



## The inclusion of women in the electricity sector: challenges, achievements and perspectives

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### Summary

The presence of women in the electricity sector has grown in recent decades, breaking down historically established cultural and structural barriers. This article aims to analyze the trajectory of women in this technical field, highlighting challenges faced, advances achieved and the importance of gender diversity for the sustainable development of the energy sector.

Based on international studies, professional reports, statistical data and market projections, the study seeks to understand the evolution of female participation and the positive impacts of their effective inclusion. The research also highlights the need for public and private policies aimed at gender equality, emphasizing the importance of diversity for the future of the sector and its impact on the global economy.

**Keywords:** Electricity sector; Women in engineering; Gender equality; Diversity at work; Renewable energy.

### Introduction

Historically, the electricity sector has always been perceived as a male-dominated environment, given the technical nature and organizational culture of the segment. However, the search for gender equality has promoted significant changes in several areas of professional activity, including the energy sector.

According to research by the International Renewable Energy Agency (IRENA), female participation in renewable energy sectors exceeds the average for conventional energy sectors, indicating a strategic opportunity for transformation (IRENA, 2019).

Recognizing this reality, this article aims to discuss historical barriers, recent advances, future perspectives and the impact of women's presence in the electricity sector.



## 1. Evolution of Female Participation in the Electricity Sector

The energy sector as a whole employs only 22% women, while the renewable energy segment has a female participation rate of 32% (IRENA, 2019). In Brazil, according to the EY “Women in Energy Brazil” report (2021), only 19% of leadership positions in energy are held by women. This demonstrates a scenario of underrepresentation that is slowly changing.

Furthermore, the number of jobs in the renewable energy sector globally has grown from 7.1 million in 2012 to 12.7 million in 2022, with projections to reach around 42 million by 2050 (IRENA, 2023). This expansion opens an important window for women to enter the technical and leadership job market.

Programs such as "Women in Power" from the Global Women's Network for the Energy Transition (GWNET) have been instrumental in creating support networks and specific training for women, accelerating this transition.

## 2. Barriers and Challenges for Female Inclusion

Despite the progress made, there are still many challenges for women who want to enter or develop in the electricity sector. Studies show that:

55% of women in the energy sector feel they need to constantly prove their competence (GWNET, 2021);

40% report the lack of female leadership models as a barrier to their growth;

35% cite non-inclusive hiring policies as the main obstacle.

Cultural barriers run deep. Professions related to electrical engineering have long been seen as “unsuitable” for women, due to social prejudices about physical strength, endurance and technical skills.

Furthermore, the lack of supportive organizational policies, such as extended maternity leave, flexible hours, mentoring programs, and early childhood infrastructure (daycare centers, breastfeeding rooms), reinforce inequality.

### **3.3 Giving New Meaning to Female Agency**

The story of Renata Maria de Souza, an electrical technician, exemplifies the resilience needed to overcome prejudices and establish oneself in the sector. Her trajectory reveals that, in addition to technical training, skills such as leadership, assertive communication and crisis management are essential to consolidate a career.

The training of an electrical technician involves knowledge of building and industrial electrical engineering, automation, pneumatics, hydraulics, material testing and safety standards, reflecting the high technical demands of the profession.

Currently, initiatives such as the Women in Electrical Engineering Program at the Federal University of Rio de Janeiro (UFRJ) and technical training projects promoted by SENAI show that there is a national effort to attract and retain women in the sector.

### **4.3 Women's Contribution to the Transformation of the Sector**

The inclusion of women in the electricity sector brings several competitive advantages:

Improvement in organizational culture: more collaborative and less hierarchical environments;

Increased productivity: Diverse teams are up to 35% more productive (McKinsey & Company, 2020);

Innovation: greater diversity of experiences generates more creative solutions to technical problems;

Environmental commitment: studies show that women are more likely to promote sustainability practices (UN Women, 2022).

The presence of women in leadership positions is also associated with better corporate governance practices, reinforcing the strategic importance of diversity.

The global energy transition, which aims to replace fossil fuels with renewable ones, demands new skills and worldviews — characteristics where gender diversity becomes an essential differentiator.



## 5. Economic Impact of Female Inclusion in the Electricity Sector

Several studies indicate that increasing female participation in technical and infrastructure sectors can have a direct and positive impact on the economy. According to the McKinsey Global Institute (2020), promoting gender equality in the labor market could add US\$12 trillion to global GDP by 2025.

In the electricity sector, specifically, a study by the World Bank (2021) found that energy companies that implement diversity programs have, on average, 30% more operating profit than those with low diversity.

Furthermore:

The inclusion of women reduces employee turnover by up to 22%, reducing recruitment and training costs (World Economic Forum, 2022);

Gender-diverse teams accelerate innovation by up to 20% in infrastructure and energy sectors;

In developing countries, such as Brazil, the presence of women in the energy sector can generate multiplier effects in their communities, promoting education, health and food security, directly impacting the local economy.

Therefore, encouraging female inclusion in the electricity sector is not just an action for social justice, but a smart economic strategy to promote sustainable growth, innovation and competitiveness in an increasingly globalized market.

## 6. Future Perspectives

Projections indicate that, with effective affirmative action policies, female participation in the electricity sector could reach 45% by 2040 (IRENA, 2023). This requires integrated actions between the government, the private sector and civil society.

Recommended measures include:

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Creation of internship and trainee programs exclusively for women;

Diversity goals in hiring and promotions;

Investment in awareness campaigns from high school onwards;

Promotion of energy events and fairs focused on female leadership.

In Latin America, the Inter-American Development Bank (IDB) already finances projects that seek to increase female participation in infrastructure sectors, including energy, as a way to promote inclusive growth.

## Final Considerations

The presence of women in the electricity sector is both an achievement and a strategic imperative for building a fairer and more sustainable future. Women bring to the sector not only technical expertise, but also new perspectives on innovation, sustainability and leadership.

Overcoming the challenges posed by a historically exclusionary culture requires continuous efforts and policies committed to diversity. As more women gain their space in the electricity sector, the sector as a whole benefits, becoming more competitive, humane and prepared for the challenges of the new low-carbon economy.

Recognizing the importance of women in the sector is not just a question of social justice, but also of economic intelligence and building a more prosperous society for all.

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