



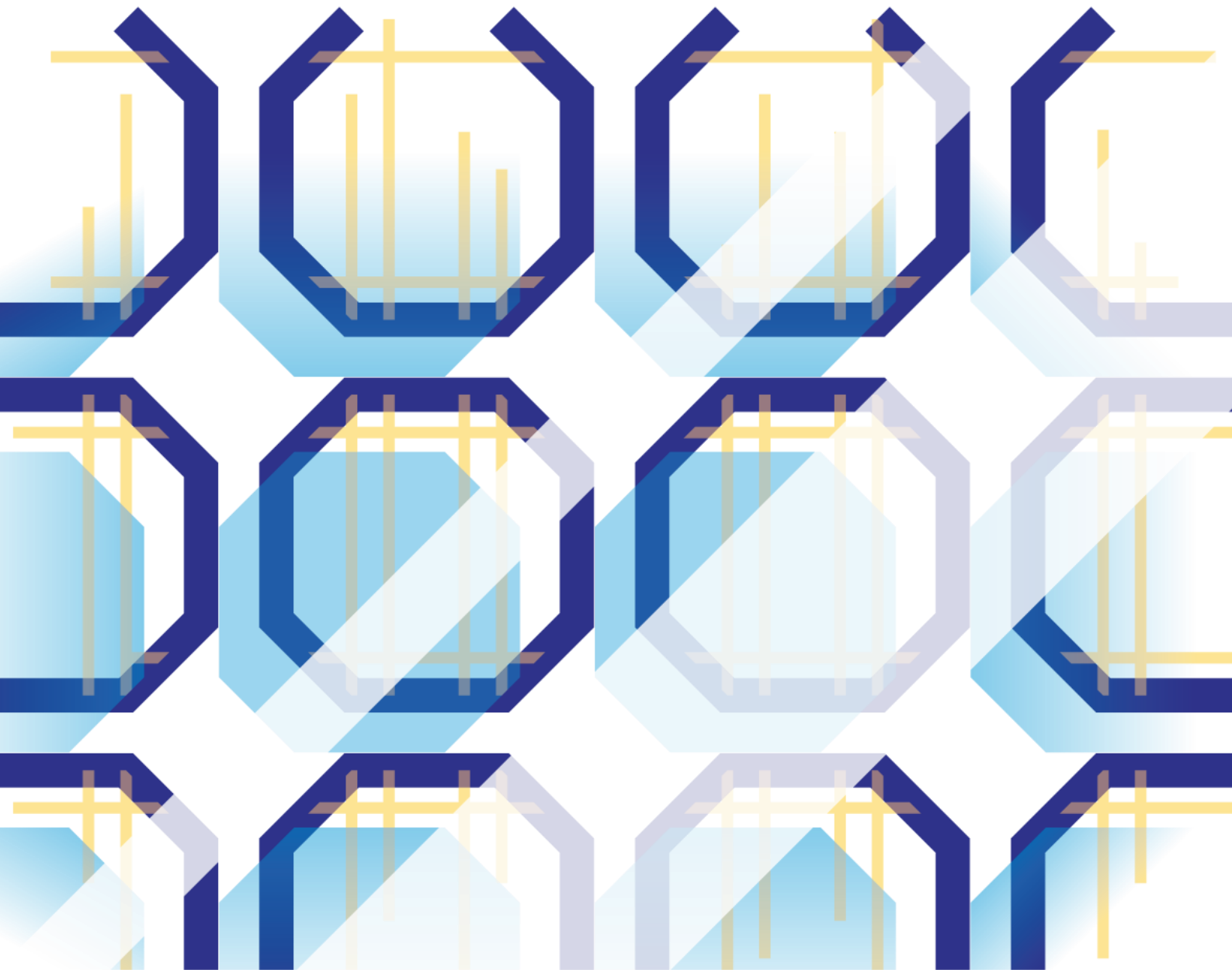
GRECO

WOMEN IN SCIENCE

A GENDER PERSPECTIVE IN SOLAR ENERGY

Giuliana Rubbia

Contribution to GRECO Consortium Meeting
Sofia, 21 May 2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°787289



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Rubbia, Giuliana*. (2019). WOMEN IN SCIENCE - A gender perspective in solar energy. GRECO project.

