



WOMEN IN COOLING

A Worldwide Survey



INSTITUT INTERNATIONAL DU FROID
INTERNATIONAL INSTITUTE OF REFRIGERATION





INTRODUCTION

Refrigeration, Air-Conditioning, and Heat-pumps (RACHP) are crucial for our health, nutrition, comfort, and well-being. It is one of the sectors that crosscuts many of the UN sustainable development goals and can contribute significantly to safeguard the environment, advance welfare of humanity and support the growth of employment and economics worldwide.

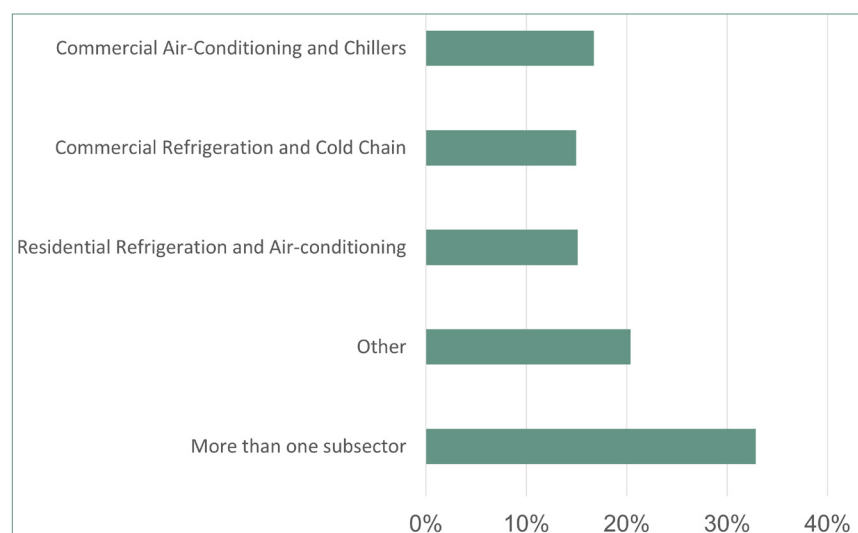
Over 15 million people are employed worldwide in the refrigeration industry, which means that almost 5 out of 1000 people have a job linked to the manufacturing, installation, maintenance and servicing of refrigeration equipment. Women are highly under-represented in this sector as indicated by the fact that only 6% of the members of national refrigeration associations/organisations/institutions are women. ^[1] As the need for RACHP professionals continues to grow, a high potential that can be unleashed by encouraging women to pursue education and job opportunities in this sector.

In 2019, the UNEP OzonAction and UN Women published a booklet of stories of 107 women from 50 countries who work in the RACHP sector to raise awareness of the opportunities available to women and recognise their success. The booklet showcased inspirational career experiences from many women across the globe, but also highlighted some of the challenges.

In order to better understand the background, motivation, challenges, and opportunities faced by women working in RACHP a worldwide survey was undertaken by the International Institute of Refrigeration (IIR) and OzonAction of UN Environment Programme (UNEP) in cooperation with several partners.

This survey was developed by Dr. Catarina MARQUES (Senior Research Fellow at London South Bank University and President of the IIR Working Group on Careers in Refrigeration – CaRe –), Dr. Ina COLOMBO-YOULA (IIR Deputy Director General and Secretary of the IIR Working Group on Careers in Refrigeration – CaRe –), Ms. Sonja WAGNER (Programme Management Officer at UNEP OzonAction), Mr. Ayman ELTALOUNY (UNEP OzonAction International Partnership Coordinator). It was designed by the IIR Scientific and Technical Information Department (Dr. Monique BAH and Ms. Aurélie DURAND).

