



Global Schools
Program

Schools For Goal 7: A Guide on Renewable Energy and The Energy Transition

Preparing to Teach SDG7



Produced by the Global Schools Program, UN Sustainable Development Solutions Network (SDSN) in partnership with Siemens Energy.

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About the Global Schools Program

The Global Schools Program is an initiative of the UN SDSN in support of UNESCO's Roadmap for Education for Sustainable Development (ESD). The vision of the program is to create a world where every primary and secondary school student is equipped with the knowledge, values, and skills necessary to respond effectively to the most significant challenges of this century and shape a sustainable and prosperous world for all.



**Global Schools
Program**

About Siemens Energy

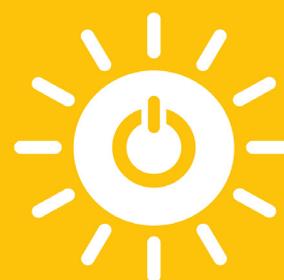
The energy transition is the greatest challenge our generation faces. How do we reduce emissions while also increasing energy supply? It is an uphill battle, and there is no silver bullet. But finding solutions has always been in our DNA. For more than 150 years, our engineers have been spearheading the electrification of the world. Today, we are a team of 98,000, sharing the same passion, vision, and values. Our diversity makes us strong and helps us find answers together with our partners.

**SIEMENS
ENERGY**

About Sustainable Development Goal 7

Sustainable Development Goal 7 (Affordable and Clean Energy) aims to provide affordable, reliable, and sustainable energy for all by 2030. It is key to the 2030 Agenda, and transitioning to clean energy is vital to supporting the Paris Climate Agreement. Achieving SDG7 requires advocating for universal access to modern energy services—not by replicating fossil fuel models but by creating renewable energy infrastructures for the global economy. Its targets guide the transition from fossil fuels to clean energy access.

**7 AFFORDABLE AND
CLEAN ENERGY**



Schools for Goal 7 is a project by Global Schools in partnership with Siemens Energy designed to train teachers and students in energy and Sustainable Development through gamified curricula. The initiative encourages active learning about SDG 7 to accelerate local sustainable development action. It provides hands-on experience in the energy transition, renewable energy, climate change, and sustainability, thereby equipping the next generation with essential skills for building resilient societies.



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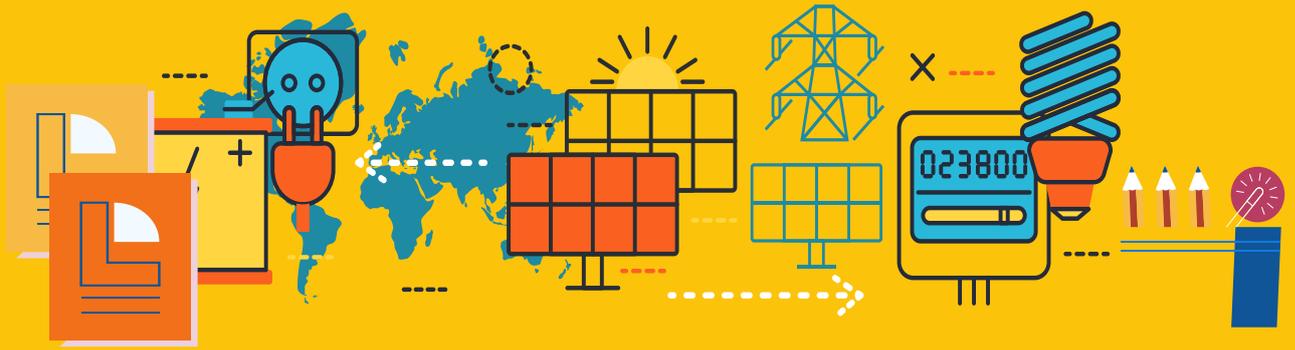
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Introduction to the guide

The Global Schools Activities Guide on the energy transition supports teachers or facilitators in carrying out activities on *SDG 7: Affordable and Clean Energy* in school communities with lower and upper secondary students. The goal of this

guide is to engage students in understanding the critical aspects of renewable energy and the energy transition.

The guide is divided into three sections:

Part 1

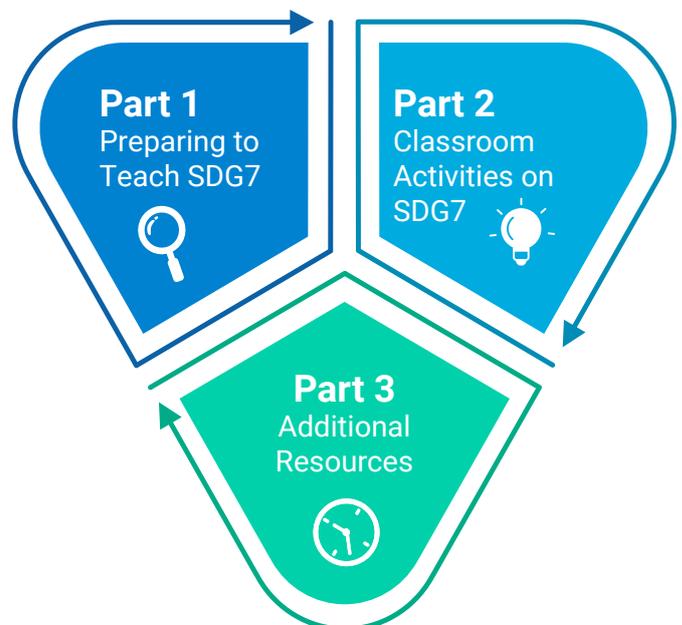
Preparing to Teach SDG7. Here, you will find learning goals and objectives, key concepts and definitions used, and introductory information, articles, and videos on SDG7.

Part 2

Classroom Activities on SDG7. A step-by-step set of activities on SDG7 to deploy in your classroom or school community with your students (see accompanying pdf).

Part 3

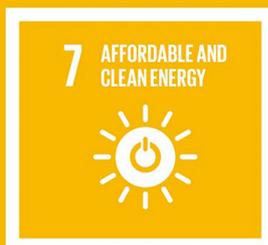
Additional Resources. Additional resources, career information, and case studies are needed to deepen engagement with renewable energy topics further (see accompanying pdf).