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Summary

This document summarises main points of the presentation given at the second GRECO¹ consortium meeting in Sofia (Bulgaria) on 21 May 2019². In the following, it will highlight gender issues from different point of views- being potentially useful for the development of the GRECO research project. GRECO aims, among others, to implement Responsible Research and Innovation practices-including gender.

After an introduction on the meaning of sex and gender analysis and their importance in research, the suggestion is to consider gender as a key aspect in research. Gender refers to research *staff*, research and innovation *methods*, *impact* of research and innovation. Key readings on gender in the energy sector, derived from current studies, are provided to frame the scenario of the project.

The conclusive invitation - in the form of open questions - is to keep and strengthen the application of gender issues to GRECO.

¹ GRECO - Fostering a Next GeneRation of European Photovoltaic SoCiety through Open Science
<https://www.greco-project.eu>

² <https://www.greco-project.eu/second-greco-consortium-meeting-sofia-bulgaria-21-23-may-2019/>





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1. Sex and gender definitions: what, why and how

Preliminarily, we have to agree about what “sex” and “gender” refer to, why these concepts are important, and how they can be implemented in research projects.

Gender refers to cultural attitudes and behaviours, while **sex** refers to biological characteristics.

The recent booklet by Korsvik & Rustad (2019)³, “*What is the gender dimension in research? Case studies in the interdisciplinary research*”, provides us with examples in different research fields:

“Gender refers to socially and culturally constructed norms, values and expectations related to men or women, boys or girls. Gender also refers to attitudes and behaviours related to what is regarded as masculine or feminine” [...] “the concept of gender varies over time and between cultures”, therefore, for example, “while throughout history and in various cultures taking care of infants has been regarded as unmanly, the “caring father” has increasingly become an ideal and a norm in many societies, not least in the Nordic countries where welfare arrangements encourage fathers to take leave from work to care for their small children.”

Source: Korsvik & Rustad (2019).



The Position paper by the H2020 Advisory Group for Gender of the European Commission (2016)⁴ summarises why gender is important in research:

“Gender is a key analytical and explanatory variable in research. Gender has an impact on the design of products, technologies, environments, and knowledge. Gender assumptions often go unquestioned and can unconsciously influence scientific priorities, research questions, and choice of methods. Awareness of gender aspects is therefore a key component of research excellence.”

Finally, the following three objectives underpin the strategy on gender equality in Horizon 2020, the funding programme of the European Commission:

*“1) Fostering **gender balance in research teams**, in order to close the gaps in the participation of women;*

³ Trine Rogg Korsvik & Linda M. Rustad (2019). *What is the gender dimension in research? Case studies in the interdisciplinary research*. Published by Kilden genderresearch.no, independent sub-unit of the Research Council of Norway 65 pages. <https://tinyurl.com/yy78b9f6>

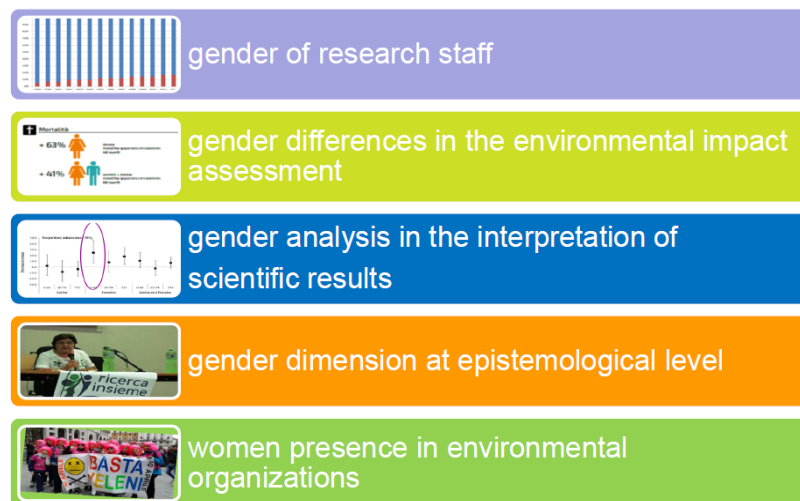
⁴ H2020 Advisory Group for Gender (2016). *For a better integration of the gender dimension in the Horizon 2020 Work Programme 2018-2020*. Position paper 27 pages. <http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=28824&no=1>

