

# WHEN I GROW UP

INSPIRING STORIES  
FROM PEOPLE WORKING IN  
CLEAN ENERGY

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# WHAT IS THIS BOOK ABOUT?

It started with a dream to inspire you and other young people around the world to become passionate about clean energy and the many opportunities it offers.

We are six women who have put this book together: from Algeria, Poland, Canada, South Africa and Belgium.

Some of us are mums and some are not, but we all share the belief that you and other young people have the power to help change the world for the better. Malgosia, Yamina and Joyce work in wind associations that are helping people understand the role of wind energy in combating climate change. Veronique develops renewable energy projects in South Africa. Philippa is a journalist writing about climate change and how clean energy is an important solution for

stopping global warming. Chantal is an artist, who did the illustrations. This book is about 21 people who are working in clean energy to help tackle the climate crisis.

This project would not have happened without all the amazing young people from 25 different countries, who formed our Editorial Committee and sent more than 1,000 questions to the people whose stories feature in the book. You can find all their names at the end.

Chloé aged 11 from Brussels in Belgium, and her dad Ian, deserve special thanks. They were our test readers, and Chloé made sure we saw the world through young people's eyes!

"THE CLIMATE CRISIS HAS ALREADY  
BEEN SOLVED. WE ALREADY HAVE ALL THE  
FACTS AND SOLUTIONS,"  
SAID SWEDISH CLIMATE ACTIVIST  
GRETA THUNBERG IN 2019.

"ALL WE HAVE TO DO IS TO WAKE UP AND CHANGE."

"The climate crisis has already been solved. We already have all the facts and solutions," said Swedish climate activist Greta Thunberg in 2019. "All we have to do is to wake up and change." Two years before, she had accused world leaders at a UN Climate Summit in Katowice in Poland of failing the younger generations. "Since our leaders are behaving like children, we will have to take the responsibility they should have taken long ago," she said.

The people you will meet in this book know how important it is to act now. They found the solutions and are working for change. They also know that we all can take responsibility and work to fight climate change and make the world a better place.

They are not famous and you've almost certainly not heard of them before. But they are definitely worth getting to know!

They include people like Jos, an architect from the Netherlands, who makes playgrounds, and other amazing things, out of rotor blades from old wind turbines.

Then there's Brian, from Ireland, whose job is helping Google buy renewable energy from wind and solar farms, and Vanessa - originally from France, but now in the US - working to reduce Microsoft's energy use.

We have Swarna in India, Toni in South Africa, He Dexin in China and Elbia in Brazil. We have engineers, sales people, an expert from the European Commission, a professor and an inventor!

What all these people have in common is that they work to increase the amount of our energy that is produced by clean, renewable sources such as solar and wind. In this way, the world can stop using so many fossil fuels and reduce carbon dioxide and methane emissions, which are causing climate change.

We wanted to show that to help save the world, you don't have to be a super hero. You don't have to pull your pants on top of a pair of tight leggings and fly through the sky! Simply by deciding to do certain jobs, we can all help look after our planet, nature and the people who live on it.

WE DECIDED TO WRITE THIS BOOK  
SO YOU CAN GET A BETTER IDEA OF THE  
CLEAN ENERGY JOBS THAT ARE OUT  
THERE, WHAT SUBJECTS YOU MIGHT NEED  
TO STUDY AND THE SKILLS IT MIGHT  
BE USEFUL TO HAVE.



You will also find at the end of this book a glossary that will help you understand and learn important words.

Hopefully, you will be inspired by what you read and might even decide that becoming a wind turbine engineer, wind farm designer or the boss of a renewable energy company is for you!

You can, if you wish, read the book from cover to cover. Or, if the mood takes you, you can start at the back. Or you can just pick out the people who interest you most. This is your book, you choose.

If you want to learn more about clean energy jobs and the people who do them, or simply let us know what you think about this book, please go to our website [www.whenigrowupstories.org](http://www.whenigrowupstories.org).

We look forward to reading a book about your experiences working in the world of clean energy in a few years time! We are sure the world will have evolved massively by then, helped by the actions of people like you.

We can't wait to hear all about it. In the meantime, thanks for reading.

Yamina, Malgosia, Philippa, Joyce, Veronique and Chantal.

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# I'VE ALWAYS BEEN A BIT CRAZY



I've always been a bit crazy and loved inventing things, even if they were totally impractical! As a child, I spent a lot of time trying to build a perpetual motion machine. That is a machine that starts moving and never stops. But you can't do it; it is impossible to make, no matter how hard you try. The energy to keep it going needs to come from somewhere. I think my interest in renewable energy stems from these experiments as, with a little help from the wind, we can (almost) have perpetual motion.

As Head of Innovation for an engineering company, it is my job to uncover the best ideas to make our projects as sustainable as possible. For wind energy, this means finding ways to keep costs down so everyone can afford to use clean energy. It is also important to make sure wind turbines have a positive impact on local animals and people.

To do this, I keep track of the latest development in science and engineering. I help my company get ready to do the kind of jobs that we will be asked to do in five or ten-years' time. I spend a lot of

time in universities working with students and scientists, learning about new ideas and thinking about old problems in new ways. In short, my job involves lots of reading, organising and talking!

Floating wind turbines are one of the most exciting new technologies that I am investigating. These are turbines that are not attached to the bottom of the sea and can be used in very deep waters, where there is generally more wind.

We want to better understand how they will behave in places where there is a lot of wind, but also lots of waves, like off the west coast of Ireland. These conditions can make things very difficult, especially when you need to visit the wind turbine to maintain or repair it. We are looking at using robots to fix a turbine when it breaks, so you don't have to send a person out in dangerous conditions.

I really enjoy that I get to work on so many different projects with such talented people and interesting technologies. I have worked with wave tanks (that generate artificial waves of water)

and mini floating wind turbines. I've used satellite data from NASA (the American space programme) to measure the wind and had cups of tea with community groups trying to build their own wind farms. There is always something interesting to learn or someone interesting to meet.

I also love that my job allows me to live near the sea, and I go there as much as possible with my family. Even in the middle of winter I love playing on the beach with my three kids and running into the water for a swim. It is a great way to have fun after a busy week and the coast is different every time we visit.

CIAN DESMOND IS HEAD OF INNOVATION AT GAVIN AND DOHERTY GEOSOLUTIONS (GDG) LTD., IRELAND.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?



I loved biology and maths at school. The human body is more amazing than any of the machines or technologies I have worked with over the years. With maths I always felt like I was learning a language. It was a real thrill when I felt I was finally becoming fluent and understood what all the squiggles and signs meant. At university, I did a four-year degree in civil and environmental engineering, using maths to understand the world around us. I then studied renewable energy and wind energy. All in all, I was at university for eight years, but I took many breaks to work and travel, and so this time was spread over about twelve years.

Once you have the technical knowledge, the main skills you need to do my job are communicating with other people, self-discipline and curiosity. I am interested in almost everything and love learning about new technologies and telling my colleagues and others about them. Self-discipline is needed to keep focused on the jobs that need to be done. It is far too easy to get distracted, the world around us is so interesting.



CIAN, 37

# WINDS AND GREEK GODS



**M**y dream job was to become an astronaut until I attended a science class on sustainable energy.

I was shocked when I learnt about fossil fuels and the pollution we are inflicting on our own planet. That was when I decided to contribute as much as I can to creating a clean and sustainable environment.

My job is to study the wind conditions on sites where we want to build wind turbines. This means measuring things like wind speed and direction. Based on this information, I pick the best locations to place wind farms.

Each country makes a wind atlas. This is a series of maps showing where the winds are. Based on these maps, we place devices on the different sites to measure the wind over a full year to verify the wind potential.

These devices are set at the height of a wind turbine. They have an anemometer to measure wind speed, wind vanes to measure wind direction, a sensor to measure temperature, a barometer

to measure air pressure, and a data logger to record all these measurements. Recently we started using remote sensing devices SODAR (using sound) and LIDAR (using light) to measure wind.

We use all these measurements to determine how much energy a wind turbine will produce. The faster the wind speed, the more energy produced. Temperature and air pressure help us measure air density; denser air produces more energy.

India is a very sunny country and so we can mix solar and wind energy using hybrid systems where the two technologies work together to produce a reliable supply of clean energy. There's more wind at night and more sun during the day, and so the combination makes a steadier flow of energy.

My favourite part of the job is understanding local wind flows and working out how to position the wind turbines to get the maximum amount of power from them. I find it interesting how wind shapes landforms and has the

ability to change the surface of the Earth through Aeolian processes like erosion and deposition. The term Aeolian is named after the Greek god Aeolus, the keeper of the winds.

It used to be difficult for women to become engineers in India, but the situation is improving gradually. My dad was an engineer and I grew up watching him working with great passion and enjoyment. Sometimes he used to take me to his sites and show me the water tanks and roads that were being constructed by him and his team.

SWARNA PRIYA NATARAJAN IS LEAD ENGINEER AT VESTAS, INDIA.

