Gender and Power Sector Regulation

Lessons and way forward for India

Aprajita Salgotra and Anoop Singh

Centre for Energy Regulation (CER)
Department of Management Sciences
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Supported by UK Government

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GENDER
AND
POWER SECTOR REGULATION

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Source: meta AI

This book is the outcome of a study carried out under the Power Sector Reforms (PSR) Programme – Phase II, funded by the UK's Foreign, Commonwealth & Development Office (FCDO), as part of the India-UK collaboration on climate and energy.

Acknowledgment

Centre for Energy Regulation (CER) at IIT Kanpur was set up through seed funding from Foreign, Commonwealth & Development Office (FCDO), Government of UK. The Centre has engaged itself in undertaking regulatory research, development of knowledge base and capacity building activities for wider set of stakeholders in the power sector. As a part of its initiatives to understand the contours of regulatory governance framework, identifying the areas for avenues for strengthening accountability, transparency and wider stakeholder participation towards that endeavour, the Centre initiated a study to understand gender dimension in the regulatory governance space in the sector. This study compiles key insights and findings from the research, which have been documented in this book. The study included wider stakeholder consultation since inception, culminating in a focussed Regulatory Conclave.

The Regulatory Conclave on "Role of Women in Power Sector Regulation," organized by the Centre for Energy Regulation (CER), IIT Kanpur, on September 07, 2024 served as a dynamic platform for meaningful discussions, bringing together policymakers, industry leaders, regulatory experts, and other key stakeholders. We are grateful to the following distinguished personalities; *Ms. Parminder Chopra* (Chair), CMD of Power Finance Corporation; *Ms. Audrey Zibelman* (Co-chair), Former Chairperson of the New York Public Service Commission and Former CEO of the Australian Energy Market Operator; *Mr. V. P. Raja*, Former Chairman of the Maharashtra Electricity Regulatory Commission; and *Ms. Anjuli Chandra*, Former Member of the Punjab State Electricity Regulatory Commission. The insightful discussions highlighted the need for providing women equal access to capacity building programs, adopting equal opportunities in the workplace, implementing a doctrine of preference in recruitment, mentoring and sensitizing male colleagues, and introducing new gender-specific policies. These discussions provided a critical lens through which the study has been able to examine both policy-driven and structural impediments to gender diversity in the sector.

The CER survey was instrumental in providing a broader, data-driven perspective on the issue. To capture diverse viewpoints from a wide range of stakeholders across the sector, an online survey was designed and implemented. The responses offered valuable insights into existing workplace policies, professional aspirations, and the challenges women face in advancing their careers within the industry. The authors sincerely appreciate all participants of the Regulatory Conclave and CER's online survey, whose invaluable contributions significantly shaped this study.

We are also deeply indebted to the experts who shared their experiences and insights through Stakeholder Consultation and Personal Interviews: *Ms. Neerja Mathur*, First Woman Chairperson, Central Electricity Authority; *Dr. Jyoti Prasad*, Member (Law), JERC (Goa & UTs); *Mr. V. P. Raja*, Former Chairman of the Maharashtra Electricity Regulatory Commission; *Dr. Arbind Prasad*, Former Chairperson, Jharkhand Electricity Regulatory Commission; *Ms. Shilpa Agarwal*, Joint Chief (Engineering), Central Electricity Regulatory Commission; *Ms. Sharda Yadav*, Deputy Director, Delhi Electricity Regulatory Commission; and *Mr. Bijoy Kumar Sahoo*, Former Ombudsman, Odisha Electricity Regulatory Commission. Their valuable insights are instrumental in driving the study forward, shaping the findings and contributing to a comprehensive understanding of the subject.

We would like to express our sincere gratitude to the Foreign, Commonwealth and Development Office (FCDO), UK for financial support for the study under the PSR II program. We extend our gratitude to the Forum of Regulators, which assisted us in retrieving data from various State Electricity Regulatory Commissions (SERCs). The data provided by these SERCs helped us understand the trends of women's participation over the years in roles such as Chairpersons, Members, Secretaries, and Staff. We are thankful to *Prof. N. K. Sharma* for his critical review of this study and his assistance in analysing the survey outcomes. We extend our heartfelt thanks to the unwavering support and assistance received from the entire team of the Centre for Energy Regulation, Department of Management Sciences, IIT Kanpur, especially, *Ms. Diksha Pandey, Ms. Garima Maurya, Ms. Garima Bajpai, Mr. Chaman Abhishek and Ms. Malabika Roy*. Their dedication and hard work have been invaluable in the successful completion of this book.

परमिंदर चोपड़ा
अध्यक्ष एवं प्रबंध निदेशक
PARMINDER CHOPRA
Chairman & Managing Director

पावर फाइनेंस कॉर्पोरेशन लिमिटेड
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Foreword

The Indian power sector has remarkably grown since independence. Near universal electricity access, the growing share of renewable energy, and sectoral reforms have notably transformed the sector's role in the overall socio-economic development. This transformation is a bellwether for the nation's energy transition journey in the coming decades.

Women's participation in the sector has historically been limited due to social and cultural barriers restricting their entry and advancement. Women are now getting the better of these barriers by challenging stereotypes and contributing significantly across various fields, including the power sector. Their unique perspectives and skills can effectively achieve more inclusive and dynamic outcomes.

Women possess unique qualities such as emotional intelligence, communication skills, multitasking abilities, and a nurturing nature. These qualities can bring diverse perspectives, innovative ideas, and unique approaches to problem-solving. Decision-making bodies with an extensive range of experiences and viewpoints tend to produce more comprehensive and well-rounded outcomes. An enhanced women's role in the regulatory sphere can also demonstrate a heightened sensitivity to the social consequences of economic and sectoral policies. Their qualities of conflict resolution and resilience under pressure can also positively impact regulatory roles.

As we delve into this study, it is crucial to recognize the strides made by women in the power sector and to build on this momentum. The findings of this study indicate that cultural and social norms are the most significant barriers to women's participation in the power sector. These deeply rooted norms shape perceptions and expectations about gender roles, discouraging women from pursuing careers in this field. Other challenges, such as personal and family constraints, and limited access to job training opportunities, also significantly hinder women's career advancement. The book highlights the often-overlooked impact of senior and colleague behavior on the retention of women. A lack of support and respect in the workplace can lead to feelings of isolation and marginalization, causing many women to leave the sector. This emphasizes the need for a more supportive workplace environment that constructively promotes inclusivity and respect for all employees.

The insights gained from this research can serve as a foundation for developing targeted policies and initiatives to promote gender diversity and inclusion. By addressing the barriers that hinder women's participation and creating a supportive environment, we can pave the way for a more equitable and dynamic power sector. This book not only highlights the current state of gender diversity in the regulatory governance of the Indian power sector but also provides a roadmap for future progress. The recommendations and findings presented herein aim to inform policymakers, industry leaders, and stakeholders about the importance of gender equality and the steps needed to achieve it.

I felt honored to have chaired and contributed to the panel discussion leading to this study.

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This book on women in power sector regulation represents a groundbreaking approach, as it addresses a topic that has not been extensively explored before. While women's participation in the energy and power sectors has garnered attention in recent years, the specific focus on their involvement in power sector regulation is a relatively new area of research.

I am delighted to write the foreword for this book on a study that significantly contributes to women's empowerment in the power sector.

I am confident that the findings of this research will resonate across the policy and regulatory corridors and will strengthen the role of women in regulatory and policy aspects in the sector.

Parminder Chopra

Chairman & Managing Director

Power Finance Corporation Ltd.

Abbreviations

AICD	:	Australian Institute of Company Directors
BCA	:	Business Council of Australia
BPL	:	Below Poverty Line
CAC	:	Central Advisory Committee
CER	:	Centre for Energy Regulation
CERC	:	Central Electricity Regulatory Commission
DAM	:	Day Ahead Market
DISCOMs	:	Distribution Companies
EA, 2003	:	Electricity Act, 2003
ECSOC	:	Economic and Social Council of the United Nations
ERCs	:	Electricity Regulatory Commissions
EU	:	European Union
FIFA	:	Fédération Internationale de Football Association
FoR	:	Forum of Regulators
GoI	:	Government of India
IITK	:	Indian Institute of Technology, Kanpur
ICRW	:	International Center for Research on Women
IEA	:	International Energy Agency
ILO	:	International Labour Organization
ISI	:	Indian Statistical Institute
ISTS	:	Inter-State Transmission System
ISGS	:	Inter-State Generation Station
JERCs	:	Joint Electricity Regulatory Commissions
LPG	:	Liquefied Petroleum Gas
MHRD	:	Ministry of Human Resource Development
MoP	:	Ministry of Power
NFHS	:	National Family Health Survey

NON STEM	:	Non-Science, Technology, Engineering, and Mathematics
NHST	:	Null Hypothesis Statistical Testing
RE	:	Renewable Energy
RTM	:	Real-Time Market
SEWA	:	Self-Employed Women's Association
SERCs	:	State Electricity Regulatory Commissions
SERB	:	Science and Engineering Research Board
STEM	:	Science, Technology, Engineering, and Mathematics
TERI	:	The Energy and Resources Institute
TNERC	:	Tamil Nadu Electricity Regulatory Commission
UNICEF	:	United Nations International Children's Emergency Fund
UK	:	United Kingdom
USA	:	United States of America

Keywords

1. Access to education
2. Barriers
3. Bias
4. Career advancement
5. Central Electricity Regulatory Commission (CERC)
6. Climate change mitigation
7. Collaborative approach
8. Corporate boards
9. Data collection
10. Decision-making
11. Distribution Companies (DISCOMs)
12. Economic growth
13. Education
14. Gender
15. Gender diversity
16. Gender equality
17. Gender gap
18. Gender imbalances
19. Governance
20. Health
21. Inclusive development
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24. Leadership roles
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26. Progression barriers
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28. Rural India
29. Skill development
30. Social norms
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37. Workforce diversity
38. Work-life balance
39. Women's rights

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Executive Summary

The power sector regulation in India has historically seen a significant gender gap, with a noticeable lack of female candidates in leadership and decision-making roles. This underrepresentation can be attributed to various factors, including societal norms, limited access to STEM education for women, and the traditionally male-dominated nature of the energy sector. Despite gradual progress, there remains a need for more proactive measures to encourage and support women in pursuing careers in this field, ensuring a more diverse and inclusive environment.

This study explores the gender gap in the regulatory governance of the Indian power sector, focusing on the underrepresentation of women. By identifying the barriers and significant factors contributing to this underrepresentation, the study seeks to propose actionable solutions to improve gender diversity in decision-making roles. The research highlights the critical role of women in electricity regulatory commissions, examining their current status, trends over the last decade and the challenges they face, particularly in career retention and advancement. The findings reveal that cultural and social norms, management biases and limited access to training are key barriers to women's participation. The findings underscore the need for targeted policies and a supportive work environment to ensure a more inclusive and equitable regulatory landscape in the power sector.

The report is structured in four key sections:

Section 1 briefly emphasizes the role and importance of gender equality across various spheres, including health, education, politics, and sports. It sets the context for understanding the relevance of gender diversity in the power sector.

Section 2 delves into the barriers and challenges women face in the power sector's regulatory landscape. This section is informed by a robust knowledge base developed through a survey, which provides insights into the social norms, management biases and personal constraints that hinder women's participation.

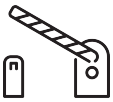
Section 3 details the methodological approach of the study, including the implementation of an online survey and personal interactions with key stakeholders across the power sector. It outlines the steps taken to gather data and insights, ensuring a comprehensive understanding of the issues at hand.

Section 4 highlights the key conclusions of the study, providing policy recommendations aimed at closing the gender gap in the sector. It also discusses the relevance of these findings in the current scenario, emphasizing the urgency of implementing these solutions.

Source: unsplash pic credit: karsten-wurth

The main objectives of the study include:

Identify the Gender Gap: Assess the extent of the gender gap in the power sector's regulatory governance structure.



Explore Barriers: Identify and analyze the barriers to women's participation, including the impact of social norms, management biases and personal constraints.

Review Literature: Explore existing literature on gender aspects in the power sector and associated regulatory governance.

Examine Best Practices: Review international best practices aimed at encouraging women's participation in the power sector's regulatory structure, particularly in leadership roles.

Identify Influencing Factors and Provide Key Measures: Pinpoint the significant factors that influence the limited representation of women in power sector regulation.

The key measures and policy recommendations include

- **Reservation Policy Implementation:** Implementation of reservation policies to ensure a minimum percentage of women in regulatory bodies and senior management, similar to the 33% reservation for women in local government bodies in India.
- **Equal Opportunity:** Enforce strict equal opportunity policies, including unbiased recruitment, equitable access to promotions and equal career advancement opportunities.
- **Doctrine of Preference:** Give preferential treatment to women in hiring and promotions when candidates are equally qualified, as a temporary measure to correct historical imbalances.
- **Voluntary Goals by ERCs:** ERCs should set voluntary goals for increasing women's representation within their organizations, with clear timelines and accountability.
- **Capacity Building/Training Opportunities:** Invest in capacity building and training opportunities for women, including technical training, leadership development programs and mentorship schemes.
- **Access to Online Programs:** Provide access to online education and professional development programs tailored to the needs of women in the power sector.
- **Conveniences/Facilities:** Improve workplace conveniences and facilities, such as sanitary facilities, childcare services and safe transportation options.
- **Behaviour of Superiors/Colleagues:** Promote a respectful and inclusive workplace culture through gender sensitivity training, strict anti-harassment policies, and valuing women's contributions.

This study provides a comprehensive analysis of the gender gap in the Indian power sector, offering practical solutions and policy recommendations to address the underrepresentation of women and promote gender equality in regulatory governance.

1. Introduction

The equal participation of women in all spheres of society is fundamental to building a sustainable future for everyone. Women's involvement in various sectors fosters innovation, drives economic growth, and promotes social equity. Studies indicate that working women bring positive changes to society. At the local level, women leaders reduce female feticide rates, delayed marriage and childbirth, and decrease domestic violence (Kalsi, 2017) (Koburtay, *et al.*, 2023), (Parikh, *et al.*, 2023), (Sivasankaran, 2014). In the workplace, women demonstrate equal dedication, emotional intelligence, and decisiveness compared to men (Donthu & Gustafsson, 2020), (Nodirovna, *et al.*, 2024), (Qian, 2008). Women are often more expressive and responsive to emotions, enhancing workplace dynamics.

Evaluations across sectors highlight women's underrepresentation in decision-making, technical fields, and higher hierarchical positions (Al-Sammarraie & F., 2023), (Chang & Milkman, 2020), (Nodirovna, *et al.*, 2024). This underrepresentation underscores the need to address disparities and advocate for a significant role of women across the socio-economic spectrum. Research often focuses on women in executive positions and on corporate boards, highlighting their economic value and role model status (Bonet, *et al.*, 2020), (Nguyen & Q.K., 2023), (Sweet-Cushman & J., 2022). However, for sectors like the power sector, where women are generally underrepresented, gaps at entry, middle, and senior levels need a thorough examination.

The mixed process of reform and regulations in the Indian power sector (Singh, 2006) highlights the importance of regulatory governance (Bhatt & Singh, 2021), (Dubash, 2008), (Ghosh & Kathuria, 2016). However, the role of women remains largely unaddressed, focusing primarily on energy access, renewable energy, and sustainable energy development. There is a critical need for gender sensitization in the regulatory landscape.

This comprehensive view delves into the multifaceted roles women play and why their empowerment is crucial:

Source: AI

Economic Contribution

- **Innovation and Growth:** Women bring diverse perspectives and ideas, fostering innovation and creative solutions across industries. Their involvement in the workforce enhances productivity and economic output (Azeem, 2022), (Díaz-García, 2013).
- **Entrepreneurship:** Women entrepreneurs create jobs, stimulate local economies, and contribute to economic diversification. Their businesses often focus on community needs, leading to more inclusive economic development (Emon, 2024).

Social and Community Development

- **Social Equity:** Women's participation in decision-making processes promotes policies that address the needs of diverse populations, leading to more equitable and just societies (Lind, 1997).
- **Community Leadership:** Women often lead grassroots movements and community organizations, advocating for social change and improved living conditions. Their

leadership strengthens community resilience and cohesion (Zautra, 2008).

Family and Household Support

- **Financial Stability:** Women contribute significantly to household incomes, ensuring financial stability and security for their families. Their earnings are often reinvested in their children's education and family well-being (Riitsalu, 2024), (UNICEF, 2006).
- **Primary Caregivers:** As primary caregivers, women ensure the health and well-being of their families. They manage healthcare, nutrition, and emotional support, which are essential for a thriving household (Cancian, 2000).

Education and Youth Development

- **Role Models:** Women serve as role models for younger generations, inspiring girls and boys alike to pursue their ambitions and break down gender stereotypes (Byrne, 2019).
- **Education Advocates:** Women prioritize education, recognizing its importance for personal and societal growth. They encourage their children to excel academically and support educational initiatives in their communities (Grogan, 2010).

Political and Regulatory Influence

- **Policy Making:** Women in political and regulatory roles advocate for policies that benefit society as a whole, including healthcare, education and social services. Their presence ensures that diverse voices are heard in governance (Dolan, 2021).
- **Peacebuilding:** Women are often key players in peacebuilding and conflict resolution. Their involvement in diplomatic and community efforts promotes lasting peace and stability (Gizelis, 2011).

Environmental Sustainability

- **Stewards of the Environment:** Women play a critical role in environmental conservation and sustainability. They manage natural resources, advocate for environmental policies, and implement sustainable practices in their communities (Agrawal, 1999).
- **Climate Change Mitigation:** Women are at the forefront of climate change adaptation and mitigation efforts, developing innovative solutions to protect the environment and ensure a sustainable future (Reckien, 2017).

Healthcare and Well-being

- **Healthcare Providers:** Women constitute a significant portion of the healthcare workforce, providing essential medical services and care. Their contributions are vital for the health and well-being of populations (Søvold, 2021).
- **Mental Health Support:** Women often provide emotional and psychological support within their families and communities, promoting mental health and well-being (Balaji, 2007).

Cultural and Artistic Contributions

- **Cultural Preservation:** Women are instrumental in preserving cultural heritage and traditions. They pass down knowledge, customs, and values that strengthen cultural identity and diversity (Kirshenblatt- Gimblett, 2006).
- **Artistic Innovation:** Women contribute to the arts through literature, music, visual arts, and performance. Their artistic expressions enrich cultural landscapes and inspire societal progress (Lomas, 2016).

Empowering women to participate fully in society lays the groundwork for a resilient, prosperous, and inclusive world. When women are given equal opportunities, they drive positive change across all sectors, creating a ripple effect that benefits everyone. Their empowerment is not just a matter of justice and equality, it is a strategic imperative for achieving sustainable development and a better future for all.

This study aims to identify the gender gap across the regulatory landscape, identify barriers and the significant factors influencing the limited representation of women in the power sector's regulatory governance structure, and suggest solutions to address the same. The study highlights the role and importance of women in electricity regulatory commissions and suggests policies and processes that integrate women into decision making. Women's role, current status and the trend of representation in the last decade, particularly in power sector regulation are studied. The reasons for the under-representation of women in power sector regulation are explored, and the concern regarding the retention and career advancement of women,

once they enter into such sectors is also highlighted in this work. With this in view, the main objectives of this study are highlighted:

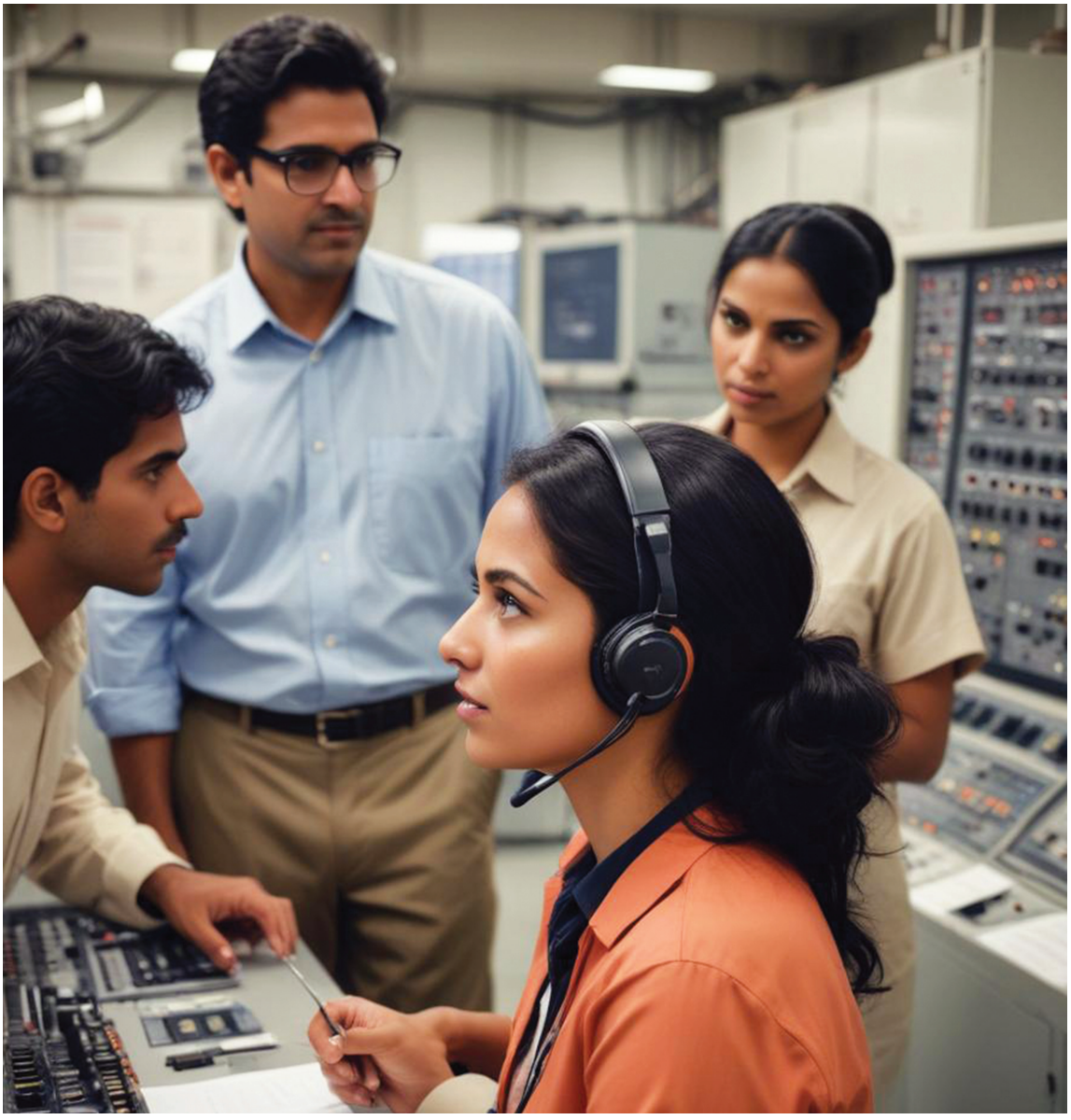
a. To identify the gender gap and gender barriers, and study the impact of social norms and perceptions on women's role in the power sector regulation.

b. To explore the existing literature covering gender aspects in the power sector, in general, and the associated regulatory governance structure, in particular.

c. To review the international best practices encouraging women's participation in regulatory affairs, including leadership positions.

d. To identify significant factors influencing the limited representation of women in the power sector's regulatory governance structure.

The report is structured in four sections. The first Section briefly emphasizes the role and importance of gender equality in society and other spheres like health, politics, sports, etc. The Section 2 discusses the barriers and challenges in detail and focuses on the knowledge base developed through a survey. The methodological approach covering the identification of key parameters, designing a questionnaire, implementation of an online survey, and personal interaction with key stakeholders across the power sector landscape appears in Section 3. Section 4 highlights the key conclusion and way forward along with some policy recommendations to close the gender gap in the sector and further understand its relevance in the present scenario.



Source: DEEP AI

2. Gender Equality

Gender refers to the array of socially constructed roles, values, attitudes, personality traits, and behaviors that society deems appropriate for men and women. These constructs are deeply embedded in cultural, social, and institutional norms, influencing how individuals perceive themselves and each other. Gender equality is achieved when both men and women have equal rights, freedoms, and access to social and economic opportunities. This means that individuals of all genders should have the same chance to pursue education, participate in the workforce, receive healthcare, and engage in political and social activities without facing discrimination or bias (Klugman, *et al.*, 2014), (Markowsky, *et al.*, 2022).

The gender gap represents the inequality in women's progress compared to men across various criteria, including education, health, income, and career opportunities (Figure 1). This gap arises when women and men are treated differently based on characteristics unrelated to their skills, abilities, merit, or job requirements. For instance, societal expectations may pressure women to prioritize family responsibilities over career advancement, while men might be expected to focus on professional success, leading to unequal opportunities and outcomes (Kaushik, *et al.*, 2014). Gender equality does not mandate the participation of women in the workforce as an alternative to staying home to care for children or elderly family members. Instead, it supports the principle that both women and men should have equal opportunities to choose their preferences without societal pressure or discrimination. This means creating environments where individuals can balance work and family responsibilities without facing penalties or biases (Evans, *et al.*, 2020).