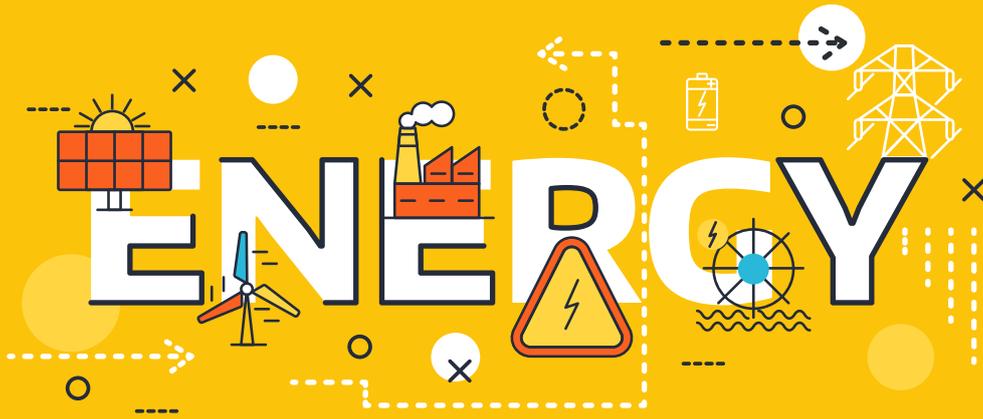
Sustainable Development Goals

In 2015, the 193 countries that comprise the United Nations General Assembly unanimously agreed to adopt a global action plan to address humanity's significant challenges: climate change, inequality, hunger, and more. This roadmap is outlined in the 2030 Agenda for Sustainable Development.

The new global agenda establishes 17 Sustainable Development Goals, commonly known as SDGs, which all signatory states are committed to achieving within a 15-year timeframe. The 2030 Agenda calls for action and collaboration among all sectors of society—businesses, public institutions, citizens, and education professionals. However, for this vision to become a reality, it is essential that everyone becomes aware of these goals and that each individual or institution explores how they can contribute to achieving the SDGs.



**Ensure access to
affordable, reliable,
sustainable and
modern energy for all**



What is SDG7: Affordable and Clean Energy?

Sustainable Development Goal 7 is one of 17 SDGs. It aims to ensure universal access to affordable, reliable, and modern energy services by 2030 and enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology. SDG7 also promotes investment in energy

infrastructure ([The Global Goals](#)). Access to energy is a crucial pillar for people's well-being, economic development, and poverty alleviation.

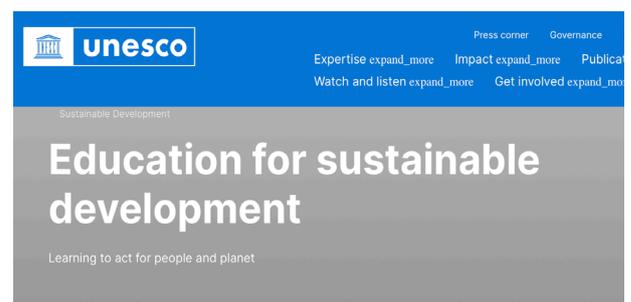
Moreover, our current reliance on fossil fuels is unsustainable and harmful to the planet, so we have to change how we produce and consume energy.

Education for Sustainable Development

Learning goals and competencies in the context of SDG 7

In the face of today's challenges, the world needs responsible and committed citizens to find viable and sustainable solutions over time. Through education, these personal transformations can also lead to broader societal changes that create a more sustainable, peaceful, and just world for all (UNESCO & Education International, 2021).

Education for Sustainable Development (ESD) is essential to attain this goal. ESD emphasizes the importance of achieving learning objectives across the cognitive, socio-emotional, and behavioral domains and aims to empower learners to resolve global challenges through transformative action. Promoting curriculum on ESD topics is considered a key pillar of ESD integration (UNESCO, 2017), as curriculum influences students' learning outcomes.



Education for Sustainable Development (ESD) is UNESCO's response to the urgent challenges facing our planet.

Education for Sustainable Development empowers people with the knowledge, skills, values, attitudes and behaviors to live in a way that is good for the environment, economy, and society. It encourages people to make smart, responsible choices that help create a better future for everyone.

UNESCO's ESD for 2030 programme produces and shares knowledge, offers policy guidance and technical support to countries, and implements projects on the ground. It fosters peer learning and innovation through information, networks and partnerships.

Want to learn more about ESD?

<https://www.unesco.org/en/sustainable-development/education>

Overview of the guide

Below, you will find two charts with suggested learning goals and objectives aligned with UNESCO's Education for Sustainable Development (ESD) pedagogy and frameworks, demonstrating how they relate to SDG7.

Title	Clean Energy and the Energy Transition
Suggested Ages	12-14 & 15-17
Overarching Objective of the Guide	To develop the knowledge, values, and skills related to the issues, challenges, and importance of clean energy and the energy transition
Global ESD Competencies	Critical Thinking, Research Skills, Problem-Solving Skills, Teamwork, Collaboration, Global Awareness, Public Speaking, Civic Engagement
Learning Goals	<ul style="list-style-type: none"> • Students will gain knowledge of the key elements of SDG 7 and why clean and renewable energy is crucial for sustainable development. • Students will increase their understanding of the barriers and solutions for achieving affordable and renewable energy globally. • Students will reflect on their energy practices, making SDG7 relevant to their daily lives, and how renewable energy sources could be implemented in their lifestyles, schools, and communities. • Students will collaborate on SDG 7 activities and initiatives, emphasizing an active and participatory approach (group discussions, peer-to-peer learning, or interactive methods help students become more engaged and prepared for the peer-based dynamics of Education for Sustainable Development [ESD]). <p>Adapted from Education for Sustainable Development Goals: Learning objectives, UNESCO, 2017.</p>
Learning Objectives	<ul style="list-style-type: none"> • Students will be able to identify and differentiate between non-renewable and renewable energy sources and their impact on the environment, health, and safety. • Students will be able to analyze and demonstrate the harmful impacts of unsustainable energy production. • Students will be able to articulate and communicate why renewable energy is needed and evaluate alternative energy sources for a given context. • Students will be able to interpret their energy usage and assess how they can become more energy efficient in their daily lives. • Students will be able to identify and outline energy-saving behaviors that can be applied in their day-to-day lives. • Students will be able to cooperate with others to develop action plans to achieve SDG7 in their communities. • Students will be able to articulate how SDG7 is interconnected with other SDGs. <p>Adapted from Education for Sustainable Development Goals: Learning objectives, UNESCO, 2017.</p>
Standards Explicitly Taught	*Global Schools encourages teachers to align the above learning goals and objectives to their national standards
Success Criteria & Assessment	Sample quizzes, essays, debates, and presentation topics can be found in the companion toolkit to this introductory guide.

A Gender-Sensitive Approach

5 GENDER EQUALITY



The lack of access to modern energy sources directly affects women and girls, who are often the primary household energy managers. They may spend hours each day collecting fuel and carrying heavy loads. In households that cook with solid fuels, girls spend 18 hours a week, on average, gathering fuel. Women are primarily sidelined in the industries that produce modern renewable energy sources; however, they comprise only 20 percent of the workforce ([UN Women](#)).

As educators, we have the powerful opportunity to make visible the situation of many women and girls concerning access to clean and affordable energy and integrate SDG7 into our lessons with a gender-sensitive approach. This guide offers several examples that work at the intersection of SDG7 and SDG5 (Gender Equality).