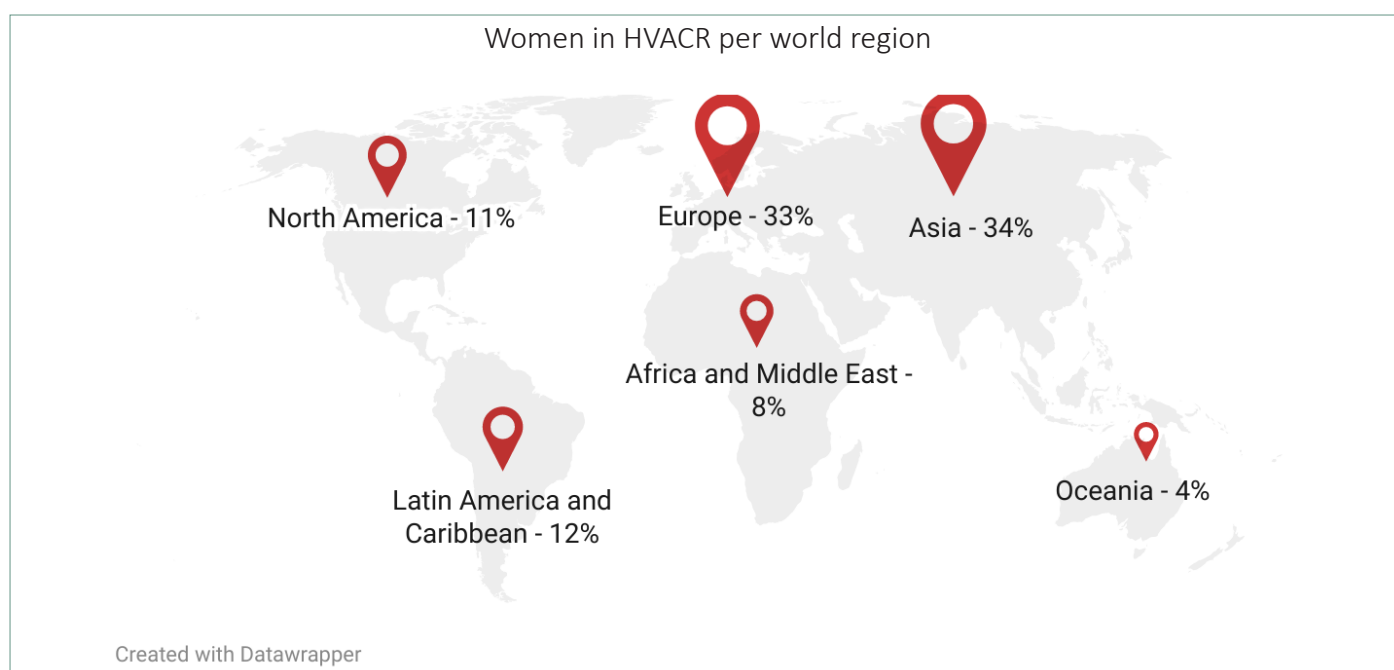
WORLDWIDE SURVEY OF WOMEN IN COOLING: PROFILE OF RESPONDENTS



A total of 810 women from all continents responded to the survey, which was available in English, French, Spanish, Portuguese, Russian, Arabic and Chinese. 59% of the respondents were under 40 years of age and half had a postgraduate degree, indicating likely limitations in reaching women working in the field as technicians.

Figure 1. RACHP sectors of employment reported by surveyed women.

Their area of work was evenly spread across residential/commercial refrigeration and air-conditioning, with one third of respondents working in more than one sub-sector.



The bulk of respondents worked in Asia (34%) and Europe (33%). Indeed, in an earlier survey updated in 2019, Colombo et al found that national associations/institutions in China (20.1%) and the EU (19%) had an above average percentage of women members. ^[2]

CAREER

With most respondents holding advanced degrees, there was an understandably low percentage of women who reported working in RACHP applications servicing (8%). Half of the respondents declared working either in design and/or R&D (22%), in sales/marketing (15%), or held academic and teaching roles (13%).