Source: Pexels

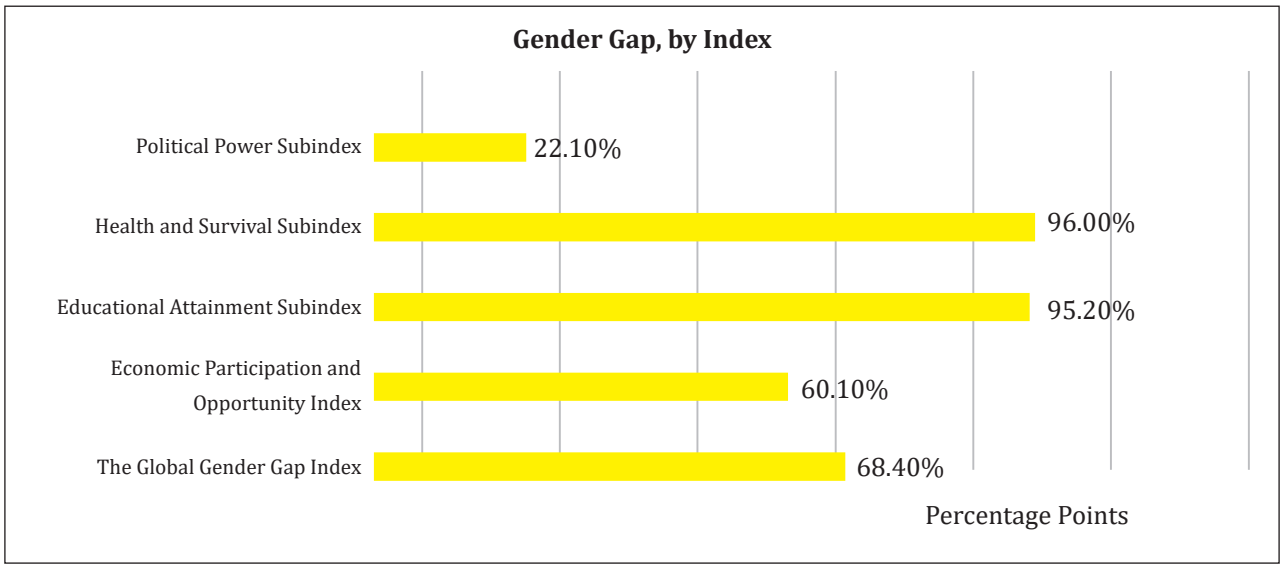


Figure 1: Gender Gap Index (World)

So: World Economic Forum, Global Gap Gender Index, 2023

The gender gap index across the world reveals stark disparities in different areas of life, with the political power sub-index showing particularly low levels of gender parity as shown in (Figure 1). According to the World Economic Forum, only 22% of political power is held by women, a significantly lower percentage compared to other sub-indices such as health and survival and educational attainment.

The political power sub-index measures the representation of women in political leadership and decision-making positions. This includes the proportion of women in national parliaments, ministerial positions, and heads of state. Despite progress in some regions, women remain significantly underrepresented in political spheres globally.

In contrast, the health and survival sub-index shows relatively higher gender parity. This sub-index assesses factors such as life expectancy and sex ratio at birth. While there are still significant issues, such as maternal mortality and access to reproductive health services, the gap between men and women is narrower compared to political power. Advances in healthcare and increased awareness of women's health issues have contributed to improvements in this area.

The educational attainment sub-index also shows higher levels of gender parity. This sub-index measures the ratio of women to men in primary, secondary, and tertiary education levels. In many parts of the world, girls and women now have greater access to education than ever before. However, challenges remain, particularly in regions where cultural and economic barriers prevent girls from attending school.

Table 1: Gender Gap Index (India)

	2023		2024	
Index and Sub-Index	**Score**	**Rank**	**Score**	**Rank**
Gender Gap Index	0.643	127	0.629	135
Economic Participation and Opportunity	0.367	142	0.350	143
Educational Attainment	1.000	26	0.961	107
Health and Survival	0.95	142	0.937	146
Political Empowerment	0.253	59	0.267	48

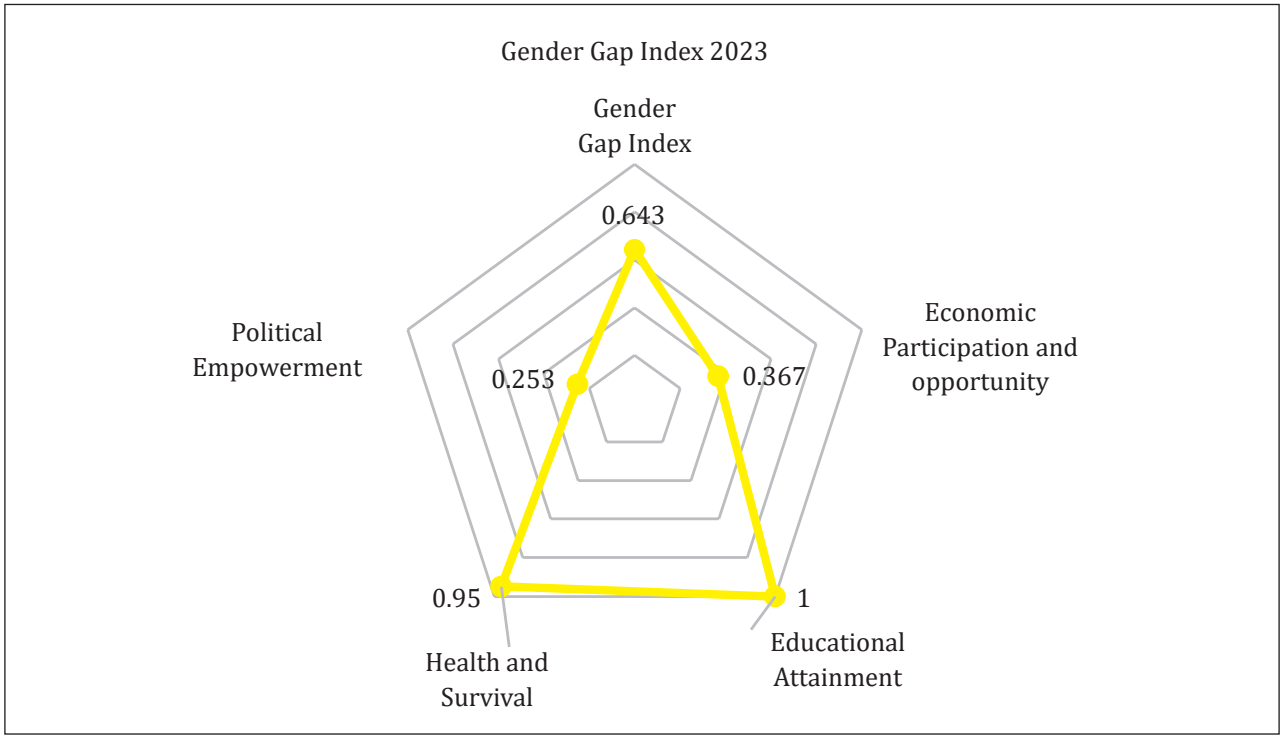


Figure 2: Gender Gap Index (India)

So: World Economic Forum, Global Gap Gender Index, 2023

In India, the educational attainment ranking is notably high at 26th globally, indicating significant progress in providing education to women and girls. India's strong performance in educational attainment reflects the country's efforts to increase access to education for women and girls. Policies such as the Right to Education Act, various scholarship programs for female students, and initiatives to improve school infrastructure have contributed to this success. However, despite this achievement, the overall global gender gap index for India stands at a concerning 127th place as depicted in (Table 1). This disparity highlights the multifaceted nature of gender inequality, where advancements in one area do not necessarily translate to improvements across all dimensions of gender parity. The health and survival index for India is 0.95, which is comparable to global standards while political empowerment is the area where India lags the most, with an index of 0.253, the lowest among the indices charted in (Table 2).

2.1 Representation of Women in Society

When discussing the representation of women in society, qualitative data offers valuable insights into their experiences, perceptions, and challenges. Such data helps uncover the nuanced realities women face, providing a deeper understanding beyond quantitative metrics. This approach is essential to grasp the complexities of women's underrepresentation & the social and cultural dynamics that influence their participation in various sectors.

Over the past 25 years, women's representation in politics has seen a significant increase globally. In 1997, only 11.7% of parliamentarians were women, but by 2020, this figure had risen to 24.9% (ECSOC, 2020). This growth reflects concerted efforts to address gender imbalances through legislative reforms, policies, and advocacy. Government's and international organizations have recognized the importance of women's participation in decision-making processes, leading to the implementation of various measures aimed at enhancing their representation.

In the past two decades, numerous laws and policies have emerged to address legislative inadequacies and improve the status of women. These initiatives aim to create a more equitable society by promoting gender equality in all spheres, including politics, education, and the workforce. For instance, the Government of India has taken several steps to

Source: DEEP AI

improve women's representation, as illustrated in (Table 1). Despite these efforts, the global gender gap index for India stands at 62.5%, with the country ranking 140th out of 156 nations (MHRD, 2015).

One of the significant legislative milestones in India is the 73rd Amendment to the Constitution, which mandates an electoral quota of at least 33% of seats to be filled by direct elections in local government bodies, such as villages and municipalities, to be reserved for women. This amendment has been instrumental in increasing women's participation in local governance. Some states, like Andhra Pradesh, Maharashtra, Tripura, and Kerala, have gone further by reserving 50% of seats for women in panchayats and municipalities. Overall, 20 out of 29 states and 7 Union Territories have implemented 50% reservation for women in Panchayati Raj Institutions.

To promote women's representation in education, the Indian Central Government introduced the addition of supernumerary seats for women in IIT in 2018. This initiative aimed to increase the number of female students in these premier institutions. In the first year of implementation (2018-19), 14% of seats were added for women, which increased to 17% in 2019-20 and 20% in 2020-21 (MHRD, 2015). This measure addresses the gender gap in STEM education and encourages more women to pursue careers in these fields.

The Government of India has also implemented the Prevention of Sexual Harassment (POSH) Act, 2013 to ensure the safety and dignity of women in the workplace. The Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013, commonly referred to as the POSH Act, was enacted in response to the increasing need for a structured framework to address and prevent workplace harassment.

Despite these progressive steps, significant challenges remain. Women often face societal expectations and traditional gender roles that limit their opportunities. For example, women in politics and leadership positions frequently encounter bias and discrimination, making it difficult for them to advance their careers.

Table 2: Gender Dimensions of Indian Electricity Policies

S. No.	Name of the Policy	Year	Gender context
1.	Kutir Jyoti Programme	1998	Extending a single-point connection to BPL households and 100% grant for a one-time cost of internal wiring and connection charges.
2.	Rajiv Gandhi Grameen Vidyutikaran Yojana	2005	Provisions for community participation through self-help groups to take up project franchises.
3.	Rural Electrification Policy	2006	Acknowledges that the burden of non-availability of energy falls more on women, encourages women's participation in the implementation of rural electrification programs, mandates women's representation in District Committees.
4.	Integrated Energy Policy	2006	Identifies disproportionate impacts and drudgery of using traditional energy sources on women and girls, recognizes the lack of attention paid to gender issues in energy policies, and suggests greater participation by women's groups in taking up franchises of Rajiv Gandhi Grameen Vidyutikaran Yojana.
5.	SERB-POWER Scheme	2008	SERB-POWER (Promoting Opportunities for Women in Exploratory Research) scheme program is formulated to mitigate gender disparity in science and engineering research funding in various S&T programs in Indian academic institutions and R&D Laboratories.
6.	Pradhan Mantri Ujjwala Yojana	2016	Pradhan Mantri Ujjwala Yojana is a scheme of the Ministry of Petroleum & Natural Gas for providing LPG connections to women from Below Poverty Line (BPL) households. The extension of the scheme intended to release of 75 lakh LPG connections over three years from Financial Year 2023-24 to 2025-26.
7.	SAUBHAGYA Yojana	2017	Identifies multiple categories of households that are eligible for scheme, including female-headed households.
8.	Bijli Sakhi Yojana	2020	The initiative was launched as part of a larger scheme called Uttar Pradesh Banking Correspondent Sakhi scheme, it trained and appointed women volunteers to conduct door to door meter reading and bill collection exercise.

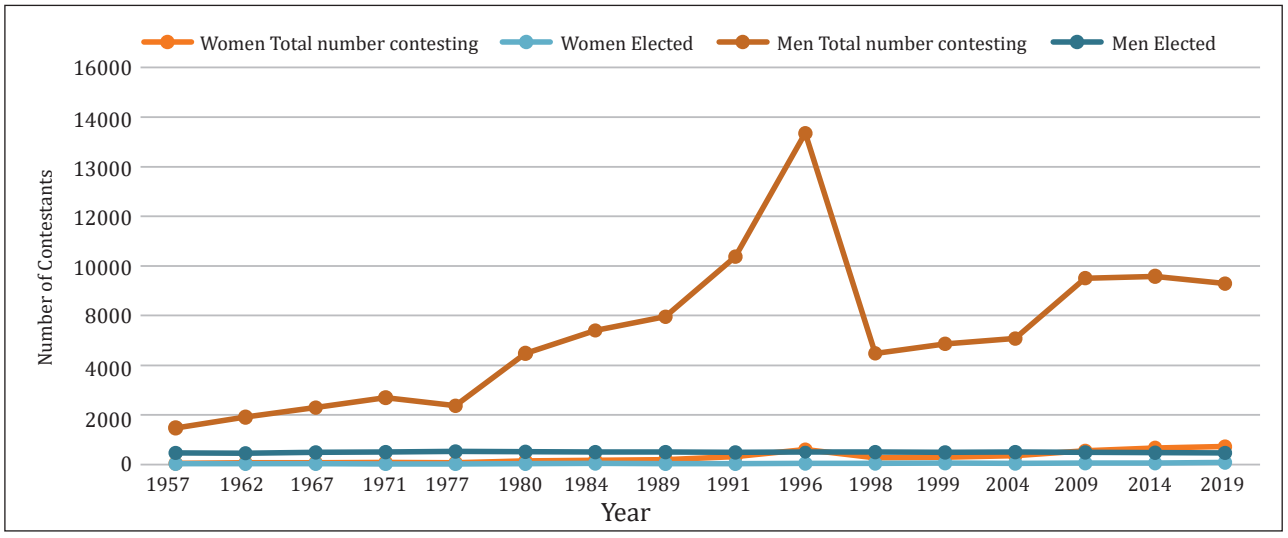


Figure 3: Trend of Representation of Women in Lok Sabha Election (as of 30.04.2024)

So: Election Commission of India, New Delhi & Lok Sabha Secretariat

Table 3: Women in Mass Communication

Women in Mass Communication	2000	2005	2010	2015
Newspaper	17%	21%	24%	26%
Radio	13%	17%	22%	21%
Television	22%	22%	24%	24%

So: (ECSOC, 2020)

There are profound differences between men and women in ownership, use and control over assets and wealth. Women are less likely to own assets, particularly in developing countries. Either they do not have a constitutional/legal right to bequest ancestral property such as land, or parents choose sons over daughters to inherit their property. Women also have less access to household resources and therefore, cannot indulge in business activities (Luke, 2011). Women's rights to assets are associated with improved well-being and have positive implications for children's outcomes (Gaddis, 2020). On 11 Aug 2020, the Supreme Court of India passed a landmark judgement that the daughters would have equal birthrights in Hindu Undivided Family properties. This judgement has strengthened women's inheritance rights and enhanced measures of women empowerment.

Sports is a crucial platform to encourage gender equality. The participation of women has increased in all fields like politics, sports, defense services, etc. Only 2.21% of women athletes participated in the Paris Olympics, 1900 which has increased to 48.8% of women athletes in the Tokyo Olympics, 2020. Despite the visible progress in their representation in sports, women are paid less than men in wages and prize money globally (Kolotouchkina, *et al.*, 2021).

Women's poor representation in traditional news is also reflected in the era of digital news (as reflected in Table 3). Only 26% of women are represented in Internet news stories and media news tweets. It is evident from the literature that the underrepresentation of women in the media plays a crucial role in dealing with violence and disrespect towards them. The bonuses determined by FIFA for men (32 teams) is $400 Million, whereas for women (24 teams), the amount is only $ 30 Million (McCarthy, 2019).

2.2 Women and Education

Education has been an important tool for the development of India. The educational pathways and recruitment pipelines have become the prominent barriers to maintaining gender balance in the workplace. There has been a significant consistent growth in the literacy rate in the country for both men and women since independence (Figure 4). However, as girls grow older, and reach the age group of 15-18 years, the school enrollment drops significantly (39.4% in India). Several factors deter girls from pursuing secondary and higher education – the expectation and norms of families, low familial aspirations, distance and safety concerns on the way to school, etc. In India, while more women are earning university degrees than men, their labor force participation has surprisingly dropped to 18.6% in 2019, the lowest rate in South Asia (Srija, *et al.*, 2020). Women's participation in the labor force in India demonstrates a U-curve where the informal workforce participation, specifically from rural India is high workforce participation with low and intermediate education is lower, and there is an upward trend for women with graduate and post graduate degrees (Klasen & Pieters, 2013) (Sorsa, *et al.*, 2015).

Source: meta AI

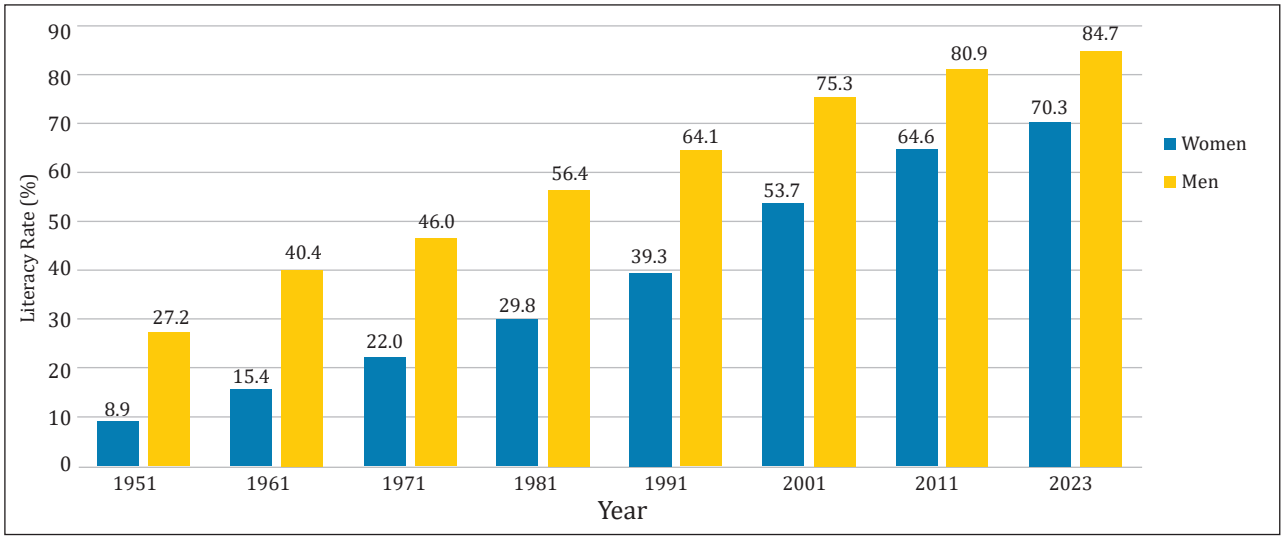


Figure 4: Literacy Rates in Post Independent India (as of 15.05.2024)

So: National Sample Survey 75th round, MoSPI

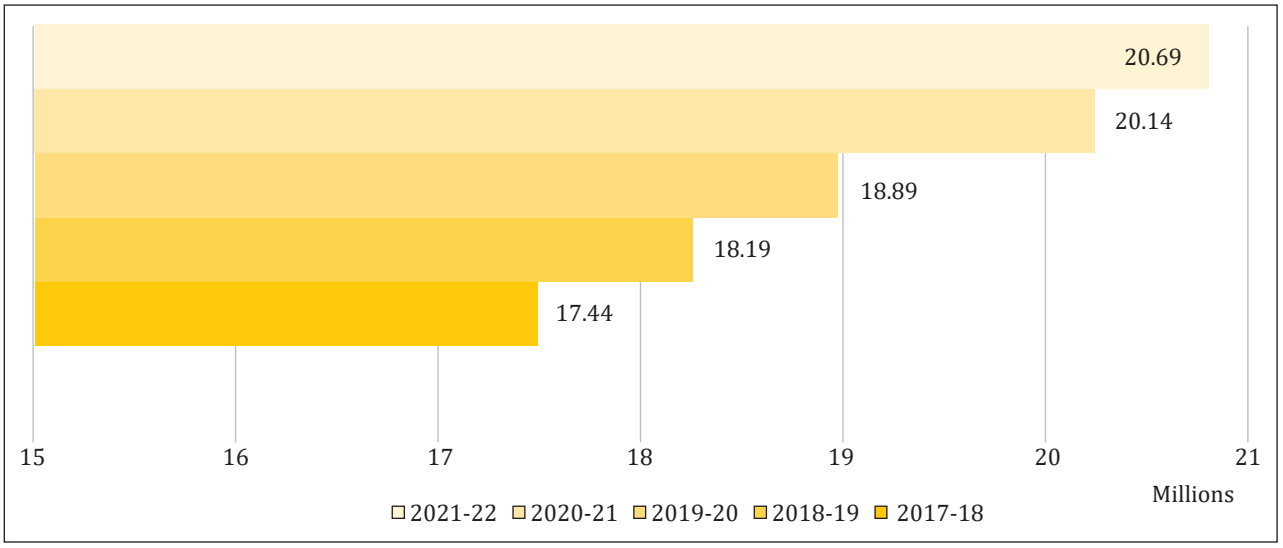


Figure 5: Year-wise Status of Girl's Enrolment in Higher Education across India

So: Ministry of Higher Education, 2024

In India, huge efforts have been made to effectively close the gender gap in education. There are thirteen universities exclusively for women, three in Rajasthan, two in Tamil Nadu and one each in Andhra Pradesh, Assam, Delhi, Haryana, Karnataka, Maharashtra, Odisha, and West Bengal (ISTI, 2024).

About 60.53% of colleges in India are located in rural areas, and of these, 11.04% are exclusively for females. This distribution indicates a significant effort to make higher education accessible to a broader segment of the population, including women in rural regions. In the academic year 2021-22, women constituted 48.6% of the total enrollment in higher education, showcasing a positive trend towards gender parity in education, as illustrated in (Figure 5). However, this progress in education raises an important question: "If women have acquired almost equal distribution in higher education, why is there a huge gender gap in the workforce?"

2.3 Gender, Health and Work

Gender differences are multifaceted, encompassing both physiological and psychological aspects. Physiological differences are often the most apparent, however, psychological attributes also play a crucial role in distinguishing gender dynamics. Women tend to use a more collaborative and inclusive approach, emphasizing empathy and emotional expression. Men, on the other hand, might favor a more direct and assertive style of communication. These differences can impact workplace interactions and the way individuals build relationships and resolve conflicts (Malhotra & Shah, 2015). When it comes to stress responses, women are more likely to engage in "tend-and-befriend" behaviors, seeking social support and nurturing others. Men are more prone to the "fight-or-flight" response, focusing on direct action or avoidance. These stress response patterns can affect

how individuals cope with workplace pressures and challenges. Quality in the workplace fosters an environment of diversity and inclusivity, enhancing various aspects such as skills, thoughts, and perspectives. Diverse teams are known to be more innovative and effective in problem-solving due to the broad range of viewpoints and approaches they bring.

Legislative measures and affirmative initiatives aimed at increasing women's participation in senior corporate executive roles have shown positive results in several regions. For instance, the EU, Norway, Italy, and the UK have implemented policies to ensure gender diversity on corporate boards. These measures include quotas and gender diversity targets, which have led to a significant increase in women's presence at the executive level (Adams & Ferreira, 2009). A few successful initiatives are:

Norway: Norway was one of the first countries to implement a gender quota law in 2003, requiring at least 40% of board members in publicly listed companies to be women. This initiative has successfully increased female representation in corporate leadership.

EU: The European Union has also adopted similar measures, encouraging member states to implement policies that promote gender diversity on corporate boards.

UK: The UK's voluntary approach, through the Hampton-Alexander Review, has aimed to increase the number of women in senior leadership positions in FTSE 350 companies, achieving significant progress over the past decade.

The underrepresentation of women in STEM fields is a significant barrier to achieving gender equality in technical areas. Despite efforts to promote STEM education among girls and women, the gender gap persists, limiting their participation and advancement in these critical fields (Cimpian, *et al.*, 2020), (Ganley, *et al.*, 2018). The exclusion of women from STEM fields results in a significant loss of talent and potential. Diverse perspectives are essential for innovation and problem-solving, and the absence of women limits the breadth of ideas and approaches in these fields. STEM careers are often high-paying and offer significant opportunities for advancement. The underrepresentation of women in these fields contributes to the overall gender pay gap and limits women's economic empowerment. Women hold

Source: DEEP AI

only 3% of legislative, management, and senior official positions, which restricts their ability to influence policy and decision-making processes in STEM-related areas. This lack of representation can perpetuate gender biases and hinder efforts to create more inclusive environments (Singh, *et al.*, 2017). Women are listed in less than 11% of patent applications related to the energy sector, indicating a significant gender gap in innovation and intellectual property. This disparity can slow progress in addressing critical challenges in the energy sector and other STEM fields (Sun, *et al.*, 2020).

In the Indian context, women face significant barriers due to limited access to essential conveniences and resources such as sanitary facilities, healthcare, and transportation. These deficiencies contribute to broader issues of gender inequality and have profound impacts on women's ability to participate fully in public and professional life. The ICRW survey highlights the extent of this problem in New Delhi, where a staggering 95% of women aged 16 to 49 reported feeling unsafe in public spaces. This fear is not unfounded, as incidents of harassment, assault, and other forms of gender-based violence are common in many parts of the country.

3. Methodological Approach

The persistent disparity in women's participation in almost all spheres begs the attention of policymakers. These gaps highlight the need for a more inclusive approach in the evolution and performance of institutions, especially those aimed at enhancing the overall framework for regulatory governance, including transparency, accountability and inclusiveness, which can benefit from regulatory governance in the Indian power sector. A methodological approach to understanding women's current role and their influence on institutional responses should requires comprehensive data collection and analysis. This includes qualitative and quantitative research to assess women's participation, decision-making power, and the barriers they face in influencing institutional processes. To understand the current status of the role of women, the factors influencing their participation and institutional response to enhance inclusiveness through gender sensitivity, a methodological framework is set out to analyse and understand the relevant aspects and provide regulatory and policy inputs for the same.

The methodological approach includes a detailed review of the literature to understand the role of women in the workplace and data collection from relevant commissions and DISCOMs to analyse the status of participation of women in the regulatory structure. An online survey is conducted to identify the significant factors influencing the limited representation of women in the power sector's regulatory governance structure. Finally, interactions with key stakeholders in the power sector were set up to deep dive into the identical factors. This led to identification of key recommendations to help improve the gender diversity across the regulatory framework in the Indian power sector. This approach helps identify gaps and opportunities for improvement, ultimately leading to strategies that better support and empower women in institutional roles, thereby fostering a more inclusive environment.

