



# OECD Education and Skills Today



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## Looking for green engineers – Insights from PISA 2018

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### Key points:

- Many green jobs require STEM skills, but young people's interest in these types of professions is deeply gendered
- 15-year-olds' future aspirations are commonly disconnected from the realities of the job market
- Effective career guidance and first-hand experience of the world of work can help change young people's thinking about green jobs

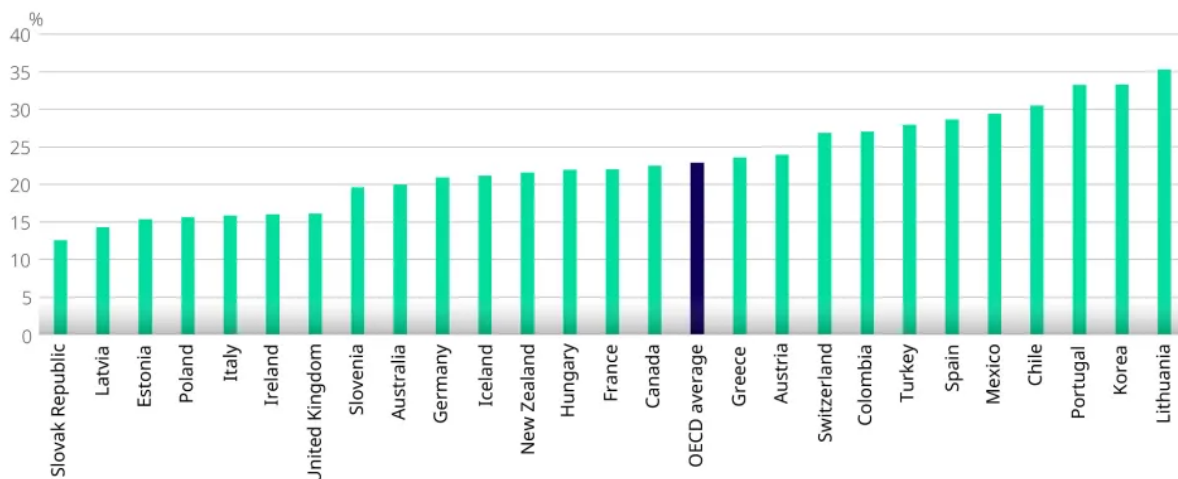
The fight against climate change cannot be won without significant changes in knowledge and skills that people bring to their work. Addressing the existential challenge is leading by consequence to important changes in patterns of labour market demand over the decades ahead. As well as demand for jobs in high-carbon industries like coal mining expected to fall, new jobs will appear (at least 24 million globally by 2030 according to the International Labor Organisation) and others will change radically. For policy makers addressing a sustainable future, a

key question is: will the necessary skills be available to underpin a fundamental recalibration of human life on earth? Looking at what is known about young people's interests in green careers is a good place to start in answering this question.

## Many young people care a lot about the environment...

The good news is that many teenagers have a strong interest in green issues. In 2018, the OECD's Programme for International Student Assessment (PISA), asked representative samples of students across multiple countries whether they agreed with the statement "Looking after the global environment is important to me". Across the OECD, 23% of 15-year-olds strongly agreed, including more than 30% of youth in Chile, Korea, Lithuania and Portugal. Outside of the OECD, it is young people in Albania and Costa Rica who are most committed to protecting the environment. Respectively, 40% and 46% of students strongly agreed that looking after the global environment was important to them personally. Committed environmentalists are found in all social demographics, but tend to be higher academic achievers (on average across the OECD 26% strongly agreeing with the statement) from higher socio-economic backgrounds (29%) and are more often girls (25%) than boys (21%).

**Protecting the environment is important to many young people**  
Percentage of 15-year-olds that strongly agree with the statement  
"Looking after the global environment is important to me"



Selected OECD countries

Source: OECD PISA 2018

...but we don't know how interested young people are in green jobs

Does personal interest in the environment translate into an active interest in green jobs? Globally, PISA represents the best way to understand young people's career interests. Every three years, PISA asks hundreds of thousands 15-year-olds what type of job they expect to be doing at age 30. This question allows analysts to gauge teenage interest in different occupations and map how interests have changed since the start of the century. Across the 79 countries and economies that participated in PISA 2018 we see, for example, strong continuing interest in traditional occupations like doctors, lawyers and teachers.