Background on SDG7

The first step in facilitating a lesson or workshop using this guide is to familiarize yourself with [Sustainable Development Goal \(SDG\) 7](#) and introduce the topic to your learners. Here are some key concepts to begin with:

1. Sustainable Development Goal (SDG) 7: Affordable and Clean Energy



[SDG7](#) ensures “**affordable, reliable, sustainable, and modern**” energy access for all. Achieving SDG7 requires comprehensive national, regional, and global action plans supported by strong leadership and increased investment in diverse energy solutions ([UN SDG7 High Political Forum, 2018](#)).



Global electricity access rose to 91% from 2015 to 2021; however, **675 million people remain without access** ([HLPF 2023 Factsheet](#)), and over 2 billion people still rely on polluting fuels and cooking technologies ([United Nations](#)).



SDG7 is **closely interlinked with all of the SDGs** and is crucial for driving progress on climate action and sustainable development. For example, without electricity, clinics cannot store vaccines for children or provide other types of critical medical care (SDG3: Good Health and Well Being); many schoolchildren cannot complete homework at night (SDG4: Quality Education); and people cannot run competitive businesses (SDG8: Decent Work and Economic Growth) ([United Nations](#)) ([UN SDG7 High Political Forum, 2018](#)).

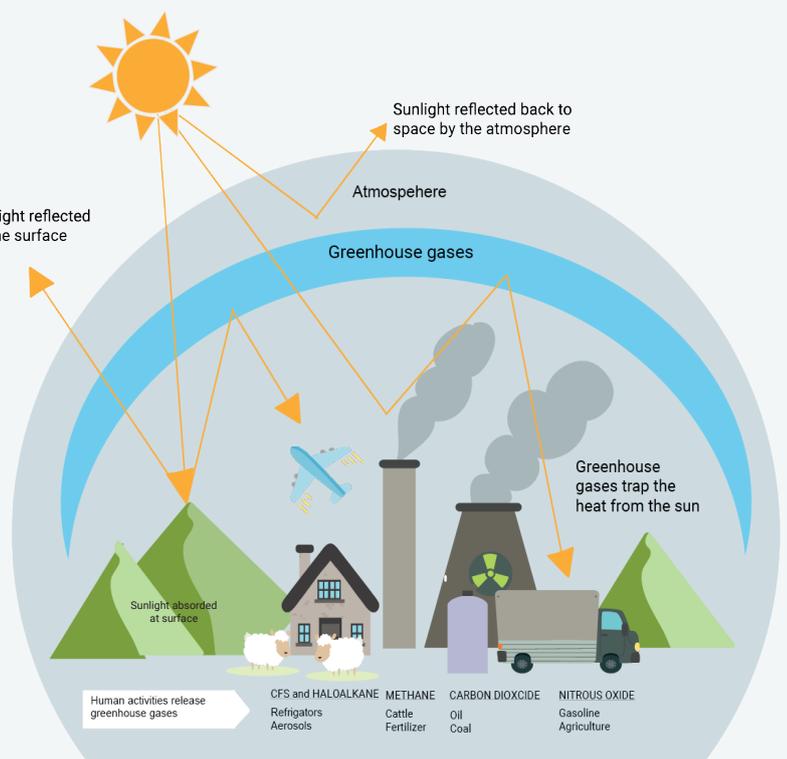
2. Non-renewable energy sources

- Non-renewable energy sources, also known as fossil fuels, include coal, oil, natural gas, and other energy sources derived from finite resources.
- They have been the primary sources of global energy consumption for over a century.
- They are responsible for about 80% of global energy production ([United Nations](#)).
- These sources have played a critical role in powering industries and homes; however, their extraction and continuous use are some of the largest contributors to environmental degradation and climate change ([Client Earth](#)).
- Relying on these types of energy sources can be unsustainable, and new technologies and energy sources are needed to achieve sustainable development.



3. The greenhouse gas effect

- When fossil fuels or non-renewable resources are burned, they release large amounts of carbon dioxide and other greenhouse gasses into the atmosphere.
- These greenhouse gases trap heat in the air, contributing to rising temperatures worldwide ([Client Earth](#)).
- Burning fossil fuels and the increased concentration of greenhouse gasses is one of the direct causes of climate change.
- As temperature rises, more moisture evaporates, intensifying extreme rainfall and flooding, causing more destructive storms. Such storms often destroy homes and communities, causing deaths and substantial economic losses. ([United Nations](#)).
- Finally, burning fossil fuels can also affect air quality and human health, causing illnesses and diseases.



GREENHOUSE EFFECT

4. What is net zero?

- Due to the increasing threat of climate change, countries worldwide have created cooperative frameworks to cut carbon emissions.
- The **Paris Climate Agreement was passed in 2015**. This legally binding international treaty seeks to ensure that global temperatures rise no more than 1.5C above pre-industrial levels, as they did before the Industrial Revolution ([UNFCCC](#)).
- Many countries and organizations are working towards achieving net zero emissions.
- Net zero emissions mean that the world would cut carbon emissions to the extent that emissions can be absorbed naturally, leaving none in the atmosphere ([United Nations](#)).
- Investing and transitioning to renewable energy sources and increasing energy efficiency are the most efficient ways to reach net zero emissions while simultaneously supporting daily living.
- Renewable energy sources currently account for 29% of electricity usage. However, to avoid the worst impacts of climate change, emissions need to be reduced by almost half by 2030, and the world needs to reach net zero by 2050 ([United Nations](#)).
- Another crucial pillar in reaching net zero emissions is decreasing the overall energy consumption in industrialized countries by removing or reducing emissions.



5. The Energy Transition

- In pursuit of environmentally friendly energy solutions, the world is shifting from non-renewable energy sources such as carbon and coal to renewable energy sources ([United Nations](#)).
- Transitioning to renewable energy requires adapting electrical grids to accommodate the intermittent nature of renewable energy sources and different ways to store and transport energy, which may require technological innovation.
- Countries and regions have varying energy needs, and solutions adaptable to the local context will vary. For example, they may focus on specific, abundant renewable energy sources in each region.
- A clear understanding of the dynamics of this transition is essential for achieving SDG7: Affordable and Clean Energy.
- With climate change threatening our planet, countries, organizations, and industries are working together to find strategies to support the energy transition.