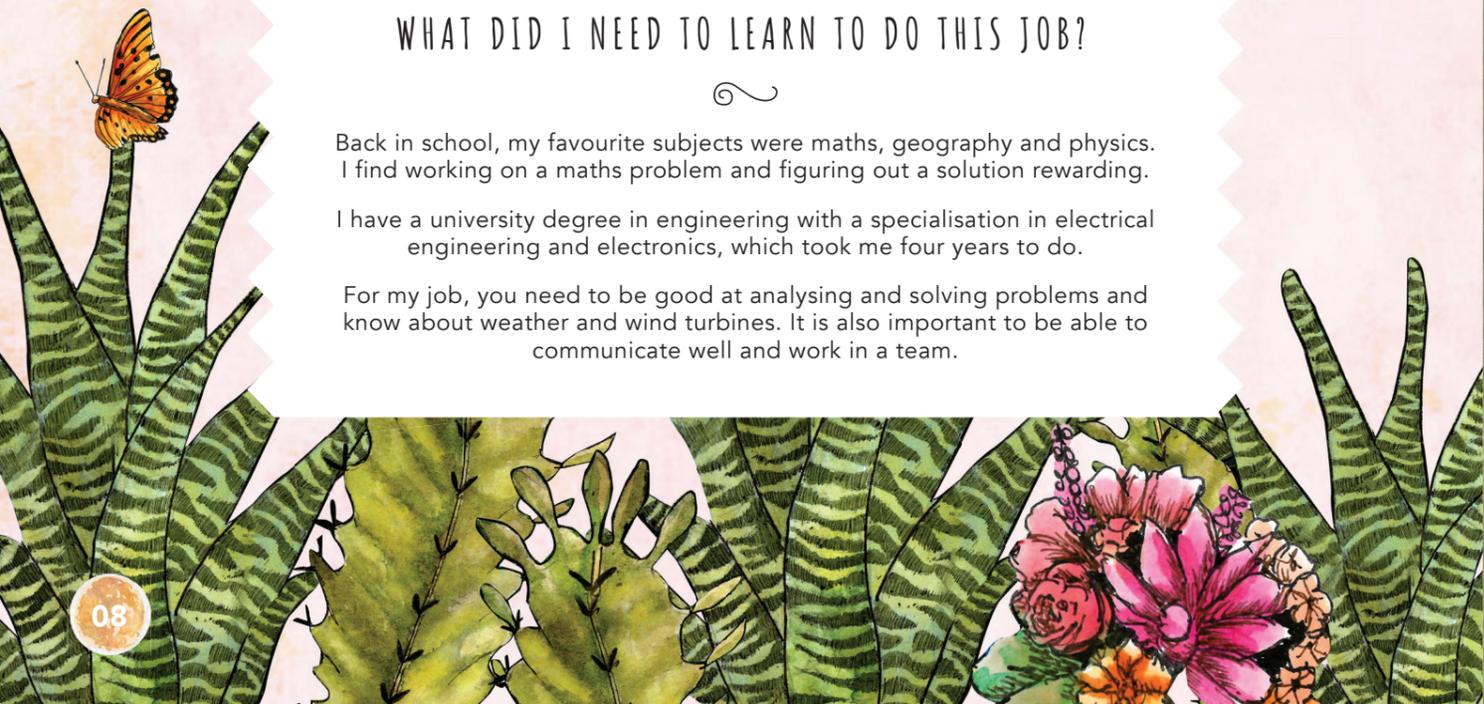
## WHAT DID I NEED TO LEARN TO DO THIS JOB?



Back in school, my favourite subjects were maths, geography and physics. I find working on a maths problem and figuring out a solution rewarding.

I have a university degree in engineering with a specialisation in electrical engineering and electronics, which took me four years to do.

For my job, you need to be good at analysing and solving problems and know about weather and wind turbines. It is also important to be able to communicate well and work in a team.



# GREENING GOOGLE



I'm passionate about fighting climate change and decided after university that I wanted to dedicate my career to that cause. Renewable energy is one of the best ways to reduce greenhouse gas emissions and stop global heating, but energy systems can be complicated to manage. This is what motivates me - fighting climate change and solving complex problems!

Google buys a lot of renewable energy because electricity is needed to power the company's apps, and it is important this electricity is clean. I help Google buy renewable energy from wind and solar farms, so the electricity needed to show you videos on YouTube or to give you directions on Google Maps doesn't produce greenhouse gases.

I do this by having conversations with lots of creative people who work on renewable energy. I speak to engineers who build wind farms, politicians who make the plans for using renewable energy and the people who keep the electricity grid running.

My challenge for the next few years will be to help Google operate completely on clean energy everywhere, and all of the time. It's not an easy problem to solve, but it's interesting, ambitious and rewarding! Google is a very exciting place to work for someone who is interested in clean energy.

Many of Google's services also help people to use less energy and reduce their carbon footprint by doing things virtually. For example, if businesses hold more video meetings, people don't have to travel as much and so they pollute less. Apps like Google Maps can also tell you the most efficient route to get home, and so you use less energy!

The favourite part of my job is getting to meet and share ideas with other people who are very motivated and passionate about climate change. By working together, we have a much better chance of fixing the problem.

Working with people from lots of different backgrounds was also important in the jobs I did before

joining Google. First, I helped governments and businesses around Europe make good plans and rules for using more renewable energy. I then did a similar job for the Irish government, helping it understand the actions needed to meet the country's climate change targets.

My home country, Ireland, is very windy and so it is the perfect location for wind farms.

I find it very inspiring and motivating to see young people like Greta Thunberg telling adults that we need to do better and end our use of fossil fuels faster — they are absolutely right!

**BRIAN DENVIR IS EUROPEAN ENERGY MARKETS LEAD AT GOOGLE, FRANCE.**

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

I first studied theoretical physics for four years at university which taught me how to think about complex problems. After that, I studied energy policy and energy finance.

To do my job well, you need to be able to explain complicated things in a very clear way, and so being a good communicator is important. You also need to closely follow what's happening in the world of renewable energy by reading lots of news articles and talking to people. Finally, you need to be quite good at maths because working in energy often means juggling lots of numbers.

At school I loved maths and physics, but music was my favourite subject. If I couldn't work in renewable energy, I would love to be a composer of soundtracks for blockbuster movies!



BRIAN, 34

# I DREAMT OF A JOB THAT DIDN'T EXIST

**M**y job is to make sure my company has all the right permits to build wind farms. When I was little this job did not exist, but I am very glad that it does now! Today, working in the wind industry is my dream job because it does not feel like a job. It's fun. In particular, I enjoy going to the places where we want to put wind turbines and meeting the local landowners and residents.

With the landowners, I talk about how long it will take to get the permits we need and we establish relationship talking about their families and their farms. Landowners are always curious about the wind turbines, how big they are, how they work, how much power they produce.

In South Africa, we are very lucky to have lots of space and lots of wind, and so it is generally easy to get permission to put up wind turbines. When we need to convince people, we explain to them how good wind energy is for

our country and our planet. We also make sure they understand that wind turbines do not harm nature if they are built in the right way.

I became interested in renewable energy 11 years ago when the industry first started in South Africa. One of the most amazing experiences is climbing up a wind turbine; it feels like you are standing on top of the world.

I have twins and they couldn't believe how big the turbines are when I took them to visit a wind farm. They said they looked like giants standing in the wheat field and that they reminded them of the film "The Iron Giant". They also loved the shape of the blades.

At home, we try to live a low-emissions lifestyle, walking to work and school instead of driving as much as we can. We grow many of the vegetables we eat and we plant lots of shrubs and trees in our garden.

I believe the world needs more green energy. The wind industry is very exciting and I want to be a part of a changing world. I also think it is very important we get more women working in the industry as only a fifth of employees in the wind energy sector are women.

When choosing the job you want to do, you should follow your dreams because sometimes the job you dream about has yet to be created. More generally in your life, think carefully about what you use and what you need. Our planet only has so much to give. It is important we give back to nature. Plant gardens and trees if you can.

MERCIA GRIMBECK IS HEAD OF PROJECT DEVELOPMENT AT ENERTRAG, SOUTH AFRICA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

Biology was my favourite subject at school. When I was older, I went to the University of Cape Town in South Africa to study finance for three years. Later I went back to university to study environmental science.

For my job you need strong analytical skills (figuring things out) and to be good at problem solving and communication.



# A LIFELONG FASCINATION WITH WINDMILLS



I have had a lifelong fascination with wind power. I'm Australian and when I was five my family went on a four-month camping trip around the country. My mother tells me I spent a large part of it excitedly watching out for farm windmills and learning how they were used to pump water.

Later, when I was eight, I was told at school about the environmental problems the world was facing and that it had to be our generation who solved them. I stomped around the playground afterwards furious that adults were wasting time telling children about these problems, rather than working on solutions like wind energy.

Growing up, I wanted a job that would have a positive impact on the world. And now here I am, designing wind farms.

In my work, I have to consider complex combinations, such as the placement of turbines to ensure they produce the most electricity and to minimise their potential impact on farming and nature. I care a lot about nature and animals. My mother and aunt run wildlife shelters, where they care for wild birds, possums and the occasional koala! Wombats are my favourite animal.

Another part of my job is helping decide what to do with old wind turbines. Like all machines, they wear out over time. Some of the oldest wind farms in Australia are now reaching the end of their life. We aim to recycle used parts and reuse the sites, generally constructing new wind turbines on them.

Nobody builds a wind farm on their own. It needs people who understand the electricity business, finance, legal and environmental issues, as well as local communities, and construction and maintenance companies. This means I work with all kinds of people, which means I never get bored!

Wind turbines are expensive to build; a modern one costs over €6 million. To avoid wasting money, lots of time is spent negotiating where and how to build a wind farm. If the electricity produced ends up being too expensive, it can't compete with other sources of power.

In these negotiations, you never get everything you want, but everyone has an interest in the project being successful. It is important to always treat everyone with respect even if you don't necessarily agree with them – the

chances are you will be working with them again on another project in the future.

I like to see girls getting involved in the sector, and in STEM (science, technology, engineering and mathematics) more generally. In our company, I lead discussions on how unconscious attitudes towards women may discourage them from working in our field, and how to overcome such attitudes. People still often think that only men can be engineers!

Ultimately, I encourage girls to study science, maths and physics because they are interesting subjects that can lead to fascinating jobs with a real impact on society.

KATRINA SWALWELL IS PRINCIPAL IN THE POWER GENERATION TEAM AT AURECON, AUSTRALIA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

I really liked English, physics and maths at school and decided to study science at university. During the ten years I spent at university, I chose subjects I enjoyed the most. I got better marks in chemistry than physics, but chose to continue my studies in physics because I liked it more.

