CENTRAL POWER RESEARCH INSTITUTE (CPRI), BANGALORE

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Invitation for Post-Doctoral Fellows

Central Power Research Institute (CPRI) with headquarter at Bangalore and units located at Bhopal, Hyderabad, Nagpur, Nashik, Noida, Kolkata and Guwahati, functions as a National Power Research Organization for undertaking and/or sponsoring research and development projects in the fields of generation, transmission, distribution and operation of electricity supply systems. CPRI acts as an apex body for initiating and coordinating the R&D in the field of electric power.

CPRI invites applications for engagement of Post-Doctoral Fellows (PDFs) in the categories mentioned in **Annexure I**:

Qualifications and Experience:

- Ph.D. in relevant areas: Power Engineering, High Voltage Engineering, Energy Storage, Cyber Security, Smart Grids, Power Electronics, Materials Science, Chemical Engineering, Mechanical Engineering, Computer Science, or allied disciplines according to tentative topic on which the PDF is expected to work.
- First Class or equivalent (in grades) in the preceding qualifying degrees. Good academic record throughout.

Note: Selection will be based on personal interview along with weightage to publication of technical papers, patent, and research experience.

Age Limit:

- Ph.D. holders can apply within five years of completing their degree; the maximum age limit is 35 years, relaxable by five years for women and reserved categories.
- Applicants who have submitted their Ph.D. thesis may apply with proof of submission. However, provisional/ degree certificate must be provided within six months of appointment, or else the appointment may be cancelled.

Fellowship Emoluments and Benefits:

- **Monthly Fellowship:** Rs. 80,000/- (Consolidated), with annual increment of 5%.
- **Accommodation:** Either suitable accommodation provided, if available OR 15% of the remuneration can be paid in lieu.
- **Other Benefits:** Insurance coverage, paid leave, access to CPRI research facilities, eligibility for conference participation, and subsidized canteen facility will be provided at par with CPRI officials.

Duration:

Three (3) years (extendable maximum upto five (5) years based on performance in exceptional cases, based on the recommendation of the Committee appointed by the Competent Authority.

Annual review shall be held to assess the performance and if the performance of the PDF is not found to be satisfactory, his/her fellowship may be discontinued before the completion of tenure)

How to Apply

1. Candidates may apply in the prescribed application form given in **Annexure – II**. Completely filled in Application Form and all necessary enclosures may be sent in a Sealed cover super scribed with 'APPLICATION FOR PDF' to 'Chief Administrative Officer', Central Power Research Institute, Prof.Sir C.V. Raman Road, PB NO.8066, Sadashiva Nagar P.O. Bangalore – 560 080' on or before **31.10.2025**.
2. Self-attested Copies of the certificates related to age, qualifications, caste, experience etc., should be submitted along with the application form.
3. Self-attested copies of research publications in journals and conferences, if any, should be attached along with the application form.
4. One recent passport size photograph shall be affixed to the application form.
5. A brief bio data of the candidate (not exceeding 1 page) shall be enclosed along with the application form.
6. Candidates already working in any Government organization should apply through proper channel.

Annexure-I

Category Name	Number of PDF Positions	Tentative topic on which the PDF is expected to work
A	**1**	Analysis and mitigation of electro-magnetic field environment of 1150 kV UHVAC transmission lines
B	**1**	At the Central Power Research Institute (CPRI), significant challenges persist in optimizing energy storage systems, particularly in lithium-ion batteries, sodium-ion batteries, solid-state batteries, and fuel cells. These technologies are essential for advancing renewable energy systems and electric vehicles (EVs), but they each face critical limitations. Lithium-ion batteries degrade over time due to temperature fluctuations, charge-discharge cycles, and state-of-charge (SOC) imbalance, reducing efficiency and lifespan. Solid-state batteries, though promising with higher energy densities and enhanced safety, struggle with material stability, scalability, and high production costs. Fuel cells, while offering a clean energy alternative, are hindered by efficiency losses, limited durability, and expensive catalysts. CPRI's research focuses on mitigating these issues by exploring new materials and optimizing system management. Specifically, it aims to enhance battery management systems (BMS) for better SOC control, improve thermal management, and extend the lifespan of energy storage technologies. In the case of solid-state batteries, CPRI investigates novel solid electrolytes and interfaces that can support higher performance. For fuel cells, the focus is on improving catalyst efficiency and reducing operational costs. By addressing these challenges, CPRI's research contributes to the development of more efficient, durable, and cost-effective energy storage solutions, essential for a sustainable energy for future.
C	**2**	1. Cyber security in power sector - SCADA, communication protocols, Cyber security standards used in power sector, communication network security, python, Linux, Kali Linux, VAPT test tools 2. Hardware security - embedded systems, firmware, semiconductor chips and electronic systems designs.
D	**2**	1**.** Design & Modelling of Renewable Energy Sources and their associated controls including PPC and SVG controls in RMS (PSS/E) model and EMT (PSCAD) models when evacuating the power into Weak Grids 2. Develop a platform for creating and simulating digital twins of power systems, integrating data from real-time monitoring systems