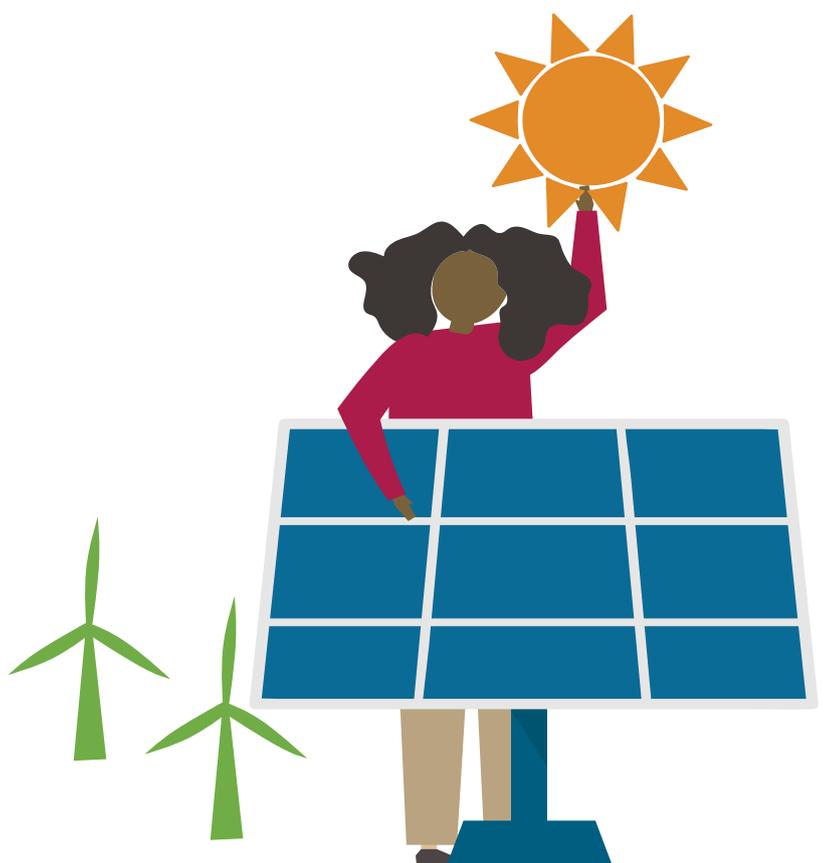


6. Renewable energy sources

Renewable energy sources are available in abundance, such as energy provided by the sun, wind, ocean, waste, and heat from the Earth ([United Nations](#)).

Renewable energy is energy derived from these natural sources that can be replenished at a higher rate than consumed ([UN Economic and Social Council, 2016](#)).

For a closer look at some renewable energy sources, read the definitions on the next page.



Solar panels convert sunlight into electricity, offering an abundant, entirely renewable energy source. This source reduces dependence on fossil fuels and is an incredibly sustainable method that can be scaled for extensive purposes, such as powering an entire school or electric grid ([Britannica](#)). However, solar energy is weather-dependent and requires consistent sunlight, meaning it is not viable for areas without sunlight ([Forbes](#)).

Solar

Tidal

Waves and tides move vast amounts of water, and that movement is full of kinetic energy or energy in motion. Generators placed in the water where tides or waves are most decisive capture that motion and turn it into electricity.

Green Hydrogen

The term "green hydrogen" refers to hydrogen produced using renewable energy sources and is considered one of the most promising energy vectors in the future ([Guevara-Ramírez et al., 2023](#)). It is produced by splitting water (H₂O) into oxygen (O₂) and hydrogen (H₂). When electricity is used for this process, it is called electrolysis. However, a significant amount of energy is required to split the H₂ molecule. At the same time, hydrogen can be stored as secondary energy, unlike electricity, enabling a temporal and spatial decoupling between energy production and consumption.

Wind

Wind turbines harness kinetic energy from the wind. The wind rotates the turbine blades, which power a generator and create energy that can power homes, businesses, towns, and electrical devices ([National Geographic](#)). This energy source can also be utilized for large-scale use but may be inefficient in areas with inconsistent or low wind speeds.

Hydroelectric

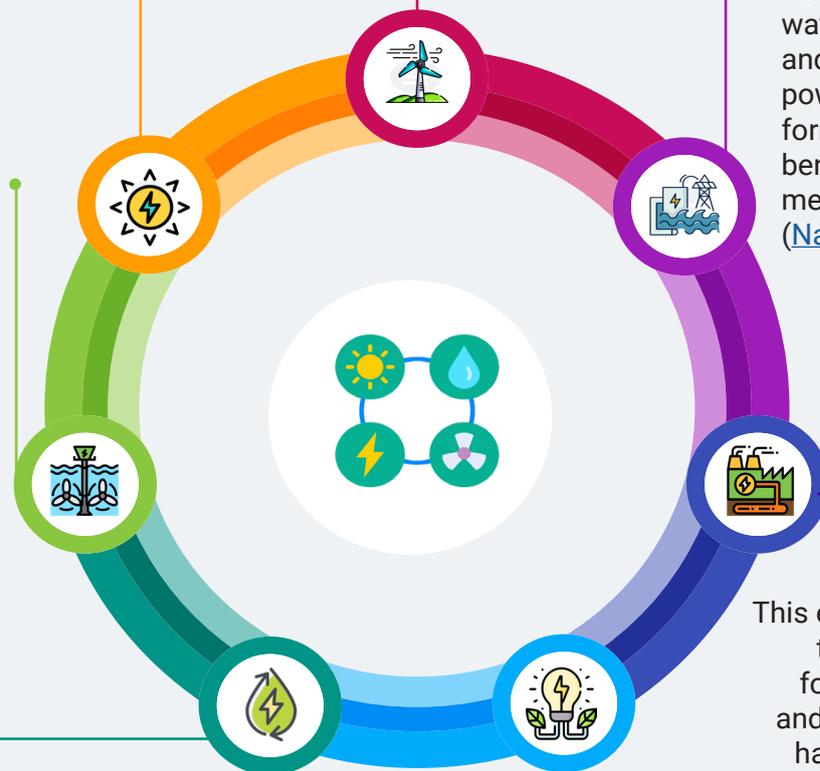
Dams and turbines capture the energy of flowing water, providing a reliable and efficient source of power generation. This form of energy can also benefit water management within a community ([National Geographic](#)).

Geothermal

This energy is heat within the earth and can be found in natural pools and hot springs. People have used geothermal energy for centuries for cooking, bathing, and warmth. Today, it is also used to create electricity.

Biomass

Biomass is a type of energy from plants and animal products. It can be burned directly to produce heat, or it can also be changed into liquid fuels, like bio-diesel or gaseous fuels, through special processes ([Siemens](#)).



7. A note on nuclear energy

- Nuclear fission reactions produce heat, which drives turbines connected to generators. The steam from the reaction spins the turbine, thus generating electricity.
- This method has a high energy density, meaning that a small amount of fuel produces a large amount of energy ([Britannica](#)).
- Since nuclear reactors do not produce air pollution or carbon dioxide while operating, it is sometimes considered a form of renewable or clean energy.
- A primary environmental concern related to nuclear power is the creation of radioactive waste. These materials can remain radioactive and dangerous to human health for thousands of years. ([U.S Energy Information Administration](#)).
- Nuclear energy has safety concerns and must be thoroughly regulated to ensure the safety of workers, the environment, and the community surrounding the power plant.
- However, it provides a consistent and reliable energy supply that is suitable for large and stable electrical grids ([World Nuclear](#)).