2) Ensuring **gender balance in decision-making**, in order to reach the target of 40% of the under-represented sex in panels and groups and of 50% in advisory groups;

3) Integrating the **gender dimension in research and innovation (R&I) content**, helps improve the scientific quality and societal relevance of the produced knowledge, technology and/or innovation”⁵

2. Gender dimensions in environmental research: a perspective

Once agreed on these basic considerations, we can proceed in identifying the possible gender dimensions in the energy sector and in the GRECO project. **Gender dimensions in research are necessarily manifold**: they do not refer only to the gender of the research staff, but also to methods of research and impact of results, as illustrated for example by Mangia et al. 2018⁶ for environmental health debate (see table below).



2.1. Gender in research staff: a male dominated sector and actions to promote women in STEM

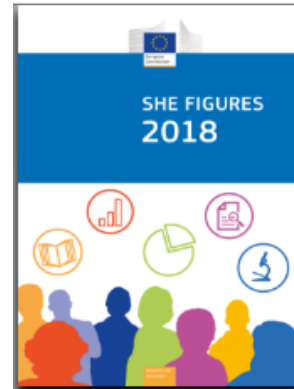
It is well known that the so-called STEM disciplines- Science, Technology, Engineering and Mathematics- attract and retain less women than men. According to the most recent indicators collected at European level by the “*She Figures*” report⁷,

⁵European Commission. *Promoting Gender Equality in Research and Innovation*. <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/promoting-gender-equality-research-and-innovation>

⁶ Mangia C., Ravaioli M., Rubbia G. (2018). *Gender dimensions in environmental sciences and the role of women associations*. Gender Summit 15 – Europe (GS15) "United in Science and through Science. London, UK, June 2018, Video registration: <https://tinyurl.com/yxuo7wee> and <http://hdl.handle.net/2122/12263>

⁷European Union, 2019. *She figures 2018*. https://ec.europa.eu/info/publications/she-figures-2018_en

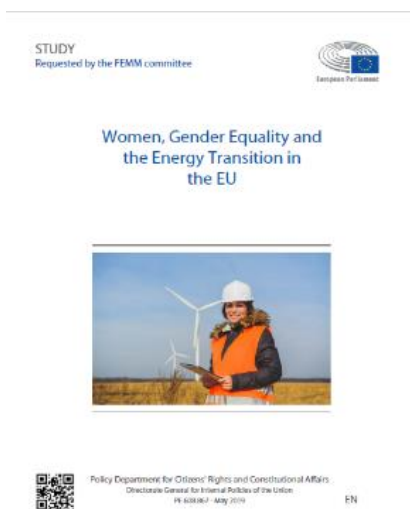
“women are still a minority in science and engineering occupations in most countries” [...] “The proportion of female R&D personnel working as researchers is lower than the corresponding proportion for men in most countries, in the higher education, government and business enterprise sectors. On the contrary, the proportion of female R&D personnel working as other supporting staff is higher than the corresponding proportion of men”.



However, *“the number of women employed as scientists and engineers grew on average by 2.9% between 2013 and 2017”*, a rate faster than the respective rate for men.

Energy still appears as a male dominated sector.