I believe the secret to studying anything is persistence. I still do some lecturing at university and I love working with students and seeing when a concept they had been struggling with finally "clicked" for them. You don't have to be the best student to have a really interesting career. Some of the best engineers I have worked with didn't get the top marks at university, but they are really good at coming up with practical solutions to problems.



# A LOVE OF PHYSICS LED ME TO CLEAN ENERGY



**M**oney doesn't grow on trees, goes the old saying, but money can help trees grow - and pay for wind and solar farms - all of which are vital in the fight against climate change. The main mission of the European Investment Bank (EIB), where I work, is about helping fund projects that will bring down greenhouse gas emissions and protect people and places against the impacts of climate change that are already happening.

The EIB is owned by the 27 countries of the European Union (EU) and we finance large projects that will benefit Europe's citizens. Recently, we made an important decision to become the first bank in the world to stop giving money to projects that could have negative effects on the climate and to focus on those that have a positive effect.

This is why we are also called the EU Climate Bank.

To make sure we can fulfil this mission to the best of our ability, the EIB doesn't just rely on bankers, but employs a whole

range of people including engineers, economists, lawyers and environmental experts.

My job is to help make sure we spend the bank's money on the best projects. The bank receives lots of proposals from different countries and regions wanting money to build wind and solar farms. I look at these ideas and see which ones we should support. Last year, we invested in over 200 energy projects. Together, they supplied clean electricity to almost nine million homes!

To decide which are the best I look, with my team, at the technical aspects of the project. How large are the blades of the wind turbines? Are they the right ones for the wind conditions in a certain area? How much electricity will they produce?

We also want to make sure wind and solar farms do not in any way harm nature or wildlife in the fields where the turbines and panels will be installed. We check, for instance, whether birds flying in the area would be affected by blades rotating.

Thirdly, we want to learn what people living nearby think about the project, if they have any concerns or questions and if these have been taken into consideration.

Even though we are a European bank, we also support the growth of clean energy further afield. I am particularly proud of two projects in Africa. One is a wind farm in Kenya and is the largest ever built on the continent, and the other is a solar plant in Morocco which is one of the largest one of its kind in the world!

I am proud of these projects because they will help Africa produce more clean electricity and supply it to homes where many people today still live without any access to electricity.

I like my job because I feel I am contributing something positive to the world. I like seeing our projects come to life, and watching the people in my team improve and learn. I also really like working with people from many nationalities and cultures, both from Europe and elsewhere. I lead a team of 15 people from eight different nationalities. I also travel to our project sites and get to see lots of new places and meet different people.

I go to work by bus or by bike, and the next car I buy will be electric and I will charge it with renewable electricity!

ALESSANDRO BOSCHI IS HEAD OF THE RENEWABLE ENERGY DIVISION AT THE EUROPEAN INVESTMENT BANK (EIB), LUXEMBOURG.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?



For many years, I did not really have a favourite subject and just liked going to school to make friends and do sport. But as I got older, I had a fantastic teacher, who led me to really love physics. I was fascinated by the different forms of energy and the laws that govern them.

I went on to study electrical engineering at university as I wanted to better understand how we produce and transport electricity. After that, I studied business administration to understand how to run a company.

However, it was only after I had been working for some years that I realised that the future of energy could only be renewable. In my job, aside from knowing about renewable energy, you need to be good at managing and motivating different people. It also helps to speak different languages.



# HAVING A POSITIVE IMPACT ON SOCIETY

I'm from Ituiutaba, a small city in the state of Minas Gerais in Brazil. Learning was always a guiding force in my life. When I was 17, my whole family moved to Uberlandia, another Brazilian city, so I could study in a university.

I went from being a university student to wanting to be a university teacher. But then I got a job in the electricity sector instead. I'm glad I did because I ended up as president of the Brazilian Wind Energy Association. Wind energy is very important in Brazil and we really like it; it is the second source of electricity in the country and we have more than 8,000 wind turbines.

In this job, I get to help Brazil have a better future by using even more wind energy. Happily, I also get to give some classes to university

students like I always wanted. I teach them about wind and other renewables and how these energy sources are growing in Brazil. Every week the country has more and more wind farms.

As the president of the wind association, I work with the government, companies and all kinds of specialists to increase the amount of wind energy in Brazil. I help politicians and businesses answer any questions they have about wind power. I really enjoy meeting such a variety of people.

I especially like explaining how clean energy can bring jobs and money to communities living in places far away from large cities.

In my work, it is also fundamental to be able to talk with lots of different people and explain things

clearly to them. This is especially important when people don't think or feel about things in the same way as you.

Finally, it is important to understand the impact your work has on society. In the case of wind energy, it is fabulous to know that this impact is positive.

ELBIA GANNOUM IS PRESIDENT OF THE BRAZILIAN WIND ENERGY ASSOCIATION ABEEOLICA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

I've always enjoyed learning and at school I liked all subjects, but maths was my favourite. At university, I studied economics for four years, followed by electrical engineering.

Even as president of the Brazilian Wind Energy Association I have not finished studying and that will never happen. Right now I am learning about the use of hydrogen to generate power because this will be a technology that will be used a lot in the future.

It doesn't matter if you want to be president of an association, head of a company or a researcher, what matters most is to ask yourself if what you want to do can have a positive impact on other people.



ELBIA, 42

# BEING GOOD AT MAKING NEW THINGS

I'm an inventor. I create new wind power technologies to fight climate change. I built my first wind turbine in 1976, and in 1978 I designed one of the first modern wind turbines we use today. Back then, this was all very new and we had no idea that wind turbines would become a big source of energy all around the world. What's happened since is amazing and I am very happy and proud to have been part of this story from the beginning.

When I started building wind turbines it was not because of climate change, but because Denmark wanted to be able to generate its own energy instead of importing it from oil-producing countries in the Middle East.

Concern about climate change only really began in the late 1980s. I realised very quickly that wind power was an answer to the problem, and from then on I felt that I was part of something much bigger than just a mid-size Danish company.

I believe there are two very important solutions to climate change.

First, we must stop carbon dioxide emissions from fossil fuels being released into the atmosphere. We can do this by replacing fossil fuels with renewable energy.

Secondly, we need to make systems that can extract carbon dioxide from the atmosphere.

While we are already well advanced with clean energy solutions, technologies to remove carbon from the atmosphere still need a lot more work.

Wind is an important renewable energy. Windmills have been around for a thousand years or more. The first windmills that were made to produce electricity were invented by James Blyth in Scotland and Poul la Cour in Denmark, around 1890. More advanced versions, looking much like today's turbines, appeared in 1940 and the really modern wind turbines came to life at the end of the 1970s.

As for me, I became an inventor by chance; I just started fiddling around and discovered that I was good at making new things. I am not an engineer, but I work as if

I were. It is great fun! The most interesting part of my job is when I am figuring out new solutions together with my team. In fact, I have written it into my company's description that we have to make climate solutions, we have to create jobs and we have to have fun!

Being the boss has its good and bad sides. It is good because you can decide the best way to do things and make sure the people working for you are happy in their job. But it is bad in the sense that you have all the responsibility and, if you don't do your job properly, a lot of people can get hurt.

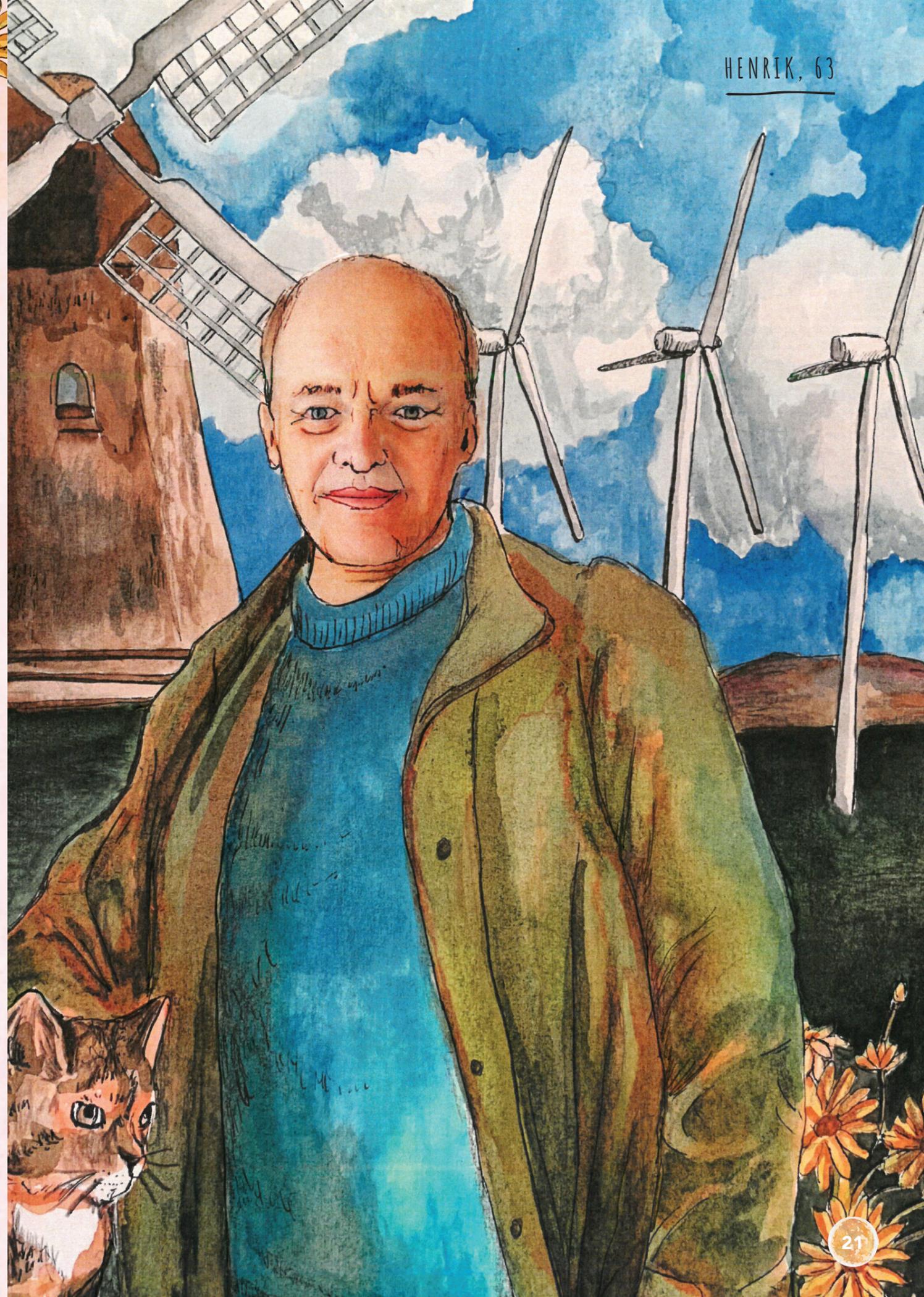
HENRIK STIESDAL IS INVENTOR AND FOUNDER AND HEAD OF STIESDAL OFFSHORE TECHNOLOGIES, DENMARK.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

My favourite subjects at school were physics, history, Danish, geography and biology.