8. Economic aspects of SDG7

- **Ensuring access to affordable, reliable, sustainable, and modern energy.** Goal 7 is key to developing essential sectors of the global economy, such as agriculture, business, communications, and transportation ([Sustainable Energy for All](#)).
- The energy transition is expensive and requires incentives and funding from government sources, international cooperation, private investors, and innovative partnerships between stakeholders for possible change.
- **Green Jobs and the Greening Economy** Green jobs ([ILO, 2023](#)) exist across industries and are growing significantly due to environmental policies, new design principles, and worldwide decarbonization. Deloitte Economics Institute projects 300 million more green jobs by 2050 ([2022](#)).



- Encouraging female students to pursue careers in green energy can help break gender-related barriers to career paths in STEM, which is essential for future innovation and sustainable development. [UNESCO reports](#) that women make up only 35% of STEM graduates, a number that has remained unchanged for a decade.
- Approximately 700,000 jobs were added in the energy sector between 2020 and 2021 ([IRENA Renewable Energy and Jobs, Annual Review 2022, IRENA, 2022](#)). Crucial skills for developing a career in Green Energy ([Earth Buddies](#)) include technical expertise in engineering and energy management, problem-solving, innovation, and adaptability, as well as soft skills like communication, project management, and policy understanding.

Examples of Green Jobs



Manufacturing - plant and system operators, first-line supervisors, inspectors, logistics



Green Construction - architects, building inspectors, carpenters or laborers, managers, installation or repair workers



Environmental Protection - zoologists or biologists, reporters, plant scientists, meteorologists, conservation workers, scientists



Engineering - electrical, energy, mechanical, environmental, civil, biochemical, industrial



Transportation - planners, automotive engineers or mechanics, fuel cell technicians, locomotive engineers, aerospace engineers



Government and Administration - energy auditors, politicians, urban and regional planners, safety & health



Agricultural and Forestry - farmers, ranchers, managers, landscape architects

Some real-life sample job openings from Siemens Energy can be found [here](#).

Energy mix - the combination of energy sources needed to meet the energy needs of a particular region, country, or location; this is determined by the availability of resources, policies, and energy demands ([Planet Energies](#))



Energy sufficiency - this involves reducing energy consumption by making behavioral and lifestyle choices, as well as ensuring that people's basic energy needs are met equitably and sustainably ([Climate Recon 2050](#))



Energy transition - this is a long-term process, including adopting new energy strategies, jobs, and planning across countries and communities to reach net-zero emissions ([UNDP](#))



Fossil fuels - fossil fuels are a carbon-based type of non-renewable energy source that releases carbon into the Earth's atmosphere when combusted; these types of fuels formed naturally in the Earth's crust and originated from the Earth's geological past, such as coal, natural gas, oil, etc. ([European Commission](#))



Gender-sensitive approach - to understand and give consideration to socio-cultural norms and discriminations to acknowledge the different rights, roles & responsibilities of women and men in the community and the relationships between them ([UN- REDD](#))



Greenhouse gases - greenhouse gases include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs), which are released into the atmosphere upon the burning of fossil fuels ([World Meteorological Organization](#))



Green Economy - one that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcity ([UN Environment Program](#))



Green Jobs - the International Labour Organization ([ILO](#)) defines green jobs as "decent jobs that contribute to preserving or restoring the environment, either in traditional sectors such as manufacturing and construction or in new, emerging green sectors such as renewable energy and energy efficiency"



Net zero - achieving net zero means reducing carbon emissions to a small amount that can be absorbed or stored by nature and other carbon dioxide removal measures, leaving zero in the atmosphere ([United Nations](#))



Non-Renewable energy - non-renewable energy is energy that is derived from sources that will eventually run out and could include coal, oil, natural gas, or any other finite resources ([Inspire Clean Energy](#))



Offshore - offshore means something that happens in the water, away from the land. For example, offshore wind farms are built in the ocean or sea to capture strong winds and generate electricity using turbines. These areas are often chosen because the wind is stronger and more consistent than on land ([IRENA](#))



Onshore - onshore means something that happens on land. For example, onshore wind farms are built on land, usually in open spaces like fields or hills, to capture wind and produce electricity. These turbines are closer to towns and cities, making it easier to connect the energy to the people who need it ([Iberdrola](#))



Renewable energy - this is energy derived from natural sources that is replenished at a higher rate than consumed ([UN Economic and Social Council, 2016](#)). Examples of renewable energy include solar, wind, geothermal, hydropower, tidal, and bioenergy ([United Nations](#))



Renewable energy sources - are available in abundance, such as energy provided by the sun, wind, ocean, waste, and heat from the Earth ([United Nations](#))



The Paris Agreement - otherwise known as the Paris Accords, this is a legally binding international UN treaty on climate change. Its goal is "to limit the temperature increase to 1.5°C above pre-industrial levels" ([UNFCCC](#))



Turbines - a turbine is a machine that uses air, water, steam, or another fluid to create energy. It has blades that spin when the fluid moves through or around them. This spinning motion can be used to produce electricity or power machines ([Energy Education](#))





Pre-unit videos, readings, and additional training

Before facilitating the activities in Part 2, use the following links and resources to increase your knowledge and understanding of SDG7: Affordable and Clean Energy.



Videos

Watch these videos to gain technical background and prepare yourself to teach about renewable energy and the energy transition.

Beginners

- [Setting the Scene for SDG7](#) (SEforALL). An overall vision of what SDG7 encompasses.
- [What does clean energy look like? - Climate Action Explained](#) (UNDP). Learn about renewable energy through real cases around the world.
- [The Missing Piece of the Clean Energy Transition - Sheila Ngozi Oparaocha](#) (TED). A powerful call to prioritize gender equality in energy policies.
- [How fossil fuel emissions add to the climate emergency](#) (ABC News). A three-minute summary about the relationship between climate change and the use of fossil fuels.

Advanced Learners

Tailored for those with a firm grasp of the subject, focusing on in-depth analysis, complex concepts, and specialized skills

- [Clean Energy](#) (SDG Academy). A detailed explanation of SDG7 and the key aspects of the energy transition.
- [The Earth's Energy Balance](#) (SDG Academy). A comprehensive explanation of why, when, and how greenhouse gases should be reduced and their relationship to climate.



Readings

Read these articles to gain additional background and prepare yourself to teach about renewable energy and the energy transition.