E	**2**	1**.** Design and Development of High Performance and Reliable Electric Drives for EV application. The Electric Vehicle Mission, conceptualized by Prime Minister's Science, Technology Innovation and Advisory Council, aims to reduce fossil fuel consumption, mitigate emissions, and facilitate production of Electric Vehicles in India. In line with this R&D works of Indian research scholars are focused to improve the performance and reliability of EV so that it becomes popular and adopted by the users in place Internal Combustion Engine (ICE) automobiles. From literature survey, it is found that lot of research works are focused on development of high-energy storage system, Power Management strategy incorporating regenerative braking, ultra-capacitor and wireless charging of energy storage. Less Research works is reported on reducing ripple torque of Brushless DC (BLDC) Motor and Permanent Magnet Synchronous Machine (PMSM) and improving the reliability of their insulation system. Three research gaps identified under problem statement of Design and Development of High Performance and Reliable Electric Drives for EV application are as follow: i. Development of a Novel Power Management Strategy to improve the performance of EVs. ii. Quantification/measurement of ripple torque and develop strategy to Reduce ripple torque. iii. Improving the reliability of the insulation system of EV considering steep front switching surges due to high frequency switching of power devices. 2. With the increase in the integration of renewable energy sources (RES) such as solar photovoltaic (PV) and wind energy into the power grid, power quality issues have become a significant concern. The distribution cables utilized for power trans mission from the RES System to grid suffers premature failures due to temperature rise due to harmonics, and over voltages developed in the system. In addition, proper design of cables and their installation also plays an important factor in its reliability. Hence, the problems to be addressed are evaluation of the effects of harmonic distortion and filter on power cables, their design and installation methods. It is also required to optimize cable laying and installation patterns to improve thermal management of the cables.

F	**1**	Failure Analysis of Composite Insulators in Tropical Indian Conditions
G	**1**	The Hydrogen and Ammonia synthesized through Green routes having the potential to replace natural gas for the gas turbines and also co-fired in coal fired power plants to replace coal to achieve de-carbonization. However there are challenges in respect of using hydrogen and ammonia for both gas turbines and co-firing. Hydrogen has the threat of potential flash back in the gas turbine combustors due to its high burning velocity. Ammonia has lower heating value, low burning velocity, higher risk of unstable combustion and the possibility of producing large quantities of NOx emissions because it contains nitrogen. Suitable blends of hydrogen and ammonia needs to be tried but the challenges will vary with the design and capacity of the gas turbine combustors. Combustors need to be designed to handle high hydrogen concentrations, prevent flashback and manage NOx emissions from ammonia while using Hydrogen – Ammonia Blends. In respect of co-firing with coal ammonia can alter the flue gas temperature and heat transfer characteristics and potentially affecting the overall performance of the boiler. There would possibilities that ammonia contains nitrogen may increase the NOx emissions and the ammonia slippage if not properly burned. The burner design and retrofittings are essential in the boiler to handle hydrogen and ammonia. Constant research is required in the area of developing prototypes and modeling using advanced CFD tools. The PDF will work in the research area of addressing the challenges pertaining to the full or partial replacement of natural gas and coal in gas turbines and PC boilers respectively using existing CFD facilities and other research facilities at CPRI.