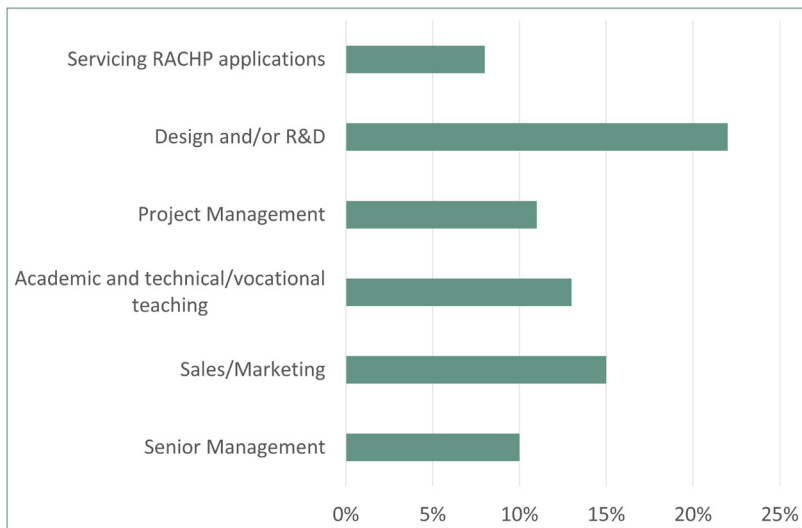


Figure 3. Current job roles in RACHP declared by surveyed women

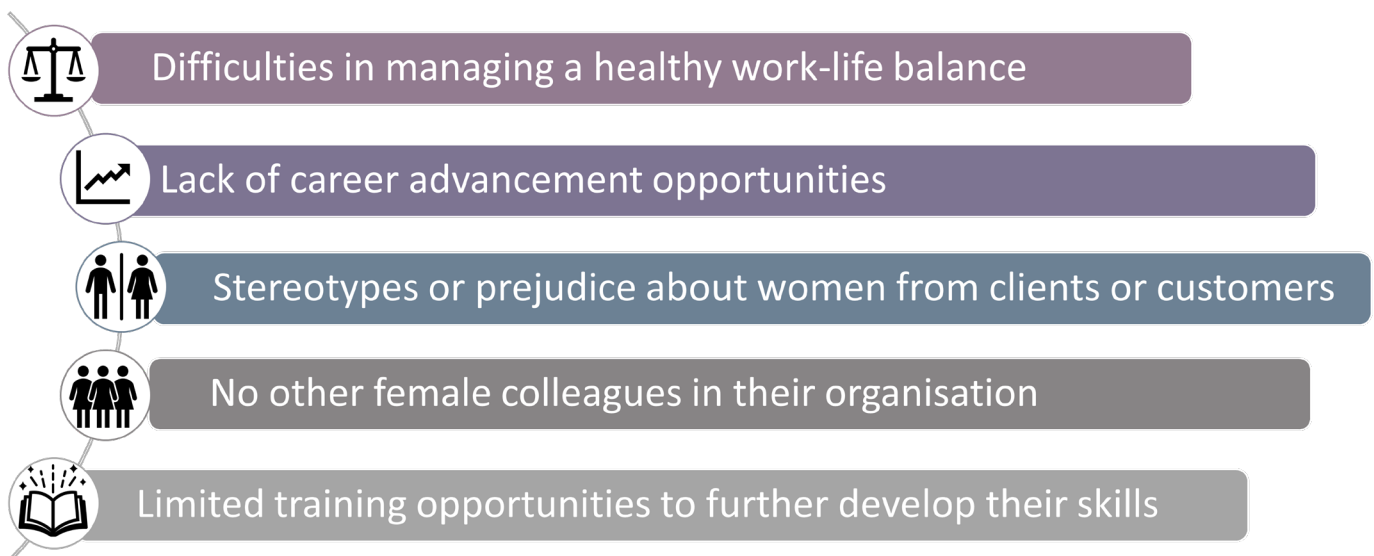
**High retention rate for women in RACHP :
47% working for more than 10 years**

With 47% of women working in the RACHP sector for more than 10 years, survey results indicated a high retention rate in the industry. However, only one out of five women had been promoted twice in the last ten years while 24% had never been promoted, suggesting limited career progression opportunities.

When asked about salary perception, 55.4% felt they were fairly paid in relation to their job. Compared to their male counterparts in similar positions, very few (10%) felt highly underpaid.

CHALLENGES

Women identified the top five challenges that they experience the most in their workday.



Companies can help women achieve a healthier work-life balance by adapting their human resources policies. For instance, they could allow flexible working hours and remote working where possible as well as fair pregnancy and maternity leave policies. The limited training and career development opportunities in the sector is a wider issue that will require national organisations and industry to work together on a solution.

MOTIVATION AND OPPORTUNITIES



Figure 4. Proudest career achievement

Women were mostly motivated by the environmental impact of a career in RACHP, the feeling of carrying out work that is useful to society, the fact that is an interesting subject area, the diversity of roles available and the job security associated with the sector.

