

CURRICULUM VITAE

PRABODH BAJPAI

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Department of Sustainable Energy Engineering,
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Educational Qualifications

- Ph.D., Electrical Engineering. (Power Systems), 2008, Indian Institute of Technology Kanpur, U.P., India
Topic: Development of Market Monitoring System and Swarm Intelligence Based Bidding Strategies in Electricity Markets.
- M. Tech., Energy Studies, 2001, Indian Institute of Technology Delhi, New Delhi, India
Topic: Automatic Reactive Power Control of an Isolated Hybrid Power System.
- B. E., Electrical Engineering, 1997, Indian Institute of Technology Roorkee, Uttarakhand, India.

Professional Experience

<i>Duration</i>	<i>Organization</i>	<i>Position</i>
July 2022 till date	Department of Sustainable Energy Engineering, Indian Institute of Technology Kanpur	Associate Professor
July 2014 till June 2022	Electrical Engineering Department, Indian Institute of Technology Kharagpur, WB, India	Associate Professor
Sept. 2015 to March 04, 2021	School of Energy Sciences and Engineering, Indian Institute of Technology Kharagpur, WB, India	Joint faculty
June 2008 to July 2014	Electrical Engineering Department, Indian Institute of Technology Kharagpur, WB, India	Assistant Professor
July 2001 to July 2002	Electrical Engg. Department, Hercourt Butler Technology Institute, Kanpur, UP, India	Guest Lecturer

Publications & Patent

- International Journals : 39
- International Conferences : 16
- National Conferences : 42
- White Papers : 01
- Book Chapters : 05
- Patent : 01(filed)

Research Interests

- Renewable Energy Systems
- Power System Restructuring
- Restructured Electricity Market
- Power System Operation, Control and Analysis

Awards

- Faculty Excellence Award 2021** for outstanding contribution towards Teaching, Research and Institutional Development by IIT Kharagpur
- The Institution of Engineers (India) Fellow**, Membership No:F-1265438, in Electrical Engineering Division since April 2020
- Bhaskara Advanced Solar Energy (BASE) Fellowship** in School of Electrical Engineering and Computer Science, Washington State University (WSU) Pullman, USA from **May 8, 2015 to August 5, 2015** on the research theme of *Grid Interaction including Smart Grids*.
- Sr. Research Fellowship** in the Power Management Institute (PMI), National Thermal Power Corporation (NTPC), Noida, India from **July 2004 to July 2005** on the research theme of *Developing Power Trading Model for Indian Scenario*

Work Experience

- **RESEARCH EXPERIENCE**

a) Research Guidance

Degree	Guidance	Completed	In progress	
			IIT Kharagpur	IIT Kanpur
Ph.D.	Single	3	--	--
	Joint	4	8 (2 Submitted)	2
M. Tech.	Single	19	--	1
	Joint	1	--	1
M.S.	Single	2	--	--
	Joint	2	1	--

b) Sponsored Research Projects

- 1) Centre for Rechargeable Energy storage systems for Augmenting Transportation and Electrification (CREATE), (SERB India, Rs. 8.5 Cr), PI: Prof. Raju Kumar Gupta, Co-PI: Shobit Omar, Kanwar Singh Nalwa, Anand Singh, Ashish Garg, Jishnu Bhattacharya, Ankush Sharma, Suwendu Samanta, Dr. Prabodh Bajpai, DOS:14-03-2022, DOE: 10-03-2027
- 2) Centre of excellence on energy aware urban infrastructure, (SERB India, Rs. 17.5 Cr), PI: Prof. Siddhartha Mukhopadhyay, Co-PI: Dr. Jhareswar Maiti, Dr. Amit Patra, Dr. Ashish Ranjan Hota, Dr. Prabodh Bajpai, Dr. Dipankar Debnath, Prof. Debaprasad Kastha, Dr. Ashok Kumar Pradhan, Dr. Trilok Singh, DOS:11-03-2022, DOE: 10-03-2027
- 3) Development and Integration of an Efficient MPC in Intelligent HMG Energy Systems (SERB India, Rs. 102 Lakhs), PI: Dr. Ashish Ranjan Hota, Co-PI: Dr. Prabodh Bajpai Co-PI: Dr. D. Kastha, , DOS: Feb. 18, 2020, DOE: Aug 17, 2023
- 4) Transmission line protection in the presence of bulk solar photo voltaic power plants (PBV), (CPRI India, Rs. 48.4 Lakhs), PI: Dr. A.K. Pradhan, Co-PI: Dr. Prabodh Bajpai DOS: July 23, 2019, DOE: Sept. 30, 2021
- 5) Grid complaint Direct matrix converter fed DFIG based Wind power generator (GFG), (DST India, Rs. 59.8 Lakhs), PI: Dr. D. Kastha, Co-PI: Dr. Prabodh Bajpai, , DOS: July 17, 2019, DOE: July 16, 2022
- 6) UK India Clean Energy Research Institute (UKICERI), (DST India, Rs. 1247.83 Lakhs), PI: Dr. C. Chakarborthy, Co-PI: Dr. Prabodh Bajpai, DOS: April 5, 2017 DOE: Sept. 4, 2022
- 7) Socializing the micro-solar dome: empowering marginalized rural SC communities through solar illumination and solar electricity ((DST India, Rs. 472.94 Lakhs), PI: Dr. P.P. Chakrabarti, Joint PI: Dr. Priyadarshi Patnaik, Dr. A.K. Pradhan, Co-PI: DR. J.N. Roy, Dr. Pallab Dasgupta, Dr. Pulak Mishra, Dr. Prabodh Bajpai, DOS: March 29, 2019, DOE: March 28, 2022
- 8) Socializing the micro-solar dome: empowering marginalized rural ST and tribal communities through solar illumination and solar electricity, (DST India, Rs. 684.98 Lakhs), Pr: Dr. P.P. Chakrabarti, Joint PI: Dr. Priyadarshi Patnaik, Dr. A.K. Pradhan, Co-PI: Dr. J.N. Roy, Dr. Pallab Dasgupta, Dr. Pulak Mishra, Dr. Prabodh Bajpai, DOS: March 29, 2019, DOE: March 28, 2022
- 9) Reconfigurable Distribution Network (DST India, Rs. 452 Lakhs), PI: Dr. Prabodh Bajpai, Co-PI: Dr. A.K. Sinha, and Dr. D. Kastha, DOS: Sept. 29, 2014, DOE: March 28, 2019