I went to university, but I never graduated. I did about two-thirds of the studies to become a doctor before figuring out that it was not for me. I changed to physics and biology, but never got around to finishing the degree as my work in wind power was taking up all my time.

To build wind power technologies you need a good understanding of physics and a good understanding of people.



# A GREAT TEACHER CHANGED MY LIFE

**T**ake notice of your teachers! Nobody in my family had ever been an engineer, but when I was choosing what to study in university, my physics teacher at school suggested I think about engineering. I am very grateful to her as she set me off on an amazing career path that has led me to where I am today.

I work for DNV, a company which provides technical advice to people building solar and wind farms or operating electricity grids. For example, if the owner of an electricity grid wants to know how much energy a wind farm will produce, how long it will last, where to put it, or how to adapt the electricity grid, we do the calculations to answer such questions. I am responsible for developing new ways to answer these questions more accurately and more quickly.

The most important project I am working on is called the "digital transformation", which means finding ways to use computing to do things faster and better than humans. It is similar to how schools now use computers and digital whiteboards instead of big encyclopaedias and messy blackboards. This kind of technological change has been really impressive in the wind industry over the past 30 years. Wind turbines today are more than

40 times more powerful than they were when I started working. It is exciting how wind energy has gone from being relatively unimportant to playing a big role in providing our electricity.

In the UK, many people used to dislike wind turbines. Now though, we have a lot of turbines out in the sea and we get more than 15% of our electricity from wind. In Spain, they get more than 20%. It is exciting to be part of such big changes.

One of the best aspects of my job is working with people from around the world. In the same day, I might speak to someone from India in the morning and to someone from California in the late afternoon – I love that diversity of culture!

People around the world care about climate change. They often feel they can't do much about it, but there are lots of things we can

all do to make a difference. For example, we can encourage our governments to act against climate change by making it clear we want them to reduce carbon emissions.

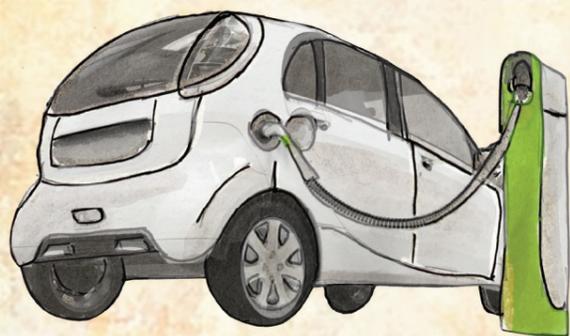
You can help make this happen by writing to your local politician to ask them to build more wind farms, to set up lots of charging stations to make it easy to use electric cars and to create safe and convenient bike lanes to make it easy to cycle.

LUCY CRAIG IS SENIOR VICE PRESIDENT OF GROWTH & INNOVATION AT DNV ENERGY SYSTEMS, THE NETHERLANDS.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

I loved French, maths and physics at school. When I went to university, I first studied electrical engineering and then I specialised in power system engineering. Next, I combined the two by studying electrical engineering for wind turbines.

As my job has changed, so have the skills I need. In the early years, I mostly needed my engineering skills. Then when I started managing projects, I had to be good at planning and organisation. As I have become a more senior manager, it has become more important to be good at dealing with different people and to be able to build strong teams and motivate them.



# SCIENCE AND CREATIVITY MAKE FOR A HEALTHY PLANET

**P**rotecting the planet needs to begin with ourselves. I have followed this belief all my life and I am now 80 years old!

My job is to develop the best ways to use wind energy with the goal of protecting the environment, limiting climate change, producing green energy and improving human health and wellbeing. I love my job very much and it is an important part of my life.

I mainly conduct scientific research and help university students learn about wind engineering and aerodynamics (the way air moves around things). I do a lot of reading in the library or my office, carry out tests in the wind tunnel (a device that generates artificial wind), give lectures and tutor students in the classroom, and write papers or reports at home.

Around the year 2000, it became clear to me how important it was that we respond to climate change and reduce carbon emissions. We need to replace fossil fuels with renewable energy and reduce greenhouse gases. To make this happen, a lot of different people need to cooperate.

As the leader of a wind energy association, I must have a vision and see the "big picture".

Like the conductor of an orchestra, I have to organise and coordinate each person in the team, while working for a common goal. I have to believe in what I'm doing while caring for my colleagues. I live by these goals in my work and in my personal life. I took my two grandchildren to visit and learn

about wind farms, so they could see what protecting the planet means in their own lives. I hope all young people will understand that we must develop and use renewable energy to keep our planet clean and healthy.

HE DEXIN IS PRESIDENT EMERITUS OF THE WORLD WIND ENERGY ASSOCIATION AND HONORARY DIRECTOR OF CHINA WIND ENERGY ASSOCIATION, CHINA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

Maths, physics, nature and art were my favourite subjects at school. Literature and science complement each other. Culture and art can feed our scientific and creative thinking.

I studied aerodynamics at Northwestern Polytechnical University in China. I also enjoyed languages; I studied English and Russian.

In my job I need to carry out scientific experiments properly. To be an excellent scientist, you need to believe in your dreams. You need to be hard working, patient and creative, and want to continually improve things. You also need to have team spirit and a healthy body.



# THE COAL MINERS' FRIEND



I always wanted to be helpful. As a child I thought the best way to do this was to become a policewoman, but instead I ended up helping coal regions.

If we are to halt global warming caused by climate change, we must stop digging up and burning coal, and instead use clean sources of energy such as wind and sun. This means that coal miners in regions like Katowice in Poland, will have to find new jobs.

My role in the European Commission is to help such regions create new jobs and opportunities for people. I had a lot of experience working with fossil fuel industries, where the number of jobs is decreasing. My current boss thought this experience could be helpful to the Commission.

The European Commission is based in Brussels, the capital of Belgium, and it proposes and implements laws and rules that apply to all 27 countries in the European Union. The Commission is working to implement the European Green Deal to make our continent a cleaner, more sustainable place to live. I am part of the team which coordinates this massive task.

There are 180,000 people working in coal mines in Europe. I can't help them all personally. My job is to suggest ways the European Commission can help national governments and regions create new jobs for these people.

Coal miners often think they can only work in coal mines, but in reality they are very skilled workers and highly trained in operating sophisticated machines, working in difficult conditions, respecting health and safety codes and many are also trained electricians. With a bit of retraining, they could easily work, for example, as technicians on wind turbines.

By 2050, we want Europe to have no negative impact on the climate and the environment, so we can all live safer, healthier lives. But to achieve this vision, people need to have the skills necessary to work in new renewable energy jobs.

Though I feel very connected to Poland and my family, I've always wanted to study, work and live in different countries and meet people with different cultures, speaking different languages and living different lives. When I lived in Poland there was very little ethnic diversity and everyone looked similar. It made me want to know what the rest of the world looks like.

I lived with a host family in France from the age of 15 and this is also where I went to high school and

did part of my studies. I then lived in Cardiff in Wales and in Bruges in Belgium, where I went to university. From there I moved to London in England, where I started working.

I come from a coal mining region. My great grandfather worked in the coal mines in Belgium as a seasonal worker and my grandfather still today plays in a brass band in a coal mine. So in my job I find it very interesting to travel to coal mining regions around Europe and see how, despite so many cultural differences, there are also so many similarities.

ALEKSANDRA TOMCZAK IS A MEMBER OF THE CABINET OF THE EXECUTIVE VICE-PRESIDENT OF THE EUROPEAN COMMISSION, BELGIUM.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?



Back in school, I think maths was my favourite subject. I also liked being part of a school choir.

I went to three different universities, where I studied political science and European law. It took six years to complete my studies. I wish I could go back to university again - I love learning, and it is also where I met my closest friends.

In my job, the most important skills are listening, reading, writing and speaking. In my job it is important to be able to quickly understand complicated legal texts, negotiate, write speeches and communicate with colleagues and stakeholders from different countries and backgrounds. I speak Polish, French and English well, and I can also speak some Spanish and Bulgarian.



ALEKSANDRA, 34

# FROM HELICOPTERS TO WIND TURBINES



I teach how wind energy works. I work with students, scientists, engineers and researchers. My students are very enthusiastic, and my colleagues are full of ideas and creativity. A lot of people think being a university science professor must be very dull, but it is not. You get to make things and you have to come up with new ideas.

I used to be a professor of flight mechanics, which meant I worked a lot with helicopters. Helicopters are very complicated and sophisticated machines, but some of the technologies used to make them fly are also employed to make energy from wind.

For me, wind energy is a new and exciting area to work in!

As a professor, I spend more time doing research than teaching. But teaching can be fun.