According to Clancy & Feenstra 2019⁸ *“Engineers, mainly men, are overrepresented in the technical posts in the energy sector (77.9%). Women make up 22.1% of the energy sector workforce usually in administrative positions with limited decision-making power.”* Possible explanations include:



- *“lack of appropriate skills due to the gender gaps in energy-related education;*
- *the perception of the energy sector as a male domain and persisting gender stereotypes;*
- *the difficulty of achieving a work-family balance which discourages women from taking on jobs that involve unpredictable work schedule or emergency travel:*
- *insufficient career promotion opportunities and mentoring programmes for women.”* [Source: Clancy&Feenstra 2019]

Therefore, education, role models such as female teachers and professors, adoption of work-life balance and mentoring appear as areas of promoting women in the field.

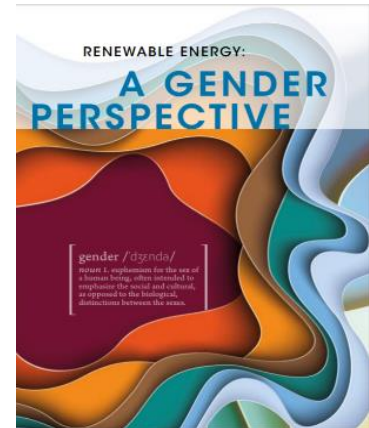
⁸Clancy J. & Feenstra M. (2019). *Women, Gender Equality and the Energy transition*. Study requested by the FEMM committee (European Parliament's Committee on Women's Rights and Gender Equality). European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs. Directorate General for Internal Policies of the Union, PE 608.867 - May 2019. ISBN 978-92-846-4669-2|doi: 10.2861/750279| QA-04-19-252-EN-N. 62 pages. [http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU\(2019\)608867](http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2019)608867)



Specifically, the International Renewable Energy Agency (IRENA) examined the question of gender equity throughout the sector. The report “Renewable Energy: A Gender Perspective”⁹ published in May 2019, provides a global overview.

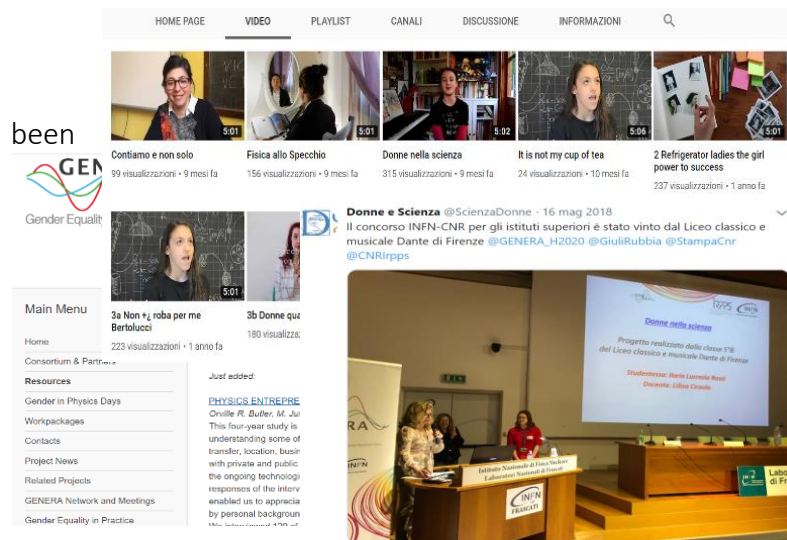
The IRENA's survey was carried out at the end of 2018, gathering nearly 1500 responses from all over the world, mostly from individuals, as well as from representatives of organisations e.g. academic and research institutes, industry associations and public utilities.

A wide range of suggested measures in supporting gender equality were found, including variations from country to country. Examples of measures include “network opportunities, gender policies, mentoring, training, gender targets, job sharing, seminars, internships, volunteer work”.



At European level, regardless of the field, dedicated organisations and research projects provide several tools.

The European Institute for Gender Equality (EIGE), for example, provides the Gender Equality in Academia and Research (GEAR) tool, a set of practical advices to set up a gender equality plan¹⁰ and assess its impact¹¹.