Annexure - II

Application for the post of *Post-Doctoral Fellow*

(Important: Please use only A4 size paper for application and other testimonials)

PART A

Affix recent passport size Photograph here

01.	Category No. to which applied	:	
02.	Area of research in Ph.D.	:	
03.	Name in full *(in Block letters)*	:	
04.	Age(*as on last date for receipt of application*) and Date of Birth *(Enclose a copy of certificate in support of age)*	:	
05.	Nationality	:	
06.	Father's/Husband's name	:	
07.	Address for correspondence *(in Block letters)*	:	
08.	Permanent Address	:	

a)	Telephone/Mobile No. (Landline/Cell)	:	Landline :
		:	Mobile :
		:	E-mail id :
b)	Alternate No., if any	:	
09.	Religion	:	
	Whether belonging to SC/ST/OBC/PWD*(must be supported by Certificate)*	:	
10.	Educational/professional qualification (indicating clearly the examinations passed, University/Board, Year and Month of passing, class and percentage of marks & subjects taken starting from minimum qualification prescribed for the post) If the examination was semester wise, marks should be indicated semester wise and copies of marks sheets of all semesters should be enclosed. If the examination is year-wise marks should be indicated year wise and copies of marks sheets of all years should be enclosed, along with certificates, failing which the application will be rejected. In case of grades/CGPA, documents supporting the conversion formula used by the university/institute should be enclosed:		

Examination passed	Year and month of passing	Board/ University / Institution	%age of Marks semester wise /year wise		Class obtained	Subjects taken	Whether marks sheets enclosed
			Semester / year	% of marks			
(ATTACH SEPARATELY as Annexure – I)							

12. Whether continuing for higher studies? If so furnish details

Name of the course	Year and month of Regis-tration	Board/University/ Institution	Whether part time or full time	Subjects Taken	Year & month during which the course will be completed
(ATTACH SEPARATELY as Annexure – II)					

13.	Details of the previous/present employment held, if any, in chronological order starting from present position backwards (indicating the name of the employer with full address, post held, salary drawn, period of service, nature of duties etc.). Supporting documents in the form of offer of appointment letter, discharge letter, experience certificate etc. shall be enclosed. **Without these documents, experience will not be considered.**

Name of the Firm/Company with address	Post held	Service Period		Scale of pay, salary drawn	Nature of duties	Reason for leaving the previous organisation
		From	To			

(ATTACH SEPARATELY as Annexure – III)

14.	Total number of years of experience (if applicable)	
15.	Area of expertise	
16.	Details of Research Projects undertaken (Furnish Details as Annexure)	
17.	Details of Research papers published (attach copies of papers published)	
18.	Details of Professional membership like IEEE, etc	
19.	Details of membership in National Committees if any like BIS, etc	

20.	Details of special work carried out if any	
21.	Details of Training/Course attended (attach details)	
22.	Details of Seminar/Training/short term courses organized (attach details)	
23.	Details of awards/honours received	
24.	Have you executed any bond to present Employer, if so, please give details	
25.	If selected, the minimum time required to join the post	
26.	Name and address of two persons who have knowledge about your professional experience (give name, complete designation, postal address, mobile/land line nos.)	1.
		2.
27.	Have you ever been detained in Police Custody? If yes, please give complete details thereof.	
28.	Whether you have been convicted by any Court of Law? If yes, please give complete details thereof.	
29.	Whether any criminal case is pending or contemplated against you in any Court of Law? If yes, please give complete details thereto.	

DECLARATION

I affirm that the information given in this application is true and correct. I also fully understand that if at any stage it is discovered that any attempt has been made by me to willfully conceal or misrepresent the facts, my candidature will be summarily rejected and my employment terminated without notice and compensation.

Place :

Date :

(Signature of the Candidate)

PART B *(To be filled by employees of State/ Central / PSUs etc. only)*

Name of the Organization : Reference No. :

It is certified that :

1. The date of birth, qualification, experience and other details given by Shri/

   Smt.....

   as given in Part A of this application for the post of .....

   .....at Central Power Research Institute have been verified and found to be correct.

2. Integrity of Shri/Smt./..... is beyond doubt.

3. No vigilance or disciplinary proceedings is either pending or contemplated against the officer.

Signature of the authorized Officer
(Name & Designation)

Seal of the Officer

Full address of the authorized Officer (Seal)
Telephone No.
Fax No.