- 10) Stability and performance analysis of photovoltaics (DST India, Rs. 168 Lakhs), PI: Dr. C. Chakarborthy, Co-PI: Dr. Prabodh Bajpai, Dr. A.K. Sinha, DOS: May 17, 2011, DOE: May 16, 2014
- 11) Renewable Hybrid Energy Power Plant for Telecom station in Isolated Sites (Vodafone Essar-IIT Kgp Center of Excellence in Telecommunications (VICET), Rs. 95.00 Lakhs) PI: Dr. Prabodh Bajpai ; Co-PI: Dr. N. K. Kishore, Co-PI: Dr. C. Chakarborthy, DOS: May, 1, 2009, DOE: March 31, 2013

c) Consultancy Projects

- 1) Assessment of solar PV plant generation in WBSEDCL projects at Salboni, Patni, Dhaka, and Raniganj in West Bengal, Client: Vikram Solar Ltd., Value: 33.75 Lakhs; Period: 6 months, PI: Dr. P. Bajpai, Co-PI: Dr. Ashok K. Pradhan, DOS: July. 15, 2022, DOE: July. 15, 2023
- 2) Technical vetting of hydraulic and process design, electro-mechanical and instrumentation design-drawing for interception and diversion structures, lifting stations, main pumping station, effluent pumping station, and 35 MLD STP in maheshtala municipality in the state of West Bengal, Client: Kolkata Metropolitan Development Authority, Value: 29.9 Lakhs; Period: 18 months, PI: Dr. Ashok K. Gupta, Co-PI: Dr. P. Bajpai, DOS: Sept. 17, 2021, DOE: March 31, 2023
- 3) Resiliency modeling and analysis with recommendations for overhead LV distribution network of CESC Ltd. In Kolkata region, (Client: CESC Ltd., Value: 26.08 Lakhs; Period: 12 months, PI: Dr. P. Bajpai, Co-PIs: Dr. A.K. Pradhan, Co-PIs: Dr. Neeraj K. Goyal), DOS: Jan. 15, 2021, DOE: Jan. 14, 2022.
- 4) Solar PV based DC Microgrid at NETRA (Client: NTPC Ltd., Value: 25.56 Lakhs; Period: 24 months, PI: Dr. P. Bajpai, Co-PIs: Dr. A.K. Pradhan), DOS: Jan. 5, 2017, DOE: Dec. 31, 2021.
- 5) Vetting of design and scheme of 50kW rooftop solar power plant at MES Bamrauli (Client: Agni Power & Electronics Pvt. Ltd. Kolkata, Value: 1.534 Lakhs; Period: 1 month, PI: Dr. P. Bajpai, Co-PIs: Dr. A. Shaw), DOS: Nov. 15, 2018, DOE: Dec.15, 2018.
- 6) Vetting of design and scheme of 1 MWp solar power plant at MES Barrackpore (Client: Agni Power & Electronics Pvt. Ltd. Kolkata, Value: 3.68 Lakhs; Period: 1 month, PI: Dr. P. Bajpai, Co-PIs: Dr. A. Shaw), DOS: Sept. 7, 2018, DOE: Oct.5, 2018.
- 7) Estimation of technical transmission and distribution losses for NESCO, (Client: NESCO, Odisha, Value: 5.50 Lakhs; Period: 6 months PI: Prof. A. K. Sinha; Co-PIs: Dr. P. Bajpai, Dr. N. K. Kishore, Dr. A.K. Pradhan, DOS: Aug., 6, 2012, DOE: Feb. 6, 2013

- 8) Inspection cum Survey and Evaluation of Solar PV HLS installed in West Bengal (Client: West Bengal Renewable Energy Development Agency (WBREDA), Value: 5.50 Lakhs; Period: 3 months, PI: Prof. A. K. Sinha; Co-PIs: Dr. P. Bajpai, Dr. C. Chakraborty, Dr. A.K. Pradhan, DOS: May 15, 2009, DOE: Aug.,28, 2009.