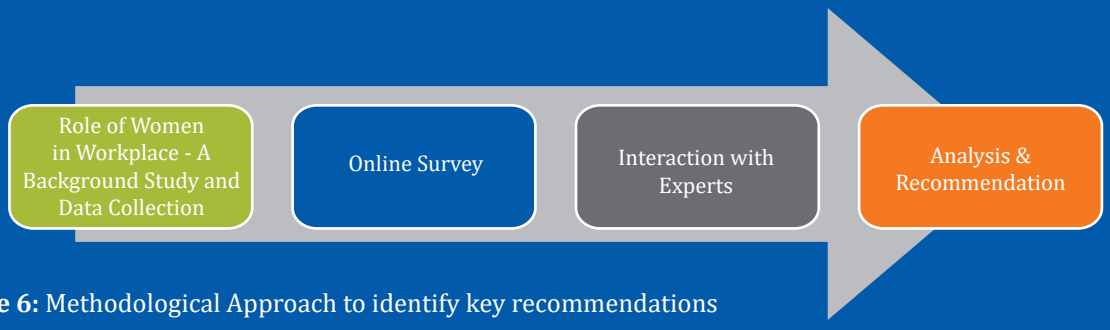


Figure 6: Methodological Approach to identify key recommendations

3.1 Role of Women in the Workplace - A Background Study

Women's role in the workplace is multifaceted and indispensable as they play a critical role in contributing to the economic, social and cultural developments of organisations and society as a whole. Their participation brings diverse perspectives, innovative solutions, and a range of skills essential for the success of any business and industry. They drive innovation and creativity with diverse experiences and viewpoints contributing to innovative problem-solving and creativity in the workplace. Women bring unique leadership styles that often emphasize collaboration, empathy and inclusivity. Women in the workplace often serve as mentors and role models for younger or less experienced female colleagues. They often excel in roles that require strong interpersonal skills, such as human resources, customer relations, and team management. Their ability to foster positive relationships and address the needs of employees contributes to a higher level of employee engagement and satisfaction, which in turn boosts productivity and reduces staff turnover. In this work, we initially intended to address a relatively broad topic of gender diversity in various fields of politics, health, technical education, renewable energy, board diversity, etc. (Cecelski, 2000) (Joshi, *et al.*, 2019), (Patnaik, *et al.*, 2021).

This led us to reformulate the study design as we became more familiar with the field at the national and international levels.

S. No.	Title & Author	Objective	Sector	Country	Findings / Recommendations
1.	Board Diversity or Gender Diversity: Perspectives from South Africa (Du Plessis, 2012)	Overview of board diversity in Europe, Australia and South Africa.	Board Diversity	European countries Australia South Africa	(a) Belgium, Norway, France, the Netherlands and Spain mandate up to 40% women on the boards of public companies. (b) Several initiatives by BCA and AICD are aimed at giving women exposure to senior executive and board functions. (c) Careful consideration should be given to ensure that a person has sufficient skills and ability to meet the legislative requirements and standard of duty.
2.	A six-year longitudinal study of undergraduate women in engineering and science (Brainard, 1998)	To determine an accurate measure of retention by tracking individual students through their science and engineering academic careers; To examine factors affecting retention of women in science and engineering.	Women in Engineering	University of Washington, 6 years	Maintaining a feeling of interest, involvement with coursework, and acceptance into a department are the major influences for women.
3.	Gender equality and diversity politics in higher education: Conflicts, challenges and requirements for collaboration (Klein, 2016)	To conceptualize diversity by focusing on diversity policies at institutions for higher education in Germany.	Gender Equality and Diversity Politics in Higher Education	Germany and the European Union	The normative vision of diversity management should be equity and social justice and the diversity policies are to be accompanied by activism on campuses to avoid a de-politicization.
4.	Gender diversity and innovation: The role of women's economic opportunity in developing countries (Ritter-Hayashi, 2016)	To analyse the relationship between gender diversity in the ownership, management and workforce structure at the firm level and women's economic opportunity to improve innovation outputs.	Gender Diversity in the ownership, management and workforce.	South Asia, Africa and the Middle East	The introduction of tax advantages, subsidies, or other incentives targeted at increased gender diversity at all hierarchical levels within a firm is recommended.

S. No.	Title & Author	Objective	Sector	Country	Findings / Recommendations
5.	Case study: battery-operated lamps produced by rural women in Bangladesh, (Khan, 2003)	To develop and operate the micro-enterprise for rural women, and To prepare a guideline for future project development in the public sector.	Women in the Renewable energy sector	Bangladesh	(a) Suitable fiscal policies should be developed by the Ministry of Finance for the basis of capital investment in RE. (b) More women should be encouraged to get involve in the planning and management of energy services for the selection of energy sources and their efficient use.
6.	Creating Opportunities for Women in the Renewable Energy Sector (Baruah, 2016)	To address the knowledge gap through empirical research conducted by The Energy and Resources Institute (TERI) and Self Employed Women's Association (SEWA)	Women in the Renewable energy sector	India	By increasing access to reliable and affordable sources of decentralized clean energy, initiatives like Hariyali and LaBL benefit households by diversifying their energy sources to save money. More schemes are needed to be introduced.
7.	Gender Equality and Women's Empowerment in India (Kishor & Gupta, 2009)	To assess progress in India towards gender equality and women's empowerment using data from NFHS-1, NFHS-2 and NFHS-3. To examine gender differentials in selected health and nutritional outcomes.	Gender Equality and Women Empowerment	India	The sex ratio is much lower in NFHS-3 (0.918) than in NFHS-1 (0.934). In real areas, the female disadvantage in education is marked and increases with age. The median age at first marriage has risen by less than one year from 1992 to 2006. 43% of women and 87% of men between the age of 15-49 have been employed.
8.	Gender in electricity policymaking in India, Nepal and Kenya (Govindan, *et al.*, 2020)	1. To study the extent of the gender elements in electricity policies of India, Nepal and Kenya. 2. To study the impact of policy implementation in practice	Gender in electricity Policymaking	India, Nepal and Kenya	(a) In India, attention to gender has historically failed to take center stage in electricity policies. (b) In Nepal, the policies of the past two decades exhibit more gender awareness, both in terms of recognizing the disproportionate impacts of non-availability of electricity on women and in terms of making appropriate provisions to ensure inclusion. (c) In Kenya, more recent policies clearly show an all-encompassing and holistic approach towards the energy sector and thus, gender and related issues gained prominence.
9.	Studies on the impact of energy quality on human development index (Ray, *et al.*, 2016)	1. Assessment of energy resources quantified in terms of opportunity cost 2. To study the impact of emissions on human health in terms of health costs.	Impact of energy quality on human development Index.	India	(a) Bio-mass gasifiers can bring partial energy security to the rural agro-based industries. (b) Integration of charcoal fuel along with solar photovoltaic lighting systems can introduce energy security in rural households. (c) The use of charcoal and solar PV lighting systems enhances human development index to 16-18% from its initial figure.

S. No.	Title & Author	Objective	Sector	Country	Findings / Recommendations
10.	Antecedents of gender gap in workforce participation: A phenomenology of psychologists and medical doctors in urban Pakistan (Anjum, *et al.*, 2019)	To study the experience of women in the field of medicine and psychology who face difficulty in professional participation and face discrimination of various kinds.	The gender gap in workforce participation	Pakistan	(a) The study shows the importance of gender role beliefs in determining the kinds of positions women occupy in the public space of work/ education.
11.	Gender empowerment in the renewable power sector (International Energy Agency, 2019)	To study the experience of women in the energy sector.	The gender gap in workforce participation	Worldwide	The study shows that on average, there are 76% fewer women than men working in the energy sector, a significant difference from the average 8% gap seen in the total workforce, according to data from the previous year.

3.2 Data Collection

To comprehensively analyze the status of women as participants in regulatory structures within the power sector, a two-fold approach was employed. This methodology ensures a robust collection of data from both public and direct sources, allowing for a thorough examination of women's role and representation in these critical areas.

3.2.1 Exploring Public Domain Information

The first step in the methodology involves exploring information related to women's role in power sector regulation that is publicly available. This includes:

- **Review of Existing Literature:** Examining academic papers, reports, and articles that discuss gender diversity in regulatory structures. This literature provides insights into historical trends, current status, and challenges faced by women in these roles.
- **Analysis of Regulatory Documents:** Scrutinizing documents such as annual reports, policy papers, and regulatory filings from relevant organizations. These documents often contain data on gender composition, policies promoting gender diversity, and examples of women's contributions to regulatory decisions.
- **Public Database and Websites:** Utilizing online database and official websites of regulatory bodies, which publishes information on board compositions, committee memberships, and gender diversity statistics. This data helps to quantify women's representation and identify patterns across different regions and organizations.

Source: DEEP AI

3.2.2 Reaching Out to Regulatory Commissions with Questionnaires

The second step involves direct engagement with regulatory commissions through targeted questionnaires. This approach ensures the collection of current, specific, and contextual data directly from the organizations involved. The process includes:

- **Developing the Questionnaire:** Crafting a detailed and relevant questionnaire designed to capture various aspects of women's participation in regulatory structures. Key areas of focus include:
    1. **Representation:** The number and proportion of women in various roles, including leadership positions, technical committees, and decision-making bodies.
    2. **Policies and Initiatives:** Information on existing policies, programs, or initiatives aimed at promoting gender diversity within the organization.
    3. **Challenges and Barriers:** Insights into perceived or actual barriers that women face in entering or advancing within the regulatory roles.
- **Identifying Target Organizations:** The questionnaire is distributed to key regulatory bodies in the power sector, including:
    1. **Central Electricity Regulatory Commission (CERC):** The central body responsible for overseeing the power sector at the national level.
    2. **State Electricity Regulatory Commissions (SERCs):** State-level bodies responsible for regulating electricity distribution and consumption within their respective states.
    3. **Distribution Companies (DISCOMs):** Companies responsible for distributing electricity to end consumers, playing a crucial role in implementing regulatory policies.

3.2.3 Data Collection and Analysis

- Responses from the questionnaires are collected, compiled, and analyzed. This data is compared with public domain information to ensure accuracy and comprehensiveness. Key findings are then synthesized to provide a clear picture of women's status in regulatory structures.

Source: DEEP AI

3.3 Online Survey

Online surveys are convenient for gathering data from a large and diverse group of respondents. They allow for quick distribution of the survey instrument and, collection of responses. The online survey in this study helped to capture quantitative and qualitative information related to the importance and perception of gender diversity, women's overall status in the power sector, career progression, and workplace expectations for the period June 2021 – May 2024 (Figure 7). The survey was carried out from 18th August to 12th September 2021. To collect a sufficiently large sample of participants, the survey was shared through different platforms including, the CER Newsletter (Regulatory Insights), Emails, CER News, and CER events. Two-hundred seventy-two (61% men; 39% women) individuals responded to the survey instrument, indicating their perceptions of the main challenges and barriers to entry in the workforce, and the possible solutions to enhance the women's participation in the power sector. The respondents worked in organizations from nine different countries: India, Turkey, the United Kingdom, Switzerland, Brazil, Pakistan, Cyprus, Italy, and Nepal.

The sector-wise distribution of the respondents were as follows. Regulatory sector: 12.86%; Generation, Transmission, Distribution, and Trading: 34.94%; Academic Institutions: 31.25%; Consulting Agencies: 12.13%; Other Organizations: 8.82%. The respondents provided their gender, type of organization, country of their organisation, educational background, area of expertise, and country of origin. Their responses added much value to the study.

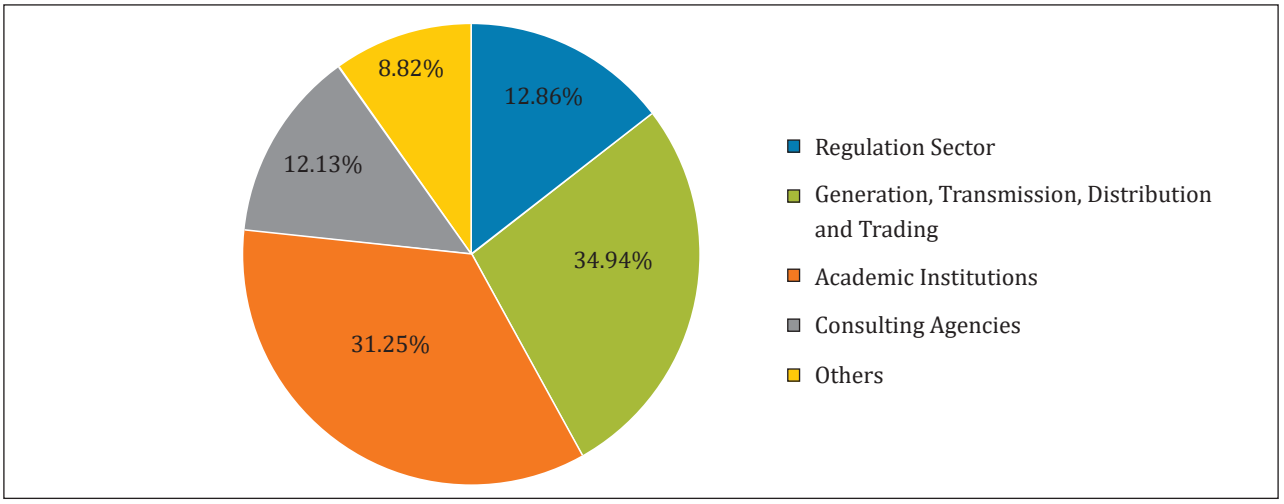


Figure 7: Sector-wise Distribution of Respondents

So: CER's Online Survey

3.4 Regulatory Conclave

The *Regulatory Conclave on "Role of Women in Power Sector Regulation"*, organized by the Centre for Energy Regulation (CER) at IIT Kanpur on September 7, 2024, served as a dynamic forum for in-depth discussions on gender diversity in the power sector. Bringing together a diverse group of policymakers, industry leaders, regulatory experts, and key stakeholders, the event fostered meaningful discussion on the systemic barriers women face in regulatory governance and decision-making roles.

The distinguished panel featured eminent leaders, including *Ms. Parminder Chopra* (Chair), CMD of Power Finance Corporation; *Ms. Audrey Zibelman* (Co-chair), Former Chairperson of the New York Public Service Commission and Former CEO of the Australian Energy Market Operator; *Mr. V. P. Raja*, Former Chairman of the Maharashtra Electricity Regulatory Commission; and *Ms. Anjuli Chandra*, Former Member of the Punjab State Electricity Regulatory Commission.

A total of 179 participants from across the power sector—including representatives from regulatory bodies, generation, transmission, distribution, and trading companies, as well as academic institutions and consulting agencies—actively engaged in the discussions.

Key takeaways from the conclave underscored the urgent need to promote gender equity through targeted capacity-building programs, ensure equal workplace opportunities, implement preferential recruitment policies, foster mentorship programs, and sensitize male colleagues on gender inclusivity. Additionally, panellists emphasized the importance of introducing new gender-specific policies to address structural impediments and create an enabling environment for women in regulatory roles. The insights generated during the conclave provided a critical lens through which this study has examined both policy-driven and systemic challenges to gender diversity in the sector.

As indicated above, the methodology was a two-stage process an online survey and online interactions with experts. The online survey that helped to understand the key issues associated with the prevailing gender bias and highlighted the need to close this gender gap. Interesting outcomes were found along with some counter-intuitive responses. To further explore the outcomes of the survey, and understand and dig deeper into it, online interaction was done with some leading experts in the sector to interpret the survey outcomes and to analyse the next policy steps to enhance the participation of women in the power sector.

Source: DEEP AI

4. Women in the Indian Power Sector

The Indian power sector is one of the largest in the world with a 3.2 million km^2 area footprint and serves 1.3 billion people. India is third in generation, consumption, installed generation capacity and transmission system, after the USA and China. Globally, India ranks 4th, 5th, 6th and 7th in wind generation, renewable energy generation, hydro generation and pumped storage installed capacity respectively (IEA, 2021). India experienced a 7% increase in electricity demand in 2023 owing to strong economic activity and increased use of air conditioners (Garg, *et al.*, 2017). It is estimated that over a period of three years, the addition of India's demand will increase equivalent to the consumption of the United Kingdom (IEA, 2024). To run this huge system effectively, the system employs vast technical constraints, and efficient operation needs a specific socio-technical[1] approach.

The composition of the workforce strongly indicates that men dominate the power sector, this perspective proposes that the differences in labor force participation[2] between men and women may be partly a function of their personality[3] differences. The power sector now recruits people with certain personality traits that best complement the ability to coordinate technical problem-solving and have better management and operational control (Kahsar, 2019).

Source: DEEP AI

On 27th January, 2022 complete state grid operation and generation regulation during shift including ISTS operation, and ISGS regulation apart from schedule management considering DAM and RTM transactions was performed by female executives at SLDC Odisha.

More women are participating in the labor force than ever. The labor force participation rate for women for the year 2020 in India is 19%, among the lowest in the world, except for Arab countries. However, the global participation rate is 45.92% (Bawazir, *et al.*, 2022). The power sector is perceived as a technical subject, attracting young boys towards it even in the early years of their schooling. The cultural diversity in India is also reflected in education. The representation of women in science is highest in South India (Figure 8 and Figure 9).

[1] Refers to design or arrangement of a specific technical device/system that influences the ways in which society interacts with it.
[2] % of female population ages 15+.
[3] Refers to factors, namely intellect, character, temperament, disposition and temper.

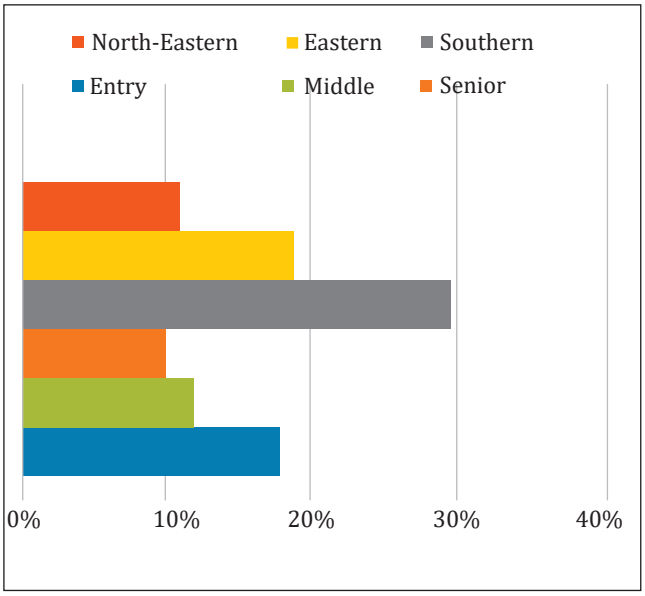


Figure 8: Region-wise Status of Women in Science across India

So: Niti Aayog, 2016-17

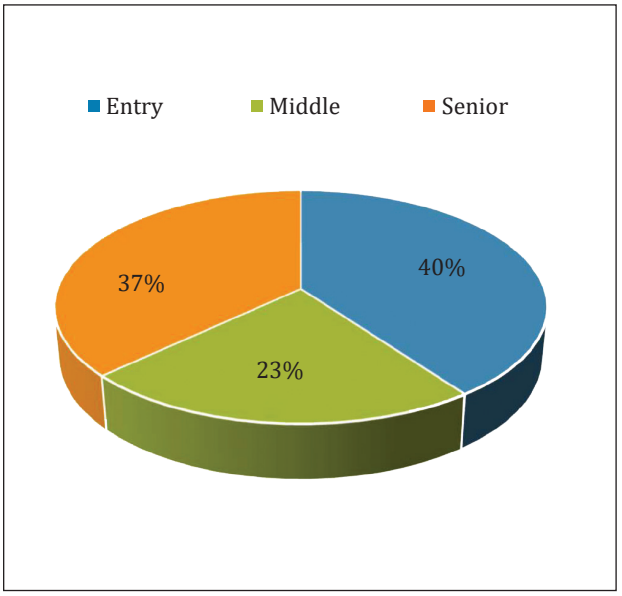


Figure 9: Seniority Level of Science Professionals

So: Niti Aayog, 2016-17

Gender inequality is most prominent in decision-making roles. Women's underrepresentation on company boards is widely perceived in senior management positions, as well as in policymaking and governance. However, in India, women's representation at the entry and senior level representation of women is perceived to be fair. Interestingly, the disparity emerges at the middle management level, where women are less represented. This indicates that while women have started gaining access to top positions, there is a bottleneck at the mid-career stage, highlighting the need for targeted interventions to support their progression through this critical phase.

The responses from CER's survey revealed that 33.93% of men and 41.90% of women perceive that the fair representation of women in the Indian power sector is above 40%. On the contrary, 11% of men and 8.57% of women perceive that the fair representation of women in the Indian power sector is below 20%. Men and women have almost the same perception for both extremes of the sample. This implies that both men and women working in the power sector realise the importance of the inclusion of women in the workforce.

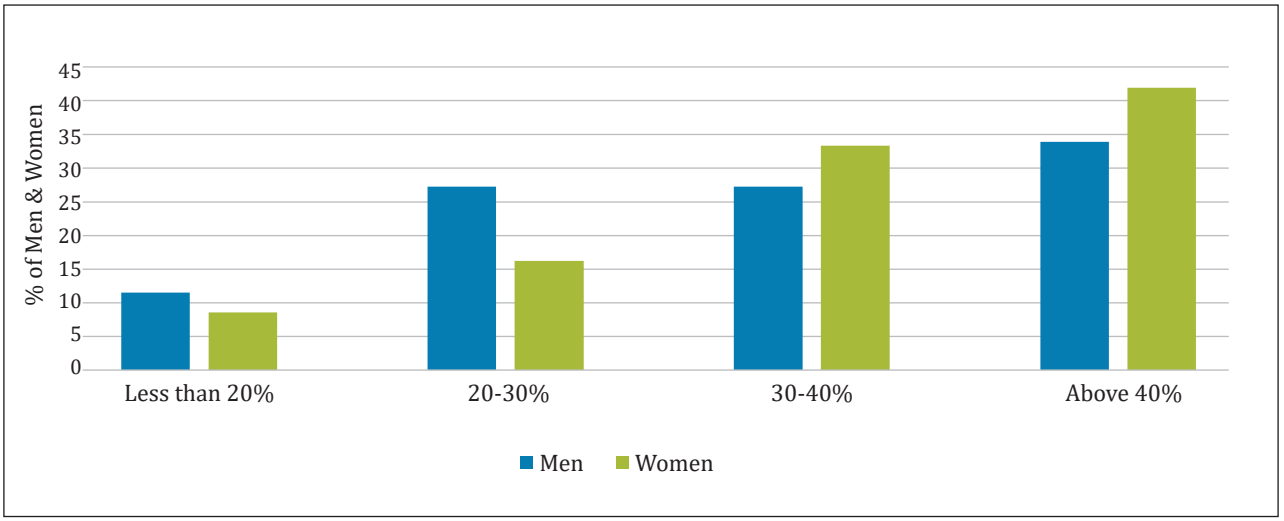


Figure 10: Perception of Respondents on Fair Representation of Women in the Indian power sector

So: CER's Online Survey

4.1 Need for inclusion of women in the Indian Power Sector

The power sector remains one of the least gender-diverse sectors due to its work culture that does not embrace gender diversity and equal opportunities and must be changed to achieve sustainable results (Baruah & B. and Biskupski-Mujanovic, S., 2021). Gender equality in the workforce has demonstrated benefits to both women and society, such as improving governance, innovation, performance, team leadership, the company's ability to survive financial risks, etc. Women tend to acknowledge the contribution of colleagues and rights to bring more transparency and fairness (Eagly & A.H., 2005), (Teelken, *et al.*, 2013). Using the traits of sensitiveness, morality, and better ethics, women have a different perspective toward a problem, which helps them to choose better options and make appropriate decisions (Diprose, 2005), (Dawson, 1995).

Women's inclusion in the workforce brings broader perspectives and approaches to their work and improves the quality of work (Moodley, 2016), (Nishii LH , 2013), (Pai & R., 2020), (Sabharwal & M., 2014). The responses obtained from CER's survey revealed that 65.42% of the respondents agreed to the same. Less attention was given to the different perceptions of men and women. More men (49.71%) than women (81.01%) agreed that women 'often' bring varied perspectives and approaches. While 46.10% of men think that women 'sometimes' bring varied perspectives and approaches, only 17.92% of women think the same. The chi-square test[4] revealed the relationship between these two variables:

$$x^2 = \sum_i \frac{(O_i - E_i)^2}{E_i}$$

Where O_i and E_i are respectively the observed and expected frequencies in a cell.

When there is no relationship between the variables, the chi-square is zero. The stronger the relationship, the greater the value of the chi-square. To determine whether a relationship existed between gender and 'perception' (that women bring varied perspectives and approaches to the workforce), the null hypothesis[5] statistical testing (NHST) was done. Here, the null hypothesis was that there is no relationship between gender and perception. The computed value of x^2 was greater than its critical value at the given degrees of freedom (υ) at a 5% level of significance. These results suggest that the null hypothesis can be rejected. Thus, there was support for the hypothesis that women's perception of their inclusion brings varied perspectives and approaches (Figure 11).

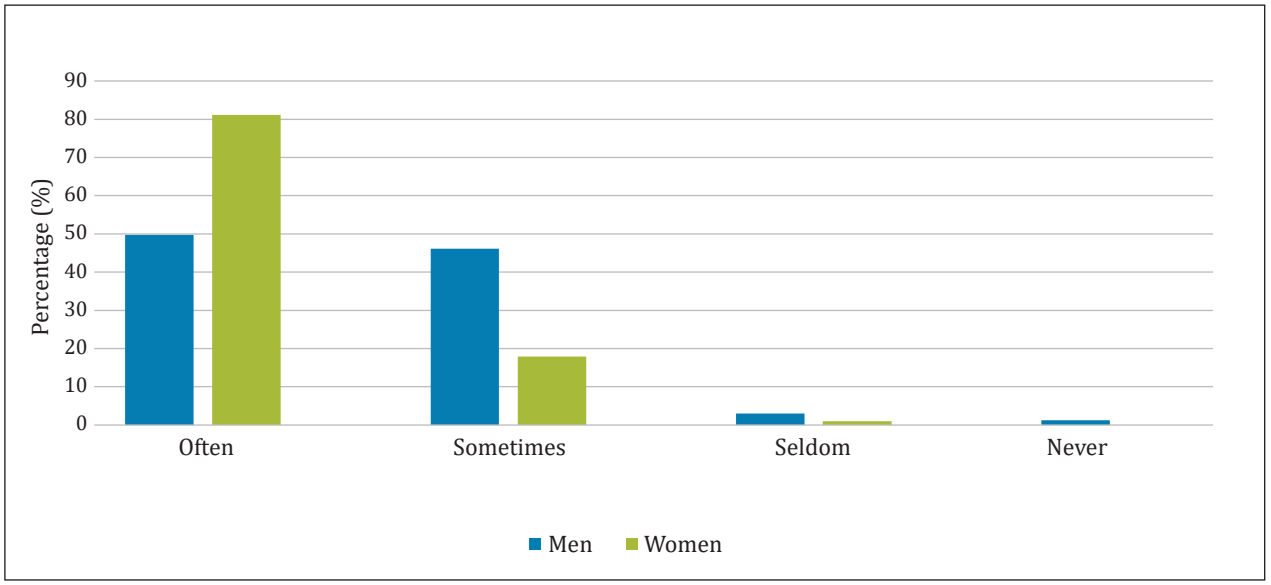


Figure 11: Inclusion of women in the workforce brings varied perspectives and approaches

So: CER's Online Survey

[4] A quantitative measure used to determine whether a relationship exists between two categorical variables.
[5] Tentative statement about some relationship or condition that is subject to subsequent verification.

