

## Career opportunities for geophysics and seismology

Below is a guide to the type of career one can pursue in geophysics and seismology. There are many applications of geophysical methods and the list below is only intended as a taster.

Broadly speaking, geophysicists apply the principles and concepts of physics, mathematics, geology, and engineering to the study of the physical characteristics of the Earth and other planets. They make measurements of gravity and magnetic fields, seismic waves, temperatures, and natural electric current. Geophysicists study these topics from the standpoint of the physics of solid bodies, gases, and fluids. Some geophysicists are field oriented, some laboratory oriented, some theoretical, and some combine these areas. Exploration geophysics is the applied branch of geophysics which uses many physical methods (e.g., seismic, gravitational, magnetic, electrical and electromagnetic techniques) to measure the physical properties of rocks in the Earth's subsurface.

Seismologists, specifically, study the Earth's interior and its vibrations. These are caused by explosions and natural ground vibrations which reflect off or are refracted by subsurface features such as bedding planes. There are many practical applications of seismology including studies of the Earth's interior, oil and mineral exploration, underground detection of nuclear explosions and engineering geology.

ACADEMIC RESEARCH	Universities and research institutes employ many people in the field of geophysics because of its varied applications. You would need a Bachelor degree and a Masters degree or PhD to carry out research in such an environment. Some areas of research that are concentrated in universities are listed below. Most university researchers are also expected to teach at university level and this is a vital part of passing on scientific knowledge.
Geodesy	Geodesists study the size, shape, and gravitational field of the Earth and other planets. Their main tasks are mapping the Earth's surface and explaining the variations found. With the aid of satellites, geodesists determine the positions, elevations, and distances between points on the earth, and measure the intensity and direction of gravitational influences. They also study phenomena such as crustal motion, tides and polar motion. They design global and national control networks and use space and land-based techniques. <i>Related job titles: Geodynamicist; Geodesist; Geophysical Modeller</i>
Geodynamics	Geodynamicists deal with the dynamics of the Earth, usually numerically. Experts in geodynamics commonly use techniques such as geodetic GPS, Interferometric synthetic aperture radar (InSAR), and seismology, to study the evolution of the Earth's lithosphere (upper crust), mantle and core. <i>Related job titles: Geodynamicist; Geodesist; Geophysical Modeller</i>
Tectonophysics	Tectonophysics is the study of geodynamic and deformation processes associated with plate tectonics. Tectonophysicists typically look at the spatial patterns of stress, strain and differing rheologies in the lithosphere (upper crust) and asthenosphere (partially molten layer beneath the upper crust) and the relationships between these patterns and observed patterns of deformation due to plate tectonics. <i>Related job titles: Geodynamicist; Structural Geologist</i>

<p>Seismology (Earth structure)</p>	<p>Seismologists map the Earth's interior structure by looking at changes in the way seismic waves, produced by earthquakes or explosions, travel through the various layers in the Earth.</p> <p>Seismic energy travels as elastic waves and can be reflected off the seafloor, thus allowing us to create maps (2D, 3D) of the seafloor which can contribute to our understanding of such features as fracture zones, mid-ocean ridges and continental margins. These waves can also travel through the Earth's interior where they may be refracted/slowed down by different materials they encounter along their paths. Much of what is known about the interior of the Earth including the positions of the boundaries between the crust, mantle, outer core and inner core, as well as the physical properties and composition of the Earth's interior, has been learned through in-depth analysis of these waves as recorded by seismographs. For example, the fact that 'S-waves' (transverse waves) are stopped by the outer core, and that 'P-waves' (longitudinal waves) are refracted by it shows that it is a liquid. However, there is still much to learn about what the Earth's deep interior is really like.</p> <p><i>Related job titles: Marine seismologist; Deep Earth Seismologist.</i></p>
<p>Volcanology</p>	<p>Many working in the field of solid Earth geophysics will be involved with volcanoes, mainly because they exist at plate margins which reveal a lot about the structure of our Earth. Some volcanologists look at volcanoes at continental margins whilst others investigate mid-ocean ridges and hotspots. Whilst volcanoes provide an important insight into the functioning of plate tectonics and the internal composition of our Earth, it is also important to understand them in order to make predictions about when they will erupt and thus prevent the deaths of the many people who live in volcanic areas.</p> <p>Many geophysical techniques are used to monitor volcanic activity. The deep structure of volcanic regions, for example, the Andes can be inferred through seismological methods which can identify the presence of magma chambers and earthquakes associated with plate movements. Seismic observations using seismographs deployed near volcanic areas are used to look out for underground movements during or prior to volcanic events associated with the rising magma through volcanic conduits.</p> <p>Geophysical (geodetical) techniques are used to monitor deformation at the Earth's surface associated with volcanic movements as surface deformation indicates magma upwelling. For example, tilt, strain, angle and distance measurements may be made using tiltmeters, local stations, EDMs and using Global Navigation Satellite System (GNSS) observations and InSAR.</p> <p>Other geophysical techniques (electrical, gravity and magnetic observations) include monitoring fluctuations and sudden change in resistivity, gravity anomalies or magnetic anomaly patterns which may indicate volcano-induced faulting and magma upwelling.</p> <p>People who have been trained in geophysics may be employed in insurance companies where scientific evaluations of such natural hazards have to be translated into economic risk assessments.</p> <p><i>Related job titles: Volcanologist; Marine Geophysicist; Marine Seismologist.</i></p>