- **TEACHING EXPERIENCE**

Theory/lab subjects taught in the Department of Electrical Engineering, **IIT Kharagpur** since June 2008.

- 1) Electrical Technology (EE11001)
- 2) Electrical Technology Lab (EE19001)
- 3) Measurements and Electronic Instruments (EE21004)
- 4) Measurements and Electronic Instruments Lab (EE29004)
- 5) Power System Lab (EE39002) (*New experiments included*)
- 6) Illumination and Electrical Utility Services (EE30024)
- 7) Energy Conversion Processes (EG30002)
- 8) Photovoltaic and Fuel Cells (EG31002)
- 9) Non-conventional Electrical Energy Systems (EE60049) (*New course developed*)
- 10) Renewable and Distributed Energy Systems (EE60005) (*New course developed*)
- 11) Smartgrid (EE60016) (*New course developed*)
- 12) Renewable Energy Sources (ES61007) (*New course developed*)
- 13) Energy systems modelling (ES61008)
- 14) Energy Systems Lab I (ES69007) & II (ES69008) (*New experiments included*)

- **ADMINISTRATIVE EXPERIENCE:**

A) Institute Activity

1. Vice - Chairman, Career Development Centre (CDC) (Jan. 2021-June 2022)
2. Advisory Committee member of Institute Works (IW) section (Sept. 2019-2022)
3. Warden, B. R. Ambedkar hall of residence (July 2021-June 2022)
4. Assistant Warden, B. R. Ambedkar hall of residence (May 2017-June 2021)
5. Assistant Warden B. R. Ambedkar hall of residence (since May 2017)
6. Associate Professor-in-Charge, Electrical works (Jan 2014- Dec. 2018)
7. Assistant Warden Acharya J.C.Bose hall of residence (Oct. 2011- Oct.2013)
8. NSS Program officer (July 2011-June 2012)
9. Laboratory development in School of Energy Science & Engineering

B) Departmental Activity

- 1) Department representative for Central Library (Since 2019)
- 2) Department representative for Training program (2014-2016)
- 3) Building Infrastructure/ Physical facility/ Housekeeping In-charge (2013-2014)
- 4) Faculty advisor for EE students (2008-09 to 2011-12),
- 5) Energy Lab In-charge and Computer control Lab Co-In-charge, (Since 2009)
- 6) Time Table Co-In-charge (2009-2013)

C) Professional Activities

- 1) Secretary and Treasurer, 2011, IEEE Kharagpur Section
- 2) Vice Chair, 2012, IEEE Kharagpur Section
- 3) Chair, 2013, IEEE Kharagpur Section

D) Seminar / Conference Organization

- 1) Organizing Chair in 9th International Conference on Power Systems (ICPS 2021) at I.I.T. Kharagpur in Dec. 2021
- 2) Registration Chair in International Conference on 21st Century Energy Needs Materials, Systems and Applications (ICTFCEN), held at I.I.T. Kharagpur in Dec. 2016
- 3) Registration Chair in Third International Conference on Power Systems (ICPS 2009) held at I.I.T. Kharagpur in Dec. 2009
- 4) Registration Co-Chair in IEEE Region 10 Colloquium and Third International Conference on Industrial and Information Systems (ICIIS) held at I.I.T. Kharagpur, Dec. 2008.

• Service rendered to other Institutes and Organizations:

1. Guest Editor, IET Smart Grid Special Issue on Resilience
2. Solar System Consultant for Water resource Investigation and Development Department, Government of West Bengal
3. Building-Works-Committee (BWC) member of IIIT Kalyani
4. Invited Talks in various National Seminars, Technical sessions, Short term courses, Conferences and Workshop
5. Principal coordinator for organizing Annual Short Term Courses for Power utilities engineers of WBSEDCL, CESC and Tata Power at IIT Kharagpur Campus
6. Member of Research Degree Committee (Electrical Engineering Discipline), Dr. APJ Abdul Kalam Technical University, Lucknow (UP), India
7. Organizing International and National conferences and workshops in association with other Institutions
8. Technical paper review for various International and National publishing journals and conferences
9. Project proposal review and PhD and Master thesis review of research organization and academic Institutions
10. Mentorship and collaborative research activities with academic and R& D organizations

List of Publications

Papers in International Journal:

1. *Bonu Ramesh Naidu, Krishan Kumar Saini, Prabodh Bajpai, Chandan Chakraborty*, “A Novel Framework for Resilient Overhead Power Distribution Networks”, *International Journal of Electrical Power and Energy Systems*, Elsevier, Vol. 147, May 2023, <https://doi.org/10.1016/j.ijepes.2022.108839>