Figure 11 reveals that women feel confident in their ability to offer unique perspectives and approaches to tackle the challenges in the power system. Women's presence on corporate boards reduces the probability of corporate fraud, enhances earnings quality, and more conservative financial reporting. Women's inclusion as stakeholders and decision-makers in regulatory commissions and within policy design can lead to effective and broadly informed outcomes (Morris, 2015). In the data obtained through the survey of CER, the respondents ranked 'reduce the probability of corporate fraud' as the most common benefit of the presence of women on corporate boards, followed by 'more conservative financial reporting' and finally 'better conflict handling' (Figure 12 and Figure 13). Both men and women ranked 'women reduce the probability of corporate fraud' as the first common choice. The chi-square test did not reveal any significant relationship between gender and women's presence on corporate boards.

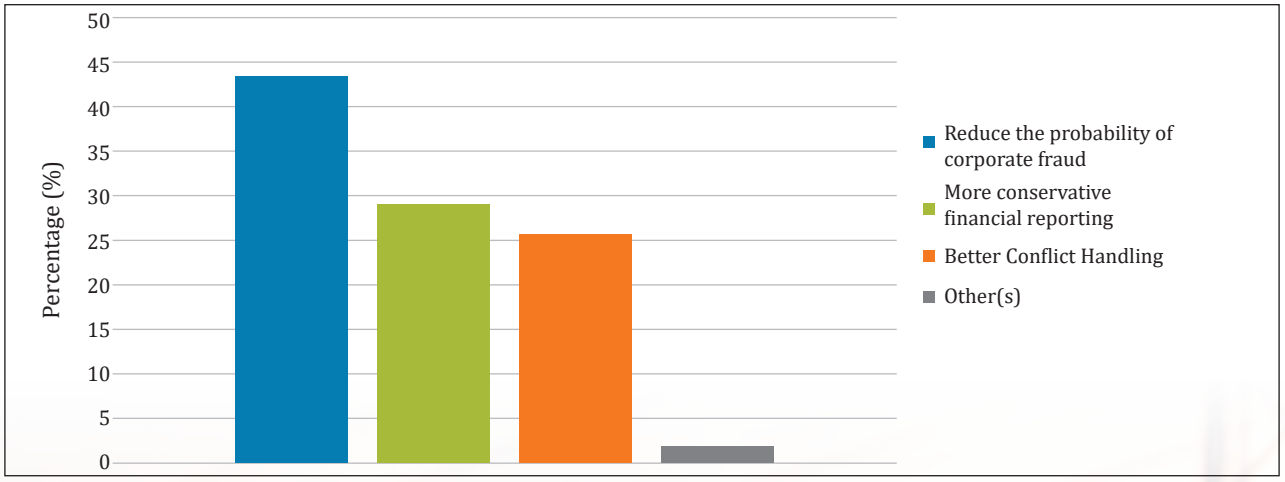


Figure 12: Will the presence of Women on corporate boards brings benefits (Overall)?

So: CER's Online Survey

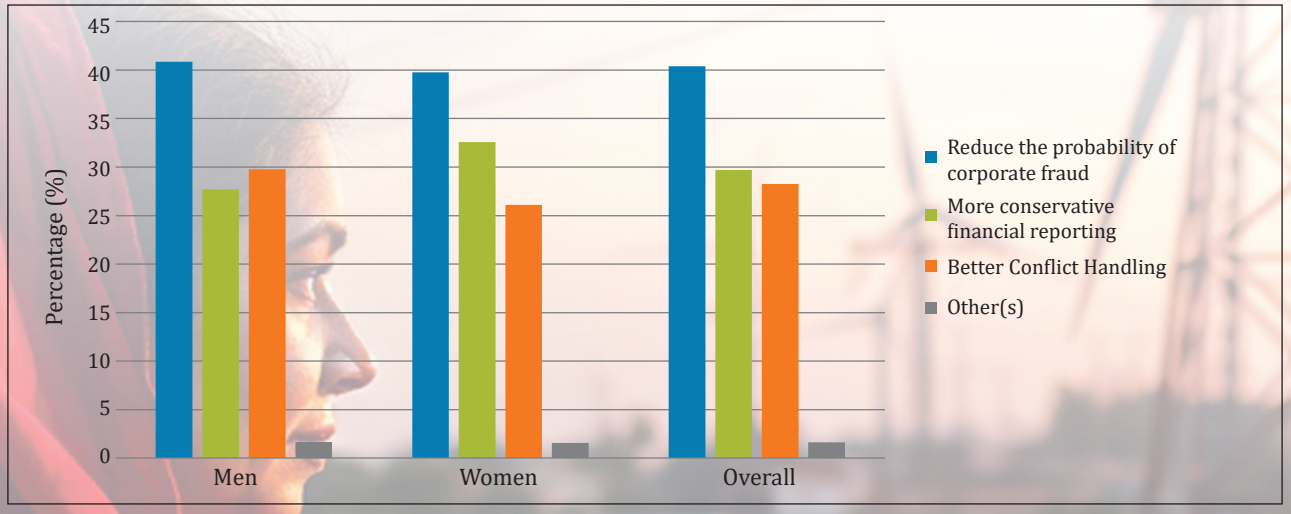


Figure 13: Will the presence of Women on corporate boards brings benefits (Men vs Women)?

So: CER's Online Survey

Source: DEEP AI

4.2 Barriers and Challenges

Women face significant barriers at both entry and advancement stages in the power sector. These barriers are rooted in societal norms, educational disparities, workplace culture and structural issues.

Entry Barriers

Entry barriers refer to obstacles that prevent women from initially entering the power sector. These barriers are often rooted in societal norms, educational disparities, and recruitment practices. The primary concern of losing women aspirants from the sector starts at the level of higher studies with enrolment in postgraduate or doctoral degree programs being much lower for women than their male counterparts (MHRD, 2015), (Srija, *et al.*, 2020), (Sturm & S., 2006).

Survey respondents reported that cultural and social norms were the most significant barriers to greater female participation in the power sector. These norms often perpetuate stereotypes about gender roles, leading to biased perceptions about women's capabilities and suitability for technical and leadership positions. Societal expectations and traditional gender roles can limit educational and career opportunities for women, starting from a young age. For example, girls might be discouraged from pursuing STEM subjects, which are crucial for careers in the power sector. This early discouragement creates a pipeline issue, resulting in fewer women entering the field.

Additionally, these norms can manifest in the workplace through discriminatory attitudes and behaviours. Women in the power sector often face unconscious bias, where their contributions might be undervalued compared to their male counterparts. Such biases can hinder career advancement, as women may be overlooked for promotions, leadership roles, or professional development opportunities. The lack of role models and mentors exacerbates the issue, making it challenging for women to envision and pursue career growth within the sector.

Following cultural and social norms, the second most common barrier identified by survey respondents was the lack of female candidates. This shortage can be attributed to the aforementioned pipeline issue, where fewer women are encouraged to pursue relevant education and careers in the power sector. Consequently, the pool of qualified female candidates for technical and leadership positions remains limited. This scarcity creates a vicious cycle, where the lack of women in the field deters other women from considering it as a viable career path.

The third significant barrier reported was the prevalent hiring practices within the power sector. Traditional hiring practices often rely on networks and referrals, which can perpetuate existing gender imbalances. If the current workforce is predominantly male, the hiring processes are likely to favour male candidates, whether consciously or unconsciously. Furthermore, job descriptions and recruitment strategies might be biased, using language or criteria that unintentionally discourage female applicants.

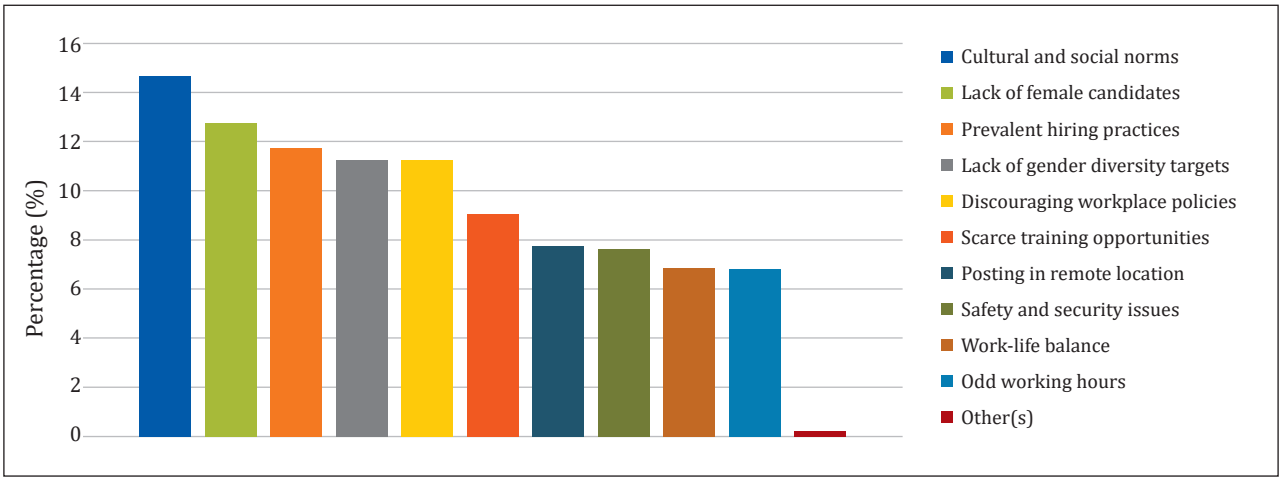


Figure 14: Key barriers to greater participation in the power sector

So: CER's Online Survey

Cultural and Social Norms

The cultural and social norms that expect women to behave and act in a particular way are deep-rooted in our society. Social norms belong to the society while cultural norms belong to different social groups. Society expects women to provide a significant amount of their time for household work, childcare, or elderly care (McDonald, *et al.*, 2015). These social expectations influence the roles that women take within the power sector, especially if a position is not responsive to its cultural expectations, both inside and outside the workplace Listo, R., 2018, (Rosaldo, *et al.*, 1974), (Tonso & K.L., 1996).

It is believed women have fewer technical competencies than males even if they have the same or superior qualifications. Cultural and social norms were cited as the most common barriers to women's participation in the sector, followed by a lack of female candidates and prevalent hiring practices. The survey respondents also reported the same pattern. The perceptions about gender roles and responsibilities will not change abruptly, however, these hurdles are affecting the ability of women continuously.

Lack of female candidates

The social and cultural norms contribute to grinding down the confidence, self-belief and willingness to engage in subjects with technical background. Despite huge efforts over the years to address this gender gap, the share of women graduating in medicine, education, and management is considerable, while the share of women in other fields is less (Figure 15).

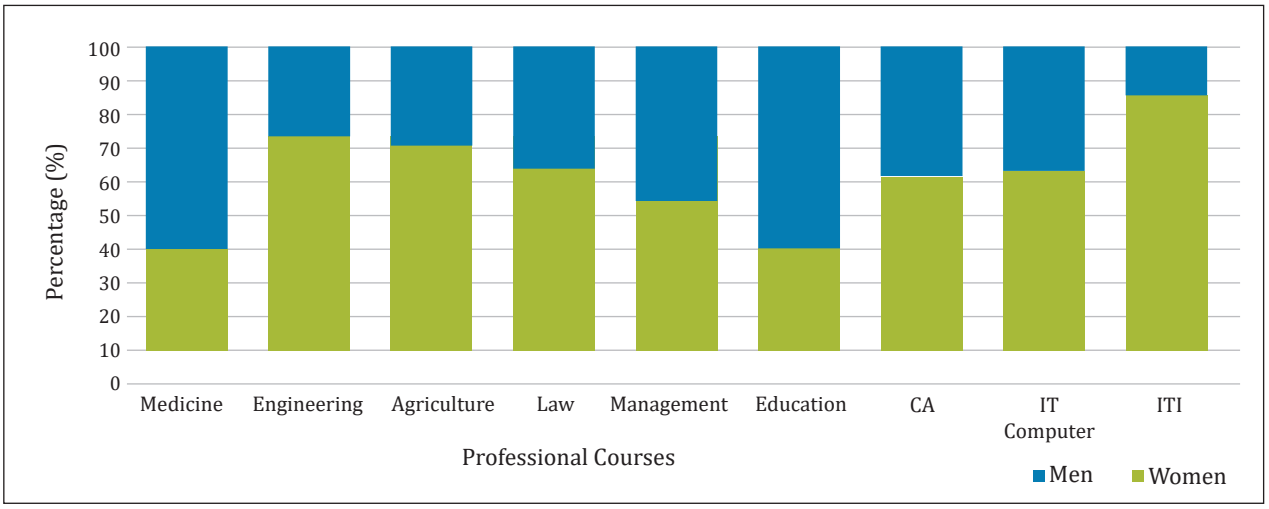


Figure 15: All-India Percentage distribution of students by gender pursuing technical/professional course

So: NSS 75th Round

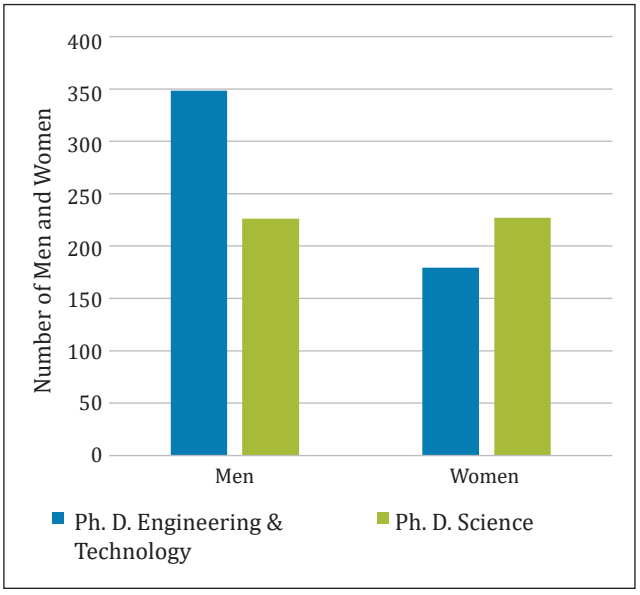


Figure 16: Women in Ph.D. STEM

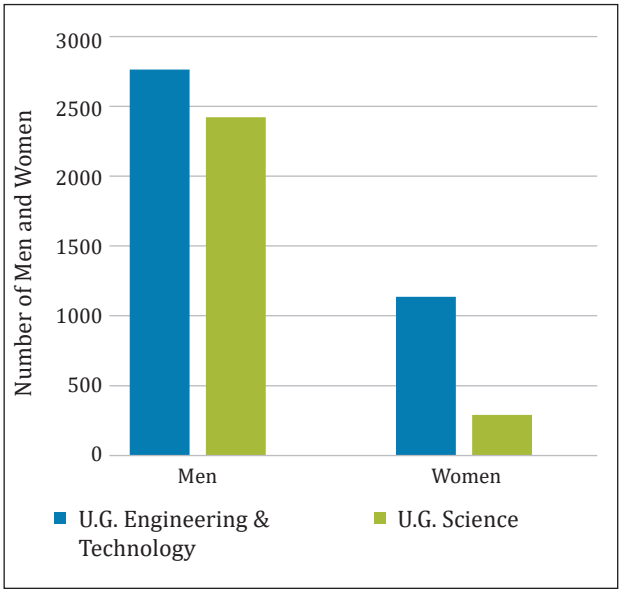


Figure 17: Women in U.G.STEM

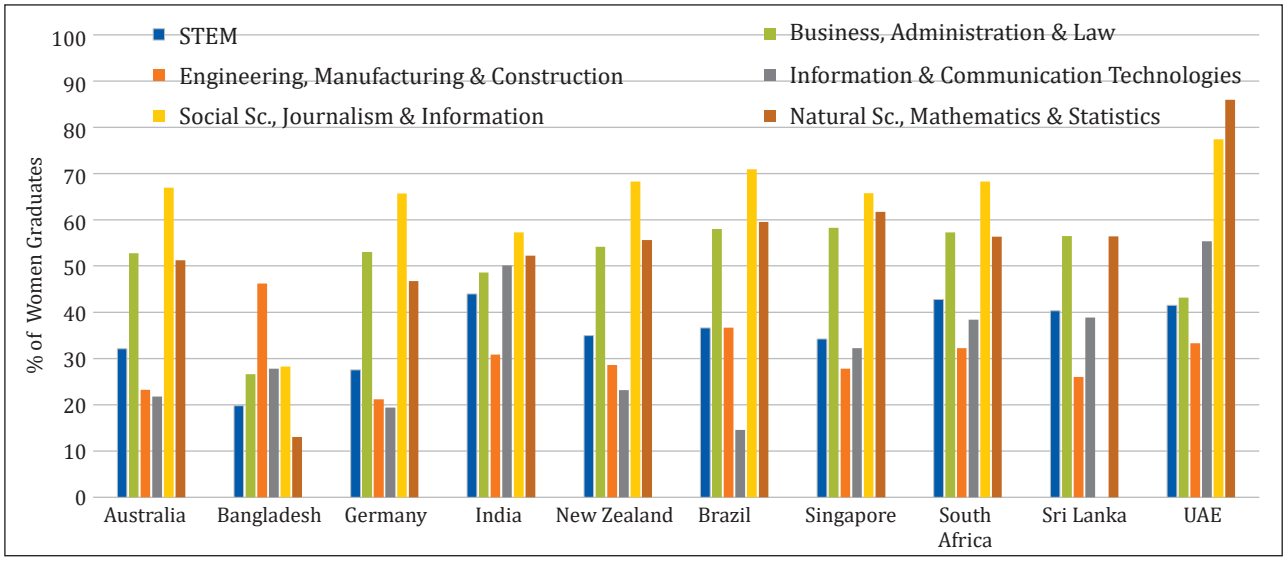


Figure 18: Share of Women Graduates in different fields of Education across World

So: The World Bank (Gender Data 2024)

This scenario is the same for the world as shown in Figure 18 where it is seen that the share of women in engineering, manufacturing, and construction is the least in almost all countries depicted in the figure. The representation of women in social science, journalism and information remains at the top, which depicts the preferences of the women lies away from the technical fields in many countries.

Work-Life Balance

Women working in developing countries may be considered as doing double shifts, as they are primarily responsible for routine domestic activities like cooking, cleaning, household maintenance and caring of the young and the old. These additional responsibilities adversely influence their abilities to contribute effectively and efficiently. 'Marriage effect' (Sudarshan & Bhattacharya, 2009) reveal that cultural restrictions on women's mobility are even more severe for married women that their unmarried counterparts. The marriage effect is different from "motherhood penalty" found in the literature (Hegewisch & Gornick, 2011), where the child's responsibilities intrudes women's ability to participate in the workforce.

Lack of awareness of opportunities

Owing to a smaller number of women in the sector, their network is feeble which leads to a lack of readily accessible information about job opportunities among them in the power sector. A significant amount of information about employment remains in personal connections and professional networks that are less likely to be accessible to women.

Financial Constraints

Financial constraints are a significant barrier to women's participation in power sector regulation in India. Many families, adhering to traditional expectation that women will primarily manage household responsibilities, are reluctant to invest in their daughter's education and career development in fields like power regulation. This lack of financial support limits opportunities for women to pursue the necessary education and training, contributing to their underrepresentation in this sector. Addressing these financial barriers is crucial for promoting gender diversity and empowering more women to enter and thrive in the power sector. The same is also depicted in Figure 19, where the survey respondents cited financial constraints as the most significant barrier.

"Opportunities should not come by Gender, it has to come by the merit of one's capability."

– Dr. Jyoti Prasad
Member (Law), JERC (Goa & UTs)

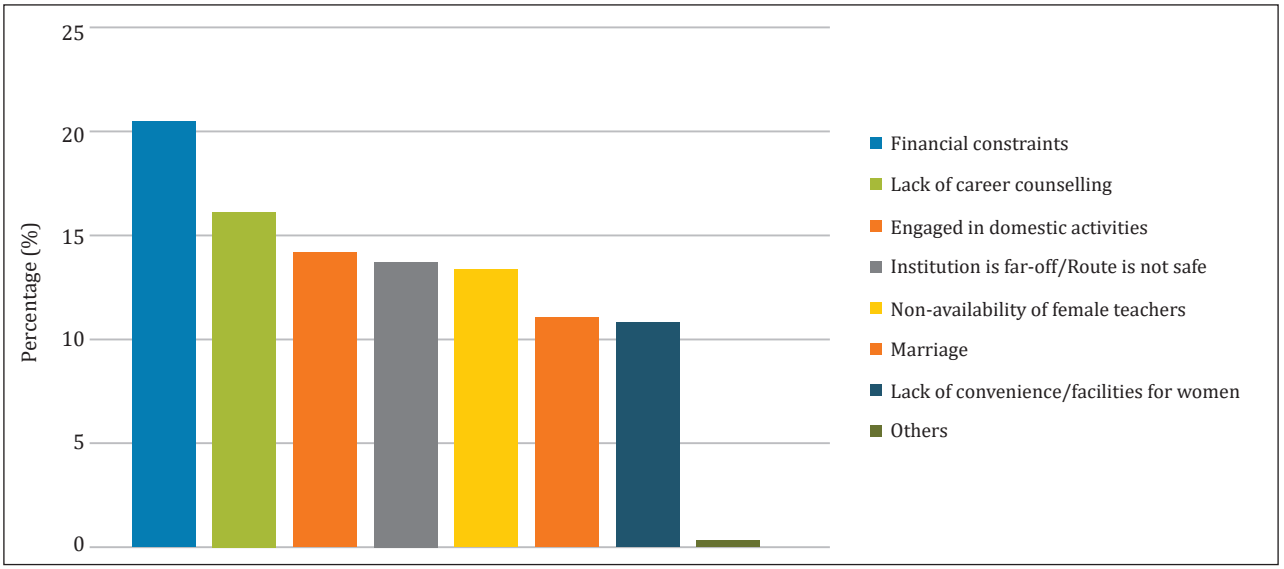


Figure 19: Reasons for low enrolment of women in higher education

So: CER's Online Survey

"The most prominent challenges that most women face in the power sector are remote power station locations and odd working hours. The selection process is not against the women. However, very few women are available or qualify/ eligible for senior positions in power sector regulation".

– Ms. Neerja Mathur
First Women Chairperson,
Central Electricity Authority

Health and safety

Globally girls have higher survival rates at birth as compared to their male counterparts; however India is the only country in the world where more infant girls die than boys (UNICEF, 2021). Women have limited access to conveniences and resources such as sanitary facilities, health care, transportation, etc. A survey conducted in New Delhi revealed that 95% of women aged 16 to 49 felt unsafe in public spaces Tiwari, A. and Vyas, S., 2024. Most young girls are forced to leave the school as their families feel that the route between the school and residence is unsafe. The ICRW survey records that the fourth common reason for low enrolment of women in higher education is, "Institution is far off/ Route is unsafe". Lack of conveniences/ facilities for women affect their career choices at every stage of their life, be it the lack of sanitary conveniences for girls in schools and colleges or lack of childcare facilities in the workplace.

Barriers to Career Advancements

Even when women successfully enter the power sector, they face numerous challenges that impede their career advancement. These barriers are often structural and behavioral, affecting their ability to progress to leadership positions. It is important to realize that women's retention and entrance into the workforce are equally important. Women usually tend to leave their jobs when they feel balancing

Source: DEEP AI

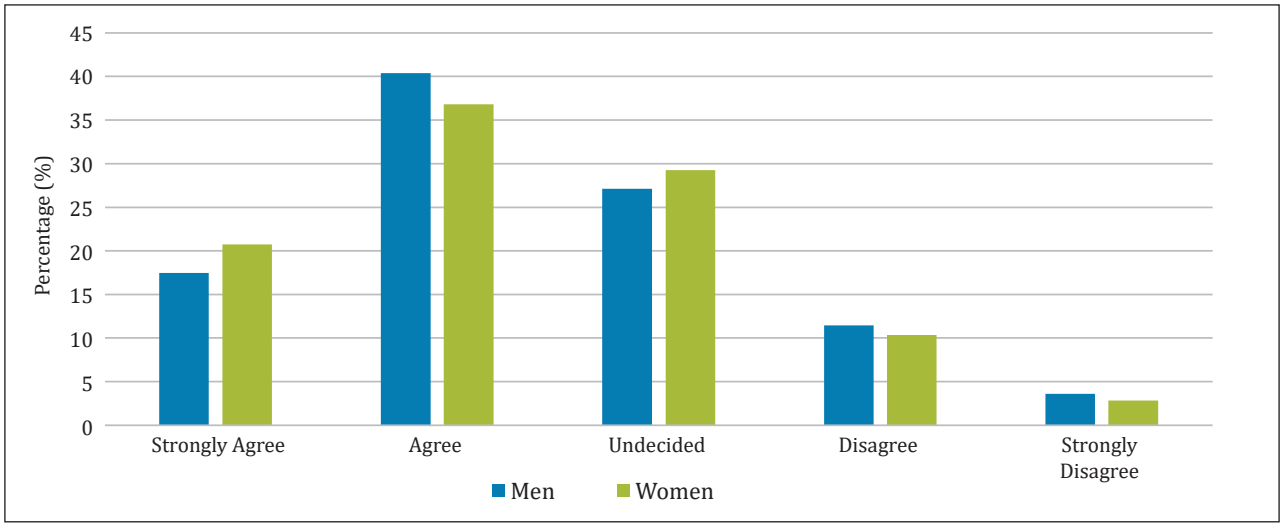


Figure 20: Are Women working in the field of power sector regulation assigned administrative responsibilities?

So: CER's Online Survey

work and family is demanding, especially during the early stages of motherhood. The self-perception of women that they do not belong to technical fields poses a major hurdle in women's career (Zeldin, *et al.*, 2008).