Seismology – natural earthquakes	<p>Seismology can be used to study the many natural earthquakes that occur each year. These include both moderate to large earthquakes that are recorded over great distances (e.g. along the San Andreas fault, California) and small earthquakes that can be detected only locally (e.g. the 2008 Lincolnshire earthquake). Large earthquakes are usually analysed in observatories or analysis centers built around large computers and supported by national governments. Smaller earthquakes are typically processed at regional research centres that can be university or government-funded. Such information can aid our understanding of plate tectonic movements in an area.</p> <p><i>Related job titles: Seismologist</i></p>
Exploration geophysics (archaeology)	<p><i>Also employed by government heritage bodies.</i></p> <p>Archaeologists use geophysical methods to image subsurface archaeological sites thus avoiding the need for time-consuming and often destructive excavation procedures. The most commonly applied methods used are magnetometers, electrical resistance meters, ground-penetrating radar (GPR) and electromagnetic (EM) conductivity meters. In this case, geophysical surveys detect buried features when their physical properties contrast measurably with their surroundings.</p> <p><i>Related job titles: Environmental Geophysicist</i></p>
Hydrology, oceanography, glaciology	<p>Geophysics also study water on the Earth. Hydrologists study the distribution, circulation, and physical properties of underground and surface waters. They also study rainfall and its rate of infiltration into the soil. Some are concerned with water supplies, irrigation, flood control, and soil erosion. Oceanographers use geophysical methods to study patterns of ocean circulation. Many methods are also used in the study of the cryosphere (ice sheets), for example to infer conditions under ice sheets.</p> <p><i>Related job titles: Hydrologist; Physical oceanographer; Cryosphere geophysicist</i></p>
Geomagnetism	<p>Geomagnetism is the study of the Earth's magnetic field, including its origin, telluric currents driven by the magnetic field, the Van Allen belts and the interaction of the magnetic field with the solar wind. Mathematical modeling is generally involved.</p> <p>Paleomagnetism is the study of the record of the <u>Earth's magnetic field</u> preserved in various <u>magnetic minerals</u> through time. The study of paleomagnetism has demonstrated that the Earth's <u>magnetic field</u> varies substantially in both orientation and intensity through time.</p> <p>Magnetic methods are also used in oil exploration to determine depth to the basement rock, in mineral exploration to detect magnetic minerals or to locate igneous bodies which contain magnetic minerals, and in archaeological surveys to detect buried artifacts, grave sites etc.</p> <p><i>Related job titles: Geomagnetist; Palaeomagnetist; Environmental Geophysicist.</i></p>
Atmospheric geophysics	<p>Geophysicists involved in the atmosphere investigate the earth's magnetic and electric fields, and compare its outer atmosphere with those of other planets. Aeronomists study the physical structure and chemistry of the atmosphere, especially of regions of ionized gas in the upper atmosphere.</p> <p>Meteorologists and climatologists also use geophysical techniques in their studies of the weather and climate.</p> <p><i>Related job titles: Meteorologist; Aeronomist; Remote Sensing Scientist.</i></p>

