

RPG Dublin

The 9th International Conference on Renewable Power Generation

1 - 2 March 2021, Online

Monday 1 March 2021	
10.00	Conference Chairs' welcome and opening Damian Flynn, University College Dublin and John Ging EirGrid
10.05	Keynote: Jonathan O'Sullivan, EirGrid, Manager, Innovation
10.30	Break
10.35	Oral Sessions
Session 1A: Market design and operation	
Session 1B: Low inertial power system operation and management	
1a.1	Maximizing the profits of the battery energy storage systems in the integrated single electricity market A Mohamed, DJ Morrow, R Best, <i>Queen's University Belfast, UK</i>
1a.2	Operation of battery storage in hybrid power plant in Australian electricity market J Moolman, K Das, P Sørensen, <i>Technical University of Denmark, Denmark</i> , J Kazda, <i>Denmark</i>
1a.3	Towards imposing dayparted restrictions on tokenised energy within peer-to-peer markets A de Villiers, P Cuffe, <i>University College Dublin, Ireland</i>
1a.4	Benefits of interconnection in the 2030 integrated single electricity market (I-SEM) with high renewable generation S Wang, <i>Ulster University, UK and China Institute of Engineering Thermophysics</i> , D McLarnon, <i>Ulster University, Jordanstown, Ireland</i> , Y Huang, I Vorushylo, N Hewitt, <i>Ulster University, UK</i> , P MacArtain, <i>Dundalk Institute of Technology, Ireland</i>
1b.1	Grid-forming Inverters - a real-life implementation experience and lessons learned S Dutta, SD Rao, M Lwin, D Howard, R Konopinski, S Achilles, J Macdowell, <i>GE Energy Consulting, USA</i>
1b.2	Fault ride through capability of grid forming wind turbines: a comparison of control schemes A Arasteh, A Jain, NA Cutululis, <i>Technical University of Denmark, Denmark</i> , Ö Göksu, <i>Siemens, Turkey</i> , L Zeni, <i>Ørsted, Denmark</i>
1b.3	Synchronous converter role in a grid forming system P Marinakis, <i>HVDC Technologies, UK</i> , N Schofield, <i>Huddersfield University, UK</i>
1b.4	Dynamic studies of a 100% converter-based Irish power system X Zhao, D Flynn, <i>University College Dublin, Ireland</i>
11:15	Q&A Session 1A for all papers
11:25	Q&A Session 1B for all papers
11:25	Networking, Poster Sessions and Break
11:40	Oral Sessions
Session 2A: Wind power plant modelling and control	
Session 2B: Battery energy storage systems	
2a.1	Exploiting bidirectional power flow control to capture wind gust power in small and medium wind turbines
2b.1	Real-time model predictive control of battery energy storage active and reactive power to support the distribution network operation

