

Energizing equality

We all stand to gain by doing more to combat gender inequality.

Ada Lovelace Day falls on 10 October 2017 (<http://go.nature.com/2fdthVZ>). It is an international day to celebrate the accomplishments of women in science, technology, engineering and maths (STEM), increase their profile, provide them with greater support, and encourage more girls to take up STEM careers. This is important work: on average, women continue to be under-represented in science across the globe, making up just 28% of researchers¹. This lack of diversity is critical as it suppresses swathes of the population, inhibits economic development and productivity, and stifles our thinking, limiting creativity and innovation to a particular mindset.

Gender imbalance is problematic in all spheres, of course, but in the energy domain it feels particularly knotty. Gendered societal roles have implications for energy transitions, technology use and development; many efforts now focus on how energy policy and clean technology can increase social equity. At the same time, much is made of the role of creativity and innovation in finding solutions to global energy problems, which will require a diverse collection of mindsets and experiences to maximise. Yet, in the US in 2014, just 32% of physical sciences and 23% of engineering doctoral degrees went to women; women made up 22% of postdoctoral fellows in academic institutions in both subject areas². Things aren't any better in the power and utilities sector: just 5% of executive board members and 14% of senior management leadership are women³. More generally in the energy industry, women make up 20.2% of the oil and gas and 22% of the utilities workforces in the US⁴. Things are improving rapidly in the blossoming solar energy industry, but still only 28% of the US workforce are women (up from 24% in 2015)⁵.

Addressing such an imbalance is no mean feat. Support and encouragement for interest in STEM for more girls from an early age is important. Our notion of what a scientist looks like is often predisposed to be a white male, immediately excluding anyone who doesn't fit that bill. Increasing the visibility of women and their contributions to STEM helps create role models for young girls, eroding those notions of non-conformity that create barriers. Much progress has been made in closing the gap on science

test scores between girls and boys globally⁶ but more needs to be done to challenge social norms — at home, at school, and in the media — to prevent girls from being discouraged to engage with science.

For those working within academia, even outside STEM, a different set of challenges exist. To name a few, female academics are less likely to receive grant funding⁷, less likely to win prizes⁸, more likely to be seen as less competent than males⁹, and more likely to have their gender misattributed in publications¹⁰. They also often end up taking on more teaching and administrative duties than their male colleagues; this work is rarely appropriately recognised by promotion or hiring boards.

Institutional change is imperative to address such structural inequalities. Committing to better representation is an important step. The publication of figures on gender performance creates visibility for the problem and allows for comparison between agencies and institutions. Developing practices that support career progression and champion gender equality is also an essential element. In the UK, the Athena SWAN scheme has proven successful at changing cultures; a similar project is now entering pilot phase in the US¹¹.

While creating better structures and intuitional practices is critical, it is also imperative not to forget that we all play a role, every day, in combatting gender inequality. Unconscious bias is an issue that affects us all. And it is pervasive. Who hasn't attended a conference and noticed how male moderators only take questions from male audience members? How frequently have you referred to a female colleague by their first name but male colleagues by their title and surname, or heard others do the same? Male energy company executives have admitted assumptions they held that women are less concerned about safety and don't want to work in technical positions¹². Research has also shown that women in economics are less likely to receive tenure if they co-author publications, although attribution of each author's contribution to the work is not provided¹³.

The difficulty with unconscious bias is that we aren't aware we're doing it. Few would believe that such bias causes harm, that they exhibit any unconscious bias at all,

or, even if aware of their own unconscious biases, they do not see how they can control their expression. Nonetheless, the consequences are large and have severe reverberations, perpetuating stereotypes and upholding inequities.

Yet by recognising that unconscious bias exists, it becomes easier to mitigate. Calling out conferences for having all-male panels or pointing out when moderators are biased in selection of questions will cause them to pay closer attention and hopefully do better next time, and remind others who are organizing conferences or chairing sessions later to do the same. Take an implicit bias test (for example, <http://go.nature.com/2w8W6tK>) and encourage others to do so. At *Nature Energy*, we would like to encourage all our authors to check their unconscious bias when suggesting reviewers and aim for a diverse pool of referees instead of the default list of go-to names. Even this small action can help bring attention to female academics beyond the act of anonymous peer review.

There is no panacea to the issue of equality and diversity in STEM and this editorial has barely scratched the surface, especially in only discussing gender. However, we each can — and must — contribute to making the necessary steps to improve the situation, ensuring not just a cleaner energy future, but a more just and equitable one as well. □

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