GOVERNMENT	Many of the applications of geophysical methods listed in Academic/Research above, also apply to careers within Government.
Natural hazards (earthquakes, volcanoes, tsunamis)	<p>Qualifications: usually postgraduate, sometimes undergraduate</p> <p>Many countries employ geophysicists to study and help mitigate hazards from earthquakes and volcanoes.</p> <p>Records of past earthquake data and improvements in our understanding of the causes and consequences of earthquakes has meant that we are in a better position to predict where and when earthquakes might occur in the future. This is vital to the protection of many communities living in earthquake-prone areas. It is still impossible to forecast exactly when earthquakes will occur, even within a single year, but identifying areas of elevated risk enables governments to plan for such occurrences.</p> <p>Most volcanoes that are considered active (and some that are considered dormant) are continuously monitored to detect changes that may suggest impending activity. The devastation caused by past eruptions demonstrates the need for volcanic hazard assessments. In high-risk, tectonically-active areas, there are programmes in place for the evacuation of communities in cases of high level alert.</p> <p><i>Related job titles: Volcanic Hazard Scientist; Volcanologist; Seismologist; Earthquake Hazard Geophysicist</i></p>
Verification seismology	<p>Qualifications: postgraduate</p> <p>Seismology can also be used to monitor underground nuclear explosions as nuclear explosions generate seismic waves that can be recorded at large distances. Seismic observations are the most effective method of determining whether foreign countries are complying with nuclear test ban treaties and are therefore of great importance to world peace. This is referred to as 'verification seismology'. Such jobs typically pay very high salaries.</p> <p><i>Related job titles: Geophysicist – MOD</i></p>
INDUSTRY	
Exploration geophysics (oil and gas exploration)	<p>Qualifications: undergraduate, Masters or PhD, depending on level of entry</p> <p>The oil and gas industry has traditionally been a big employer of geophysicists. The job market tends to fluctuate in this field but there is potential for a high salary.</p> <p>Exploration geophysicists in the hydrocarbon industry use measured physical differences in subsurface rocks to distinguish those that contain hydrocarbons ('reservoir rocks') from those which do not. Physical data is also used to determine the presence of 'cap rocks' (impermeable rocks which stop oil and gas escaping to the surface) and 'source rocks' (organic-rich shales which originally supplied the hydrocarbons).</p> <p>Large numbers of seismologists ('shallow Earth seismologists') are employed by the hydrocarbon industries. They use waves generated by small explosions or mechanical devices to create detailed maps of the subsurface structure in a limited region (a smaller scale application of the principles used to determine the structure of the Earth's interior). This may reveal information about the spatial distribution of rock units and also detect structures such as faults, folds, salt domes and igneous intrusions. This information is used to indirectly assess the likelihood of hydrocarbon accumulations.</p> <p><i>Related job titles: Reservoir Geophysicist/Geologist; Petrophysicist, Borehole Geophysicist; Exploration Geologist</i></p>