2. Bonu Ramesh Naidu, **Prabodh Bajpai**, Chandan Chakraborty, M. Malakondaiah, Kalyan Kumar Boddeti, “Adaptive Dynamic Voltage Support Scheme for Fault Ride-Through Operation of a Microgrid”, *IEEE transactions on Sustainable Energy*, Early access, Dec. 2022, DOI: [10.1109/TSTE.2022.3231364](https://doi.org/10.1109/TSTE.2022.3231364)
3. Kamlesh Narayan Tiwari, Mahesh Vinayak Hadole and **Prabodh Bajpai**, “Solar Photovoltaic Pump-operated Micro-irrigation Systems: A Comprehensive Review”, *Journal of Agricultural Engineering (India)*, Vol. 59 (4): October-December, 2022, DOI: 10.52151/jae2022594.1789
4. Priyanka Mishra, Ashok Kumar Pradhan and **Prabodh Bajpai**, "Time-Domain Directional Relaying Using Only Fault Current for Distribution System with PV Plant", *IEEE Transactions on Power Delivery*, Vol. 37, Issue: 4, August 2022, DOI: [10.1109/TPWRD.2021.3118712](https://doi.org/10.1109/TPWRD.2021.3118712) IF-4.42
5. M.Malakondaiah, Kalyan Kumar Boddeti, Bonu Ramesh Naidu, **Prabodh Bajpai**, "Second harmonic voltage injection-based self impedance estimation for effective decoupled droop control in a microgrid." *Energy Conversion and Economics, IET, Wiley*, July 2022, Vol.3, Issue-4, pp:227–243. DOI: 10.1049/enc2.12065
6. Mahesh V. Hadole, **Prabodh Bajpai** and Kamlesh N. Tiwari, “Modeling and planning operation of directly coupled solar photovoltaic pump operated drip irrigation system with a case study”, *Clean Technologies and Environmental Policy, Springer Nature*, July 2022, <https://doi.org/10.1007/s10098-022-02376-0>, IF-3.636
7. Noel Richard Merritt, Chandan Chakraborty, **Prabodh Bajpai**, “An E-STATCOM based solution for smoothing Photovoltaic and Wind Power fluctuations in a Microgrid under unbalanced conditions”, *IEEE Transactions on Power Systems, IEEE Transactions on Power System*, Vol. 37, No. 2, pp. 1482-1494, March 2022, DOI: [10.1109/TPWRS.2021.3106859](https://doi.org/10.1109/TPWRS.2021.3106859) IF-4.42
8. Priyanka Mishra, Ashok Kumar Pradhan, Parul Singh and **Prabodh Bajpai**, “Protecting Distribution System with Inverter Interfaced PV Plant Using q-axis Components”, *IEEE Systems Journal*, Early Access, April 2021, DOI: [10.1109/JSYST.2021.3071627](https://doi.org/10.1109/JSYST.2021.3071627) IF-4.46
9. Kanishk Chawla, **Prabodh Bajpai** and Rajib Das, “Decision Support Tool for Enabling Resiliency in an Underground Power Distribution System”, *International Journal of Electric Power and Energy System, Elsevier*, Accepted for publication on Vol. 133, Dec. 2021, <https://doi.org/10.1016/j.ijepes.2021.107232> IF-3.588
10. Mahesh V. Hadole, Kamlesh N. Tiwari and **Prabodh Bajpai**, “Energy generation and flow rate prediction of photovoltaic water pumping system for irrigation”, *Environment, Development and Sustainability, Elsevier*, 23, pp 6722–6733, 2021, <https://doi.org/10.1007/s10668-020-00886-9>, IF-1.93
11. Priyanka Mishra, Ashok Kumar Pradhan and **Prabodh Bajpai**, “A Positive Sequence Relaying Method for Solar Photovoltaic Integrated Distribution System”, *IEEE*