Several projects funded by the Horizon2020 programme have devoted to structural changes. Among them, the GENERA project (Gender Equality Network in the European Research Area) aimed at “continuing, monitoring and improving the Gender Equality Plans of Research Institutions and Organisations specifically in the physics research field”¹².

During the Gender in

Physics Days organised by the

⁹IRENA (2019), *Renewable Energy: A Gender Perspective*. IRENA, Abu Dhabi. ISBN 978-92-9260-098-3. 92 pages.

<https://irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective>

¹⁰ A Gender Equality Plan (GEP) is a set of *concrete* actions to achieve gender equality, see EIGE's definition at: <https://eige.europa.eu/gender-mainstreaming/toolkits/gear/what-gender-equality-plan-gep>

¹¹ Available from EIGE website at: <https://eige.europa.eu/gender-mainstreaming/toolkits/gear>

¹² <https://genera-project.com>. Associazione Donne e Scienza was associated partner of the project.



project and hosted by scientific organisations in the consortium, female scientists provided their testimonies while students presented their inspiring videos on various gender issues.

Ana Belén Cristóbal is the coordinator of the EU funded photovoltaic research project GRECO. At the second consortium meeting in Sofia, Ana Belén underlines that GRECO has already put various actions in place to enhance the visibility of women in the energy sector. These are valuable and in line with suggested best practices: a number of **women are workpackage leaders; a female engineer is co-coordinating** the project, **visual communication promotes diverse people**, as displayed in the introductory video, where the (male) scientist gets out of his ivory tower to collaborate with female scientists, citizens and policy-makers. GRECO has also provided seminars about Open Science on the occasion of the **International Women's Day** and has started a **mentoring programme** to attract women in the energy sector.



2.2. Gender dimensions in solar energy innovation: GRECO gender lens

Thus, GRECO is already successfully providing greater visibility for women in the STEM field and increases the attractiveness of the sector for girls and women. However, GRECO could explore the gender dimensions even further by answering the following questions:

Do GRECO researchers include the gender perspective on the impact of photovoltaic products?

Within the framework of the project, GRECO researchers will develop six cutting-edge photovoltaic products. Those include *cheaper and more efficient solar cells which are supposed to increase societal acceptance* and *improved PV heat-pump systems enabling renewable sources in daily life*.

Society is composed of people of different genders: their needs and aspirations can coincide or be different; their attitudes can vary from country to country.

According to Clancy&Feenstra 2019:

- *"There is some evidence to suggest that **women are greener than men** in terms of making decisions by household appliances"*
- *"With increasing energy prices, ... Eurostat calculates that an average of 1 out of 7 European households are struggling to pay their energy bills on*

time...”

- *“Energy poverty analysed through a gender lens reveals a strong gender dimension to energy access. [...] Not only do women have a higher risk to live in poverty due to income disparities, they also live longer and are over-represented in single-headed households often with the responsibility for children.”¹³*

Moreover, “the geographical spread of energy poverty levels among low-income households in the EU is demonstrating a distinction between Northern-Western and Southern-Eastern countries in Europe”.¹⁵ Interesting online data and resources are provided in the framework of the Energy Poverty Observatory EU initiative¹⁴, and by other organisations, such as the network of independent experts OpenExp¹⁵, or the Right to Energy coalition¹⁶.

However, more sources indicate **a lack of disaggregated data**, and Gender and Energy appears as an area for further studies.

Case studies of gendered innovations are provided by Londa Schiebinger¹⁷ on the Gendered Innovations portal. She stated:

“Research on the relationship between gender and environmental impact is still in its infancy. Analysing gender, in this instance, means comparing women's and men's behaviours and attitudes in relation to climate change. But researchers must ask: Which women? Which men? and compare groups of women and men based on social factors that also predict climate footprint, such as income, educational background, and geographic location. Viewing women as an undifferentiated group and opposing this to men as an undifferentiated group (simply disaggregating data by sex) misses important factors that influence gendered behaviours. Studies that analyse gender and control for other social factors avoid stereotypes and false correlations.”¹⁸

2.3. Gender in civil society: do women make a difference in the public discourses on energy?

¹³ Clancy J. & Feenstra M. (2019). *Women, Gender Equality and the Energy transition*.