Exploration geophysics (mineral exploration)	<p>Qualifications: undergraduate, Masters or PhD, depending on level of entry</p> <p>Geophysicists involved in mineral exploration use geophysical instruments to determine variations in, for example, gravity, magnetism, electromagnetism (conductivity and resistivity of rocks), radioactivity. The instruments used vary according to the target source i.e. the type of mineral. For example, airborne magnetic surveys may be used to identify the presence of large concentrations of magnetic minerals such as magnetite, pyrrhotite and ilmenite and density surveys may be used to detect the presence of iron ore. The most effective surveys are conducted from the air.</p> <p><i>Related job titles: Exploration Geophysicist</i></p>
Natural hazard risk assessment	<p>Qualifications: postgraduate</p> <p>Many private consulting companies exist for performing verification seismology and estimating seismic hazard. Those trained in earthquake and volcano monitoring may also be employed by insurance companies to translate risk of natural hazards into economic assessments of risk.</p> <p><i>Related job titles: Earthquake Risk Assessor, Natural Hazard Monitoring Scientist</i></p>
Engineering geophysics	<p>Geophysical methods, such as seismology, can be used in many aspects of engineering. For example, in constructing a dam, seismologists determine where bedrock (solid rock beneath the soil) is closest to the surface so the best site can be selected. Geophysical methods can be used to locate underground storage tanks, delineating landfills, locating voids in bedrock and areas of potential subsidence, and for monitoring paths of groundwater movement.</p> <p><i>Related job titles: Environmental Geophysicist, Engineering Geophysicist</i></p>
Environmental Geophysics	<p>Qualifications: minimum undergraduate</p> <p>Environmental consulting companies also hire geophysicists because of their quantitative background. Geophysical techniques may be used to monitor environmental impact of, for example, water contaminants by creating maps of the subsurface and investigating groundwater movement. Companies have to adhere to laws and regulations concerning the environment and so, to a certain extent, this job market is more stable than other areas of industry.</p> <p><i>Related job titles: Environmental Geophysicist</i></p>
MILITARY	<p>Geophysicists are employed by the military in various capacities but individuals do not need to be actual members of the armed services.</p>
TEACHING	<p>Qualifications: for school teaching – undergraduate degree plus teaching qualification; for university lecturing – undergraduate degree plus postgraduate qualification</p> <p>A geophysics degree is a good choice for someone wanting to be a school maths or science teacher as it provides a sound background in applied mathematics, electricity and magnetism, heat flow and elasticity. It also provides expert knowledge about volcanism, earthquakes, plate tectonics and the solar system.</p>

## Career opportunities for climate change

Below is a guide to the type of career one can pursue in climate change and sustainability-related fields. Climate change and sustainability are important topics in a wide range of academic research and there are also an increasing number of climate change and sustainability specific positions within organizations, including governmental organizations through to environmental charities and private consultancies. The list below is not intended to be completely inclusive.

Climate change and sustainability-related careers are very wide ranging and may focus on using scientific understanding of the Earth's climate system through to a focus on political, social and economic drivers and impacts of climate change. Much climate change research involves complex computer modelling but may also include field data collection and the analysis of data sets.

ACADEMIC RESEARCH	Universities and research institutes across the world employ people in the field of climate change to enable us to understand climate change and predict its effects. You would need a PhD or equivalent to carry out research in such an environment. Some areas of research are listed below:
Climate Modelling	Climate modelling research may involve trying to understand natural climate variability and the dynamics of past climate change through to modelling future climate change and the impacts of projected future climate change. A climate modeller needs an understanding of the climate system and its complexity in addition to computer modelling skills. Climate modellers may also be involved in the collection of palaeoclimate information used in the validation and development of climate models.
Ecology	Ecologists study the distribution and abundance of organisms and their interaction with their environment. Ecologists involved in climate change research may study the potential ecological impacts of projected climate change such as the timing of breeding cycles or the migration and movement of different species. This research might involve field surveying and monitoring different components of an ecosystem through to working with integrated climate and ecological models.
Hydrogeology/ Hydrology	Hydrologists study the movement and quality of water and its interaction with the environment and biosphere, and its management. Hydrogeologists study the movement and quality of water beneath the ground surface. Hydrologists and hydrogeologists involved in climate change research will study the impacts of projected climate change on the hydrological cycle and on water resources and interactions between the atmosphere, cryosphere, biosphere and hydrosphere. The work of hydrologists/hydrogeologists may range from pure natural science to engineering studies based on field data collection through to computer modelling.
Meteorology	Meteorologists study the atmosphere's physical characteristics and the processes that produce weather. Weather forecasting is the most well known application of meteorology, which uses meteorological models and meteorological information from weather satellites and other sources to predict weather patterns. Meteorologists may also analyze climate trends. Meteorology has applications to many sectors from forestry and agriculture, air pollution, through to the insurance industry, hence meteorologists might work in government agencies, private consulting and research services, industrial enterprises, utilities, radio and television stations, through to education.