B Mehdizadeh Gavvani, T Staessens, J Van Damme, J De Kooning, L Vandeveldel, G Crevecoeur, D Bozalakov, <i>Ghent University, Belgium, corelab EEDT, Flanders Make, Belgium</i>		A Mohamed, D Morrow, R Best, <i>Queen's University Belfast, UK</i>	
2a.2 Fault Prediction and Classification for a Doubly-Fed Induction Generator based Wind Turbine by using Random Forest Classifier S Zhang, M Basu, E Robinson, <i>Technological University Dublin, Ireland</i> , B Fitzgerald, B Basu, <i>Trinity College Dublin, Ireland</i>		2b.2 Simulation Assisted Current Density Monitoring for Lithium-ion Batteries in Electric Vehicles M Javadipour, S Alavi, K Mehran, <i>Queen Mary University of London, UK</i>	
2a.3 A Discrete-time state space modelling method applying to SSO of renewable power generation Y Han, H Sun, B Huang, <i>Huazhong University of Science and Technology, China</i> , Y Yu, <i>State Grid Xinjiang Electric Power Research Institute, China</i>		2b.3 Transient clustering approach for PQ Monitoring T Streubel, A Eisenmann, K Rudion, <i>University Stuttgart, German</i> , C Kattmann, <i>BSS Hochspannungstechnik, Germany</i>	
2a.4 Transient stability enhancement of power system including large-scale wind farm by HVDC interconnection line A Nakamura, A Umemura, R Takahashi, J Tamura, <i>Kitami Institute of Technology, Japan</i> , A Sakahara, F Tosaka, R Nakamoto, <i>Hokkaido Electric Power Co., Inc., Japan</i>		2b.4 A review of communication and energy balancing schemes in LI-ION battery management systems Y Zhang, Y Hu, <i>University of Liverpool, UK</i>	
12:20	Q&A Session 2A for all papers		Q&A Session 2B for all papers
12:30	Break		
12:35	Oral Sessions		
Session 3A: Power conversion and grid interaction		Session 3B: Reserves, system services and stability	
3a.1 Evaluation of decentralized voltage harmonic mitigation through DRES converter active filtering capability KN Malamaki, C Tzouvaras, G Kryonidis, C Demoulias, <i>University of Thessaloniki, Thessaloniki</i> , Manuel Barragán-Villarejo, <i>Universidad de Sevilla, Seville, Spain</i>		3b.1 Dynamic wake analysis of a wind turbine providing frequency containment reserve in high wind speeds N Singh, J De Kooning, L Vandeveldel, <i>Ghent University, Belgium</i>	
3a.2 Improved Sigma Z-source Inverter-fed grid system for wind power generation V Sharma, S Ali, M Kashif, <i>Macquarie University, Australia</i> , J Hossain, <i>University of Technology, Australia</i> , Y Yang, <i>Aalborg University, Denmark</i>		3b.2 Development of cost-functions for the remuneration of new ancillary services in distribution networks K Oureilidis, K-N Malamaki, S Gkavanoudis, C Demoulias, <i>Aristotle University of Thessaloniki, Greece</i> , J Martinez-Ramos, <i>Universidad de Sevilla, Spain</i>	
3a.3 Comparative evaluation of dynamic performance of virtual synchronous machine and synchronous machines M Khan, Q Hong, Di Liu, A Alvarez, A Dyško, C Booth, <i>University of Strathclyde, UK</i> , D Rostom, <i>National Grid ESO, UK</i>		3b.3 Fast frequency response provided by commercial demand response from scheduling to stability in power systems M Misaghian, R Li, D Flynn, <i>University College, Ireland</i>	
3a.4 Application of an advanced short circuit strength metric to evaluate Ireland's high renewable penetration scenarios W Baker, D Ramasubramanian, E Farantatos, A Gaikwad, <i>Electric Power Research Institute, USA</i> , M Val Escudero, <i>EirGrid, Ireland</i>		3b.4 A study on the frequency dynamics of the ENTSO-E grid with increasing share of renewable generation M Ramirez-Gonzalez, F Sevilla, P Korba, <i>ZHAW Zurich University of Applied Sciences, Switzerland</i>	

13.15	Q&A Session 3A for all papers	Q&A Session 3B for all papers
13.25	Break	
13.30	Oral Sessions	
Session 4A: System Protection		Session 4B: Demand response applications
4a.1	Impact of system strength and HVDC control strategies on distance protection performance D Liu, Q Hong, A Dyško, D Tzelepis, C Booth, <i>University of Strathclyde, UK</i> , Guangya Yang, <i>Technical University of Denmark, Denmark</i> , I Cowan, B Ponnalagan, <i>The National HVDC Centre, UK</i> ,	4b.1 Potential technical and economic benefit analysis of energy flexibility in bornholms hospital H Nguyen, P Nørgård, <i>Technical University of Denmark, Denmark</i> , M Johansen, <i>Bornholms Hospital, Denmark</i>
4a.2	Islanding dependencies and detection in low-voltage grids with grid forming inverters B Winter, F Rauscher, B Engel, <i>Institut für Hochspannungstechnik und elektrische Energieanlagen, Germany</i>	4b.2 Economic demand response management for sustainable agriculture by hybrid power systems S Ratra, D Singh, <i>Punjab Agricultural University, India</i> , K Singh, <i>GNE, India</i> , R Bansal, <i>University of Sharjah, UAE</i> , R Naidoo, <i>University of Pretoria, South Africa</i>
4a.3	A novel protection philosophy for distribution grids with high share of converter-interfaced distributed renewable sources S Gkavanoudis, D Tampakis, K Oureilidis, KN Malamaki, C Demoulias, <i>Aristotle University of Thessaloniki, Greece</i>	4b.3 Modern methods of construction – an opportunity for BIPV? C Coonick, <i>Innovate, UK</i>
4a.4	Hardware based intrusion detection in E-LAN based distributed DC microgrid: a virtual sensor approach S Madichetty, <i>Trinity College Dublin, Ireland</i> , S Patra, M Basu, <i>Technological University Dublin, Ireland</i>	4b.4 Quantification of demand-side flexibility of a smart active residential building. V Stepaniuk, J Pillai, B Bak-Jensen, <i>Aalborg University, Denmark</i>
4a.5	A flexible real time network model for evaluating HVDC systems' impact on AC protection performance D Liu, Q Hong, A Dyško, A Alvarez, C Booth, <i>University of Strathclyde, UK</i> , I Cowan, B Ponnalagan, <i>The National HVDC Centre, UK</i>	4b.5 PV - BES integrated residential society governed electrical vehicle charging station S Nagar, V Gupta, R Kumar, <i>MNIT Jaipur, India</i> , R. C Bansal, <i>University of Sharjah, Sharjah, UAE</i> , R Naidoo, <i>University of Pretoria, Pretoria, South Africa</i>
14.20	Q&A Session 4A for all papers	Q&A Session 4B for all papers
14:30	Networking	