Interestingly, earning the respect of their colleagues represented the proudest career achievement for many women. Previous studies have shown that support from co-workers, namely male colleagues, is crucial to maintain women in engineering positions and further their careers. [3,4]

INSPIRING THE NEXT GENERATION

Half of the women had no role model. The ones who had a role model had been influenced by either someone working in the RACHP sector, a teacher or a family member. Actually, the top three factors that had influenced their decision to pursue a RACHP career were (1) someone already working in the RACHP sector, (2) individual initiative through reading and research and (3) school.

Furthermore, when asked about their involvement in activities to inspire other women or young people to join RACHP, 53% of respondents were directly involved in activities such as training, workshops, mentoring or recruitment.



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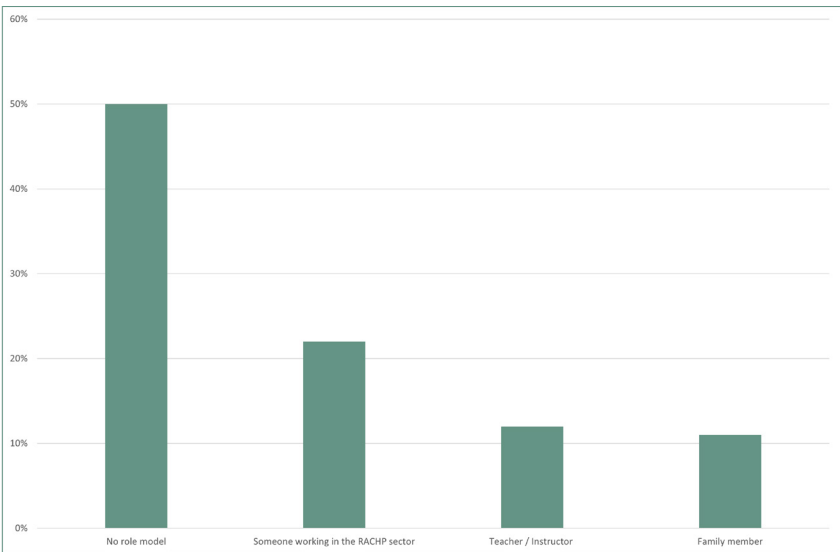


Figure 5. Role models who inspired the women's career in the RACHP sector.

These results show that there is clear scope to increase the visibility of women working in the sector by promoting role models and mentorship programs that benefit both individuals and organisations. Role models are paramount to highlight the career opportunities in RACHP and inspire the next generation of engineers. Increasing awareness of women in RACHP will also help break stereotypes and prejudice against women and empower women and girls to pursue a career in this sector.

65.7% of women valued the environmental dimension of their work



ENVIRONMENTAL IMPACT

65.7% of women valued the environmental dimension of their work in the RACHP sector. Respondents indicated that their work involved topics such as energy efficiency, technology selection, compliance with environmental regulations, refrigerant choice.

In order to draw in more women and young girls, training programmes could focus on environmental and sustainability-related courses, through either an experiential exposure or informational awareness of the link between sustainability themes and the profession. ^[5]

PARTNERSHIP FOR SOLUTIONS

The International Network of Women in Cooling (INWIC) is a networking, educational and mentoring platform to promote the role of women in the refrigeration, air-conditioning and heat pump industry. This recently launched initiative will connect women currently working in the sector, empowering them to progress in their career and to become visible role models, changing outdated perceptions and influencing the next generation of women engineers. INWIC is a joint initiative of UNEP OzonAction and WRD in cooperation with founding partners representing key professional RACHP associations from all regions. By bringing together women from all continents, INWIC enables the sharing of experiences and successful local policies and career opportunities, which would not be available otherwise. It provides an opportunity to learn from each other, understand how to bring positive change in each cultural context and promote the environmental aspect of the RACHP profession. Figure 6 summarises the INWIC proposed eight work streams for the next two years.