Oceanography/ Marine Science	<p>Marine scientists research the sea itself, the sea bed, oceanic life and coastal regions. Oceanographers study the complex interactions between sea water, fresh water, the cryosphere, and the atmosphere and biosphere.</p> <p>Oceanographers may be involved in studying the roles of the oceans in climate change in addition to many other areas of oceanic research. The oceans are an important part of the climate system as there is a strong link between ocean currents and climate and the oceans are an important sink for atmospheric CO<sub>2</sub>. These are important ongoing areas of climate change research.</p>
GOVERNMENT	<p>There are a growing number of climate change and sustainability-related careers within government at local, national and international levels. Knowledge and understanding of the science of climate change, political, social and economic climate change issues, as well as an understanding of more technical aspects such as those relating to technological solutions are all needed in government in order to formulate, communicate and implement strategies and policies. A holistic understanding of the causes and impacts of climate change 'solutions' and methods of mitigation, and a knowledge of climate change legislation is important to careers in this area.</p>
Climate change policy	<p>A reduction in greenhouse gases is a strategic priority for government and increasingly councils are attempting to make sustainability central to Councils' operations. Local, national and international government is responsible for devising and implementing climate change strategies, usually targeted at reducing greenhouse gas emissions. Work in this area will cover a range of climate change initiatives from devising policy to reduce individual or organizational carbon footprints and devising strategies to implement these policies, through to the monitoring of the carbon baseline data and evaluating the effectiveness of implemented strategies.</p> <p><i>Related job title: Climate Change Specialist, Climate Change Policy Officer, Environmental Policy Officer</i></p>
NON- GOVERNMENTAL ORGANIZATIONS/ ENVIRONMENTAL CHARITIES	<p>There are many environmental non-governmental organizations and environmental charities for which climate change is a key area of activism. Careers in this area may include lobbying for greater environmental considerations at government policy level, campaigning and fund raising, and communicating climate change and sustainability issues to a general audience.</p>
Environmental campaigns	<p>Careers in environmental campaigning can involve liaising with politicians to help inform and drive better environmental policy and legislation, through to communicating climate change and sustainability issues to a general audience and carrying out fund-raising and publicity-generating activities. Environmental campaigners need to have a good level of understanding of climate change and be committed and passionate about environmental issues.</p> <p><i>Related job titles: Environmental Campaigner, Fund-Raising Manager</i></p>
Environmental Education	<p>Careers in environmental education may range from providing support and resources to teachers to delivering environmental workshops directly to schoolchildren through to the wider public. Some schools employ environmental education specialists to help the school integrate climate change and sustainability throughout the school's operations.</p> <p><i>Related job titles: Environmental Education Developer, Environmental Education Officer</i></p>

Environmental Regulation	Environmental regulatory bodies manage the environment and our impact on it. Climate change-related positions within environmental regulatory bodies may include assessing likely impacts of future climate change and developing and implementing strategies to reduce the impacts of climate change, and monitoring the environment and the effects of climate change. <i>Related job title: Water Resources Manager, Flood Prediction Scientist</i>
INDUSTRY	There are many different careers in the private sector that require knowledge and understanding of climate change and sustainability, either in specific job roles or as occasional work in a more varied role.
Air Quality Specialist (Conservation, Ecology and Sustainability)*	An Air quality specialist will undertake air quality and noise measurement surveys. This could include the prediction/assessment of the impact on air quality resulting from construction sites, industrial sites and highway maintenance operations.
Boiler Maintenance Technician (Bio-mass)* - also known as Maintenance Fitter	Maintenance fitters ensure that all equipment works properly. They diagnose faults and make repairs. They also carry out regular servicing and major overhauls.
Bio-mass Development Officer*	A Biomass Development Officer is responsible for the promotion and development of the biomass market in a particular region of Scotland. This may include preparing guidance materials, organising events or setting up customer advice services.
CAD Technician (Water/Hydro/Marine)* - also known as Electrical/Electronics Draughtsperson	A CAD technician uses computer aided design (CAD) systems to produce diagrams for making or converting products, machinery or other equipment. The items could be large, such as the framework of an oil rig, or small, such as the circuit in a silicon chip.
Chemical Engineer (Bio-mass)*	Chemical engineers are concerned with the processes that cause changes in the chemical or physical composition of substances.
Civil/Structural Engineering	Large scale renewable energy developments are becoming increasingly common. Civil engineers plan, design and manage construction projects such as wind farms and hydro power systems. <i>Related job title: Civil Engineer</i>
Conservation Manager (Conservation, Ecology and Sustainability)*	Conservation managers are responsible for managing, maintaining and developing areas of the countryside for use by the public. They are concerned with both the conservation and use of these areas.
Ecologist (Conservation, Ecology and Sustainability)*	Ecologists study the complex and delicate relationships between animals, plants, people and their environment. They may manage a conservation area or give advice to organisations to help them reduce damage to the environment. Ecologists often do fieldwork to collect data, and produce reports on their findings.
Electrical/Electronic or Power Engineer (Water/Hydro/Marine/Bio-mass)*	Electrical engineers are involved in the generation, supply and use of electricity.