PISA is a great resource for understanding young people's expectations for their futures in work, although it is limited in assessing teenage interest in green jobs. This is because, as is widespread practice, PISA classifies teenagers' occupational expectations using the [International Standard Classification of Occupations](#) (ISCO). Last revised in 2008, ISCO categorises jobs across ten different occupational areas that are subdivided into new categories, which then include specific jobs.

As the [International Labor Organisation](#) points out, we can't say exactly how many young people expect to work in a 'green jobs' because ISCO doesn't classify jobs in such a way:

Few occupations defined in the ISCO classification system are specifically associated with improving sustainability. Environmental professionals and refuse sorters are about the only ... classifications that are specifically green, and even jobs in refuse sorting will not be green where the work produces damaging emissions or waste, or where it fails to comply with standards for decent work. Most green jobs are in occupations that also cover non-green jobs. For example, a mechanical engineering technician working in renewable energy or waste processing may be regarded as being in a green job, while a mechanical engineering technician with broadly similar skills working in manufacturing or a fossil-based energy industry is not, unless the job is focused primarily on process improvement.

## Gender and STEM skills

But there is still a lot we can learn from PISA when it comes to green jobs. Given the planet's need for a fundamental restructuring of economic areas such as transportation, manufacturing, construction, energy production and energy conservation, many green jobs will demand strong skills in Science, Technology,

Engineering and/or Mathematics (the so-called STEM subjects). Earlier OECD analysis raised concerns over the [deeply gendered character of interest in professions that make great use of STEM](#). On average, in spite of girls routinely performing well on PISA science tests, across the OECD around twice as many boys expect to work in such occupations compared to girls. By contrast, more than twice as many girls expect to work in health-related professions.

*In spite of girls routinely performing well on PISA science tests, around twice as many boys expect to work in such occupations compared to girls*

Looking more specifically at engineering, in 2018 on average across the OECD 7.7% of boys and 1.8% of girls said that they expected to work by the age of 30 as an engineer. By engineer, our analysis clusters together interest related to eight specific occupational areas:

- engineering professionals (excluding electrotechnology)
- industrial and production engineers
- civil engineers
- environmental engineers
- mechanical engineers
- chemical engineers
- mining engineers, metallurgists and related professionals
- engineering professionals not elsewhere classified.

## Is there a relationship between interest in protecting the environment and engineering?

Cross-referencing interest in engineering with passion for the environment, we find that engineering has yet to acquire a significant green character among young people. Whereas 4.4% of all 15-year-olds who agreed strongly that that looking after the global environment was important to them personally anticipated working as an engineer by the age of 30, the occupational interest was also shared by 4.3% of students less concerned by green issues.

Only in Argentina, Iceland, Korea, Malaysia and Thailand is the greater interest of young environmentalists in engineering statistically significant. By contrast, in Brunei Darussalam, Canada, Costa Rica, Indonesia and Russia, controlling for other characteristics, interest in engineering is lower among young people who have greatest interest in the environment. PISA 2018 tells us that secondary school students do not see engineering as a particularly green career. And this is a problem because in many countries the 15-year-olds who took the PISA tests in

2018 will soon after have made educational decisions (like dropping sciences) that close off professional pathways.

## How to change young people's thinking about green jobs

In general, however, young people's career interests are very traditional. They are commonly narrow, confused and distorted by social background – emerging as much or more from socially situated assumptions and expectations as from access to labour market information. PISA provides plentiful evidence that in many countries the labour market is not signalling well to students.

*To challenge assumptions and expectations, it is important for students to be exposed first-hand to people working in a wide range of jobs*

Analysis of national longitudinal databases in multiple countries shows that effective career guidance can challenge the way that young people think about their futures in work, help them to explore potential working futures and give them first-hand experiences of workplaces. Direct connection with people in work is fundamental. OECD analysis shows that young people's social backgrounds often heavily influence their career thinking. To challenge assumptions and perhaps unspoken expectations, it is important for students to be exposed first-hand to people working in a wide range of jobs. Multiple authentic interactions with the labour market can broaden and inform the aspirations of young people. One of the best ways to do that is through career talks and job fairs, whether [face-to-face](#) or [online](#). More than that, education and training pathways like apprenticeships help guide young people into the labour market. In these difficult times for youth, and perilous times for our planet, closing the gap between education and employment is more important than ever.

### Read more:

- [The OECD's work on career readiness during COVID](#)
- [Calling all girl scientists: climate change needs you](#)
- [Green at fifteen – what schools can do to support the climate](#)
- [Gender norms are clearly evident at five years of age](#)

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