Responses to the CER online survey revealed that both men and women acknowledge a persistent bias in the power sector regulation field, where women, despite having relevant qualifications and expertise, are often assigned administrative responsibilities rather than technical or decision-making roles (Figure 20). This practice not only undervalues their skills but also limits their career growth and contribution to the sector. The findings highlight the need for a more equitable distribution of roles that fully utilizes the talents of women in this field.

Most experts revealed that they did not experience gender discrimination. They emphasized that both genders should be treated equally based on their sincere efforts, hard work and talent. Some experts, mostly young female employees, feel the opposite.

The survey conducted by CER revealed that Management/Co-worker bias is the top constraint. Gender-oriented practices, personal/ family constraints and lack of job training opportunities are the other important reasons that are perceived to be the key obstacles to women's career progression in the power sector (Figure 21). This indicates that the behavior of seniors/ colleagues/ fellows towards women is the critical aspect, of which there is a void in the literature. It is important that all employees feel secure in the workplace in terms of mental health, structural conveniences and comfortable environment.

"Women are encouraged to join in the purchase or administration department even though they have relevant technical background. Technical exposure for women employee is less as compared to men".

– Ms. Sharda Yadav
Deputy Director,
Delhi Electricity Regulatory Commission

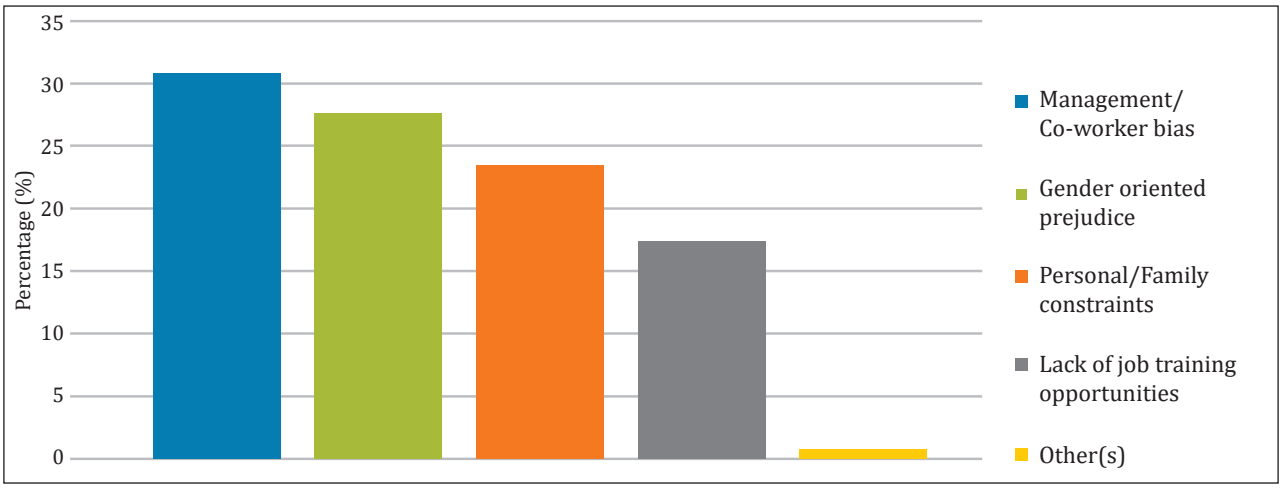


Figure 21: Key obstacles for women's career progression in the Power Sector

So: CER's Online Survey

Lack of required skills and qualifications

Patriarchy deprives women of equal access to education, training and skill development, which leads to low employable skills, thereby contributing to lower-paying jobs for women. Women often face limited access to skill development programs, training, and other essential resources (Madhav & Sankaran, 2011). This lack of access hinders their professional growth and prevents them from acquiring the advanced skills needed to excel in their roles. The survey's findings underscore the importance of creating more inclusive opportunities for women to engage in continuous learning and development, ensuring they can compete on an equal footing with their male counterparts.

Lack of gender-responsive policies and benefits

Some gender-responsive policies and benefits introduced for women that support and empower women as mentioned in the report. However, they are not sufficient to integrate women's experiences, expertise and capacities. Without these policies, the unique challenges faced by women in the industry are often overlooked, resulting in limited participation and advancement. It is essential to highlight the crucial role and importance of women in program implementation, ensuring that their contributions are recognized and valued. Additionally, appropriate budgetary provisions must be made to support initiatives that foster gender equality, enabling women to thrive in this traditionally male-dominated sector.

Discrimination

Women often experience discrimination when it comes to equal opportunities. Despite having the same qualifications and capabilities as their male counterparts, they frequently face barriers to career advancements, leadership roles, and access to key projects. This discrimination not only undermines their professional potential but also perpetuates gender inequality within the sector, highlighting the urgent need for more inclusive practices that ensure fair treatment and equal opportunities for all (Figure 22). During personal interviews, many experts have cited hesitation to hire women within the power sector workforce due to the nature of the work, as odd working hours and other structural inconveniences like safe transportation may not be acceptable for women. These testimonials illustrate how regulatory commissions may not have appropriate policies in place that make the workplace accessible and inclusive for women.

Source: DEEP AI

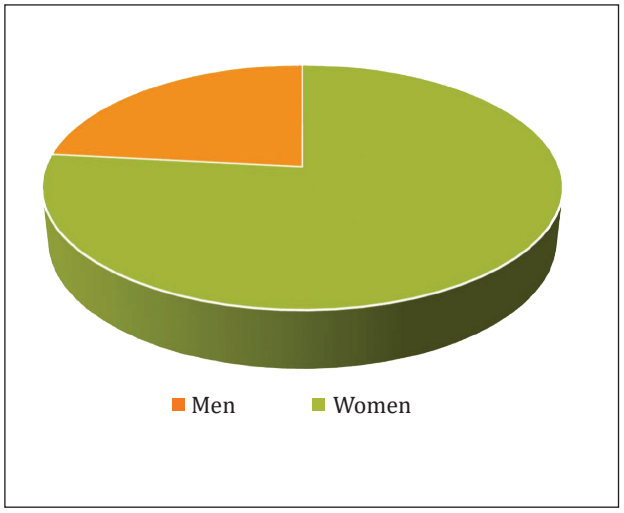


Figure 22: Women and men are offered equal opportunities for promotion

So: CER's Online Survey

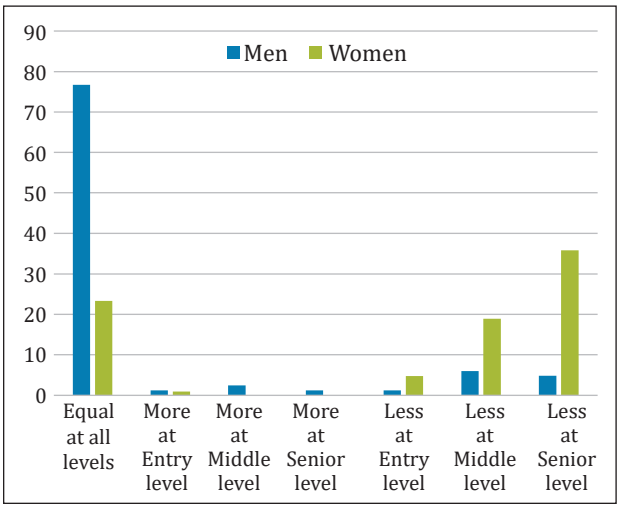


Figure 23: Women are promoted less in their career

So: CER's Online Survey

The survey respondents indicated that regulation, distribution and academic institutions are the three domains, in which more than 50% of organizations are without any gender-sensitive recruitment policy (Figure 24). The situation is worse in the regulatory sector where there are more adhoc/ temporary appointments.

Another significant barrier that women face in the power sector regulation is the lack of workplace protections[6] that directly impacts the hiring practices. Even in cases where protections exist, they are often poorly enforced, leaving women vulnerable for entering and remaining in the sector, further exacerbating the gender gap and undermining efforts to create a more equitable and supportive work environment.

"Most of the positions are deputation based in the ERCs. The employees may feel that they will lose opportunities if they join ERCs. This aspect does not allow the real talent to enter in the electricity regulatory sector. The women generally do not prefer to relocate for such short span of time".

– Mr. V P. Raja
Former Chairman, MERC

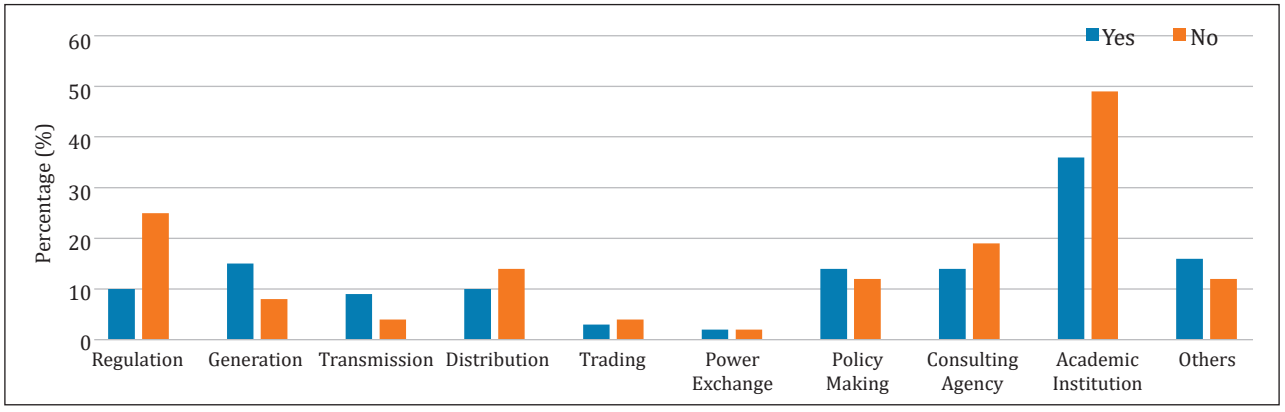


Figure 24: Does your organisation have a gender sensitive recruitment policy?

So: CER's Online Survey

[6] Protections refer to the presence of a legal/policy framework designed to reduce the discriminatory and inequality practices

4.3 Representation of Women in Electricity Regulatory Sector

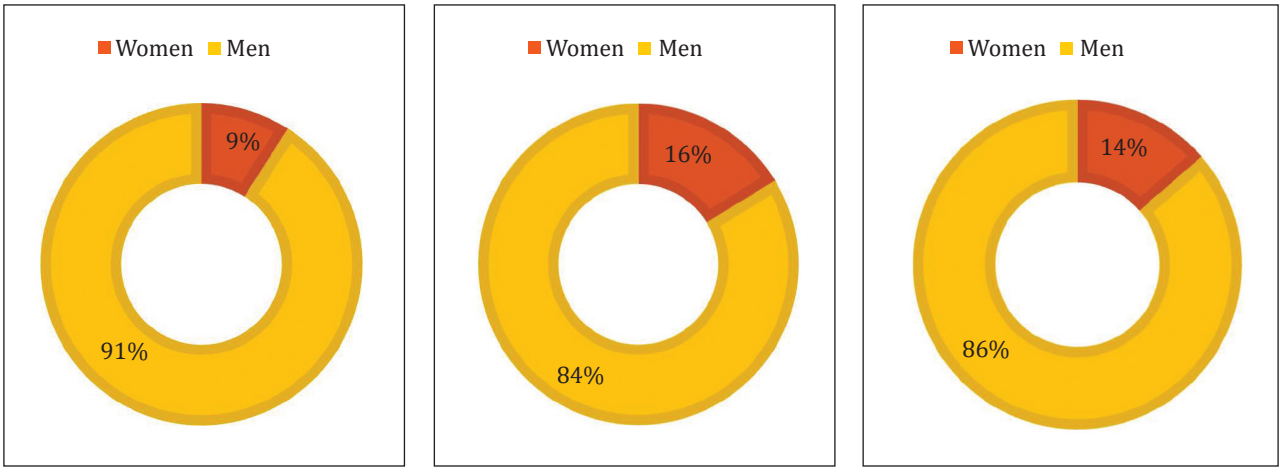
The Central Electricity Regulatory Commission was established under Section 3 of the Electricity Regulatory Commissions Act, 1998. The Central Commission shall consist of a chairperson and three other members, who shall be appointed by the Central Government on the recommendation of the Selection Committee. The qualifications required for appointment as Members of the Central Commission and Constitution of the Selection Committee to recommend Members are provided in Sections 77 and 78 of the Electricity Act, 2003. Likewise, the State Government established State Electricity Regulatory Commissions, under Section 17 of the Electricity Regulatory Commissions Act, 1998. The State Government appoints the chairperson and members on the recommendation of the Selection Committee. The qualifications for appointment of Members of the Central Commission and Constitution of the Selection Committee to recommend Members are provided in Sections 84 and 85 of EA, 2003. The EA, 2003 may be called a true harbinger of power sector reforms that laid the foundation of such reforms. The sector has seen significant progress on many fronts achieving self-sufficiency in meeting electricity demand, crucial reforms in the regulatory system and empowerment of electricity consumers. However, it is surprising to notice that there is no mention of women in the 134-page document. Part 10 of EA, 2003 defines the constitution, powers, and functions of the central regulatory commission.

It is important and interesting to understand that retired IAS officers are generally appointed to the positions of chairpersons. This preference is due to their extensive experience in political governance, economic policy, and occasionally technical aspects, which equips them with a broad understanding necessary for overseeing regulatory functions.

Current status of Women in ERCs

The current status of women in electricity regulatory commissions remains one of underrepresentation. Despite some progress, women occupy a small percentage of leadership and decision-making positions within these bodies. This gender imbalance reflects broader challenges in the energy sector, where women often face barriers to entry, limited career advancement opportunities, and a lack of supportive policies. Addressing these issues is crucial for fostering a more diverse and inclusive regulatory environment that benefits from the perspectives and contributions of women.

In India, there is a CERC, 26 SERCs, and 3 JERCs. CER has collected information about the gender gap in the Commissions through publicly available data. CER has also requested the ERCs including CERC, SERCs and JERCs to share information regarding Chairpersons, Members and Secretaries since 2010, and a current snapshot of officers and other staff of the Commission and 11 SERCs have provided the data.



(a) Chairperson (b) Members (c) Secretaries

Figure 25: Current Status of overall representation of women in ERCs as of 30.04.2024

So: CER's Analysis

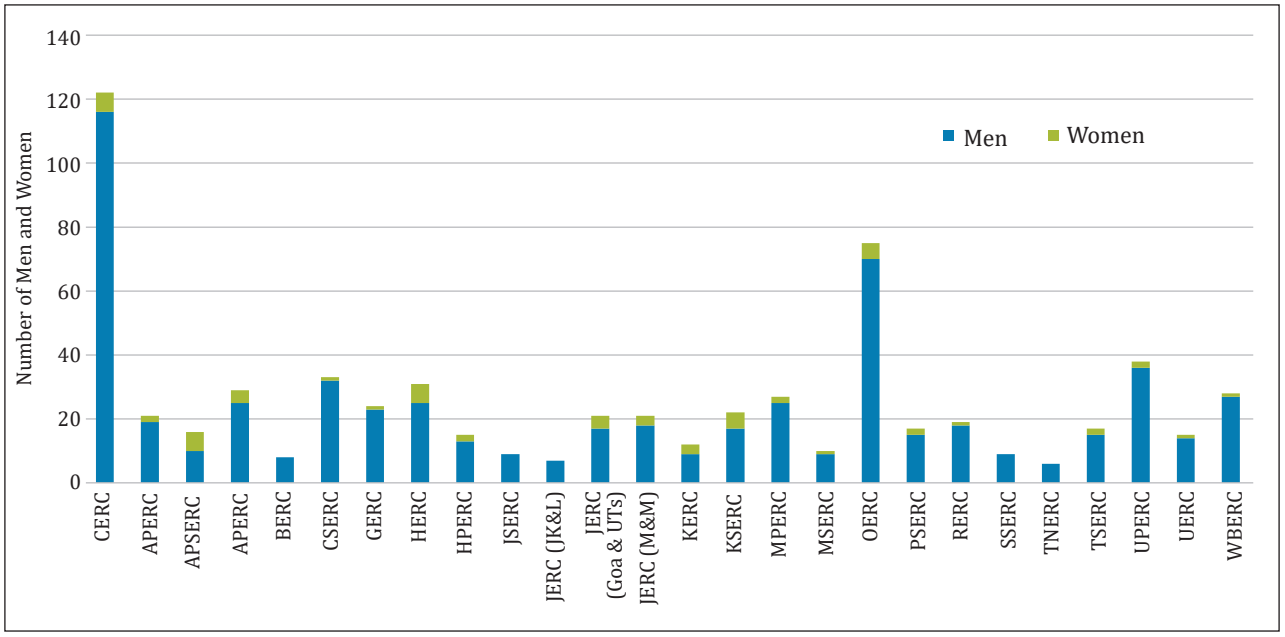


Figure 26: Trend of representation of Women in Electricity Regulatory Commission as of 30.04.2024

So: CER's Analysis

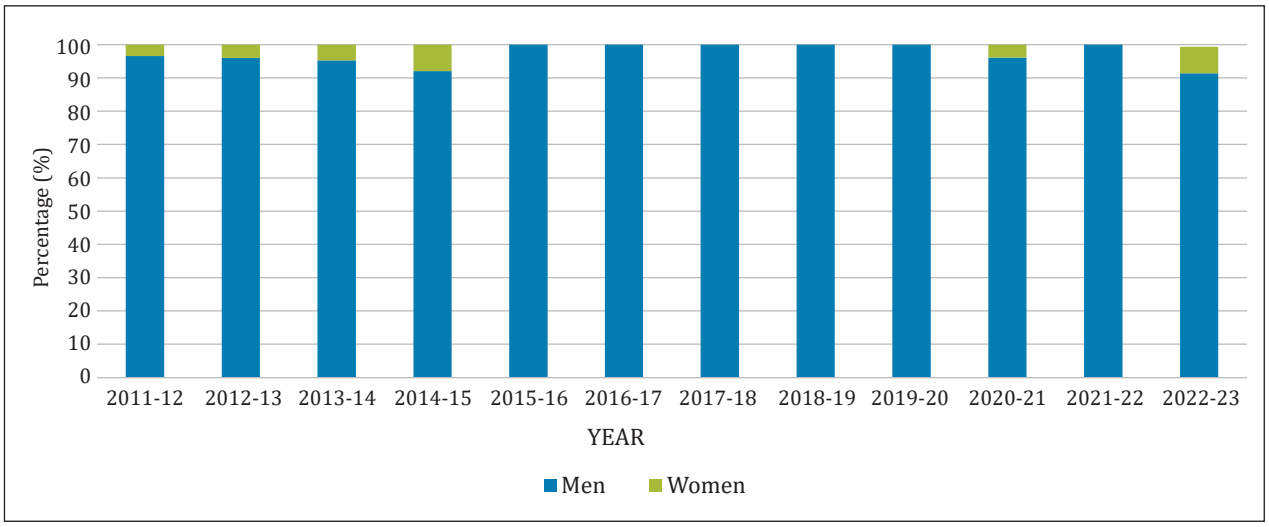


Figure 27: Year-Wise Participation of Chairpersons for all ERCs as of 30.04.2024

So: CER's Analysis

It is observed from (Figure 25) that currently women represents merely 9% chairpersons, 16% members and 14% Secretaries in the electricity regulatory sector[7]. The representation of women as officers in ERCs is shown in (Figure 26) which indicates very low participation of women, while BERC, TNERC and SSERC, JSERC, JERC (J&K) have no women in their commissions as Officers.

The financial independence of the SERCs poses a significant hurdle in the recruitment process. Due to limited financial autonomy, ERCs often struggle to allocate adequate resources for attracting and hiring qualified candidates. This constraint hampers their ability to compete with other sectors for top talent, leading to staff shortages and impacting the effectiveness of regulatory functions. Ensuring greater financial independence of ERCs is essential for strengthening their capacity to recruit and retain skilled professionals.

Representation of Women in ERC's Central Advisory Committee

CAC represents the interests of commerce, industry, transport, agriculture, labour, consumers, non-

[7] Figure 25 (a) includes the data from all the ERCs while (b & c) excludes the data from Himachal Pradesh, Jharkhand, JERC for UTs of J&K and Ladakh, Maharashtra, Nagaland, Sikkim and Tripura.

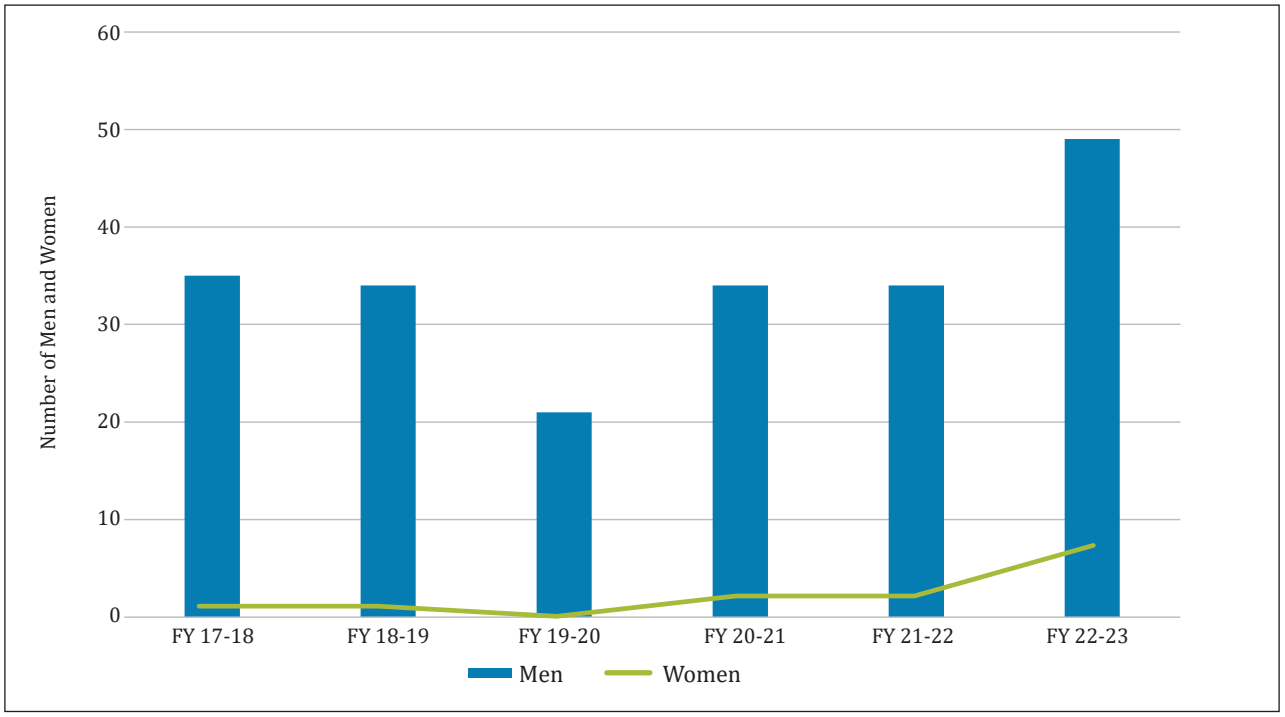


Figure 28: Representation of Women in ERC's CAC as of 15.05.2024

So: CER's Analysis

governmental organisations, and academic and research bodies in the energy sector. The members of CAC advise the Commission on matters related to quality, continuity and extent of service provided by the licensees; protection of consumer interest; energy supply and standard of performance by utilities (The Electricity Regulatory Commissions Act, 1998). (Figure 28) shows a huge gender gap in the ERC's central advisory committee. The representation of women as chairpersons and members is evidently less in the electricity regulatory commissions, thereby less participation in the advisory committee is also reflected.

Representation of Women as Electricity Ombudsman

Electricity Ombudsman means an authority appointed or designated by the Commission as per Regulation 17 of guidelines for the establishment of the Forum for Redressal of Grievances of the Consumers and Electricity Ombudsman Regulation, 2004. In India, women represent only 9.1% of the positions within electricity ombudsman roles (Figure 29). This stark underrepresentation highlights a significant gender imbalance in a key regulatory function, where diverse perspectives are crucial for addressing consumer grievances effectively.

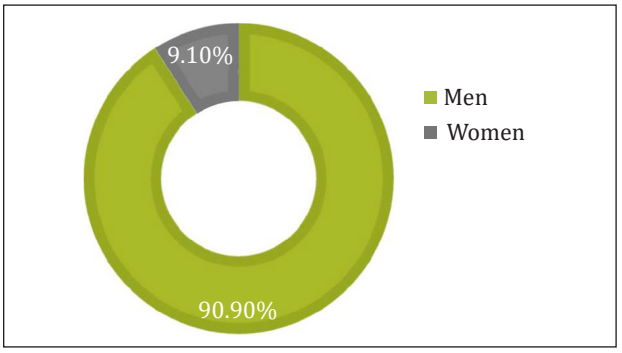


Figure 29: Men vs Women: Electricity Ombudsman

So: CER's Analysis

Source: DEEP AI

Representation of Women in STEM, NON-STEM and Administrative Domain

The representation of women in STEM, Non-STEM and Administrative fields has been a topic of interest and research for many years, and it varies significantly across these domains as shown in (Figure 30). In STEM fields, women are often underrepresented, facing barriers related to access, retention and advancements, despite growing efforts to encourage their participation. In Non-STEM areas, women typically have higher representation, though they may still encounter gender biases and limited advancement opportunities. In administrative domains, women often occupy a substantial portion of roles, but they may be concentrated in lower-tier or support positions rather than in leadership or decision-making roles.

4.4 Current Status of Women in DISCOMs

The current status of women in Distribution Companies (DISCOMs) reflects a mixed picture. Women are underrepresented in technical and leadership roles within DISCOMs, often occupying more administrative and support positions. *North-East India* is the easternmost region representing a geographic and administrative division of India and comprises eight states - Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. In Arunachal Pradesh, Department of Power, a government-owned entity, women represent 25% of the board members and key officials as shown in (Figure 31[8]). The data is retrieved from the annual reports of respective DISCOMs.