Tuesday 2 March 2021

10.00	Welcome	
10.05	Keynote: Mark McGranaghan, EPRI, Vice President, Innovation	
10:30	Break	
10:35	Oral Sessions	
	Session 5A: Long-term infrastructure planning and investment	Session 5B: Operation of Distribution Networks
5a.1	Decarbonisation of rural networks within mainland Scotland: in support of intentional islanding C McGarry, S Galloway, G Burt, <i>University of Strathclyde, UK</i>	5b.1 Voltage control in LV distribution networks considering increasing penetration of low carbon technologies A Bagchi, D Bradley, R Best, J Morrow, <i>Queen's University Belfast, UK</i>
5a.2	Enhancing network utilisation in wind-rich regions using coordinated dynamic line rating energy storage and power flow control schemes B Keyvani, M Power, D Flynn, <i>University College Dublin, Ireland</i>	5b.2 A non-wire solution for the active management of distribution networks A Nouri, A Keane, A Soroudi, <i>University College Dublin, Ireland</i> , R Murphy, <i>ESB Networks, Ireland</i> D Ryan, M Ponce De Leon, N Grant, <i>TSSG, Waterford Institute of Technology, Ireland</i>
5a.3	The growth of distributed generation in Great Britain and the associated challenges S Gordon, C McGarry, K Bell, <i>University of Strathclyde, UK</i>	5b.3 Impact of network delays on quality of voltage control for distribution grids under stress A Farooq , K Shahid, Y Gui, R Løvenstein Olsen, <i>Aalborg University, Denmark</i>
5a.4	Probabilistic approach for distribution grid planning under consideration of line loading indicators M Miller, K Rudion, <i>University of Stuttgart, Germany</i> , F Fischer, H Nägele, <i>Netze BW GmbH, Germany</i>	5b.4 Evaluation of a three-phase distribution system state estimation for operational use in a real low voltage grid H Früh, D Groß, K Rudion, <i>University of Stuttgart, Germany</i> , A Haken, B Wasowicz, <i>Netze BW GmbH, Germany</i>
		5b.5 Automated approach to power system operational planning and congestion management for a system with high levels of renewable generation D Frawley, J Ging, <i>EirGrid, Ireland</i>
11.15	Q&A Session 5A for all papers	
11.25	Q&A Session 5B for all papers	
11.35	Networking, Poster Sessions and Break	
11.40	Oral Session	
	Session 6A: Scheduling and Dispatch of Energy Systems	Session 6B: Distribution Network interactions
6a.1	Analysing wind power integration with multi-carrier energy system model of Ireland J Kiviluoma, J Ikäheimo, N Heliö, T Rasku, E Rinne, T Rasku, <i>VTT Technical Research Centre of Finland, Finland</i> , C O'Dwyer, R Li, R Lahon, D Kirchen, D Flynn, <i>University College Dublin, Ireland</i>	6b.1 Cost-benefit analysis of storage devices for provision of multiple services in MV distribution networks A Bagchi, R Best, J Morrow, <i>Queen's University Belfast, UK</i> , J Pollock, , I Bailie, A Cupples, <i>ESB Networks, UK</i>