<https://tinyurl.com/y5fk8dxc>

¹⁴ <https://www.energypoverty.eu/>

¹⁵ <https://www.openexp.eu/>

¹⁶ Right to energy, an “European coalition uniting trade unions, anti-poverty organisations, social housing providers, environmental organisations, health organisations and energy cooperatives”

<https://righttoenergy.org/>

¹⁷ Schiebinger, L., Klinge, I., Sánchez de Madariaga, I., Paik, H. Y., Schraudner, M., and Stefanick, M. (Eds.) (2011-2018). *Gendered Innovations in Science, Health & Medicine, Engineering and Environment*. <http://ec.europa.eu/research/gendered-innovations/>.

¹⁸ <http://genderedinnovations.stanford.edu/case-studies/climate.html#tabs-2>





Another dimension is the female presence in movements. There is a big influence of women's organisations on the environmental debate. Women, mothers, having the responsibility of taking care of children and families, do contribute in rising awareness campaigns, for example (Left: screenshot from Right to Energy website).

3. Conclusion

Taking gender into account is a matter of inclusion, quality, and excellence of research. It also influences economy and politics. How can we improve the impact of GRECO products accordingly?

- **Applying the gender lens at the impact of technology, research process and photovoltaic products.**
- **Implementing the gender perspective at end users, households and farmers.**
- **Considering geographical and cultural diversity.**

4. Annex 1. Dissemination activities

According to the agreed Term of Reference, being a member of the Social Advisory Board (SAB) means assuming the responsibilities to give feedback to the GRECO Consortium with regards to specific strands of work, disseminate the GRECO tasks and achievements via one's networks and attend established meetings, both online and in presence.

As agreed during the first SAB meeting in November 2018, dissemination activities have been performed through Associazione Donne e Scienza¹⁹ and the European Platform of Women Scientists²⁰ communication channels such as websites, mailing lists and social media, benefitting of promotional materials provided by the GRECO project management.



These dissemination activities took the shape of posts on the occasion of launches of the initiative, the call for ideas, the call for participation and of contributions to presentations on the occasion of workshop attended in March 2019: March 8, Università di Firenze (Italy) workshop “Donne e Fisica²¹ and March 20, COST Action Joint Workshop Citizen Science and Gender University of IASI, (Romania)²².

¹⁹ Associazione Donne e Scienza. ADS (donnescienza.it) is a non-profit cultural organisation that gathers women scientists working at Higher Education Institutions and Research Organisations in Italy. ADS promotes women's participation in scientific research to contribute and generate debate on contemporary science with a gender perspective. ADS has been one of the founding associations and is still member of the European Platform of Women Scientists – EPWS. Relevant initiatives include: networking to share materials on regulation and policies concerning women in science; participation in projects and actions, in particular at European Community level; dissemination of knowledge generated by women research; organization of meetings, congresses and debates on gender studies and women research.

²⁰ European Platform of Women Scientists. EPWS (epws.org) is an international non-profit umbrella association bringing together networks of women scientists and organisations committed to gender equality. Since its inception in 2005, more than 100 associations from 40 countries have joined the Platform as members, together representing more than 12.000 women researchers with varied disciplinary expertise. EPWS mission is to give women researchers at all stages of their career-paths a voice in the European research policy debate, by forging a link between women scientists and European research policy-makers at EU level.

²¹ <https://youtu.be/V5zrz-6ui08>

²² <https://epws.org/workshop-citizen-science-gender/>



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GRECO is a Collaborative Project funded by the European Commission under Horizon 2020.
Contract: 787289, Start date of Contract: 01/06/2018; Duration: 36 months (3 years).

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