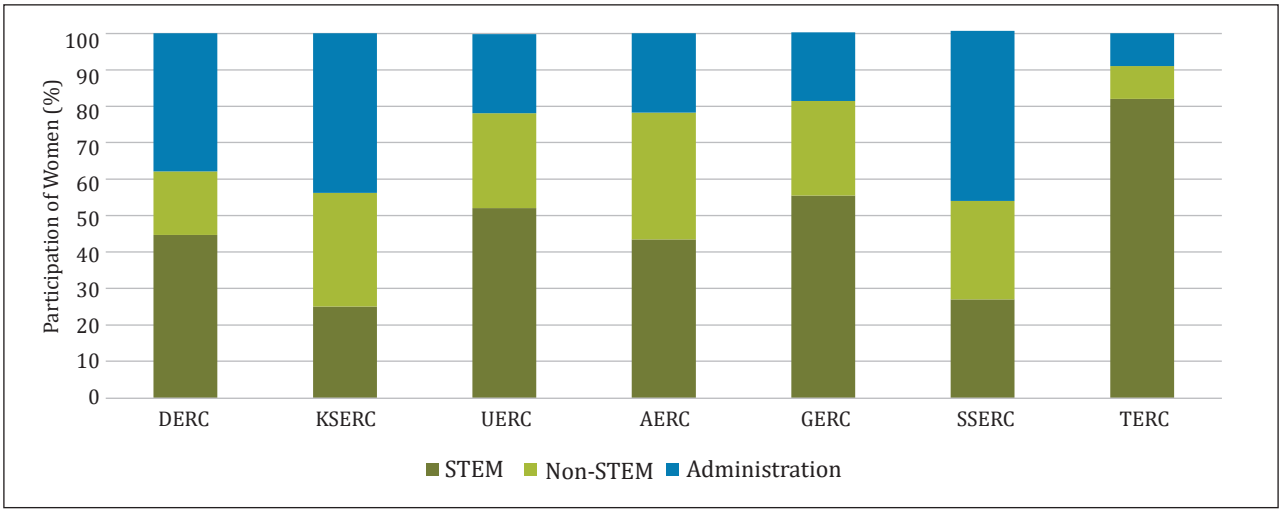


Figure 30: Participation of Women in STEM, NON-STEM and Administrative Domain (As of 05.08.2024)

So: CER's Analysis

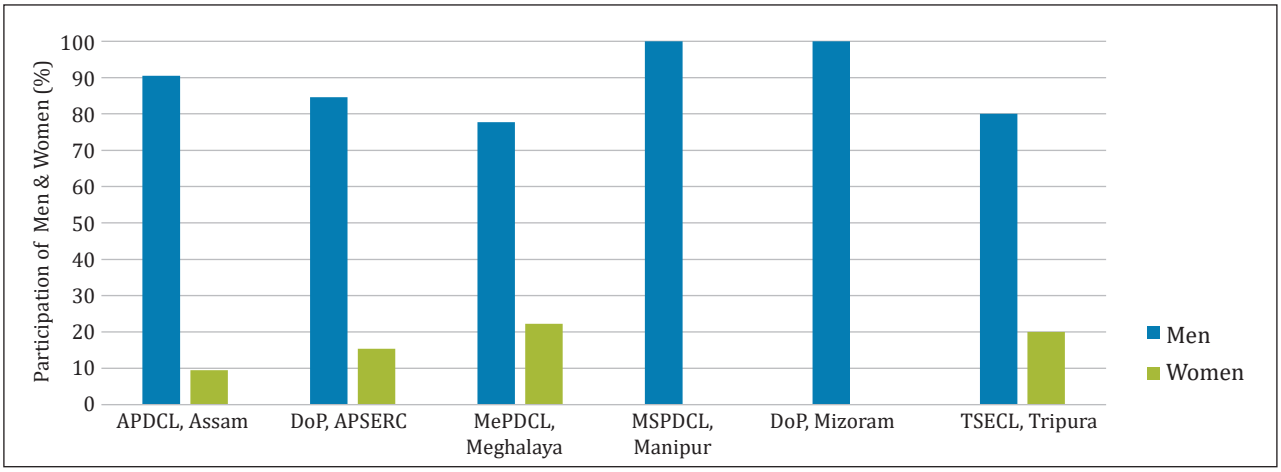


Figure 31: Participation of women (%) in DISCOMs in few Northeast states (Board Members and Key Officials as of 30.04.2024)

So: CER's Analysis

[8] In figure 31, few states have been considered based on some peculiarity and availability of data.

Eastern India consists of Bihar, Jharkhand, Odisha, West Bengal and Union Territories of Andaman and Nicobar Islands. Bihar consists of two DISCOMs owned by the Government of Bihar - South Bihar Power Distribution Company Ltd. (SBPDCL) including the impact area of PESU Area, Patna and 17 district HQ of South Bihar, and North Bihar Power Distribution Company Ltd. (NBPDCL) that serves 21 districts of North Bihar. In Jharkhand, Jharkhand Bijli Vitran Nigam Ltd (JBVNL) serves seven electric supply areas. The representation of women as key officials and board members is less than expected as shown in (Figure 32).

Western India includes Chattisgarh, Gujarat, Maharashtra and Madhya Pradesh. It is evident from (Figure 33) that the participation of women is unfair in most of the states of western India. The Torrent Power, being a private entity has almost equal participation of women whereas other government-owned DISCOMS have minimal female participation.

Northern India includes Jammu and Kashmir, Ladakh, Himachal Pradesh, Delhi, Chandigarh, Haryana, Punjab, Uttarakhand, Uttar Pradesh and Rajasthan. The representation of women is the least in Punjab. The scenario of limited participation of women in electricity regulatory commissions is similar in North India, reflecting a broader regional trend as shown in (Figure 34).

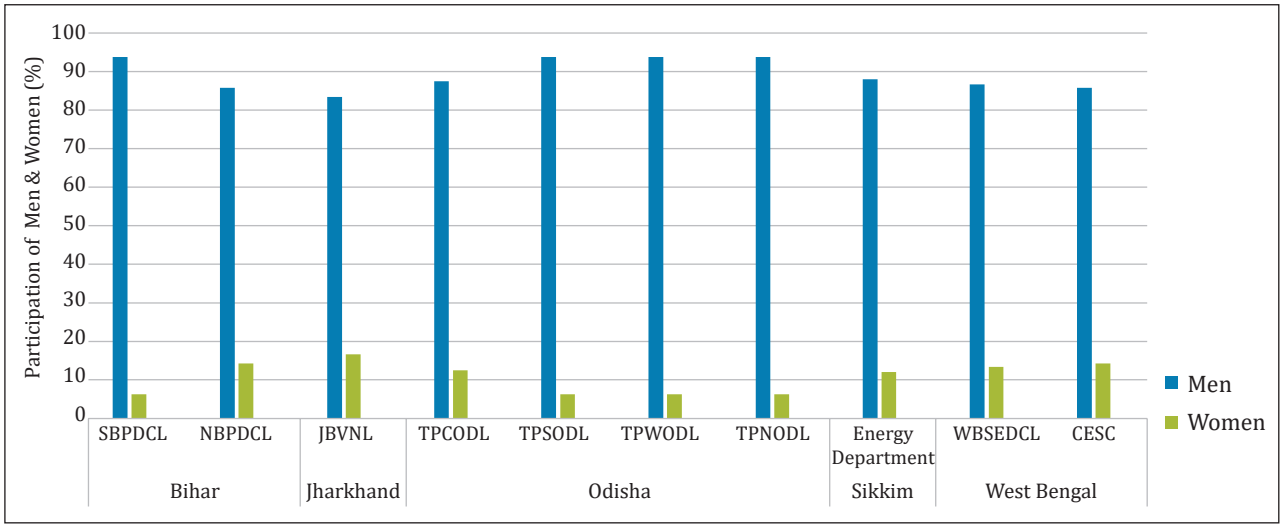


Figure 32: Participation of women (%) in DISCOMs in a few eastern states (Board Members and Key Officials as of 30.04.2024)

So: CER's Analysis

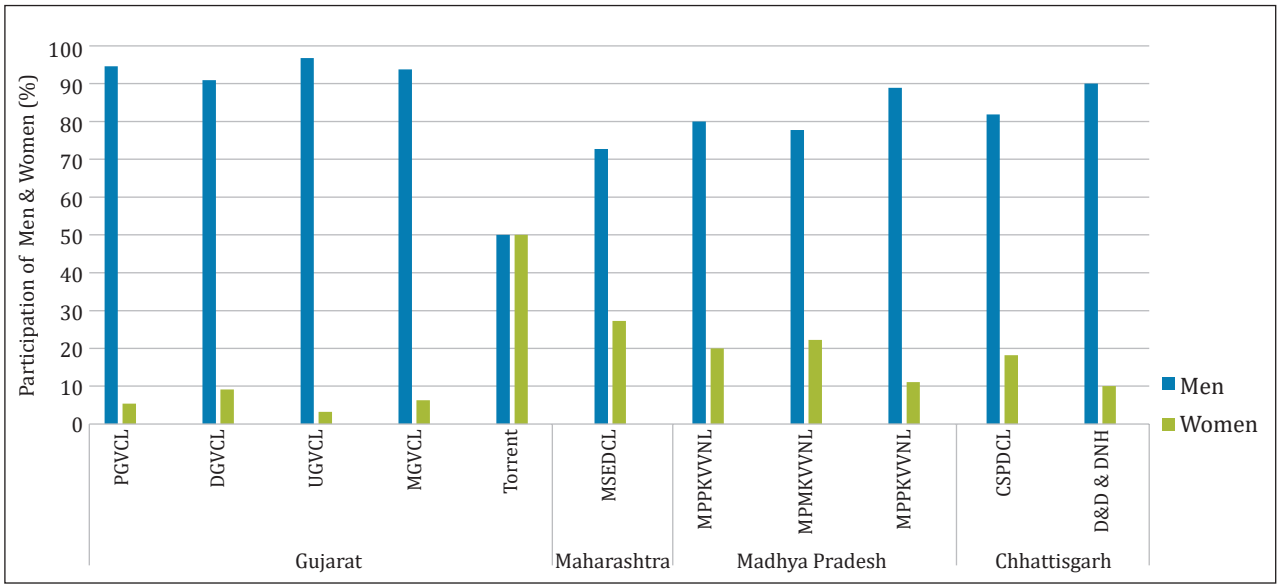


Figure 33: Participation of women (%) in DISCOMs in a few western states (Board Members and Key Officials as of 30.04.2024)

So: CER's Analysis

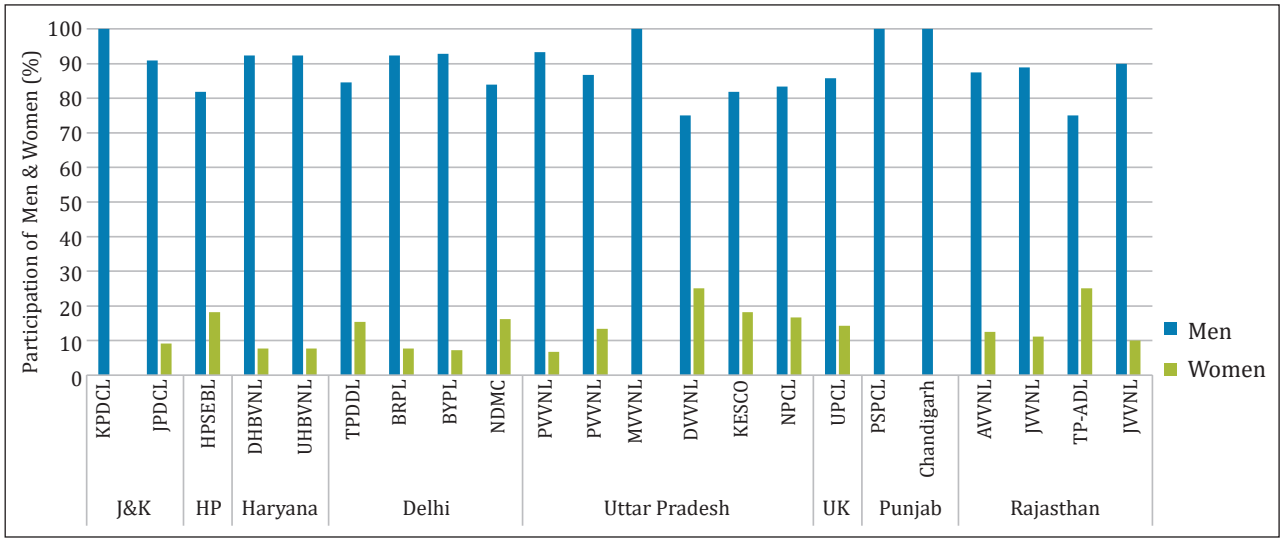


Figure 34: Participation of women (%) in DISCOMs in a few northern states (Board Members and Key Officials as of 30.04.2024)

So: CER's Analysis

Andhra Pradesh has two DISCOMS owned by the Government of Andhra Pradesh, viz. Eastern Power Distribution Company of Andhra Pradesh Limited (APEPDCL) with the impact area covering Srikakulam, Vizianagram, Visakhapatnam, Rajahmundry, Eluru, and Andhra Pradesh Southern Power Distribution Company Ltd (APSPDCL) with the impact area covering Tirupati, Kadapa, Nellore, Kurnool & Ananthapur. Women among the board members and key officials in DISCOMs of Andhra Pradesh constitute only 16.67% (Figure 35).

This section explored, the pressing need for greater inclusion of women in the power sector, focusing on the barriers and challenges they face. A discussion of women's current underrepresentation in DISCOMs and the regulatory sector highlighted the systemic issues contributing to the imbalance.

The following section provides the key solutions and policy suggestions to address these challenges to foster a more inclusive and equitable environment, ultimately benefiting the sector through diverse perspectives and enhanced problem-solving capabilities.

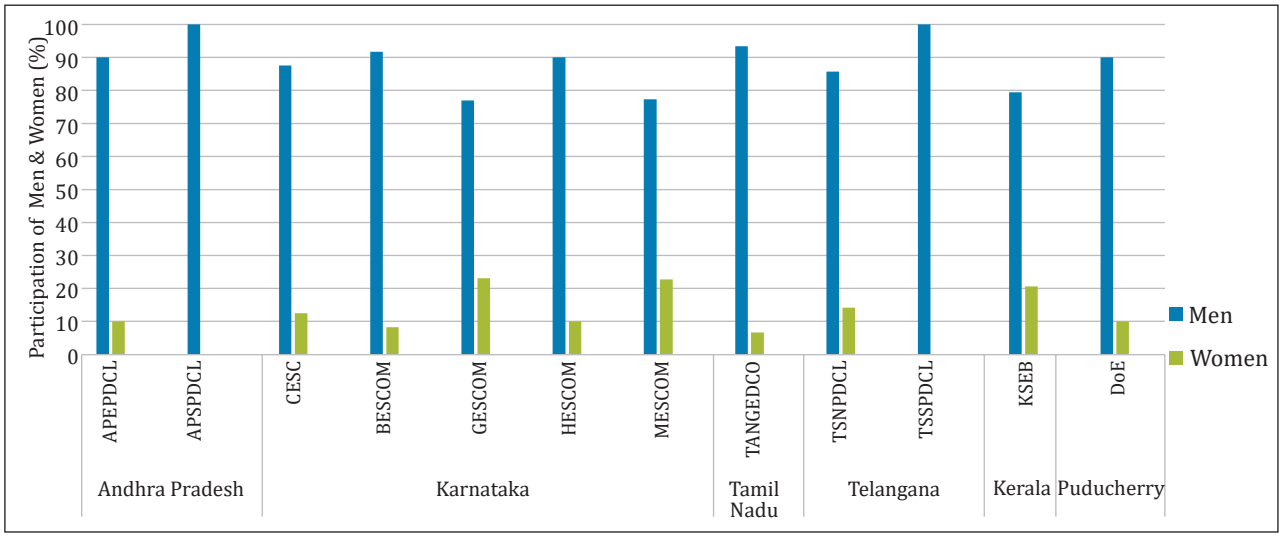


Figure 35: Participation of women (%) in DISCOMs in a few southern states (Board Members and Key Officials as of 30.04.2024)

So: CER's Analysis

5. Analysis of Online Survey and Interactions with Experts

This section synthesizes data collected from an extensive online survey and insights gathered through interactions with regulatory experts. By combining quantitative data with qualitative perspectives, this analysis aims to identify key trends, challenges and opportunities related to gender equality in the sector. It provides a nuanced understanding of how social norms, organizational practices, and individual experiences shape the professional environment for women in the power sector roles. Following are the findings that offer a critical foundation for developing targeted strategies to enhance women's participation and leadership in this traditionally male-dominated field.

Access to education and capacity building/training programs

Access to education and capacity building/ training programs is essential for skill development, especially in technical and specialized fields like the power sector. These programs equip individuals with the knowledge, expertise, and practical experience needed to excel in their roles. For women, in particular, capacity-building initiatives can bridge gaps in training and education, enabling them to compete on equal footing with their male counterparts. By investing in these programs, organisations can foster a more skilled, capable, and diverse workforce that is better prepared to meet the demands of the industry.

It is often perceived that women have fewer opportunities to participate in training programs compared to men. However, survey respondents have provided a different perspective, indicating that men and women actually participate equally in these programs as shown in (Figure 36). Also, it is observed that 58.45% of respondents (including men and women) do not have the opportunity to participate, which implies that there is a need to conduct training/capacity-building programs for the skill/ overall development of the employees. This finding challenges common assumptions and highlights the importance of examining real data to understand the participation dynamics in skill development initiatives. It also underscores the need to continue supporting equal access to training opportunities for both genders. Greater emphasis could be placed on online training programs, as they offer more convenient and flexible options for women. Online programs allow women to balance their professional development with other responsibilities, by providing access to learning resources at their own pace and schedule. This approach not only enhances accessibility but also encourages more women in skill development, ultimately contributing to greater gender diversity in various sectors.

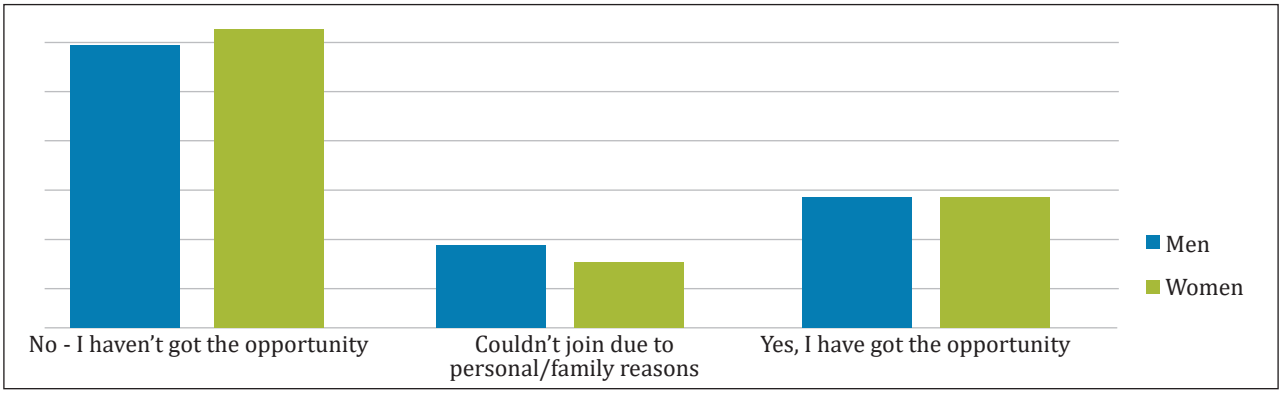


Figure 36: Access to capacity building/ training programs

So: CER's Online Survey

Source: CER IIT Kanpur

Need for mentoring male colleagues

There is a crucial need for mentoring male colleagues to create a comfortable and safe workplace for everyone, especially women. By fostering awareness and understanding of gender dynamics, mentoring can help male employees recognize unconscious biases and promote respectful behavior. This proactive approach contributes to a more inclusive and supportive work environment where all employees feel valued and secure.

Workplace diversity is important for employees irrespective of gender, organization and society. CER's survey concluded that 75.36% of the respondents feel for mentoring/sensitizing male colleagues to maintain workplace equality as shown in (Figure 37).

Source: DEEP AI

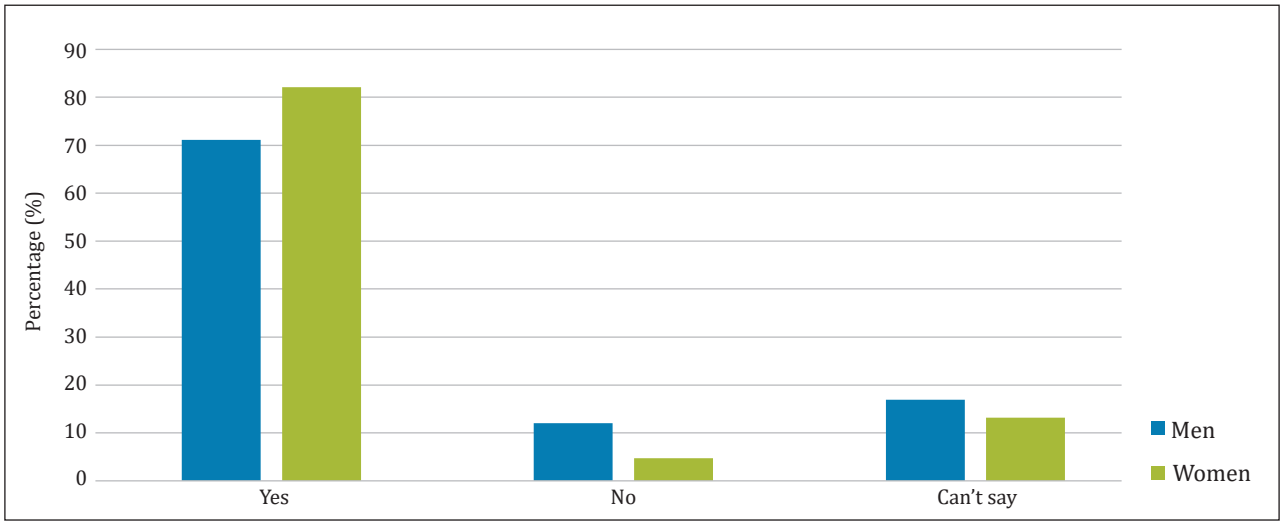


Figure 37: Need for mentoring/sensitising male colleagues to maintain the workplace equality

So: CER's Online Survey

Many male and female experts agreed that sensitizing males is important and relevant to supervising the behavior of colleagues and superiors toward their female counterparts, thereby improving the overall workplace environment.

Creating a comfortable workplace for women is essential. At the same time, ensuring that men feel they are treated fairly and without bias is crucial. A balanced approach fosters an inclusive environment where all employees, regardless of gender, feel respected, valued and supported. By promoting equality and addressing the needs of both women and men, organizations can cultivate a positive work culture that enhances collaboration, productivity and overall job satisfaction.

Encourage women to participate in the power sector

Low workforce participation and pipeline shortage of female leaders is the key issue that needs to be rectified. Encouraging women to participate in the power sector is vital for fostering diversity and innovation in the industry, traditionally dominated by men. Initiatives such as targeting outreach and training, mentorship programs, and scholarships can help inspire and support women in pursuing careers in this field. By highlighting the opportunities and impact they can have in the power sector, the women can be empowered to contribute more talents and perspectives, leading to a more balanced and dynamic workforce, that drives progress and sustainability.

One more important aspect that is highlighted by many experts during online interaction is that the mindset of women, often shaped by societal expectations and traditional gender roles, can be a barrier to their participation in field jobs. This mindset may lead to self-doubt or hesitation in pursuing roles that are perceived as physically demanding or unconventional for women. Addressing this issue requires changing perceptions through awareness campaigns, role models, and supportive policies and encouraging women to step into field jobs with confidence. Breaking down these mental barriers is essential for increasing women's participation across all areas of the power sector.

The respondents of CER's survey were asked to rate their organization's commitment to encouraging and promoting women's roles on a 10-point scale (1: LOW; 10: HIGH). The mean (7.34) and standard deviation (1.365), reflect that respondents' organizations are high in encouraging and promoting women's roles. It is visible from the histogram chart that a maximum number of respondents have been chosen in the range of 8.2 – 10, however, the box and whisker chart depict the story of the other coin i.e. the difference of the mean of both genders. This indicates that though the results are motivating as the mean of the total population is 7.34, the organization's commitment towards encouragement and promotion of women is perceived differently by men (mean value is 7.92) and women (mean value is 6.39) as seen in (Figure 38).

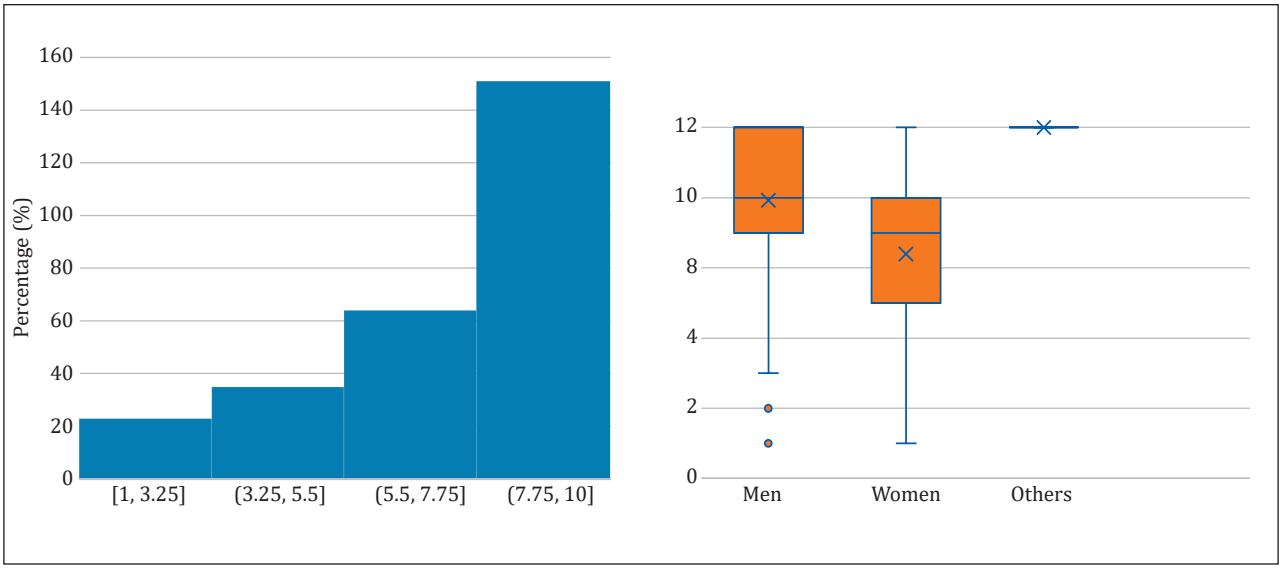


Figure 38: Organisation's commitment to encourage and promote women's role

So: CER's Online Survey

The respondents of CER's survey were asked to rate their organisation's commitment to women's retention on a 10-point scale (1: LOW; 10: HIGH). The mean of the total population was observed as 7.24, with a variance of 1.13 and a standard deviation of 1.06. At first glance, the mean value reflects that many respondents seem to have confidence in their organisations towards women's retention. However, the box and whiskers plot in shows that women respondents think a little differently than their counterparts.