For example, I use scaled models of wind turbines to show the students how wind energy works. My students use these mini versions of wind turbines to do experiments in a "wind tunnel",

which is a laboratory that generates artificial wind. This simulates what happens to wind turbines in the real world and my students do all kinds of interesting experiments with the tunnel and the models.

All this makes my course pretty popular with the students!

PROF. CARLO L. BOTTASSO, PH.D., IS CHAIR OF WIND ENERGY, TECHNICAL UNIVERSITY OF MUNICH, GERMANY.

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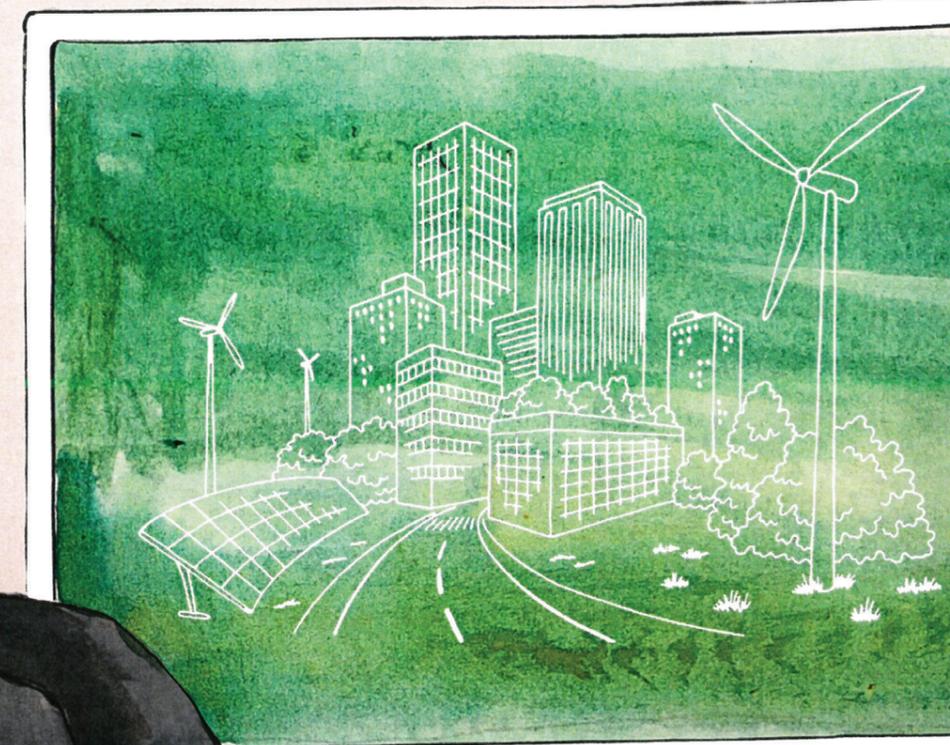
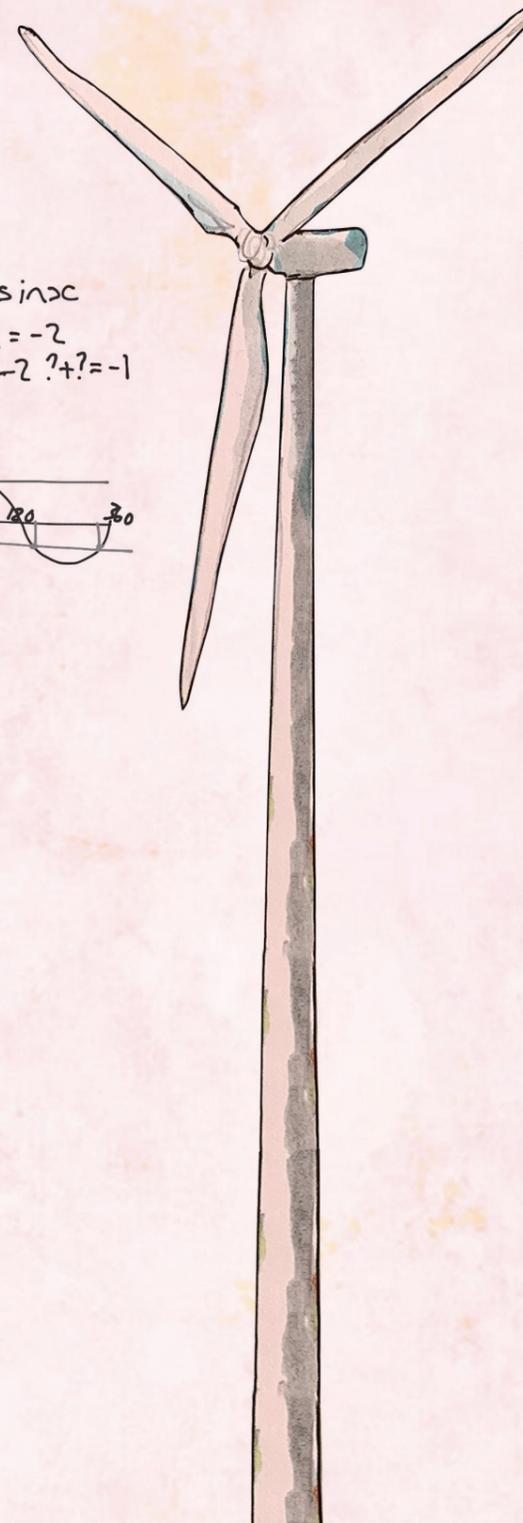
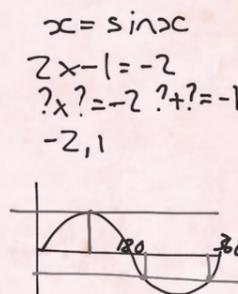
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## WHAT DID I NEED TO LEARN TO DO THIS JOB?



My favourite subject at school was maths, but I enjoyed all technical subjects. I studied aerospace engineering at university for eight years. Wind energy is very multidisciplinary, which means you have to put together different types of knowledge and skills such as aerodynamics (how air moves around things), structures, materials and electrical engineering.

If you want to work in renewable energy, I think it is good to know about engineering and maths. If you want to become more specialised, you can take courses in wind energy and become a real expert.

CARLO, 58

# GUARDIANS OF THE LAND

I first heard about climate change when I started secondary school at the age of 12. However, growing up on a farm, I was always very aware how important it was to look after the countryside and the wildlife that lived there.

Both my dad and grandad were farmers and they used to speak about being the “guardians of the land”. My dad described this as having the responsibility to safeguard the land and to pass it on, in better condition, to the next generation.

This way of thinking really inspires me to remember that we are responsible as humans to improve the planet, not damage it, for you, our kids.

I joined my company as I knew that climate change was happening, that it was real, that we had to change the way we made electricity and that renewable energy was important for solving this problem. I began 12 years ago on the

company’s finance team and, over the years, I worked my way up to the top of the company.

I love that I am working to improve things, to build a better future for all children, including my own. I imagine a world where you will tell your children about climate change in the past tense, that it was an enormous challenge we faced, but that people worked together on solutions to combat it, and that the problem has now been solved. That thought motivates me every day.

As Chief Executive Officer (CEO), I am in charge of the whole company, which builds wind and solar energy projects. We have offices in Chile, South Africa and Asia, and so I spend lots of time speaking with my colleagues around the world.

I am generally very busy at work and at home. I have three young children, and people often ask me if it is difficult to be a mother and run a big company. It can be

challenging but I don’t think it is more difficult for a woman, even as a mother, to lead a company, than a man.

Since childhood, I have always thought that women can do what men can do.

If I am the only woman in a room full of men, I like to think that my contribution can make a difference.

I do hope, though, that by the time my daughter is old enough to find a job, it won’t happen very often that she is the only woman in the room!

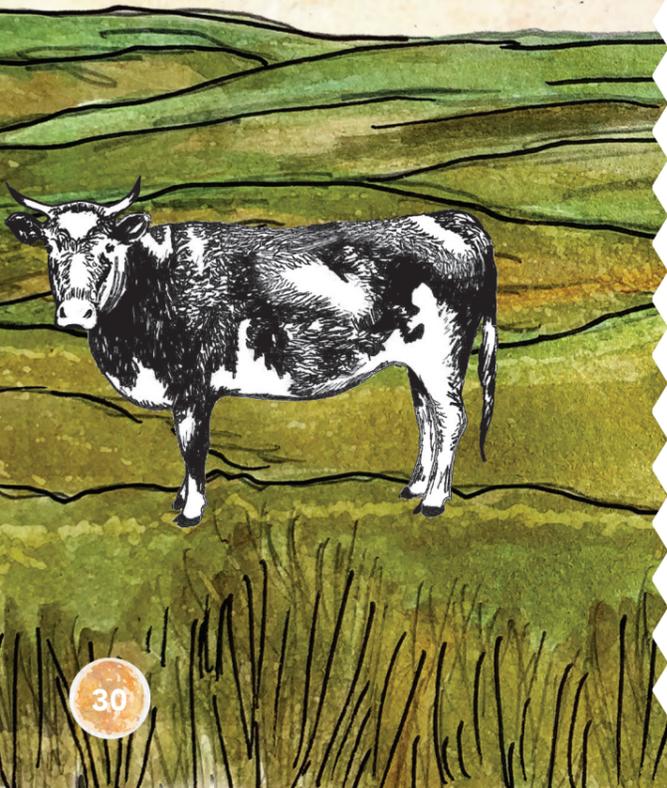
MARY QUANEY IS GROUP CHIEF EXECUTIVE OFFICER AT MAINSTREAM RENEWABLE POWER, IRELAND.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

At school I loved maths, economics and French. At university I studied business and French for four years, and then I did a one-year master’s in accountancy (aimed at helping companies to manage their money).

It is important for me to be able to manage people well as we achieve more if we work together. I have to be good at encouraging and motivating my colleagues. To do this, I need to explain things clearly and listen carefully.

I remember the advice of one of my teachers: ‘study what you are interested in and start from there’. I would pass that on. If you do what you enjoy and are interested in, and work hard, then you will end up in a job that you like.



