FLEXGRID project will propose a holistic future smart grid architecture to boost interaction and integration of innovative models and meet future energy market requirements. The project will also develop flexible business models through the use of artificial intelligence that can be exploited by today's energy service providers (ESPs) and renewable ESPs (RESPs) to ensure economic and operational advances. On the one hand, ESPs become more competitive and sustainable, and RESPs will exploit their production without risk.

Responsibilities:

Responsible for developing optimal power flow algorithms together with Denmark technical university that can capture the uncertainty in future energy markets. Developing renewable energy models that can capture the uncertainty in variables and provide frequency and voltage support.