Providing equal opportunities and treatment

Gender pay gap[9] is a common phenomenon that exists all over the world. Almost half (48%) of the population in India constitute women and one-fourth of the total participates in the workforce. According to the World Bank data, India has 24.2% wage and salaried female workers as compared to 54.58% of the world. With this unequal representation of women, the twelfth five-year plan (2012-2017) indicates that the gender pay gap in India is 24.81%. According to the Global Wage Report (ILO, 2018), women are paid 34.5% less than men on an hourly wage basis in India, followed by 34%, 10.2% and 7.8% in Pakistan, Srilanka and Indonesia. In Bangladesh, on average, women are paid more hourly wages (i.e. -5.5%) than men. The ILO Global Wage Report identified that the 'motherhood penalty[10]' versus the 'fatherhood premium' and the disproportionate burden of unpaid care work drive women into lower-paying occupations (ILO, 2020). Equal pay and opportunities empower women and enhance overall organizational performance by leveraging diverse talents and perspectives. Companies that prioritize these principles demonstrate a commitment to fairness, which can attract top talent, and build a more motivated and productive workforce.

About three-fourths 76.67% of male respondents believe that women and men are paid equally, in contrast to only 23.33% of female respondents who share this view as shown in (Figure 39). Only 3% of all respondents think that women are paid more than men, suggesting that perceptions of wage disparity are largely skewed toward the belief that men receive equal or higher pay. The situation is particularly skewed in the private sector as in the public sector, the salary structure is transparent and broadly predefined. This data underscores the need for greater transparency and dialogue around pay practices to address these differing perceptions.

To determine whether a relationship exists between gender and perception that women and men are paid equally, hypothesis testing is done. Here, a null hypothesis is stated that no relationship exists between gender and the perception that women and men are paid equally. The results of the Chi-square test revealed that the test statistic (68.03) is greater than the critical value for a 5% level of significance i.e. null hypothesis is rejected. There is a statistically significant relationship between gender and the perception that women and men are paid equally.

The survey results revealed a notable disparity in perceptions of equal opportunities, with 81.65% of male respondents believing that women have equal responsibilities, compared to only 18.35% of female respondents. This gap suggests that men may perceive the workplace as more equitable than women do, highlighting a potential disconnect between experiences and perceptions of gender equality. Addressing this disparity is crucial for ensuring that all employees, regardless of gender, feel they have fair access to opportunities and career advancement.

Source: AI

[9] Refers to the difference in earnings between men and women in the workforce.
[10] Refers to the gender pay gap through a variety of factors, including career interruptions in working time, or discriminatory hiring promotion practices that disadvantage women who are or may become mothers.

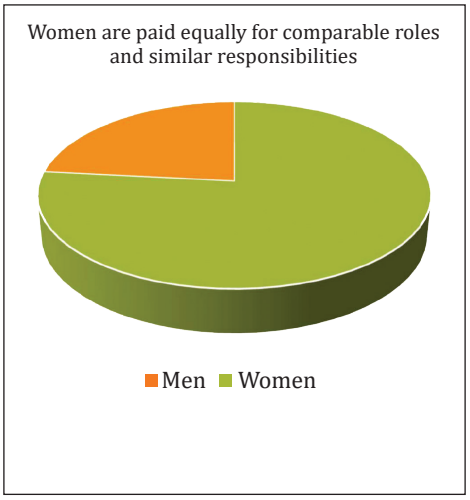
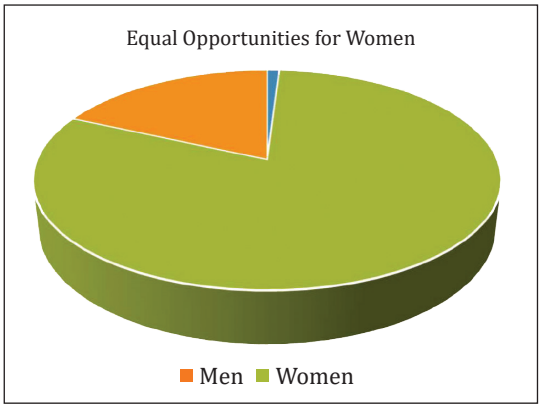


Figure 39: Women are paid equally in their career

So: CER's Online Survey



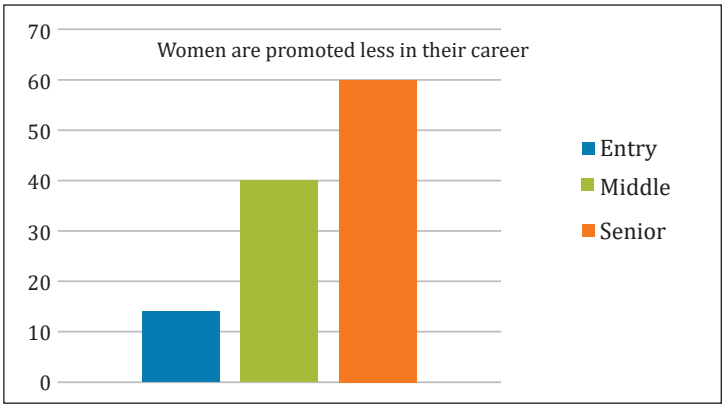


Figure 40: Women have equal opportunities

So: CER's Online Survey

Source: meta AI

"Women should be treated equally in every sector, no privilege is required. However, a 'feel good factor' should be there in every organisation for the retention of women employees. Infrastructure should also be developed at power station premises (school, basic health facility, etc.) to make it more comfortable for women employees".

– Ms. Neerja Mathur
First Women Chairperson, Central Electricity Authority

Promote a certain percentage of women

Gender quotas aim to ensure that women must constitute a certain number or percentage. To promote gender equality in the workplace, Norway in 2003 has mandated a 40% quota for women on its country's corporate boards. Many other countries like Spain, Belgium, Germany, Italy, France, etc. have followed Norway with their own quotas. In response to the mandate, a few prominent women became directors on multiple boards to fulfill the criteria. However, in India, under the Companies Act 2012[11], the government added an ordinance and mandate to appoint a women director in the board of the Company meeting specific criteria, which resulted in a large pool of women serving as directors. However, it is distressing to find that 70.4% of women appointed as directors are independent (Aguilera, *et al.*, 2021). The policymakers should target the symbolic response of firms in future legislation and board composition. A study revealed that firms with at least 30% women in the C-suite are more profitable (Noland, *et al.*, 2016). However, some authors claimed that the use of gender quotas to rectify the disproportionate gender representation is anti-meritocratic as it puts gender over merit in board appointments.

When the respondents were asked about the efforts that are required to improve women's participation, the respondents thought that counselling and guidance, and promoting gender quotas would be possible solutions to address the under-representation of women in the regulatory sector, followed by mandating the gender quota and modifying process to make it more conducive for women employees. It is important to note that the men respondents chose "counseling, guidance and mentoring of women to strengthen the skill development" as the most crucial effort while women respondents chose "promote a certain percentage of women at all levels in regulatory functions in an organisation" as shown in (Figure 41).

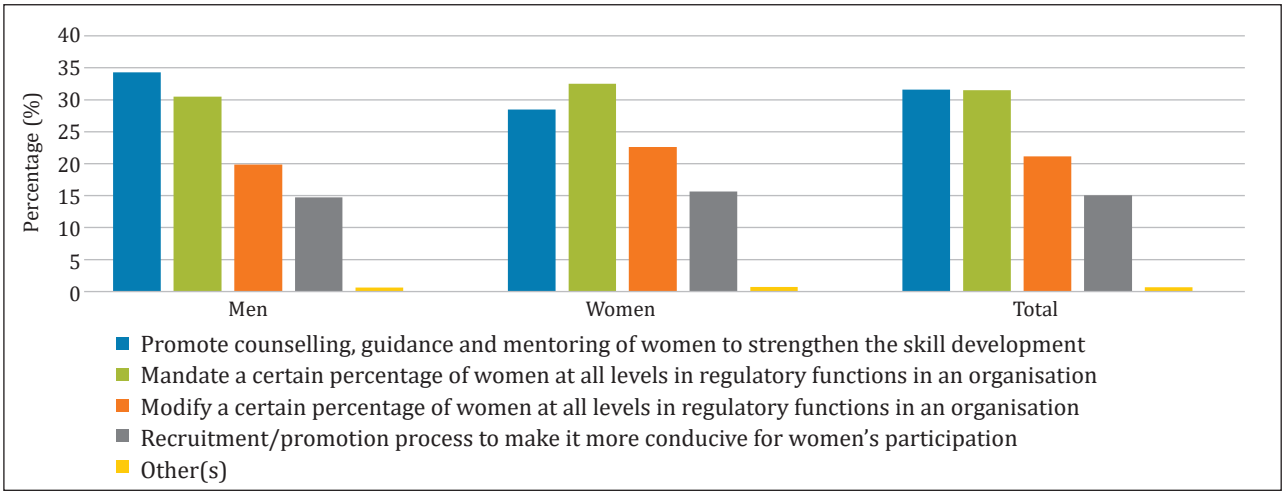


Figure 41: Efforts made to improve the women's participation

So: CER's Online Survey

[11] As per second Proviso to Section 149(1) read with Rule 3 of the Companies (Appointment and Qualification of Directors) Rules, 2014, as notified by Ministry of Corporate Affairs, the following class of companies shall appoint at least one woman director –
(i) Every listed company;
(ii) Every other public company having –
  a. Paid–up share of one hundred crore rupees or more; or
  b. Turnover of three hundred crore rupees or more

"Promoting a certain percentage of women in the power sector would increase the number of women at senior positions, and this increased participation would be reflected in their increased participation in the power sector regulation with time. These will be in line with Constitutional provisions in respect of 'Directive Principles of State Policy' and Fundamental Rights - Article 15(3)".

– Mr. Bijoy Kumar Sahoo
Former Ombusdman, Odhisha Electricity Regulatory Commission

Flexibility and Special Conveniences

Recruitment of more women employees would not solve the issue of the gender gap, women must get equal treatment in organisations. This report does not support providing unnecessary special privileges to only one section of employees. Equality will come when both men and women are treated equally and offered equal opportunities in the workplace. The culture of flexibility could be a great boon for the employees, particularly women. Some benefits like traditional health and medical benefits, well-being and mental health support, childcare reimbursement and support. Flexibility at workplace like working remotely, customized work hours, shortened workweek through a compressed work schedule, etc. Flexibility will benefit both men and women in the form of improved job satisfaction, less burnout and better productivity.

The Maternity Benefit Act, 1961 provides that women will be paid maternity benefit[12] at the rate of her average daily wage. In 2017, The Maternity Benefit (Amendment) Act, 2017 was passed when the maternity period was extended to 26 weeks from 12 weeks. A provision for crèche facility (Section 11A) was also provided where the establishments employing 50 or more employees provide crèche facilities, either separately or along with common facilities within a prescribed distance. CER's survey revealed that on-site childcare facilities is the last choice of the respondents when they were asked about the measures taken by their organization to enhance career advancement as shown in (Figure 42).

"Special conveniences in terms of infrastructure should be provided in the workplace to make women feel more comfortable and confident".

– Dr. Arbind Prasad
Former Chairperson, Jharkhand Electricity Regulatory Commission

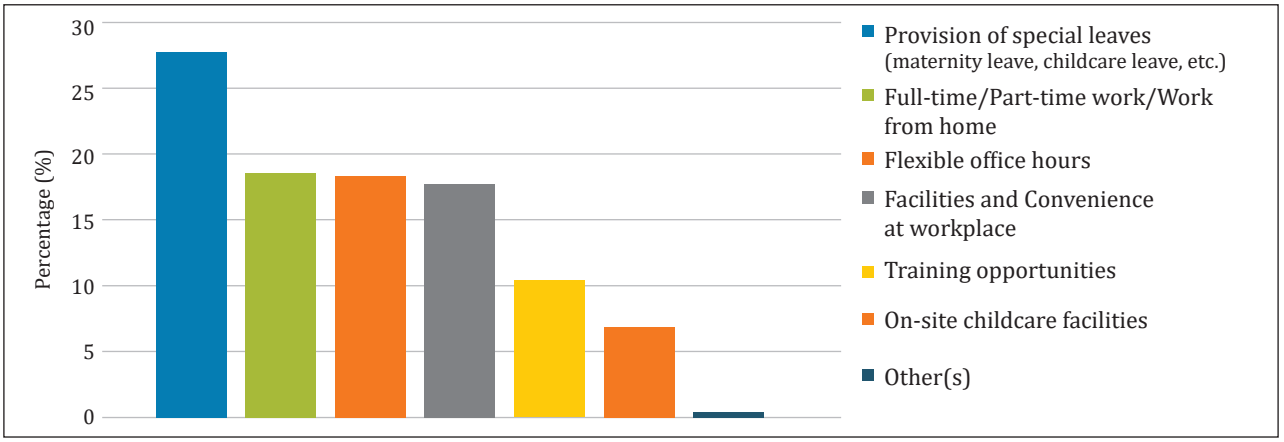


Figure 42: Measures taken by your organisation to enhance women's career advancement

So: CER's Online Survey

[12] Full paid absence from work to take care of the child

Gender-specific policies

Regulators can take proactive steps to increase the representation of women within their organizations and integrate gender considerations into their policies. One key measure is ensuring that gender employment data is collected and made available as it is currently lacking in almost all sectors. Mandating new gender policies that required the inclusion of gender breakdowns on respective websites and in annual reports would enhance transparency and accountability. This would not only help track progress but also encourage organisations to prioritize gender diversity and create more inclusive work environments.

Interestingly, women have placed gender-sensitive recruitment processes as their last choice while men ranked it immediately after gender diversity targets as a key gender-specific policy to enhance women's representation. This suggests that women might prioritize other strategies or outcomes, such as career development opportunities or workplace culture, over recruitment processes. In contrast, men may see gender-sensitive recruitment as a foundational step toward achieving gender diversity. This difference in perspectives highlights the need for a multifaceted approach to improving women's representation, addressing both recruitment practices and broader workplace policies.

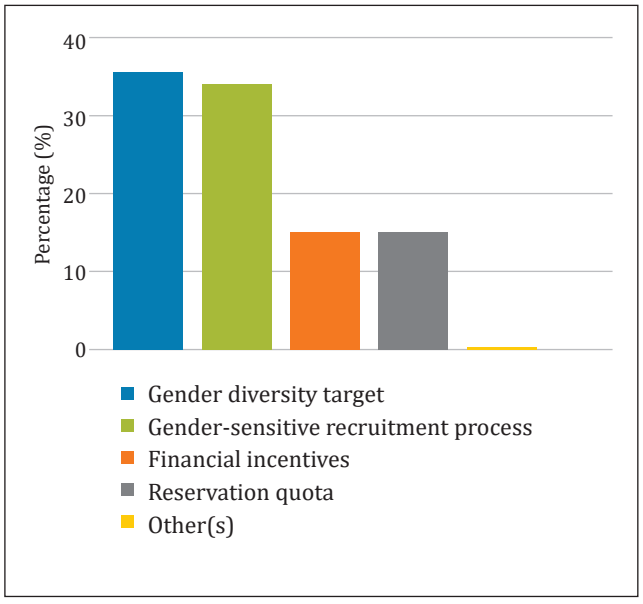


Figure 43: Gender specific policies that should be adopted to enhance women's representation (Men)

So: CER's Online Survey

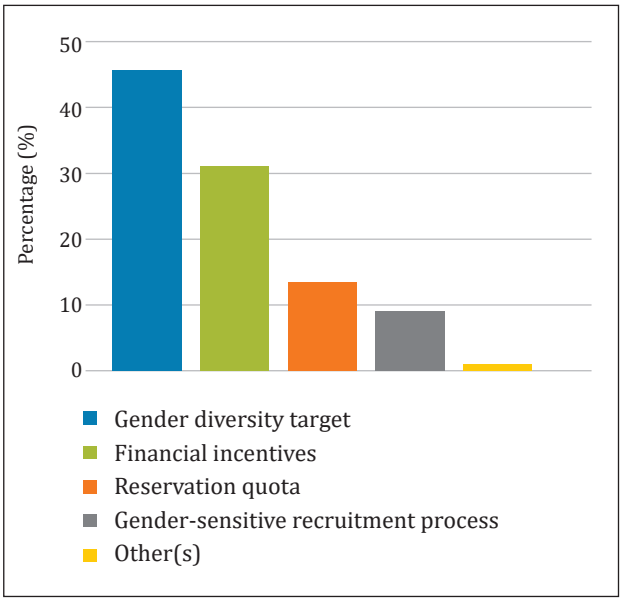


Figure 44: Gender specific policies that should be adopted to enhance women's representation (Women)

So: CER's Online Survey

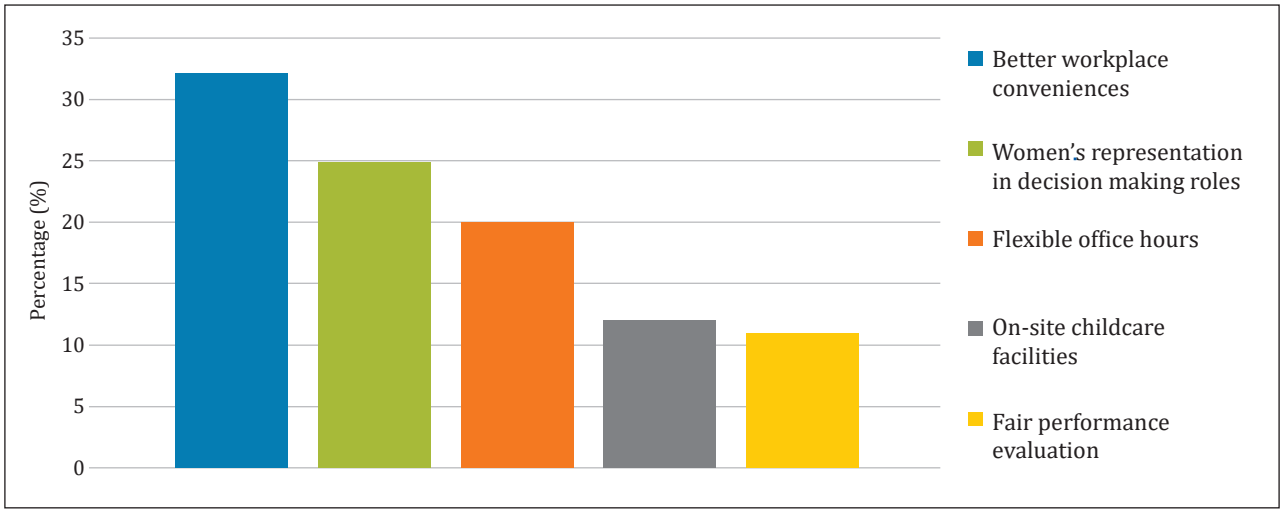


Figure 45: Measures that should be taken to ensure the retention of women employees

So: CER's Online Survey

6. Key Measures and Policy Suggestions

Key solutions and policy suggestions to address gender disparities in the power sector include promoting awareness and outreach, improving access to education and training, and implementing targeted recruitment and training programs to increase women's participation in technical and leadership roles. Establishing gender-responsive policies and workplace protections can help create a more supportive environment for women. Additionally, promoting financial independence for regulatory bodies and ensuring equitable budgetary provisions can enhance their capacity and retain talent. Encoring mentorship programs and fostering a culture of inclusion is also crucial for advancing women's careers and achieving greater balance in the sector. Following strategies can help create a more inclusive environment that supports and encourages women's participation in power sector regulation.

Achieving gender equality in power sector regulation requires a multi-faceted approach that addresses both systemic barriers and workplace culture. The following key measures and policy suggestions aim to create an inclusive environment where women can thrive and contribute effectively to the sector.

1. Reservation

Policy Implementation: Implementing reservation policies can ensure a minimum percentage of women in regulatory bodies and senior management positions. This can be modelled after the reservation systems in political spheres, such as the 33% reservation for women in local government bodies in India.

Impact: Reservation policies can provide immediate representation, helping to break the cycle of underrepresentation and setting a precedent for future inclusivity. It ensures that women's perspectives are included in decision-making processes from the outset.

2. Equal Opportunity

Policy Implementation: Enforcing strict equal opportunity policies is crucial. This includes unbiased recruitment processes, equitable access to promotions, and ensuring that women have the same opportunities for career advancement as men.

Impact: Equal opportunity policies help to level the playing field, allowing women to compete based on their skills and qualifications. This can lead to a more diverse and competent workforce, enhancing the overall effectiveness of regulatory bodies.

3. Doctrine of Preference

Policy Implementation: The doctrine of preference involves giving preferential treatment to women in hiring and promotions when candidates are equally qualified. This can be a temporary measure to correct historical imbalances and ensure more women enter and advance in the power sector.

Impact: This doctrine can accelerate the rate at which women gain representation in regulatory roles, fostering a more balanced gender ratio and providing role models for other women in the industry.

4. Voluntary Goals by ERCs

Policy Implementation: ERCs can set voluntary goals for increasing the representation of women within their organizations. These goals should be ambitious yet achievable, with clear timelines and accountability mechanisms.

Impact: Voluntary goals will encourage ERCs to actively pursue gender diversity. By setting and publicly committing to these goals, ERCs can lead by example and encourage other organizations within the power sector to follow suit.

5. Capacity Building / Training Opportunities

Policy Implementation: Investing in capacity building and training opportunities for women is essential. This includes technical training, leadership development programs, and mentorship schemes designed specifically for women in the power sector.

Impact: Enhanced training and capacity-building initiatives equip women with the skills and confidence needed to excel in their roles and pursue leadership positions. This helps in creating a pipeline of qualified women ready to take on regulatory roles.

6. Access to Online Programs

Policy Implementation: Providing access to online education and professional development programs can help women balance their career advancement with personal responsibilities. These programs should be easily accessible and tailored to the needs of women in the power sector.

Impact: Online programs offer flexibility, enabling women to continue their education and professional development without compromising their work or personal life. This can significantly improve their career prospects and retention rates.

7. Conveniences/Facilities

Policy Implementation: Improving workplace conveniences and facilities, such as sanitary facilities, childcare services, and safe transportation options, can make the work environment more accommodating for women.

Impact: Enhanced workplace facilities address some of the practical barriers that women face, making it easier for them to enter and remain in the power sector. This can lead to higher job satisfaction and lower turnover rates.

8. Behavior of Superiors/Colleagues

Policy Implementation: Promoting a respectful and inclusive workplace culture is critical. This involves training for all employees on gender sensitivity, implementing strict anti-harassment policies and fostering an environment where women's contributions are valued and respected.

Impact: A positive and supportive workplace culture can significantly improve women's job satisfaction and retention. It ensures that women feel safe, respected, and valued, which is essential for their professional growth and overall well-being.

Implementing these key measures and policy suggestions can significantly enhance gender equality in power sector regulation. By addressing both structural barriers and workplace culture, the power sector can create an inclusive environment where women can thrive and contribute effectively. This not only benefits women but also strengthens the sector as a whole, driving innovation and progress through diverse perspectives and talents. The commitment to gender equality must be continuous and adaptive, ensuring that policies evolve with the changing dynamics of the workforce and society.

7. Conclusions

This study has shed light on the significant factors that contribute to the underrepresentation of women in the power sector's regulatory governance. Through a comprehensive methodological approach, combining a detailed literature review, stakeholder engagement, and an online survey, the research study provides a clear picture of the persistent challenges women face at various stages in their careers.

The findings reveal that cultural and social norms are the most pervasive barriers to women's participation. These deeply ingrained norms influence perceptions and expectations regarding gender roles, thereby discouraging women from pursuing careers in the power sector. Additional challenges, such as management bias, gender-oriented practices, personal and family constraints, and limited access to job training opportunities, also play a significant role in hindering women's career advancement.

Moreover, the study highlights the often-overlooked impact of senior and colleague behavior on the retention of women. A lack of support and respect in the workplace can lead to feelings of isolation and marginalization, prompting many women to leave the sector. This underscores the necessity for more supportive workplace environments that actively promote inclusivity and respect for all employees.

Creating an inclusive and equitable workforce requires that no one feels marginalized. By implementing targeted policies and fostering a culture of respect and support, the power sector can take meaningful steps towards improving gender diversity and fully integrating women into regulatory governance.

This study underscores the urgency of these efforts. Promoting gender diversity and supporting the full participation of women in regulatory governance ensures that their voices are heard and valued in shaping the future of the industry. Only through such concerted efforts can the power sector realize its full potential by leveraging the talents and perspectives of both men and women, driving innovation and progress in a balanced and sustainable manner.