- Transactions on Power Delivery*, Early Access, Dec. 2020, DOI: [10.1109/TPWRD.2020.3044330](https://doi.org/10.1109/TPWRD.2020.3044330) IF-4.42
12. S. Sinha and P. Bajpai, "Power Sharing Through Interlinking Converters in Adaptive Droop Controlled Multiple Microgrid System", *International Journal of Electric Power and Energy System, Elsevier*, Volume 128, June 2021, 106649, <https://doi.org/10.1016/j.ijepes.2020.106649> IF-4.62
 13. Ishita Biswas, Debaprasad Kastha, Prabodh Bajpai, "Small Signal Modeling and Decoupled Controller Design for a Triple Active Bridge Multiport DC-DC Converter", *IEEE Transactions on Power Electronics, Early Access*, Vol. 36, Issue 2, pp.1856 – 1869, Feb. 2021, DOI: [10.1109/TPEL.2020.3006782](https://doi.org/10.1109/TPEL.2020.3006782), IF-7.224
 14. S. Sinha and P. Bajpai, "Power Management of Hybrid Energy Storage System in a Standalone DC Microgrid" *Journal of Energy Storage, Elsevier*, Volume 30, August 2020, <https://doi.org/10.1016/j.est.2020.101523>, IF- 3.517
 15. W. Shao, Ruizhu Wu, Li Ran, H. Jiang, P. A. Mawby, D. J. Rogers, Tim C. Green, T. Coombs, K. Yardley, P. Bajpai, D. Kastha, Lin Zhou, "A Power Module for Grid Inverter with in-built Short-Circuit Fault Current Capability", *IEEE Transactions on Power Electronics*, Vol. 35, Issue 10, pp. 10567-10579, Oct. 2020, DOI: [10.1109/TPEL.2020.2978656](https://doi.org/10.1109/TPEL.2020.2978656), IF-7.224
 16. Priyanka Mishra, Ashok K. Pradhan and Prabodh Bajpai, "Adaptive Distance Relaying for Distribution Lines Connecting Inverter-Interfaced Solar PV Plant", *IEEE Transactions on Industrial Electronics, Early Access*, Vol. 68, Issue 10, pp.2300-2309, March 2020, DOI: [10.1109/TIE.2020.2975462](https://doi.org/10.1109/TIE.2020.2975462), IF-8.7
 17. Noel Richard Merritt, Chandan Chakraborty, Prabodh Bajpai, Bikash. C. Pal, "A Unified Control Structure for Grid Connected and Islanded Mode Operations of Voltage Source Converter based Distributed Generation Units under Unbalanced and Non-linear Conditions" *IEEE Transactions on Power Delivery*, Vol. 35, No. 4, Aug. 2020, DOI: [10.1109/TPWRD.2019.2952692](https://doi.org/10.1109/TPWRD.2019.2952692), IF-4.42
 18. M.Malakondaiah, Kalyan Kumar Boddeti, Bonu Ramesh Naidu, Prabodh Bajpai, "Second Harmonic Impedance Drift based Islanding Detection Method" *IET Generation, Transmission & Distribution*, Vol. 13, Issue 23, pp. 5313 - 5324, Nov. 2019, DOI: [10.1049/iet-gtd.2018.6838](https://doi.org/10.1049/iet-gtd.2018.6838) IF-2.56
 19. Priyanka Mishra, Ashok Kumar Pradhan and Prabodh Bajpai, "Voltage control of PV inverter connected to unbalanced distribution system", *IET Renewable Power Generation*, Vol. 13, Issue 9, pp. 1587 – 1594, July 2019, DOI: [10.1049/iet-rpg.2018.6219](https://doi.org/10.1049/iet-rpg.2018.6219) IF-3.6.
 20. Dinesh Varma Tekumalla, Diptendu Pal, Prabodh Bajpai, "Comprehensive Performance Evaluation of Various Solar PV System Configurations", *IET Renewable Power Generation*, Volume 13, Issue 8, pp. 1261 – 1270, June 2019, DOI: [10.1049/iet-rpg.2018.5729](https://doi.org/10.1049/iet-rpg.2018.5729) IF-3.6.

21. W. Shao, Li Ran, H. Jiang, **P. Bajpai**, D. Kastha, Ruizu Wu, P. A. Mawby, Zheng Zeng, "Power module with large short-term current capability by using phase change material", *IET, The Journal of Engineering*, Vol. 2019 Issue. 16, pp. 3225-3229, Jan. 2019, <https://doi.org/10.1049/joe.2018.8405> IF-0.3.
22. Tanaya Datta, **P. Bajpai**, "An Adaptive Limiter for Unbalanced Operation of Doubly Fed Induction Generator Based Wind Energy System" *International Journal of Renewable Energy Technology*, Inderscience, Vol. 9, No. 4, pp. 416-438, 2018, DOI: [10.1504/IJRET.2018.095797](https://doi.org/10.1504/IJRET.2018.095797) IF-0.12.
23. **P. Bajpai**, Sayonsom Chanda and Anurag K. Srivastava, "A Novel Metric to Quantify and Enable Resilient Distribution System using Graph Theory and Choquet Integral", *IEEE Transactions on Smart Grid*, Vol. 9, No. 4, 2918–2929, July 2018, DOI: [10.1109/TSG.2016.2623818](https://doi.org/10.1109/TSG.2016.2623818) IF-10.49.
24. Noel Merritt, Chandan Chakraborty and **P. Bajpai**, "New Voltage Control Strategies for VSC based DG Units in an Unbalanced Microgrid", *IEEE Transactions on Sustainable Energy*, Vol.8, no.3, pp.1127-1139, July 2017, DOI: [10.1109/TSTE.2017.2657660](https://doi.org/10.1109/TSTE.2017.2657660) IF-7.65.
25. Paresh K. Nayak, A.K. Pradhan, and **P. Bajpai**, "A Three-Terminal Line Protection Scheme Immune to Power Swing", *IEEE Transactions on Power Delivery*, Vol. 31, No. 3, pp.999-1006, June 2016, DOI: [10.1109/TPWRD.2014.2387873](https://doi.org/10.1109/TPWRD.2014.2387873) IF-4.42.
26. **P. Bajpai**, and Vaishalee Dash, "Power Management Control Strategy for a Stand-alone Solar Photovoltaic-Fuel Cell-Battery Hybrid System" *Sustainable Energy Technologies and Assessments*, Vol.9, pp.68-80, 2015, <https://doi.org/10.1016/j.seta.2014.10.001> IF-3.46.
27. Paresh K. Nayak, A.K. Pradhan, and **P. Bajpai**, "Secured Zone 3 Protection During stressed Condition" *IEEE Transactions on Power Delivery*, Vol.30, no.1, pp: 89-96, 2015, DOI: [10.1109/TPWRD.2014.2348992](https://doi.org/10.1109/TPWRD.2014.2348992) IF-4.42.
28. Paresh K. Nayak, A.K. Pradhan, and **P. Bajpai**, "Wide-Area Measurement Based Backup Protection for Power Network with Series Compensation", *IEEE Transactions on Power Delivery*, Vol.29, no.4, pp: 1970 - 1977, 2014, DOI: [10.1109/TPWRD.2013.2294183](https://doi.org/10.1109/TPWRD.2013.2294183) IF-4.42.
29. Ashish R. Hota, and **P. Bajpai**, "Decentralized Operation of Residential Energy Resources in the Smart Grid", *International Journal of Renewable Energy Technology*, Vol. 5, No. 1, pp.55-76, 2014, DOI:[10.1504/IJRET.2014.059661](https://doi.org/10.1504/IJRET.2014.059661)
30. Ashish Ranjan Hota, Mahesh Juvvanapudi and **Prabodh Bajpai**, "Issues and Solution Approaches in PHEV Integration to Smart Grid", *Renewable & Sustainable Energy Reviews Elsevier*, Vol. 30, pp. 217-229, February 2014, <https://doi.org/10.1016/j.rser.2013.10.008> IF-10.56.
31. Zubin Japa Balan and **P. Bajpai**, "Optimal Load Scheduling Within a Microgrid Including Reliability Aspects", *International Journal of Smart Grid and Clean Energy*, Vol. 2, No. 3, pp. 343-349, Jan. 2013, DOI:[10.12720/sgce.2.3.343-349](https://doi.org/10.12720/sgce.2.3.343-349) IF-0.5.