# PROTECTING OUR PLANET FOR FUTURE GENERATIONS

Even as a young child I felt that I belonged to every part of our beautiful planet. I am from Africa as I have an Algerian dad and I am from Europe because I have a Czech mum. I was born in a small town called Teplice in the Czech Republic. It is a wonderful place surrounded by forests.

Today I live in Abu Dhabi, the capital of the United Arab Emirates, surrounded by the sea and the desert. There are no forests here! Over the years, I have also lived in Algeria, France, Austria and the United States, and I speak five languages, Arabic, Czech, French, German and English.

I'm the director of something called the Knowledge, Policy and Finance Centre at IRENA, the International Renewable Energy Agency. The centre studies what governments should do to grow renewables and IRENA supports countries in their transition to sustainable energy.

The most interesting part of my job is convincing governments of the importance of using more renewable energy to protect our planet for future generations.

My colleagues and I talk with important people who make decisions about energy in their countries. We study local conditions and how renewable energy can be used and then propose the best ways to make more renewable energy.

We all need energy for light, heat and to get around. We need it to keep ourselves warm during the winter and cool during the summer. We need energy to charge our phones, to play video games and to bake nice cakes. But the best energy comes from the wind and the sun, or from other natural sources, as it does not pollute the planet.

The energy sector is responsible for 70% of carbon dioxide emissions from oil, coal and natural gas, which cause climate change. With renewable energy we can drastically reduce these emissions.

As well as providing clean energy, renewables provide jobs for many people.

Like every other sector, renewable energy requires different people with different talents. That of course means women need to be involved. More women work in

renewables than in other parts of the energy sector, but we still need more of them in this workforce. I like to see girls given a chance to become doctors, engineers, astronauts, company directors or anything else they wish to be.

RABIA FERROUKHI IS DIRECTOR OF KNOWLEDGE, POLICY AND FINANCE CENTER AT THE INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA), UNITED ARAB EMIRATES.



## WHAT DID I NEED TO LEARN TO DO THIS JOB?



My favourite subjects at school were history and philosophy. I went to university, where I studied economics and political science for twelve years to get three diplomas.

The main skills needed for my job are writing, understanding economics (how money is created and used), leading teams, figuring out the energy needs of different countries and strategic thinking (thinking of how different things interact in the long-term).



RABIA, 58



# ALL PATHS LEAD TO THE SEA



**T**he sea is the one big constant in my life. I was born in France in a small city nowhere near the sea, but I have always sailed and it is where I feel closest to nature. Now, I live with my family on the east coast of Denmark, in a city called Aarhus, which is a great place for sailing. I help build wind turbines in the sea so they can be used to produce clean electricity. For me, it is the perfect job!

I used to go offshore to visit the turbines at sea in my past job, but now as the big boss, or the chief executive officer (CEO), I spend most of my time in the office and in meetings. But I like to escape to the sea with our customers when I have the chance!

Building wind turbines in the sea is like making a massive Lego construction. We have to be very precise because the components are seriously heavy. Each blade weighs 40 tonnes, equivalent to the weight of 10 elephants, and the

nacelle (the little box on top of the wind turbine), to which we attach the blades, weighs more than 500 tonnes or 100 elephants!! To manage the construction, we use a crane mounted on a special boat with long legs that go all the way down to the bottom of the sea to make sure the boat is stable when we lift the big components. We first build the foundations, the feet and the legs, before adding a tall tower, the body of the wind turbine, and at the top of the tower, we put on the nacelle, the head or face of the turbine. Finally, we attach three blades to the face's nose.

In the future, turbines may be even bigger than they are today, but they will also look simpler. There will be so many turbines that we need to find the simplest ways possible to install them and to keep them working. We will need to use similar components in all turbines and to use robots or drones to inspect and even repair them.

My job is so exciting because these offshore technologies (the wind turbines at sea) can help reduce carbon dioxide emissions that contribute to global warming. We may not be able to stop climate change, but we can reduce its consequences and not put the lives of millions and millions of people at risk. We need to put all our intelligence and efforts to live on this planet in a more sustainable way. It is our home, there is no Planet B.

PHILIPPE KAVAFYAN IS FORMER CHIEF EXECUTIVE OFFICER AT MHI VESTAS OFFSHORE WIND, DENMARK.



## WHAT DID I NEED TO LEARN TO DO THIS JOB?



My favourite subject at school was physics, but I also liked literature and history. After school, I went to two engineering schools in France. I studied there for six years in total, but I needed breaks in between, and so I studied three times for two years.

Offshore wind projects take many years and so one of the most important skills you need is anticipation, to be able to plan what will happen next.

The second most important skill for my job is probably coordination between different people: to help, for example, the finance people communicate with the engineers and the recruitment team.

Finally, you need to bring positive energy and passion to work, people only do well what they like doing and so it is important to do a job that motivates and pleases you.



PHILIPPE, 53

# TOUGH CABLES THAT CAN TAKE A LOT OF TWISTING

I have always loved science, and as a child I was interested in space-related topics. What amazed me the most were the videos of the people in the control tower during rocket launches, especially during the countdown. I don't work at NASA, as I once dreamt, but I am very happy working as an electrical engineer.

I carry out studies on electrical infrastructure, such as generators, power lines and anything related to energy consumption, to help companies and the government make decisions about renewable energy.

In a wind turbine, there are many cables that need to be fully understood. Some cables are related to control systems, others to communications or batteries.

The most important cables are those that carry electricity from the generator in the nacelle (the box on the top of the tower) to the transformer on the ground. These cables have to be very tough. The upper part of the wind turbine rotates to follow the direction of the wind and so the cables have to take a lot of twisting.

It was challenging for me to get to where I am today. Several times I was told I couldn't become an engineer because I was a woman. However, I never listened to the people who told me this. Instead, I studied hard, made lots of good friends, graduated from university and found work in the area that I was interested in, namely energy. Even though women are not yet seen as equal to men in Argentina, the country is going through an

amazing process where lots of old prejudices about what women can and can't do are being questioned, and I am confident that in some years, the situation will be much more equal.

NATALIA ZACUR IS AN ELECTRICAL CONSULTANT, ARGENTINA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

My favourite subjects at school were maths, physics and music. I went to university to become an electrical engineer, and I recently started studying again for a master's degree in renewable energy, specialising in wind energy.

For my job, you need to know a lot about applied science (science that you use) and maths, be very organised and be good at working in teams. I am very curious and I always like to learn new things. I'm also very good at speaking in public and explaining technical things to different people.



# SAVING THE PLANET CAN BE GOOD BUSINESS



I work for a company that brings clean, green, renewable energy to the world. I always dreamt of having a job that could make a positive impact, and I love being able to show people and companies that they can make money while saving the planet for many generations to come, with projects that are clean and green.

I don't actually build solar panels or wind turbines, but I help sell my company's products by explaining to people why, in the long term, it is better for them and for the climate to invest money in renewables, rather than in fossil fuels.

When people buy a house, for example, they pay for it over many years. It is important to show our customers that over the long-term buying renewables offers much more value than spending money on oil or coal.

I like meeting with our customers. I like learning about the energy problems they have and demonstrating how technology can solve them.

The other part of my job that I love is travelling. I've been lucky enough to visit 40 countries. I was born and grew up in India, spent some time in France, and today I live in the United States.

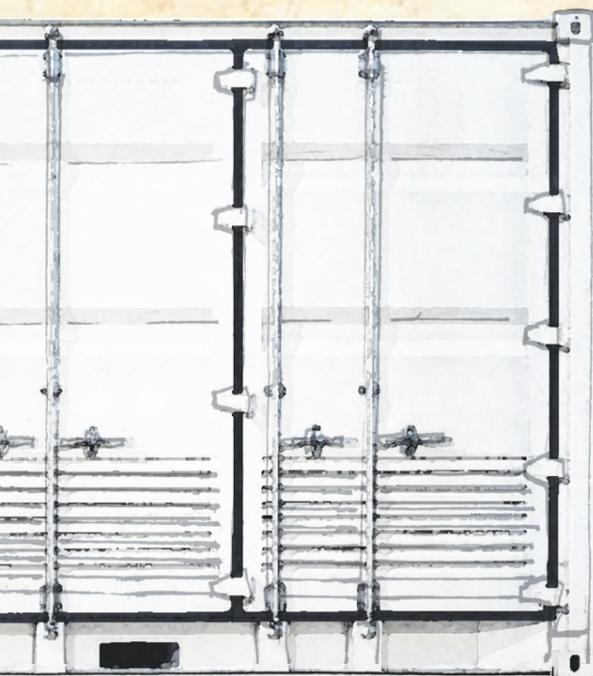
Learning about new cultures is super interesting and perhaps that is why I married my wife, who is Ukrainian-American. I speak four languages, English, some Russian, plus Tamil and Hindi, which are spoken in India. My wife speaks Ukrainian - we are very multilingual in our house!

I'm also very proud that my children care about the planet. My 13-year-old daughter is an

environmental activist, and my seven-year-old daughter is a vegetarian. My wife and I try to teach them about the importance of protecting the climate. I drive an electric car, which runs mostly on electricity from the solar panels on the roof of our house.

At university, I had a professor who taught us about solar energy and made us write a report about how much potential it has. That is what got me interested in renewables and helped me become the person I am today. I'm very glad I met him.