Beginners

- Read the [UN's website on Goal 7](#) (Department of Economic and Social Affairs).
- [Fact sheet on clean energy](#) (United Nations).
- Read the [UN's website on renewable energy](#) and learn how energy use contributes to climate change (What is Renewable Energy, United Nations).
- Learn more about [net zero emissions](#) (Net Zero Coalition).

Advanced Learners

- [Analysis of SDG7 Progress, 2024](#) (Sustainable Energy for All). Check out how the world is progressing toward achieving the SDG7 targets.
- [Learn about carbon footprints and worldwide statistics related to the Paris Climate Accords](#) (Footprint Network).
- [What net-zero emissions mean](#) (8 Common Questions Answered, World Resource Institute).



Data visualizations

Beginners

- Check out the [SDG Index](#) to see how the world is progressing on SDG7.
- Visit [Our World in Data](#) to research different data indicators on energy.

Advanced Learners

- Check out [Eurostat](#) for indicators on monitoring SDG 7.
- Explore [Climate Watch](#) to learn more about its Net Zero Tracker.
- [IRENA Dashboard](#) provides information on the global annual energy-related CO2 emissions by sector.



Resources in multiple languages

- [Climate Action](#)
- [SDG7](#) (United Nations)
- [Client Earth](#)



Spanish

- [ODS 7 | Energía asequible y no contaminante](#) (UN Etxea)



Supplemental Lesson Plans and Guides

Beginners

- [Climate kids](#). A complete guide to climate change for kids made by NASA.
- [Understanding Renewable Energy](#), World's Largest Lesson.
- [Understanding Goal 7](#), Resources for Rethinking.

Advanced Learners

- [Decoding Global Goal 7](#), the World's Largest Lesson
- [How can we keep the lights on?](#), a lesson plan by Commonwealth Class on renewable energies.


Learn
More

Please visit
globalschoolsprogram.org/schoolsforsdg7

and inquire about our online training course for
educators on SDG7.

Adapting SDG7 to the local context and classroom

The SDGs are a roadmap with solutions to the problems we are facing. Most solutions carry out unprecedented transformations of the social, cultural, or economic systems we have built over the past 200 years. We need to change how we eat, move, consume, dress, produce goods, transport them, and how we relate to the environment. In this context, working with the SDGs in the classroom is a very enriching but complex process. Here are some tips on how to approach the teaching of SDG7.

Local context

Your students might experience energy scarcity or live in a village where a large solar plant is planned but faces community rejection. Or you might teach in a country with very few sunny days, no significant wind, or limited access to installation resources.

- Understanding and talking about local realities will help students appreciate the importance of SDG 7 and see its relevance to their lives.

Classroom

When teaching more technical SDGs like SDG7, some teachers feel they don't have the knowledge or resources.

- The following background chapter, along with the pre-unit videos, readings, and additional training materials, provides both basic and advanced resources for gaining a comprehensive understanding of SDG7.
- Integration of SDG 7 can be done across almost all subjects, such as science, geography, maths, social studies, economics, and even art or history.

Challenges

Students may come from diverse backgrounds—some might have a deeper understanding of energy issues, while others may not be familiar with these concepts.

- The guide is structured in a color-coded system to show more basic and advanced information and activities. Choose what best suits your class.
- Group discussions can give you a sense of the different types of background and knowledge your students have in regards to SDG7.

Dynamics

It is important to manage classroom dynamics when discussing SDG7, which can sometimes include controversial topics.

- Encourage a respectful, open environment where students feel comfortable sharing diverse opinions. Pay special attention to gender, cultural, and ethno-religious dynamics, among others, when discussing these topics with your students.



**Global Schools
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An Activities and Action Toolkit



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About Siemens Energy

The energy transition is the greatest challenge our generation faces. How do we reduce emissions while also increasing energy supply? It is an uphill battle, and there is no silver bullet. But finding solutions has always been in our DNA. For more than 150 years, our engineers have been spearheading the electrification of the world. Today, we are a team of 98,000, sharing the same passion, vision, and values. Our diversity makes us strong and helps us find answers together with our partners.

About Sustainable Development Goal 7

Sustainable Development Goal 7 (Affordable and Clean Energy) aims to provide affordable, reliable, and sustainable energy for all by 2030. It is key to the 2030 Agenda, and transitioning to clean energy is vital to supporting the Paris Climate Agreement. Achieving SDG7 requires advocating for universal access to modern energy services—not by replicating fossil fuel models but by creating renewable energy infrastructures for the global economy. Its targets guide the transition from fossil fuels to clean energy access.

Schools for Goal 7 is a project by Global Schools in partnership with Siemens Energy designed to train teachers and students in energy and sustainable development through gamified curricula. The initiative encourages active learning about SDG 7 to accelerate local sustainable development action. It provides hands-on experience in the energy transition, renewable energy, climate change, and sustainability, thereby equipping the next generation with essential skills for building resilient societies.



**Global Schools
Program**

**SIEMENS
ENERGY**

**7 AFFORDABLE AND
CLEAN ENERGY**



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Overview of the guide

Title	Clean Energy and the Energy Transition
Suggested Ages	12-17
Overarching Objective of the Guide	To develop the knowledge, values, and skills related to the issues, challenges, and importance of clean energy and the energy transition
Global ESD Competencies	Critical Thinking, Research Skills, Problem-Solving Skills, Teamwork, Collaboration, Global Awareness, Public Speaking, Civic Engagement
Learning Goals	<ul style="list-style-type: none"> ● Students will gain knowledge of the key elements of SDG 7 and why clean and renewable energy is crucial for sustainable development. ● Students will increase their understanding of the barriers and solutions for achieving affordable and renewable energy globally. ● Students will reflect on their energy practices, making SDG7 relevant to their daily lives, and how renewable energy sources could be implemented in their lifestyles, schools, and communities. ● Students will collaborate on SDG 7 activities and initiatives, emphasizing an active and participatory approach (group discussions, peer-to-peer learning, or interactive methods help students become more engaged and prepared for the peer-based dynamics of Education for Sustainable Development [ESD]). <p>Adapted from Education for Sustainable Development Goals: Learning objectives, UNESCO, 2017.</p>
Learning Objectives	<ul style="list-style-type: none"> ● Students will be able to identify and differentiate between non-renewable and renewable energy sources and their impact on the environment, health, and safety. ● Students will be able to analyze and demonstrate the harmful impacts of unsustainable energy production. ● Students will be able to articulate and communicate why renewable energy is needed and evaluate alternative energy sources for a given context. ● Students will be able to interpret their energy usage and assess how they can become more energy efficient in their daily lives. ● Students will be able to identify and outline energy-saving behaviors that can be applied in their day-to-day lives. ● Students will be able to cooperate with others to develop action plans to achieve SDG7 in their communities. ● Students will be able to articulate how SDG7 is interconnected with other SDGs. <p>Adapted from Education for Sustainable Development Goals: Learning objectives, UNESCO, 2017.</p>
Standards Explicitly Taught	*Global Schools encourages teachers to align the above learning goals and objectives to their national standards
Success Criteria & Assessment	Sample quizzes, essays, debates, and presentation topics can be found on the final pages of the guide.