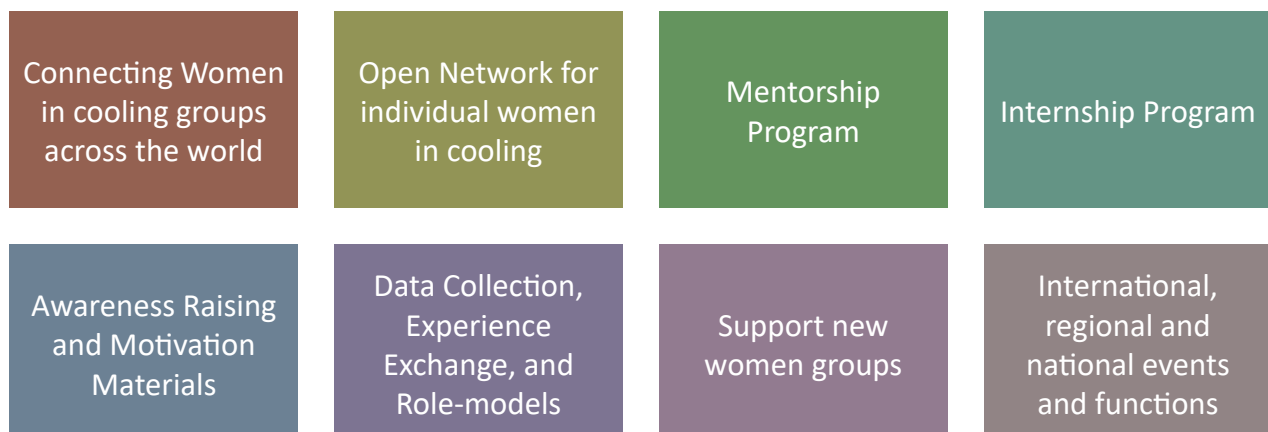


Figure 6. INWIC planned work streams for 2022 - 2024

The first stage of INWIC initiatives includes connecting existing women's groups/sections of national, and international RACHP associations/organisations/institutions to create a network that shares information and experiences. INWIC will gather data from founding partners to raise awareness and motivation and to promote role models and outreach activities underway. A mentoring program will be developed for women already working in RACHP and for young women pursuing RACHP education. On a later stage, INWIC will establish an internship programme with focus on opportunities in developing countries and will organise international, regional and national events. The network is expected to accelerate gender equality in RACHP, allowing women to be agents of change for a more sustainable and resilient future.

REFERENCES

- [1] Marques, C., Colombo, I., Evans, J., Kauffeld, M., Tarlea, G., & Coulomb, D. (2018, April 6). Care: IIR working group with emphasis on women in refrigeration. 5th IIR International Conference on Sustainability and the Cold Chain. Proceedings: Beijing, China, 6-8 April 2018. <https://doi.org/10.18462/iir.iccc.2018.0048>
- [2] Colombo, I., Marques, C., Rodway, M., Evans, J., Maidment, G., Voigt, A., & Moundjimbi Mombo, F. (2020, August 26). Women in the refrigeration, air-conditioning and heat pumps industry. 6th IIR International Conference on Sustainability and the Cold Chain. Proceedings: Nantes, France, August 26-28 2020. <https://doi.org/10.18462/iir.iccc.2020.290396>
- [3] Makarem, Y., & Wang, J. (2020). Career experiences of women in science, technology, engineering, and mathematics fields: A systematic literature review. *Human Resource Development Quarterly*, 31(1), 91–111. <https://doi.org/10.1002/hrdq.21380>
- [4] Fernando, D., Cohen, L., & Duberley, J. (2018, June 12). What Managers Can Do to Keep Women in Engineering. *Harvard Business Review*. <https://hbr.org/2018/06/what-managers-can-do-to-keep-women-in-engineering>
- [5] en-Giami, I., Simandjuntak, S., Yang, L., & Coats, A. (2022). A Grounded Theory Approach to Uncovering the Process of How Sustainability Topics Influence Women Engineers' Career Choice and Engagement. *Sustainability*, 14(9), 9. <https://doi.org/10.3390/su14095407>

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RECOMMENDATIONS

- There is a need to capture the challenges and issues of women working in the servicing and occupational areas of RACHP. Local or regional associations can better reach out to them through dedicated similar surveys that can be even designed in local languages as needed.
- Corporates and firms are encouraged to establish or update their social and HR policies to tackle many of the issues identified by women in RACHP, under this survey, such as work-life balance, training and career advancement opportunities as well as equal pay for work of equal value.
- With high attention of women to environmental and sustainability issues, as shown by the survey, there is a need to capitalise on such enthusiasm by bringing women in RACHP in the forefront of related programs and activities.
- Focused campaigns should be organised to attract young people, including women, to enrol in educational and vocational training disciplines related to RACHP as well as facilitating their joining the RACHP workforce.
- Encourage and promote enrolment and engagement with INWIC that is offering multi-tracks opportunities for women in RACHP including, but not limited to, networking, mentoring, role-models, and internships.