**BALKI IYER IS CHIEF COMMERCIAL OFFICER AT EOS ENERGY STORAGE, UNITED STATES.**



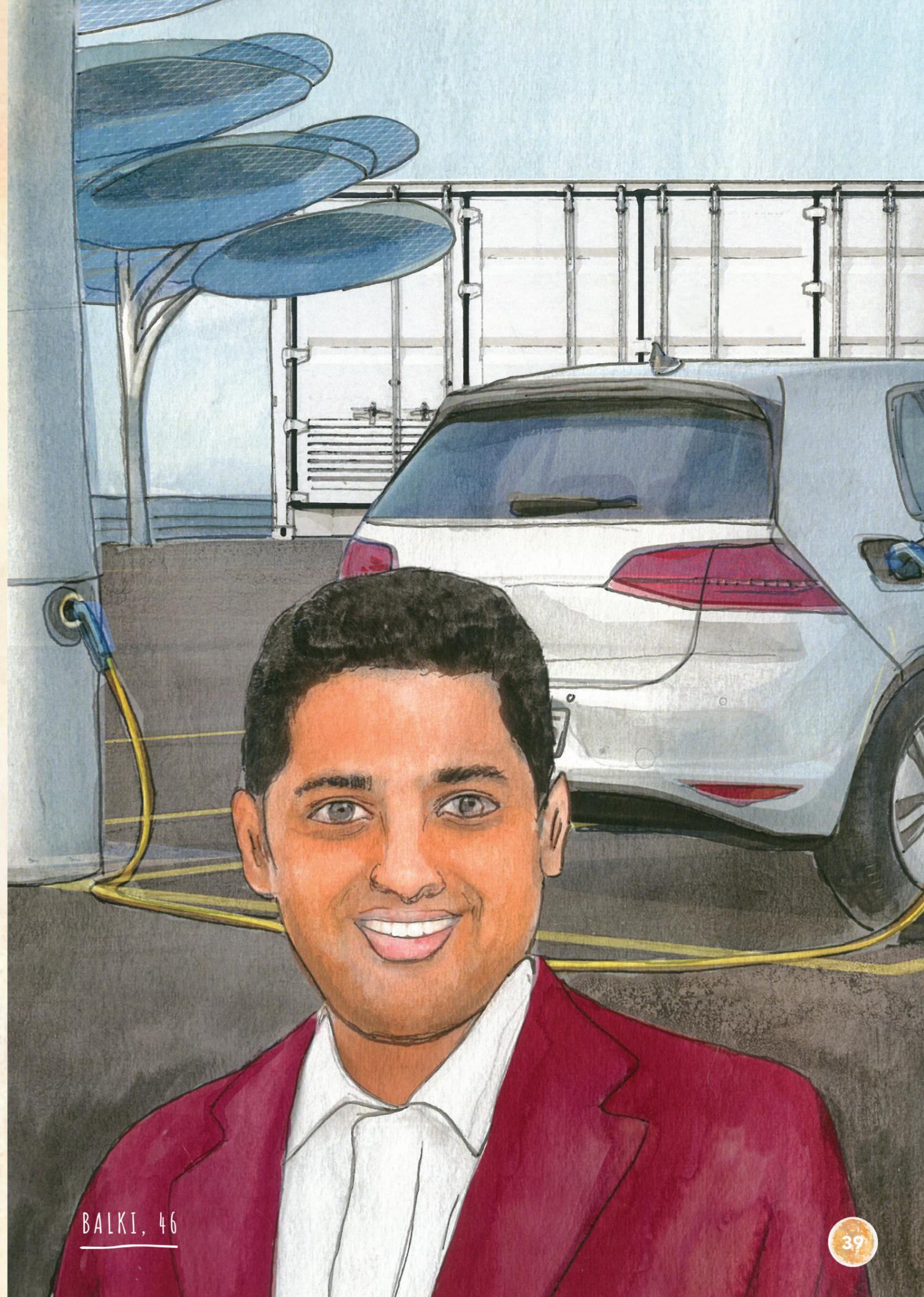
## WHAT DID I NEED TO LEARN TO DO THIS JOB?



When I was at school in India, maths was my favourite subject because you knew you were either right or wrong.

After school I went to three universities. First in India to study mechanical engineering. I then moved to the United States where I studied chemistry, engineering, and then business. In total, I spent nine years at university.

In my job, you need to be very organised since you juggle many things at the same time and be passionate about what you do.



BALKI, 46

# LAW GOT ME TO WIND

People used to say 'renewables are fantastic, but they are too expensive'. It is incredible to see how that has changed in the last 10 years. Renewables, especially wind, are able to compete against coal, against nuclear, against all other energy technologies.

I sell wind turbines throughout Africa, but especially in South Africa where I live. I started out studying law - I wanted to protect people's rights - and management. It was just as I was finishing my studies that the renewable energy programme in South Africa was starting out. And that's how I ended up in renewables.

My legal studies come in handy in the work I do now. First, there is a lot of work with big voluminous contracts and I'm trained to deal with that. Also, I have a good understanding of the implications of anti-corruption and anti-bribery laws, and what to do, or not to do, to make sure we don't accidentally break any rules. Most importantly, law teaches you to identify very quickly the key issues of a given situation.

The sale of wind turbines is a complex affair involving all kinds of technical considerations and the specifics of each location and client. But it is not just about data and technicalities, it is also about people's lives and politics.

For example, renewables are replacing coal, but a lot of jobs and places are still dependent on coal in South Africa and in some other countries. People have concerns about that. We have to take their worries into consideration and make sure our clean energy projects contribute positively to local development by creating jobs and buying local goods and products.

The sale of a wind turbine starts when a potential client, either a small local company or a big international power company that wants to build a wind farm, contacts us. They have details about the site where they want to construct, such as the wind conditions on it. We propose the most appropriate type of wind turbine for their needs and they compare our offer with those of other companies. That is where it

can get tricky because we don't really know how things work inside other companies and how they decide what wind turbines to offer and at what price.

I love that the turbines we sell can generate electricity for lots of people without harming the environment. Our turbines are very big. Just one of them can produce six megawatts of electricity, which is enough to power around 4,000 homes. This is a sector with a future, and I would encourage kids to look at it. There will be great opportunities across the globe.

TONI BEUKES IS RENEWABLE ENERGY SALES LEADER, ONSHORE WIND DIVISION AT GE, SOUTH AFRICA.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

English was my favourite subject at school - I especially enjoyed learning new words. English got me to law and law got me to wind.

I studied for seven years at university and have three law degrees and a management degree.

The most important skills for my job are the ability to plan strategically, analyse things, communicate well, collaborate and get on well with people, and to give the right tasks to the right people in my team.

When choosing a job, it is most important to ask yourself what you are naturally good at and what brings you joy. This way, you will find a career that makes you happy.

# DRONES AND DREAMS



**Y**our job should never be boring! I make sure I have as much fun as possible and keep learning new things.

My job involves three tasks. First, I help develop wind energy projects all over the world, making sure the amount of wind is correctly estimated and the right wind turbine type is used for every site. This allows us to plan energy production for the next 25-30 years!

Secondly, I help my colleagues when there are problems with any of the wind turbines, such as when a blade is hit by lightning and damaged. Thirdly, I find ways to make the wind turbines reliably produce as much energy as possible. For example, using drones to check the blades and verify that there are no cracks or other damage to them. What I like most is meeting people from all over the world who are passionate about wind technology. I like sharing experiences as this sometimes leads to new projects.

If we all work together, we have a better chance of installing enough renewable energy to stop climate change spiralling out of control.

I started to work on wind energy when I left university nine years ago and joined my current company. I began looking at the blades and how to inspect them with cameras and drones. It was so exciting that I decided to do this full-time. Wind energy is in constant evolution - the size of wind turbines has more than doubled in a decade! All this change is quite challenging and I like it!

As a child, I wanted to become an astronaut. I am fascinated by the universe, the solar system and the potential discovery of new worlds. I still dream when I look at the night sky. It is also urgent to take climate action and renewable energy technologies are part of this. I am happy to contribute to this cause.

It is worth following your dreams as much as you can. Your horizons widen so much when you become an adult and trying to follow your dreams can help you not to get lost. Not all dreams come true (I didn't become an astronaut), but I am happy with what I have achieved and I'm still interested in outer space.

**NICOLAS QUIEVY IS WIND  
ONSHORE TECHNOLOGY MANAGER  
AT ENGIE, BELGIUM.**

## WHAT DID I NEED TO LEARN TO DO THIS JOB?



Science, especially chemistry and physics, and maths were my favourite subjects at school. I went to an engineering school in Belgium, which meant a lot of maths, physics and chemistry.

It took me five years to get my degree, then I spent five more years studying to become a doctor in science (not a medical doctor).

Science is necessary for my job as I need to understand how wind energy works. However, soft skills are equally important. These include mastering digital technologies, oral communication, writing and working in teams.

If you think you might want to work in the field of renewable energy, I would advise you to study the basics of the technologies (you can already start now), identify the best institutions giving classes in the subjects you like, and always be curious about learning new things.

The future will be a mix of technologies and digital. Be prepared!

NICOLAS, 38



# CLEAN ENERGY FOR THE CLOUD

I'm a bit of a nomad, having lived on all five continents. My mum is Indian and my dad is French. I was born in Dijon, France but I now live in Washington, DC in the United States, and I have lived in India, Algeria, Morocco, the UK, Spain, Italy, Belgium, the Netherlands and Kenya. All this travelling has made it clear to me that we share one planet and that we all need to pull together to stop climate change.

I work for the technology giant Microsoft to help build sustainable cloud infrastructure. This sounds complicated, but basically "the cloud" is where the internet and information is stored on big servers [like a turbo version of the computer in your home or office]. These servers need a lot of electricity to keep working.

My team tries to reduce the energy needed by the cloud and make sure the energy it does use comes from clean sources, such as wind and solar power.

This way, we can store photos, play video games and talk over Teams or Skype with our friends and family in different parts of the world, without damaging the climate. Climate action is really important to Microsoft. In January 2020, we made a super ambitious

pledge to become carbon negative. This means that in less than 10 years we will remove from the environment more carbon than we emit. And by 2050, we believe we'll be able to remove from the environment all the carbon that Microsoft has emitted since the company was founded in 1975!

These aims are challenging and meeting them will be complex, but the first step is making sure that we run as many of our offices and our operations on wind and solar power. My work contributes to this bigger picture.