Education for Sustainable Development Competencies

Competency	Description of the Competency	Applications to the Energy Transition
Systems thinking	“The abilities to recognize and understand relationships; to analyze complex systems; to think of how systems are embedded within different domains and scales, and to deal with uncertainty.”	Encourage learners to consider how their daily actions contribute to more efficient energy consumption and how distinct energy sources are involved in the complex problem of the energy transition.
Anticipatory	“The abilities to understand and evaluate multiple futures – possible, probable and desirable; to create one’s visions for the future; to apply the precautionary principle; to assess the consequences of actions, and to deal with risks and changes.”	Encourage learners to envision a more sustainable world with renewable energy for all, along with inclusive and realistic pathways for more efficient energy use.
Normative	“The abilities to understand and reflect on the norms and values that underlie one’s actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.”	Encourage learners to evaluate how their access/lack of access to energy is influenced by their culture, nationality, and status.
Strategic	“The ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield.”	Encourage students to work together to critically analyze their school communities and propose innovative actions to promote energy efficiency within their school and with peers.
Collaboration	“The abilities to learn from others; to understand and respect the needs, perspectives, and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership);...to facilitate collaborative and participatory problem solving...”	Encourage students to work together and empathize with those who have less access to energy or resources.

Competency	Description of the Competency	Applications to the Energy Transition
Critical thinking	“The ability to question norms, practices, and opinions; to reflect on one’s values, perceptions and actions; and to take a position in the sustainability discourse.”	Encourage students to quantify their habits and reflect on their community’s energy consumption (town, school). Encourage learners to research carbon footprints and energy sources critically and use this research to inform actions.
Self-Awareness	“The ability to reflect on one’s role in the local community and (global) society, ... evaluate and motivate one’s actions, and deal with one’s feelings and desires.”	Encourage learners to reflect on their energy consumption and opportunities to access clean and affordable energy.
Integrated Problem Solving	“Ability to apply different problem-solving frameworks to complex sustainability problems, develop viable, inclusive, and equitable solutions that promote sustainable development, and integrate the competencies mentioned above.”	Encourage learners to analyze approaches to increasing the prevalence of renewable energy in their communities by engaging with their peers in various activities through research, discussion, and reflection.

SDG 7 Activities Overview

The following activities are organized within a sequence of steps:



aims to help your students become familiar with SDG7.

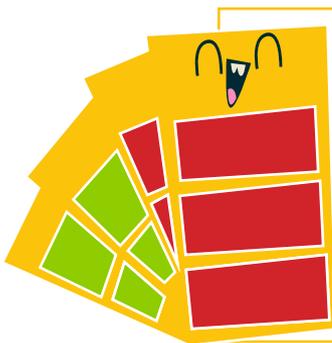


encourage students to lead their learning process by researching and investigating.



focus on student actions, student sharing, and the assessment of student knowledge.

The activities are divided into **two color codes based on age**:



Green for students aged 12 to 14 or beginners



Red for those aged 15 to 17 or advanced learners

All the activities detailed in this guide can be **carried out in the classroom or in the broader school community**.

All the activities are divided into parts so that they can be adaptable to different school contexts. **Feel free to adjust them to your students.**

You **don't need to complete all the activities**; each teacher can select the activities that best suit their educational context from each step.

Step 1 Introduction Activities

Activity one

SDGs BINGO

This introductory activity is the starting point of your student's engagement with SDG7 to help them understand the interconnectedness of this goal with the other SDGs. In this activity, students will learn how SDG7 is interconnected with other SDGs, practicing critical thinking and questioning skills.

Activity two

Energy that move the world

This introduction activity is the starting point of your student's engagement with different renewable and non-renewable energy types.

Activity three

Make a commercial

This introduction activity is the starting point of your student's engagement with communicating sustainability topics to others.

Activity four

Carbon footprint calculator

This introductory activity will teach your students how to use their carbon footprint to discover their energy usage. It is also a tool to raise awareness of energy consumption and sufficiency.

Step 2 Research

Activity

Exploring clean energy and the energy transition

Now that the students have been introduced to SDG7 and renewable energy, they will conduct guided research to explore the topic of *Clean Energy and the Energy Transition*.

Step 3 Investigate

Activity

Our contribution to the energy transition

Students investigate their schools' contribution to the energy transition. In this activity, students will act as detectives working to find clues. They will take notes, ask questions, and speak with peers, teachers, and school leadership.

Step 4 Additional Data Activities

Activity one

Evaluate your energy usage

Have your students work together to design their energy usage experiment to investigate further and learn how much energy they are using.

Activity two

Interactive map

The interactive map is an easy and highly visual way to access this data. We invite you to explore with your students how the world is progressing toward achieving SDG7.

Activity three

Clean energy infographic

In this activity, students will develop an infographic to explore and present data on renewable energy use in their country, region, or city.

Activity four

The Global Energy Mix

In this activity, students will analyze how the global energy mix has changed over time and make energy predictions.

Step 5 Take action

Activity one

Innovation

Now that students have researched and investigated SDG7 in their schools, it is time to encourage them to take action. Actions can be small; they can be long-term projects that are worked on throughout a few class periods or a new project that has never been done before.

Activity two

Campaign and raising awareness

Create a campaign to raise money for a specific issue related to SDG7 or advocate for the energy transition in the school community.

Activity three

Career Day

Organize a career day in your school, where industry experts can talk to the students about careers in the energy field or sustainability more broadly.



Step 6 Sharing Student Work

Activity one

Evaluate your energy usage

Once your students have completed their actions, celebrate their accomplishments and achievements. Invite parents, teachers, and other students to the school and organize an exhibition where everyone can see it.

Activity two

Host a Ted Talk Day

Students will speak for 5-10 minutes about their actions. Invite the head of the school, teachers, and parents.

Activity three

Encourage students to write a blog post about their work

Share it with socialmedia@globalschoolsprogram.org to feature projects on the Global Schools website and social media.

Activity four

Press release

Encourage students to write a short article for the school or local newspaper.

Step 7 Review and Assessment

Activity

Use the questions in this section to assess students' learning. Feel free to use any combination of quiz questions, debates, projects, and essays to engage your students and evaluate all they have learned.



STEP 1

INTRODUCTION ACTIVITIES

For
Beginners

ACTIVITY ONE

SDGs BINGO

Photo credit: Febia.be

Link to SDG7 Learning Objective: Students will be able to **articulate** how SDG7 is interconnected with other SDGs.