32. Paresh K. Nayak, A.K. Pradhan, and P. Bajpai, "A Fault Detection Technique for Series Compensated Line during Power Swing", *IEEE Transactions on Power Delivery*, Vol.28, no.2, pp.714-722, April 2013, DOI: [10.1109/TPWRD.2012.2231886](https://doi.org/10.1109/TPWRD.2012.2231886) IF-4.42.
33. Ashish R. Hota, P. Bajpai and Dilip Pratihari, "Evolutionary Neural Networks for Strategic bidding in Electricity Markets", *International Journal of Energy Sector Management, Emerald*, Vol.6, Issue 3, pp.321 - 342, Sept. 2012, <https://doi.org/10.1108/17506221211259637> IF-0.9.
34. P. Bajpai and Vaishalee Dash, "Hybrid Renewable Energy Systems for Power Generation in Stand-alone Applications: A Review" *Renewable and Sustainable Energy Reviews, Elsevier*, Vol. 16, Issue 1, pp. 2926-2939, January 2012, <https://doi.org/10.1016/j.rser.2012.02.009> IF10.56.
35. Ranjay Das, P. Bajpai and A. K. Sinha, "Dynamic Interaction of Renewable Hybrid Power Plant with Grid", *Renewable Energy and Power Quality Journal (REPQJ)*, Vol.9, 2011
36. P. Bajpai, and S. N. Singh, "Effective Market Monitoring System for Surveillance of Indian Electricity Market", *Special Issue of International Journal of Energy Sector Management*. Vol. 3, Issue 2, pp. 275-292, September 2009, DOI:[10.1108/17506220910986806](https://doi.org/10.1108/17506220910986806) IF-0.9.
37. P. Bajpai, Shiva Kr. Punna and S. N. Singh, "Swarm Intelligence Based Strategic Bidding in Competitive Electricity Markets", *IET Generation, Transmission & Distribution*, Vol. 2, No. 2, pp. 175-184, March 2008, DOI: [10.1049/iet-gtd:20070217](https://doi.org/10.1049/iet-gtd:20070217) IF-2.56.
38. P. Bajpai, and S. N. Singh, "Strategic Bidding in Network Constrained Electricity Markets Using FAPSO", *International Journal of Energy Sector Management*, Vol. 2, Issue 2, pp. 274-296, March 2008, DOI:[10.1108/17506220810883252](https://doi.org/10.1108/17506220810883252) IF-0.9.
39. P. Bajpai, and S. N. Singh, "Fuzzy Adaptive Particle Swarm Optimization for Bidding Strategy in Uniform Price Spot Market", *IEEE Transactions on Power System*, Vol. 22, No. 4, pp. 2152-2160, November 2007, DOI: [10.1109/TPWRS.2007.907445](https://doi.org/10.1109/TPWRS.2007.907445) IF-6.81.

Papers in Conference/Seminar Papers:

(a) International

1. P. Mishra, A. K. Pradhan, and P. Bajpai, "A positive sequence relaying method for solar photovoltaic integrated distribution system," in Proc. *IEEE Power and Energy Society General Meeting (PESGM)*, Denver, CO, USA, 2022
2. P. Mishra, A. K. Pradhan, and P. Bajpai, "Time-domain directional relaying using only fault current for distribution system with PV plant," in Proc. *IEEE Power and Energy Society General Meeting (PESGM)*, Denver, CO, USA, 2022.