6a.2 Impact of fast wind fluctuations on the profit of a wind power producer jointly trading in energy and reserve markets A Hosseini, J Toubeau, Z De Grève, F Vallée, <i>University of Mons, Belgium</i> , N Singh, J De Kooning, N Kayedpour, G Crevecoeur, L Vandevelde, <i>Ghent University, Belgium</i>	6b.2 Network limits on residential heat pump capacity as an enabling technology towards renewables integration M Afkousi-Paqaleh, V Rigoni, D Flynn, A Keane, <i>University College Dublin, Ireland</i> , C Wilson, N Hewitt, <i>Ulster University, Northern Ireland, UK</i>
6a.3 EirGrid's met mast and alternatives study C Möhrten, <i>WEPROG, Denmark</i> , D Foghlú, S Power, G Nolan, K Conway, E Lambert, <i>EirGrid, Ireland</i>	6b.3 Fault current management under high penetration of distribution generation in smart grids M Gabr, <i>University of Science and Technology, Egypt</i> , T Megahed, S Abdelkader, <i>Mansoura University, Egypt</i>
6a.4 Enabling flexible operation of CCS plant within a high renewables power system C O'Dwyer, D Flynn, <i>University College, Ireland</i> , I Vorushylo, Ye Huang, N Hewitt, <i>Ulster University, Northern Ireland, UK</i>	6b.4 An Investigation on feature extraction and feature selection for power quality classification with high resolution and RMS data A Eisenmann, T Streubel, K Rudion, <i>University of Stuttgart, Germany</i>
12.20	Q&A Session 6A for all papers
12.30	Break
12.35	Oral Session
Session 7A: Industry session	
Session 7B: Wave and Tidal Energy	
7a.1 Industry speaker Ellen Diskin, ESB	7b.1 Quantifying the market value of wave power compared to wind & solar - a case study T Vrana, H Svendsen, <i>SINTEF Energi, Norway</i>
7a.2 Industry speaker	7b.2 Design and dynamic modeling of magnetic power split device for a tidal stream turbine A Harris, B McGilton, M Mueller, <i>The University of Edinburgh, UK</i>
7a.3 Industry speaker Bernice Doyle, Statkraft	
7a.4 Industry speaker John Fitzgerald, SuperNode	
12.55	Q&A Session 7B for all papers
13.35	Industry Panel Session
14.35	Completion
14.40	Networking

1-2 March 2021**Poster Sessions**

Poster sessions are available all day throughout the conference

0012	Transient stability improvement of power system by cooperative virtual inertia control of PMSG wind generator and storage battery T Sato, A Umemura ¹ , R Takahashi ¹ , J Tamura, <i>Kitami Institute of Technology, Japan</i>
0020	Machine-learning based approach of proportional reactive power dispatch under imposing voltage constraint Y Yoo, JH Lee, S Jung, G Jang, <i>Hanbat National University, The Republic of Korea</i>
0024	Investigation of the effect of different boundary conditions on the islanding of microgrids M Buchner, K Rudion, <i>University of Stuttgart, Germany</i>
0047	Investigation of anomaly detection technique for wind turbine pitch systems C McKinnon, J Carroll, A McDonald, S Koukoura, <i>University of Strathclyde, UK</i> , C Plumley, <i>Cubico Sustainable Investments, UK</i>
0062	A new modular three-phase inverter based on SEPIC-CUK combination converter for photovoltaic applications S Alotaibi, A Darwish, X Ma, <i>Lancaster University, UK</i> , B Williams, <i>University of Strathclyde, UK</i>
0104	Battery aging due to 100 hz current ripple of power converters S Barcellona, L Piegari, <i>Politecnico di Milano, Italy</i>
0150	Effective backtracking algorithm for half-cut cell solar panels D Dolan, F Cheein, P Salter, <i>California Polytechnic State University, USA</i>
0165	Grid forming control for power systems with up to 100% inverter based generation P Marinakis, <i>HVDC Technologies, UK</i> , N Schofield, <i>Huddersfield University, UK</i>
0176	Micro-grid monitoring and supervision: web-based SCADA approach A Besheer, <i>University of Sadat City, Egypt</i> , M Ali, M Barakat, M Abokhalaf, Y Fadel, M Kandil, M Rasmy, O Ali, H Emar, A Bahgat, <i>Cairo University, Egypt</i>
0092	Dynamic maximum power point tracking of photovoltaic arrays based on simplified ripple correlation control C Caruana, <i>University of Malta, Malta</i> , A Al Durra, <i>Khalifa University, UAE</i> , S Muyeen, <i>Curtin University, Australia</i>
0032	Design and feasibility study of a biomass/diesel/PV/battery microgrid system for an off-grid application T Adefarati, <i>Federal University, Nigeria</i> , R Bansal, <i>University of Sharjah, UAE</i> , R Naidoo, <i>University of Pretoria, Pretoria, South Africa</i>
0171	Projections of energy storage in future high renewable electrical energy systems Y Hu, N Schofield, <i>University of Huddersfield, UK</i> , N Zhao, <i>University College Dublin, Ireland</i>
0252	Optimization of controller parameters for grid photovoltaic system at faulty network using emperor penguin optimizer A Omar, W El-Hameed, <i>Ain Shams University, Egypt</i> , H Hasaniien, <i>Future University in Egypt, Egypt</i>
0269	Reliability of smart grids with smart assets and large wind farms P Oyewole, D Jayaweera, <i>University of Birmingham, UK</i>
0208	Tri-State cuk inverter with power decoupling for photovoltaic applications A Darwish, S Alotaibi, <i>Lancaster University, UK</i> , M Elgenedy, <i>University of Strathclyde, UK</i>