For my job, I spend lots of time on the phone discussing projects and ideas and then writing them down.

I try to limit screen use in the home, but it is difficult when I spend so much time looking at

screens for my job. We should think about why and when we need computers, tablets and phones. A pen and piece of paper can often get the job done.

When I was little, I wanted to be an astronaut, but I am sticking with Earth now as she's the most beautiful planet we have. If we tackle climate change together, we will be able to hand her over in a good state to the generations to come.

VANESSA MILER IS DIRECTOR OF ENERGY INNOVATION AND IMPACT AT MICROSOFT, UNITED STATES.

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

In school, history was my favourite subject. I then studied public affairs and economics in Paris, graduated with a degree in public administration, and then went to work for the French government for several years.

In my job now, the most important skills are problem-solving, negotiating and multi-tasking.

# WASTE NOT, WANT NOT

As a child I was always drawing maps of imaginary islands full of railways, cities and forests, and creating worlds out of Lego. I think that's why I decided to become an architect. But I didn't want to be just any old architect; I wanted to use my skills to help solve the environmental problems the world is facing.

My colleagues and I couldn't believe so many things were thrown away, after all the money, knowledge and energy used to create them. We wanted to show what could be done with waste, by using it in our designs. We now design buildings, objects and artworks out of waste materials.

For me, it is really cool when I'm out and about to see my projects and point them out to friends and family. One of my favourite designs is a playground I made out of rotor blades (the things that spin around) from a wind turbine. What's funny is that we only stumbled on how to do this by chance. We were looking for big volumes of waste to transform into a playground.

We first looked at farm objects and airplanes and then we came across the rotor blades. After some research and small experiments, they turned out to be very good for making playgrounds.

I think my company was the first to recycle wind turbines in this way, but it is really great to see lots of other companies using parts of old wind turbines in creative ways. We have also made a bus shelter, city benches, a billboard for a recycling centre and some smaller pieces of furniture out of reused turbine parts. I've also worked on, or seen, designs for bridges, campsites and garden furniture.

I am sure we will soon see all types of waste being used in many interesting ways. I like turning something that was going to be thrown away into something useful and beautiful.

Reusing old wind turbines is better for the planet than sending them to landfill, incinerating them or even recycling them. I also think parents and children will become more aware of climate change

if they see such objects used in playgrounds and other parts of their built environment.

In this kind of work, I think it's important not to be afraid of failing or creating something that no one likes. It's always a bit stressful to show something you have created, as you never know how people will respond. However, even getting negative reactions can help as it pushes me to work harder and to explain better what we are doing and why.

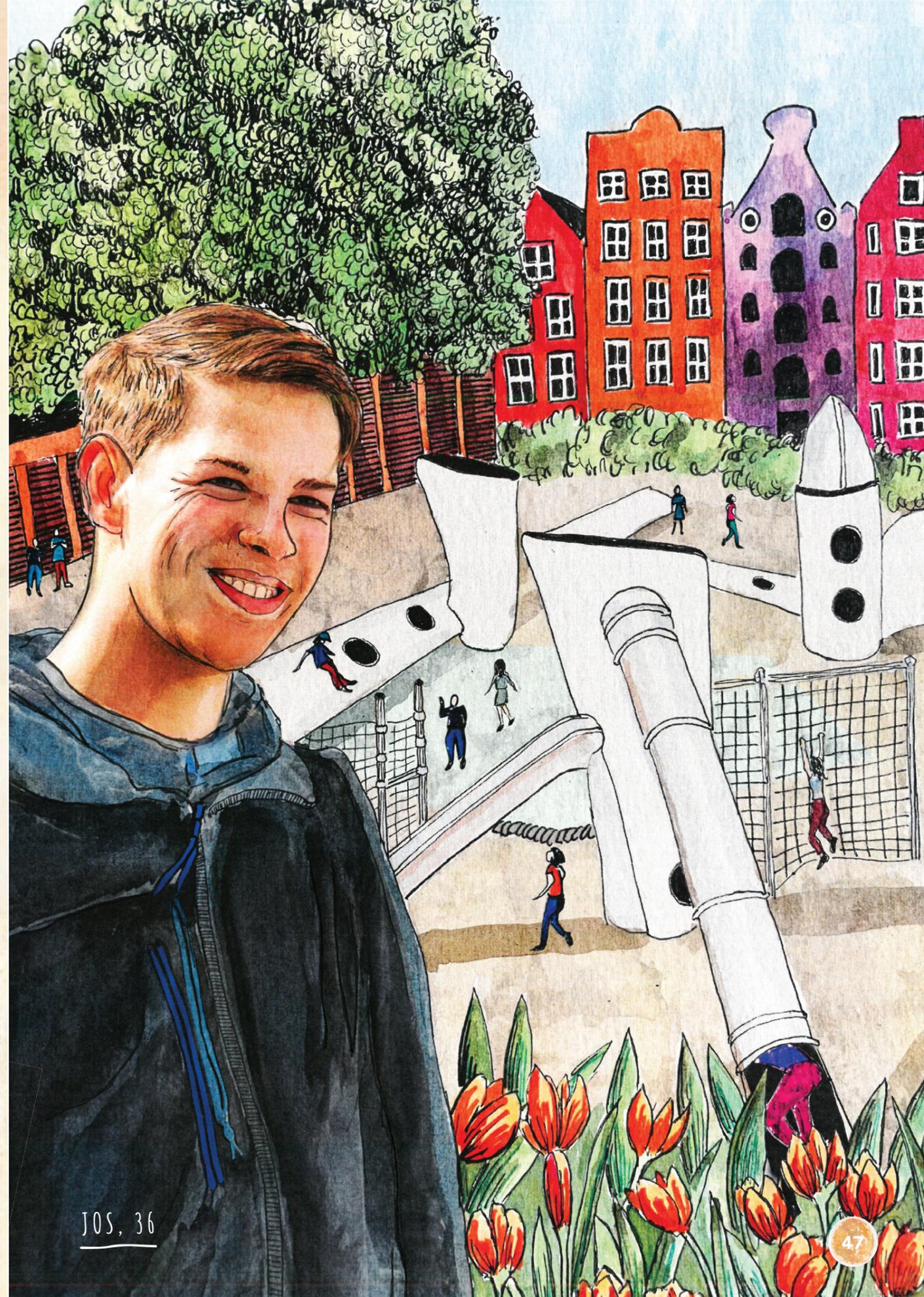
If you have an open mind and try to see possibilities where others might not, being an architect can be a good job for you. Apart from being creative, you do a lot of talking, writing and some maths.

JOS DE KRIEGER IS ARCHITECT AT SUPERUSE, THE NETHERLANDS

## WHAT DID I NEED TO LEARN TO DO THIS JOB?

I studied architecture at Delft University of Technology in the Netherlands. To get into the Faculty of Architecture I had to study maths, physics and chemistry. It is important to have a broad interest in all kinds of topics and a bit of technical understanding.

It took me six and a half years to finish two degrees. I also did other things, like being on the student council, an additional degree in sustainability and some studies in Sweden.



# GLOSSARY OF TERMS

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**Accountancy:** A system to manage business records and financial accounts (information concerning money).

**Carbon emissions:** Greenhouse gases, released when we burn fossil fuels such as coal, oil and gas, are causing global warming.

**Clean energy:** Energy from resources that do not release greenhouse gas emissions, such as wind and sun.

**Climate change:** The process of changes in the environment around us over a period of time. These changes include the warming of the Earth's surface and rising sea levels caused by humans burning fossil fuels and releasing greenhouse gases into the atmosphere.

**Deposition:** A process where materials such as soil or rocks are transported by wind, water or ice to make up a new land type, such as a mountain.

**Electricity grid:** The network for generating and distributing electricity, which connects power plants or wind farms to our homes, schools, offices and factories.

**Erosion:** The process whereby soil is washed away by wind or water

**European law:** The set of rules which guides the way people live in the European Union.

**European Commission:** The organisation at the centre of the European Union, which suggests policies to create change in Europe.

**European Green Deal:** This is the European Union's plan to become more sustainable by reducing greenhouse gas emissions

enormously, promoting more local and sustainable products, creating better jobs for people and many other projects that aim at making our lives more environmentally friendly.

**Finance:** The management of money.

**Fossil fuels:** Oil, gas and coal are fossil fuels as they are made from the fossils of animals and plants buried in the earth, which have broken down over millions of years. Burning them releases lots of energy and greenhouse.

**Global warming:** The increase in Earth's average temperature over a long period of time.

**Greenhouse gases:** Burning fossil fuels releases greenhouse gases, such as carbon dioxide (CO<sub>2</sub>) and methane, which are causing climate change.

**Master's degree or Master's:** A degree (diploma) awarded by a college or university, to students who have successfully completed a number of subjects and passed the exams. This usually takes four to five years of studies.

**NASA:** The National Aeronautics and Space Administration in the US, which studies space and space travel.

**Political science:** The study of how groups of people make decisions together, through governments or other forms of agreement.

**Renewable energy or sustainable energy:** Energy from resources that are naturally replaceable and don't pollute the environment, such as wind, water and sun.

**Rotor blades:** These are the most important parts of wind turbines. They capture wind and transform it into energy. They can have different lengths and shapes to catch different types of wind.

**Solar farm:** When lots of solar panels are built together in an organised manner to capture the sun's energy and generate electricity.

**Sustainable:** When humans live and interact with the environment and its natural resources in a smart and careful way. It is important to ensure there will be enough natural resources (food, water, plants and animals) left for future generations. We should use all resources in a thoughtful, and not a wasteful, way.

**Waste materials:** Items which are thrown away and become rubbish, like the wrapping on a chocolate bar. Some of this waste can be recycled into new products or reused for another purpose.

**Wind farm:** A group of wind turbines that are built and connected together either on land or at sea.

**Wind flows:** The movement of air.

**Wind tunnel:** A long chamber through which air is forced through to test how the wind reacts in different circumstances.

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