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Technologies Developed

Sl.	Title	Year	Supported by	Brief Detail
1.	Renewable hybrid energy power plant for stand-alone applications	2013	Sponsored research project funded by Vodafone Essar-IIT Kgp Center of Excellence in Telecommunications (VICET)	<p>Patent and Development of technology-</p> <p>A Laboratory prototype of unified controller as for stand-alone Solar-fuel cell-Battery hybrid energy power plant is designed, developed and tested with Solar PV as primary source, battery as primary backup, FC as secondary backup to feed a DC load through changeover logic based on optimal energy management strategy.</p> <p><i>Indian Patent application no. 959/KOL/2013 filed on 19.08.2013</i></p>
2.	Hybrid AC-DC Microgrid test facility	2018	Sponsored research project funded by DST, India	<p>Development of technologies-</p> <p>Unique Hybrid AC-DC microgrid system designed and developed with various sources, hybrid storage, AC/ DC loads, two level hierarchal controls. It is installed in and around a lab complex building as a test facility for various interface devices and control algorithms.</p>

Technical details with photographs are provided below for both developed technologies.

Technical details and photographs of Renewable Hybrid Energy Power Plant for Stand-alone applications developed at IIT Kharagpur under the project Sponsored by Vodafone Essar-IIT Kgp Center of Excellence in Telecommunications (VICET)

Hybrid energy system using renewable power sources is a promising solution for Stand-alone applications like telecom stations in remote locations. Such arrangements could replace diesel generators in standalone installations, particularly placed far from the power grid. In isolated regions, intermittent renewable power system is integrated with adequate energy storage to provide a reliable supply of electricity to a load. The energy storage components (battery and/or Fuel Cell) can provide power to the load when the renewable sources are inadequate. Solar-fuel cell-Battery hybrid energy power plant schematic block diagram is shown in Fig. 1. The control system will direct power to a DC bus to supply the load, while the excess power is directed to the batteries first and an electrolyzer next, which is used to generate hydrogen for supplying the fuel cell. A unified controller for Solar-fuel cell-Battery hybrid energy power plant is designed, developed and tested with Solar PV as primary source, battery as primary backup, FC as secondary backup to feed a DC load.

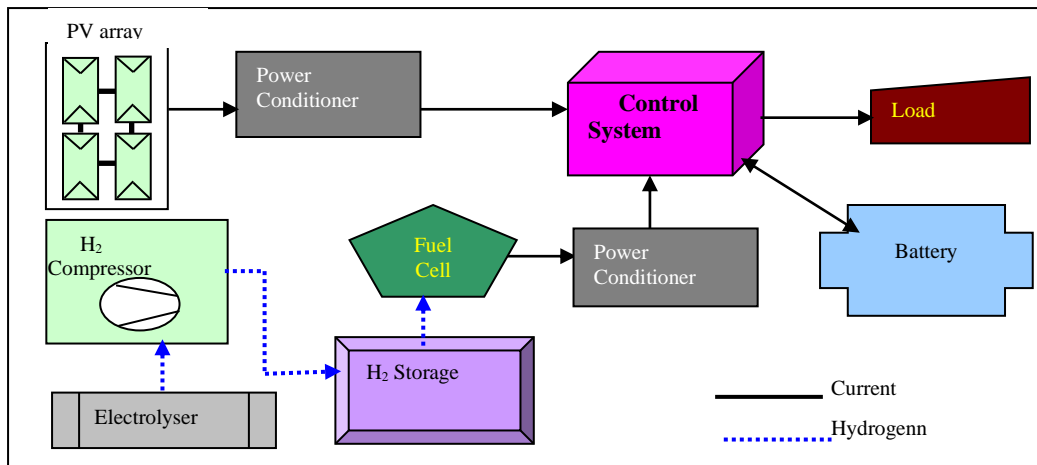


Fig. 1, Schematic block diagram of Solar-Fuel cell-Battery Hybrid Energy Power Plant