Electronics/ Instrumentation Engineer/ Control Engineer (Bio-mass)*	Control engineers research, design, develop and manage the equipment used to monitor and control a wide range of systems and machinery. They work on systems where precision is vital, for example, biomass energy plants.
Energy Assessor (Conservation, Ecology and Sustainability)*	From the end of 2008, whenever a domestic and commercial property is built or put up for sale or rent, it is necessary to have an Energy Performance Certificate. The Energy Performance Certificate will look broadly similar to a certificate on a refrigerator. Its purpose is to record, in a clear unambiguous format, how energy efficient the building is.
Environmental consultancy (Water)	Projected changes in climate are likely to have a major impact on hydrology and the management of water resources due to changes in the frequency and intensity of rain events. Environmental consultants working in the water sector may be involved in the design of sustainable urban drainage systems, flood risk management, and the management of water quality. Consultants in this area will work with a variety of key stakeholders from environmental regulators to local authorities, conservation bodies and water supply companies. <i>Related job title: Hydrologist, Environmental Consultant</i>
Environmental Consultant (Wind)*	Environmental Consultants study the relationships between animals, plants, people and their environment. They do fieldwork to collect data, and produce reports on their findings and advise organisations to help them reduce damage to the environment.
Environmental Consultant (Conservation, Ecology and Sustainability)*	Environmental consultants give advice on environmental matters. They work on matters such as the effects of new developments on the environment, the control of pollution and noise, the effects of agriculture or recreation on plants and wildlife, the effect of climate change and the conservation of rare or protected species such as ospreys and bats.
Environmental Management	All organizations have to be increasingly aware of their environmental responsibilities in order to adhere to environmental legislation, protect their image and reduce costs. Many organizations have dedicated environmental managers who oversee the environmental and sustainability operations within an organization often with an emphasis on reducing greenhouse gas emissions. <i>Related job title: Environmental Manager</i>
Environmental Planner (Conservation, Ecology and Sustainability)*	The main purpose of planning is to make the best use of land and natural resources while conserving the environment. In particular, planning to make towns and the countryside sustainable, getting enough houses where people need them and preparing for increasing demand for leisure.
Fabrication Engineer (Wind)*	Sheet metal workers work with metal sheets that are bent, cut and shaped using hammers, small presses, roller machines and guillotines. They can be involved in the building of wind turbines and wave equipment.
Forestry Professional (Bio-mass)*	Foresters plan, organise, direct and co-ordinate the development of woodlands and forests.
Heritage Manager (Conservation, Ecology and Sustainability)*	Heritage managers are responsible for the conservation of, and all aspects of public access to, heritage sites. The range of sites includes: ancient monuments; historic buildings, including industrial sites such as former collieries; landscapes and gardens; museums.