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9. Appendix

9.1 Representation of Women in various Electricity Regulatory Commission

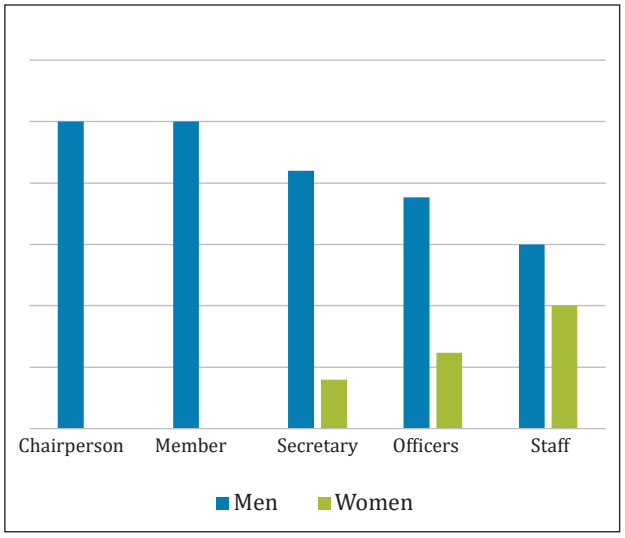

Figure 46: Participation of Women in Delhi Electricity Regulatory Commission from 2010-2024

So: CER's Online Survey

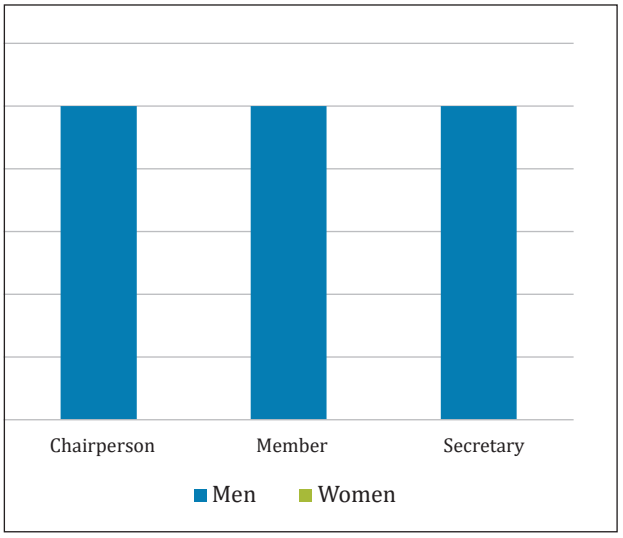

Figure 47: Participation of Women in Kerala State Electricity Regulatory Commission from 2010-2024

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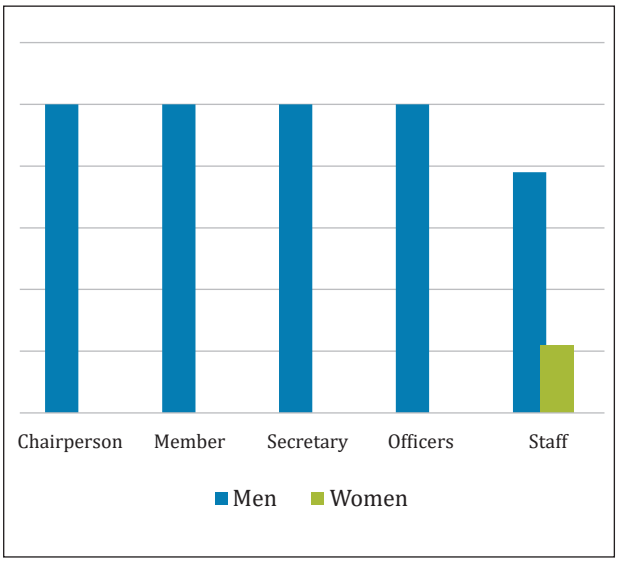

Figure 48: Participation of Women in Uttarakhand Electricity Regulatory Commission from 2010-2024

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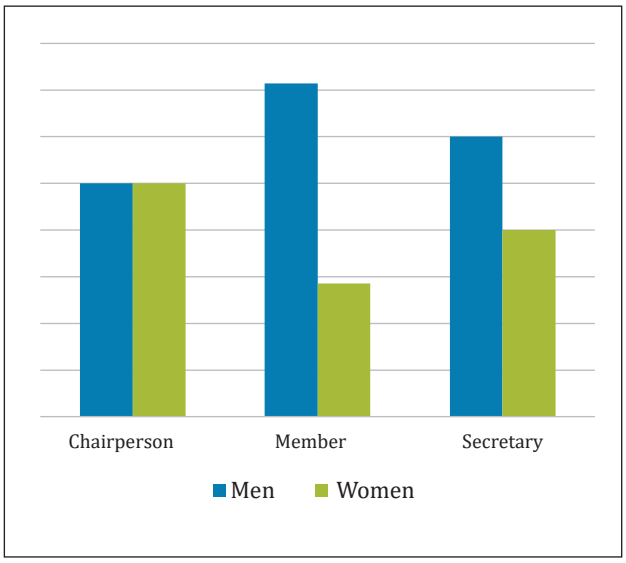

Figure 49: Participation of Women in Punjab State Electricity Regulatory Commission from 2010-2024

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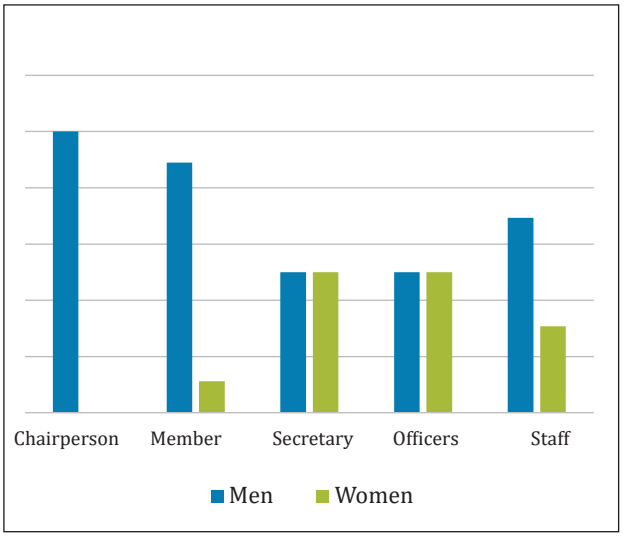

Figure 50: Participation of Women in Assam Electricity Regulatory Commission From 2010-2024

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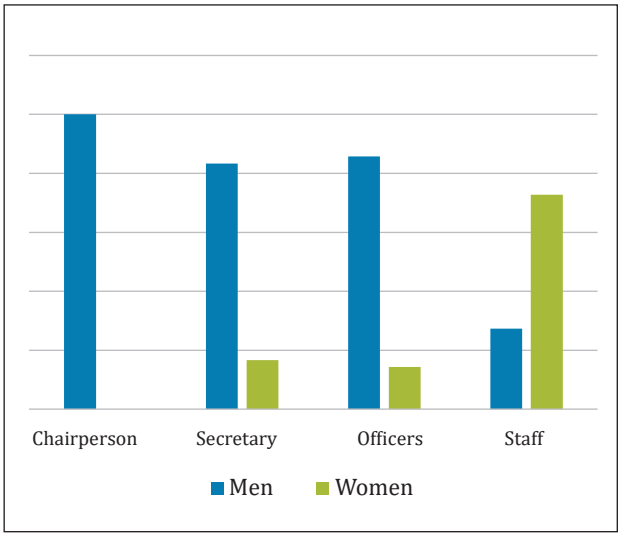

Figure 51: Participation of Women in Sikkim State Electricity Regulatory Commission from 2010-2024

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Figure 52: Participation of Women in GERC From 2010-2024

So: CER's Online Survey

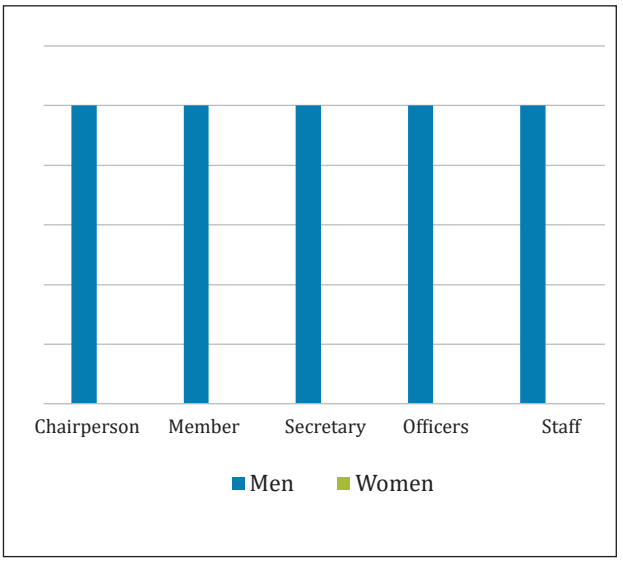

Figure 53: Participation of Women in Nagaland State Electricity Regulatory Commission From 2010-2024

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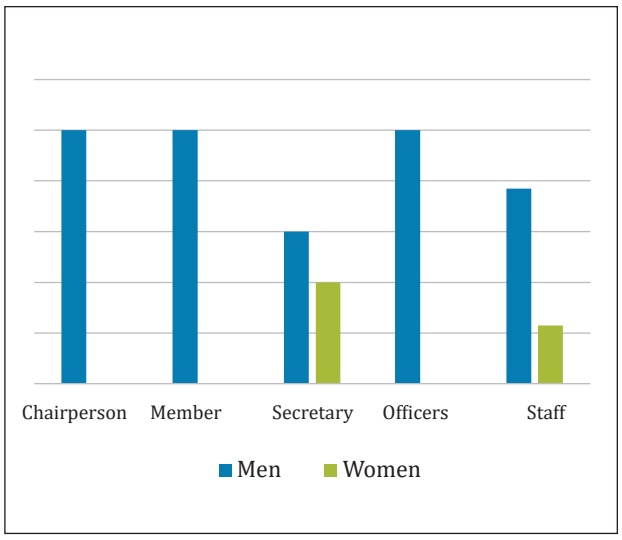

Figure 54: Participation of Women in Tripura State Electricity Regulatory Commission From 2010-2024

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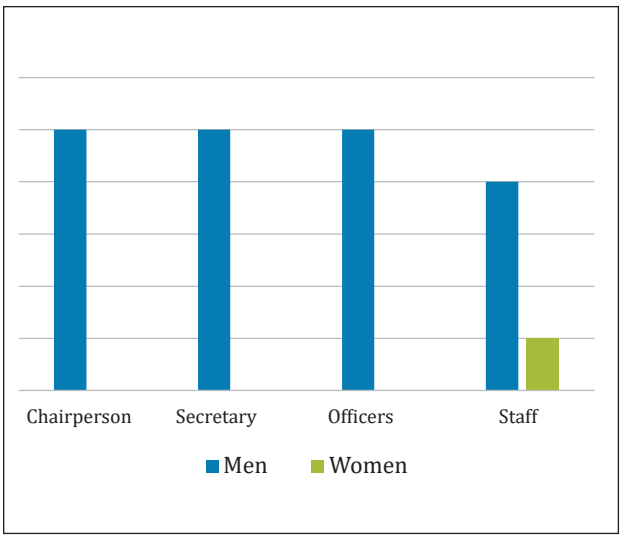


Figure 55: Participation of Women in Rajasthan State Electricity Regulatory Commission From 2010-2024

So: CER's Online Survey

9.2 State-wise Current Status of Representation of Women in ERCs

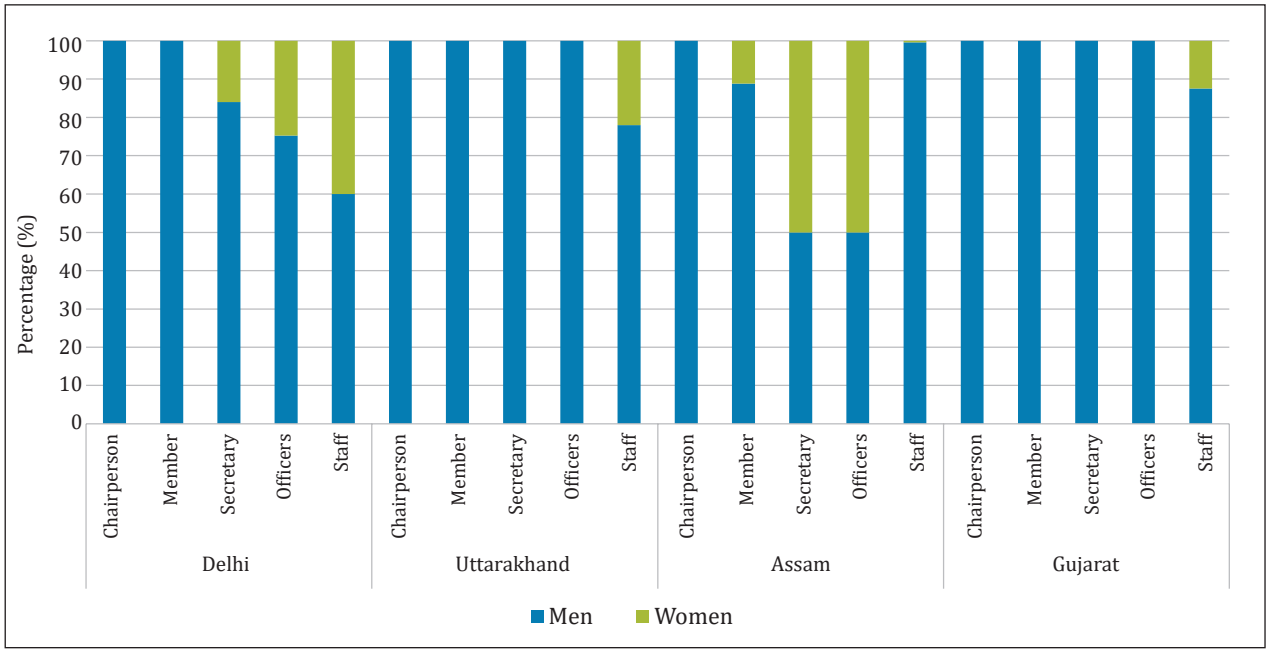


Figure 56: Current Status of Representation of Women Officers in ERCs

So: CER's Online Survey

9.3 Survey Questionnaire

1. In 2018, less than 50% girls enrolled in higher education. What do you think are the reasons that attributed to low enrollment?

*(*Please select the appropriate choices in the order of their importance.)*

- Lack of convenience/facilities for women
- Engaged in domestic activities
- Financial constraints
- Lack of career counselling
- Marriage
- Non-availability of female teachers
- Institution is far-off/Route is not safe
- Other(s)

2. In your opinion, what are the key barriers to greater participation of women in the power sector?

*(*Please select the appropriate choices in the order of their importance.)*

- Discouraging workplace policies
- Lack of gender diversity targets
- Lack of awareness of opportunities
- Safety and security issues
- Posting in remote location
- Cultural and social norms
- Odd working hours
- Work-life balance
- Prevalent hiring practices
- Lack of female candidates
- Scarce training opportunities
- Other(s)

3. What do you think are the key obstacle(s) for women's career progression in the power sector?

*(*Please select the appropriate choices in the order of their importance.)*

- Gender oriented prejudice
- Personal/Family constraints
- Management/Co-worker bias
- Lack of job training opportunities
- Other(s)

4. Does your organisation have a gender-sensitive recruitment policy?

*(*Respondents who have superannuated may refer to their last organisation)*

○ Yes

○ No

5. Please rate your organisation's commitment to encourage and promote women's role in the organisation:

*(*Respondents who have superannuated may refer to their last organisation)*

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10

6. Please rate your organisation's commitment to women's retention:

*(*Respondents who have superannuated may refer to their last organisation)*

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10

7. Do you feel that women and men are offered equal opportunities for promotion?

○ Yes, women are equally promoted as men throughout their career

○ No, women are promoted less at the

- entry level
- middle level
- senior level of their career

8. Do you perceive that women and men are paid equally for comparable roles and similar responsibilities, in general?

○ Both are paid equally throughout their career

◉ Women are paid more at

- entry level
- middle level
- senior level

○ Women are paid less at

- entry level
- middle level
- senior level

9. Do you feel that women working in the field of power sector regulation# are assigned administrative responsibilities in spite of their relevant background?

○ Strongly Agree

○ Agree

○ Undecided

○ Disagree

○ Strongly Disagree

Apart from Electricity Regulatory Commissions, regulatory cells at Generation, Transmission, Distribution, Trading and other entities across the electricity supply chain, Financial Institutions and associated Consulting Organisations.

10. Do you perceive that the inclusion of women in the workforce brings varied perspectives and approaches that result in better decisions?

- ○ Often
- ○ Sometimes
- ○ Seldom
- ○ Never

11. Do you perceive that women's presence on corporate boards brings the following benefits?

- Reduce the probability of corporate fraud
- More conservative financial reporting
- Better Conflict Handling
- Other(s)

12. Globally, 22% of women join the energy sector workplace. In your view, what should be the fair representation of women in Indian power sector?

- ○ Less than 20%
- ○ 20 - 30%
- ○ 30 - 40%
- ○ Above 40%

13. Do you think there is a need for mentoring/sensitising male colleagues to maintain the workplace equality?

- ○ Yes
- ○ No
- ○ Can't say

14. Have you participated in any training/capacity building programme related to policy and regulation in the last five years?

- ○ No
- ○ I haven't got the opportunity
- ○ I have got the opportunity, but couldn't participate due to personal/family constraints
- ○ Yes

15. Will the following efforts improve the women's participation in the power sector regulation?

*(*Please select the appropriate choices in the order of their importance.)*

- Promote a certain percentage of women at all levels in regulatory functions in an organisation
- Mandate a certain percentage of women at all levels in regulatory functions in an organisation
- Counselling, guidance and mentoring of women to strengthen the skill development
- Modify recruitment/promotion process to make it more conducive for women's participation
- Other(s)

16. To enhance women's career advancement, what measures have been taken by your organisation?

*(*Please select the appropriate choices in the order of their importance.)*

- Full-time/Part-time work/Work from home
- Flexible office hours
- Facilities and Convenience at workplace
- Provision of special leaves (maternity leave, childcare leave, etc.)
- On-site childcare facilities
- Training opportunities
- Other(s)

17. Which of the following gender specific policies should be adopted to enhance women's representation?

*(*Please select the appropriate choices in the order of their importance.)*

- Gender diversity target
- Reservation quota
- Gender-sensitive recruitment process
- Financial incentives
- Other(s)

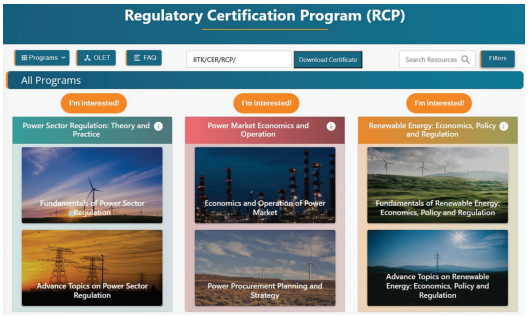
18. What measures should be taken to ensure the retention of women employees in power sector regulation?

*(*Please select the appropriate choices in the order of their importance.)*

- Better workplace conveniences
- Women's representation in decision making roles
- Flexible office hours
- On-site childcare facilities
- Fair performance evaluation
- Others

Centre for Energy Regulation

The Centre for Energy Regulation (CER) is an endeavour towards sustained institutional strengthening in the Indian power sector. The Centre, hosted at the Department of Management Sciences (DoMs), IIT Kanpur, was established with an aim to enhance regulatory research, contribute to the policy and regulatory developments and develop knowledge-based solutions for the Indian power sector. The Centre was seed funded by the UK's Foreign Commonwealth & Development Office (FCDO) under the Power Sector Reform (PSR) Phase I.



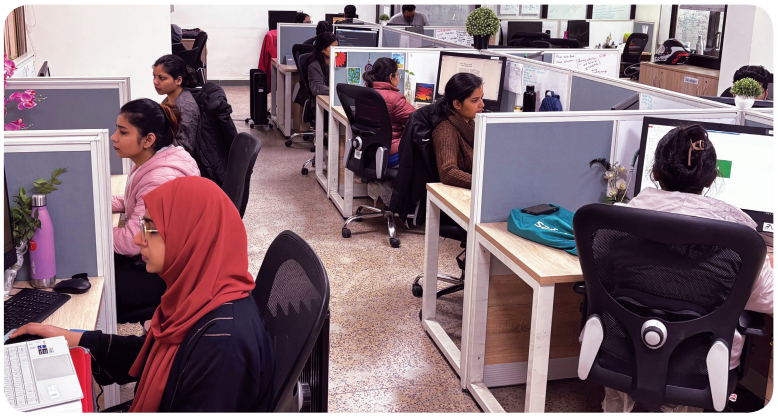
The CER has played a vital role in shaping of regulatory and policy landscape in the Indian power sector through its comprehensive research and analysis supported with in-house database and models. It has contributed with its insights for over 150 key draft regulatory and policy documents issued by, among others, Ministry of Power, Ministry of New and Renewable Energy, Central Electricity Authority, Central Electricity Regulatory Commission, State Electricity Regulatory Commissions, Grid-India, Bureau of Energy Efficiency and NITI-Aayog.

Key insights on regulatory and policy developments including CER's opinion, and a commentary on recent regulatory and policy developments are published in *"Regulatory Insights"*, a quarterly ISSN numbered periodical. The CER's research outcomes are published as research papers, books, reports etc. Collaborations with national and international level institutions add a wider perspective to CER's activities.

For more details, visit:- https://cer.iitk.ac.in/regulatory_insights

To enhance the educational and research outreach, CER conduct online Regulatory Certification Program (RCP) consisting of set of structured lectures/ talks delivered by leading industry experts and noted academicians at national and international level and Capacity Building Programs for Commissioners and Officers of Electricity Regulatory Commissions and other stakeholders in the power sector.

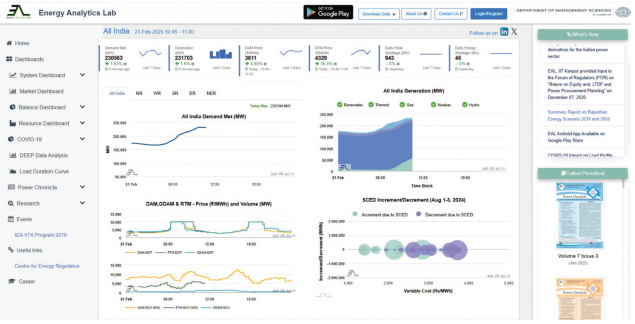
For more information, visit:- https://cer.iitk.ac.in/olet/rcp



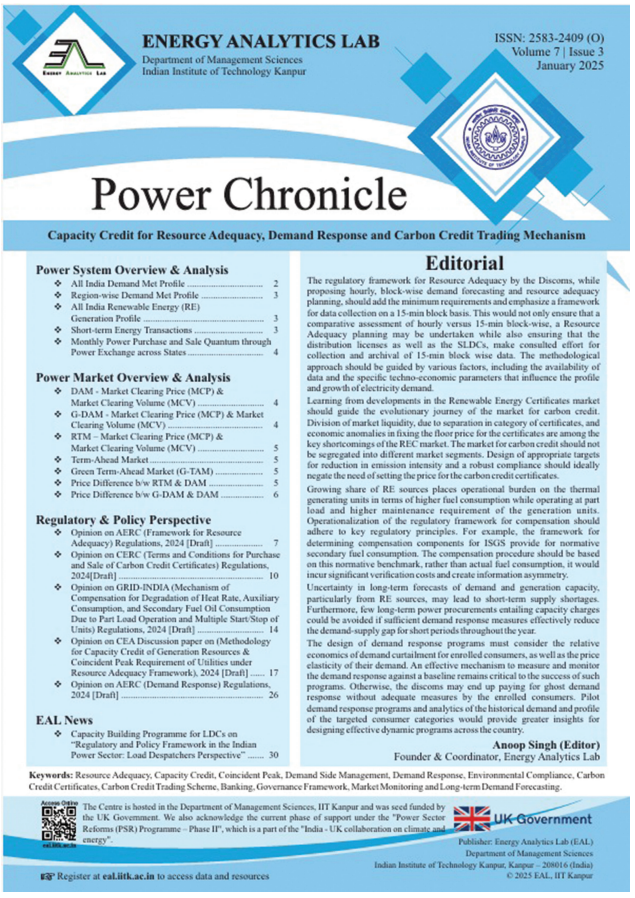
CER has maintained a fair gender balance, with women accounting for more than 40% of the team, holding various positions and, taking on lead roles and responsibilities.

Energy Analytics Lab

The Energy Analytics Lab (EAL) is an initiative of the Department of Management Sciences, IIT Kanpur, supported by CSR funding from the Indian Energy Exchange (IEX). The EAL focuses on building a comprehensive power market database and developing learning and visualization tools to enhance stakeholders' understanding of various market dynamics.



These tools enable stakeholders to understand various aspects related to power markets and take informed decisions. This helps in decision making for procurement/ sale of power, optimal utilization of existing/ proposed generation assets (conventional as well as renewable), design of new products for power markets and support development of a vibrant market for Renewable Energy Certificates (RECs). It also assists policymakers and regulators to take appropriate initiatives for the development of power market, in creating a conducive environment for investment and meeting the green growth aspirations for the sector. The activities of the EAL supports academic and research endeavours in the department. EAL has contributed to the discourse on resource adequacy by undertaking relevant assignments for long-term demand forecasting and power procurement planning. Such studies for the states of Uttar Pradesh, Chattishgarh and Rajasthan, and submissions for evolution of regulatory and policy framework for resource adequacy highlight EAL's contributions.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Power Chronicle

Capacity Credit for Resource Adequacy, Demand Response and Carbon Credit Trading Mechanism

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Editorial

The regulatory framework for Resource Adequacy by the Discoms, while proposing hourly, block-wise demand forecasting and resource adequacy planning, should add the minimum requirements and emphasize a framework for data collection on a 15-min block basis. This would not only ensure that a comparative assessment of hourly versus 15-min block-wise, a Resource Adequacy planning may be undertaken while also ensuring that the distribution licenses as well as the SLDCs, make consulted effort for collection and archival of 15-min block wise data. The methodological approach should be guided by various factors, including the availability of data and the specific techno-economic parameters that influence the profile and growth of electricity demand.

Learning from developments in the Renewable Energy Certificates market should guide the evolutionary journey of the market for carbon credit. Division of market liquidity, due to separation in category of certificates, and economic anomalies in fixing the floor price for the certificates are among the key shortcomings of the REC market. The market for carbon credit should not be segregated into different market segments. Design of appropriate targets for reduction in emission intensity and a robust compliance should ideally negate the need of setting the price for the carbon credit certificates.

Growing share of RE sources places operational burden on the thermal generating units in terms of higher fuel consumption while operating at part load and higher maintenance requirement of the generation units. Operationalization of the regulatory framework for compensation should adhere to key regulatory principles. For example, the framework for determining compensation components for ISGS provide for normative secondary fuel consumption. The compensation procedure should be based on this normative benchmark, rather than actual fuel consumption, it would incur significant verification costs and create information asymmetry.

Uncertainty in long-term forecasts of demand and generation capacity, particularly from RE sources, may lead to short-term supply shortages. Furthermore, few long-term power procurements entailing capacity charges could be avoided if sufficient demand response measures effectively reduce the demand-supply gap for short periods throughout the year.

The design of demand response programs must consider the relative economics of demand curtailment for enrolled consumers, as well as the price elasticity of their demand. An effective mechanism to measure and monitor the demand response against a baseline remains critical to the success of such programs. Otherwise, the discoms may end up paying for ghost demand response without adequate measures by the enrolled consumers. Pilot demand response programs and analytics of the historical demand and profile of the targeted consumer categories would provide greater insights for designing effective dynamic programs across the country.

Anoop Singh (Editor)
Founder & Coordinator, Energy Analytics Lab

Keywords: Resource Adequacy, Capacity Credit, Coincident Peak, Demand Side Management, Demand Response, Environmental Compliance, Carbon Credit Certificates, Carbon Credit Trading Scheme, Banking, Governance Framework, Market Monitoring and Long-term Demand Forecasting.

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