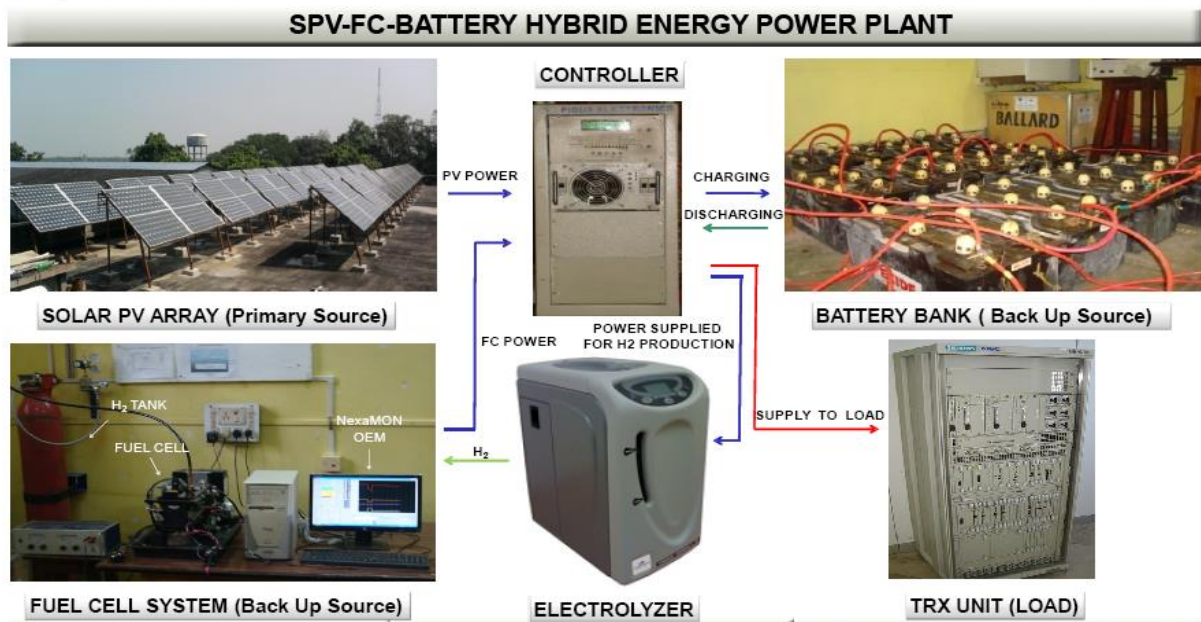


Fig.2: Photo of Solar-Fuel cell-Battery hybrid Energy Power Plant

Technical details and photographs of the Hybrid AC/DC Microgrid test facility developed at IIT Kharagpur under project Sponsored by DST, Govt. of India

This hybrid AC/DC microgrid facility is unique in terms of kind of sources composed of solar PV, wind turbine-emulator & generator system, Fuel cell (FC) system, Diesel generator and hybrid storage of Battery and Supercapacitor (SC) and AC/DC loads. This is installed in and around a lab complex building in IIT Kharagpur campus to host and test new interface prototypes devices and the control algorithms. The two level control hierarchy and communication structure is developed using local control from NI CompactRIO and supervisory control from OPAL RT OP5600.

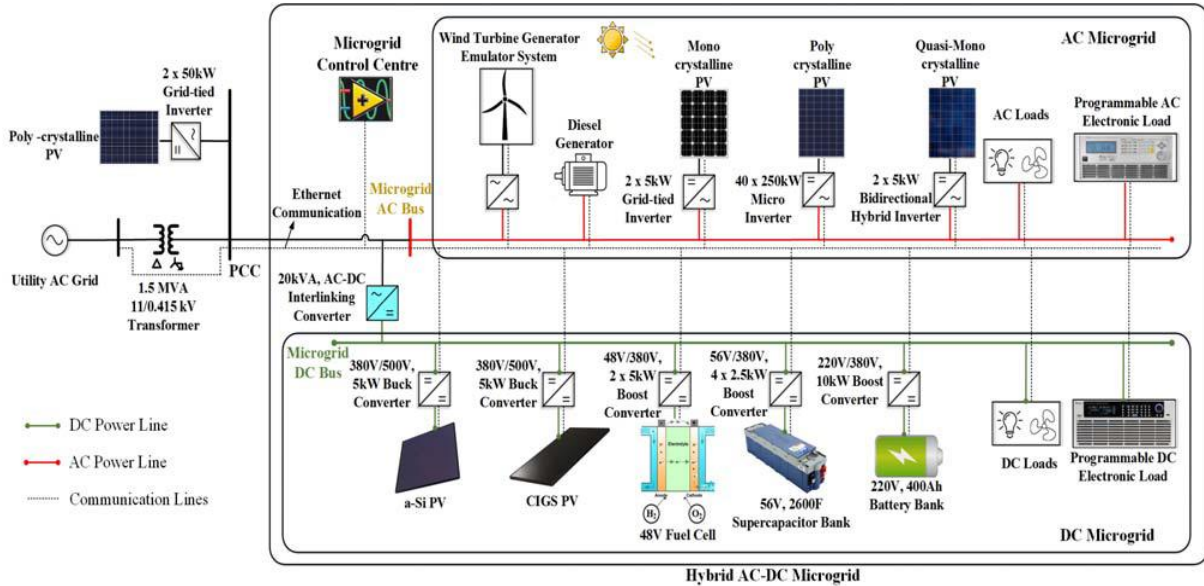


Fig.1: Schematic block diagram of the system architecture



Fig.2: Photo of 1)Control Center, 2)100kW PV plant, 3)ThinFilm PV array with Single axis tracker, 4) Crystalline PV array with Dual axis tracker, 5) Hybrid and Grid-tied PV inverters, 6) Wind turbine-emulator & generator system, 7) HMG Interface panel, 8) Converters for Battery, SC and FC, 9)FC system with Electrolyser and H2 tank, 10)Battery Bank, 11) SC bank, 12) Diesel generator