Maintenance Technician (Water/Hydro/Marine)* - also known as Maintenance Fitter)	Maintenance fitters ensure that all equipment works properly. They diagnose faults and make repairs. They also carry out regular servicing and major overhauls.
Marine Biologist (Water/Hydro/Marine)*	Marine Biologists study plants and animals that live in the sea. They look at environmental damage and explore ways to make use of the sea's resources.
Marine Surveyor (Water/Hydro/Marine)*	Marine Surveyors survey areas of oceans and seas. The survey data may be used to draw marine charts, locate shipping routes or to help build coastal of offshore structures such as wind farms and wave energy machines.
Mechanical Engineer (Water/Hydro/Marine)*	Mechanical Engineers apply their knowledge of fluid and solid mechanics, hydraulics, thermodynamics and materials to design and make all types of machines and their components. They are involved in many industries, including renewable energy.
Plumber (Bio-mass)*	Plumbers install, repair and maintain the water supply, drainage and central heating in houses and other locations.
Project Engineer (Water/Hydro/Marine)* -also known as Offshore Engineer	Most Offshore Engineers find economical and environmentally safe ways to extract oil and gas from natural reservoirs beneath the seabed. They design offshore installations and drilling equipment. Offshore Engineers are also involved in developing wave energy systems.
Renewable Energy Consultancy	As the number of individuals and organizations interested in generating their own energy increases there are a growing number of careers in renewable energy consultancy. Renewable energy consultants have a good understanding of the applications and limitations of different renewable energy technologies and are able to apply these two different settings and to address different energy challenges. Work may also involve investigating the markets for renewable energy and lobbying to improve government support for renewable energy uptake. <i>Related job title: Renewable Energy Consultant</i>
Sustainability Consultancy	Sustainability consultancy is a growing area both as a specific area and within more traditional environmental consultancy. Sustainability consultants will work on a range of different projects but often work with organizations directly to find ways to reduce their carbon footprint and improve their environmental performance. Work might also involve providing sustainability statements for Environmental Impact Assessments, sustainable design advice on new developments, and climate change-related risk assessment. <i>Related job title: Sustainability Consultant, Sustainable Building Specialist</i>
Systems Designer (Micro renewables)* - also known as Building Services Engineer	Building services engineers design building services such as lighting, heating, water supplies in buildings, including micro-renewable sources of energy. They may also supervise the installation and operation of the services they have designed.

Welder (Wind)*	Welders join pieces of metal together by using intense heat. They are responsible for preparing the metal and looking after the tools that weld the metal together. They can be involved in the building of wind turbines and wave equipment.
Wind Resource Analyst*	A Wind Resource Analyst/Wind Analyst is usually an experienced meteorologist, or engineer with meteorological or fluid mechanics background. A Wind Resource Analyst analyses meteorological data to estimate the projected wind output and consequently how much electricity will be produced at a particular site.
Wind Turbine Engineer & Technician*	Wind Turbine Engineers apply their knowledge of fluid and solid mechanics, hydraulics, thermodynamics and materials to design and make and maintain components for wind turbines. Most Wind Turbine Engineers have trained as Mechanical or Electrical Engineers.
JOURNALISM	Specialist science journalists may work for newspapers, general interest magazines, TV or radio. Journalists may be involved in identifying public interest stories from newly published academic research literature, or related to specific climate change/environmental conferences or governmental meetings and communicating these to a general public audience. <i>Related job title: Journalist, Broadcaster</i>
MILITARY	Climate change is an issue of military interest due to the effects of extreme weather on military operations, potentially increased requirements for disaster relief, and a factor heightening political instability in some regions. The military are also major energy users contributing significantly to emissions of greenhouse gases.
TEACHING	Qualifications: For high school teaching – undergraduate degree plus teaching qualification; For university lecturing – undergraduate degree plus postgraduate qualification.  A degree in Geoscience is a good choice for someone wanting to teach Geography, Environmental Science and Geology. Climate change is a key component of all of these subjects. Some Environmental Science and Geoscience degrees may provide a route into Science teaching particularly if augmented with a science enhancement course. Climate change and sustainability is increasingly covered in the school science curriculum as a way to inspire students about the potential of science.

\* Career Opportunities listed with Careers Scotland see: [http://www.careers-scotland.org.uk/GreenJobs/CareerPaths/CareerPaths\\_tpg.asp](http://www.careers-scotland.org.uk/GreenJobs/CareerPaths/CareerPaths_tpg.asp) for further information.