Time Frame: 20 minutes

Suggested Ages: 12 to 14 or Beginners

Materials Needed: SDG Bingo Card printed or projected

Procedure:

1. Useful information for the introduction

The SDGs are a roadmap for all countries to build a fairer, more equitable, and more sustainable future where no one is left behind. They are inherently interconnected: it is not possible to achieve, for example, SDG4: Quality Education without SDG5: Gender Equality, or SDG 1: No Poverty without ensuring clean water and sanitation (SDG 6). The same applies to SDG7; it is closely connected to the others. Here are some examples:



Access to energy is crucial for economic development and poverty alleviation, as it enables income-generating activities and improves quality of life.



Reliable energy supports healthcare services, including the operation of medical equipment and the storage of vaccines.



Electricity enables extended study hours and access to digital learning resources, enhancing educational outcomes.



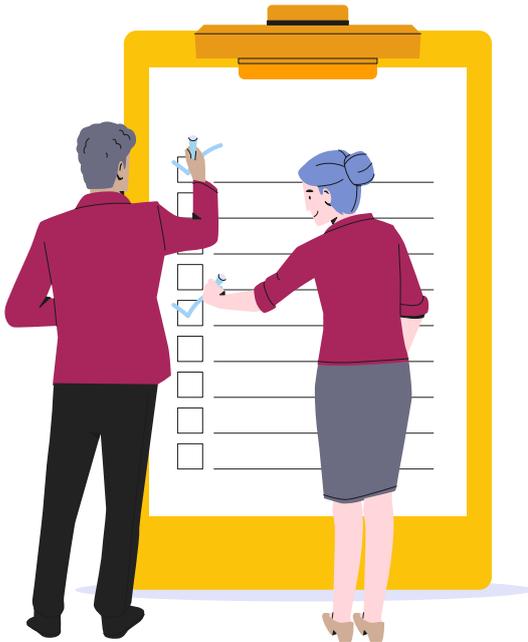
Modern energy access reduces the time women and girls spend collecting traditional fuels, allowing them to spend more time on education and economic activities.



Access to clean energy and electricity for everyone enables participation in technological progress to reduce the global digital divide.



Transitioning to renewable energy sources mitigates climate change by reducing greenhouse gas emissions.



2. Drawing Connections: Project or show the 17 SDGs in the classroom so everyone can see them. Ask your students to look carefully for a few moments, then ask them to find connections between the goals. If they find this difficult, give them ideas using the previous examples. Ask the students:

-  In what way do the other SDGs affect achieving SDG7?
-  What about the other way around—does SDG7 influence the success of other goals?
-  Do you see any examples of this in your daily life?

3. SDG Bingo Card: Each student or group has the following bingo card, which contains a grid of all the SDGs except SDG7. You can leave the 17 SDGs image projected, or you can print out a poster for the classroom.

Ask the students about how SDG 7 interacts with the other SDGs. The guiding question for this activity is: How does the green energy transition influence the achievement of other SDGs?

-  Every time a student or group finds a connection, they can write it down in the grid. Encourage them to find at least one or two connections per SDG, depending on your time for this activity.
-  When students or groups complete the grid, they shout “Bingo!” and present their grid to the class.



For
Beginners
or Advanced
Learners

ACTIVITY TWO

ENERGY THAT MOVES THE WORLD

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **identify and differentiate between** non-renewable and renewable energy sources and their impact on the environment, health, and safety.

Time Frame: 60 minutes

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials Needed: The energy sources worksheet should be printed, copied, or drawn

Procedure:

1. Useful information for the introduction

Oil, natural gas, coal, wind, hydroelectric, tidal, geothermal, biomass, and green hydrogen are some of the types of energy we will discuss. As a class, we will identify whether these sources are renewable or nonrenewable.

You can show or project the visual information about energy sources provided on page 16 or show the students this introductory video on renewable and non-renewable energy. Students can take notes or fill out the following worksheet as they are watching the video:

What is renewable energy? | Decomplicated



2. Classification

Write down the types of energy on the board and ask the students to categorize them based on whether they are renewable or non-renewable. Organize the information into a chart or print this chart out as a worksheet for students.

	Type of Energy	Renewable or Nonrenewable Energy	Key aspects
	Solar		
	Coal		
	Natural Gas		
	Wind		
	Hydropower		
	Oil		
	Nuclear		
	Geothermal		
	Biomass		

Ages 15 to 17 or Advanced Learners

	Type of Energy	Renewable or Nonrenewable Energy	Key aspects	Advantages <i>Are there any positive health, environmental, economic, or safety impacts?</i>	Disadvantages <i>Are there any negative health, environmental, economic, or safety impacts?</i>
	Solar				
	Coal				
	Natural Gas				
	Wind				
	Hydropower				
	Oil				
	Nuclear				
	Geothermal				
	Biomass				

3. Group Research on Energy Sources

Divide your students into small groups (based on class size) and assign each group an energy source. Students should work together to gather additional information and research on this renewable energy source. Advanced students can use the provided worksheets to answer questions about the different energy sources and their advantages and disadvantages.

Alternatively, give students a poster board. They can draw the energy source, attach an image of the energy source, or just write the source's name on the poster. Similarly, they should compile everything they know about this energy source. With this approach, the class will end the activity with a mural showcasing all the energy sources that move the world and their advantages and disadvantages.

Class Discussion

Bring the class together in a big group. Ask each group to present their worksheet or poster and describe their findings to the class. Then, ask the class:

**Ages 12
to 14 or
Beginners**

What technologies would you recommend deploying in the school or your community?

**Ages 15 to 17
or Advanced
Learners**

Why must we advocate for renewable energy technologies using the disadvantages and advantages gathered?

For
Beginners
or Advanced
Learners

ACTIVITY THREE MAKE A COMMERCIAL

Photo credit: istock

Link to SDG7 Learning Objective: Students will **collaborate on SDG7 activities and initiatives**, emphasizing an active and participatory approach.

Time Frame: 3 to 4 hours

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials Needed: paper, colored pencils, printed images, cell phone camera

Procedure:

1. Useful information for the introduction

Commercials are one of the oldest forms of advertising. They are an excellent way to create a clear message or narrative, visual appeal, emotional resonance, and a call to action.

2. Class Discussion

To start the conversation about how to make a commercial, ask the class:

- What makes a commercial memorable or convincing? (is this celebrity endorsements, humor, songs, etc)
- Tell the classroom about your favorite commercial
- If you have access to the internet and a projector in your classroom, you can show your students examples of successful and unsuccessful commercials or campaigns. For some ideas, see the following videos:



WE THE PEOPLE



[We the People for the Global Goals](#) (9 languages subtitles)

t∞gether
transforming the everyday

[Siemens: Transform the everyday](#) (with German subtitles)

3. Producing the commercial

- Break your students into small groups (based on class size) and assign each group the same energy source as in the previous activity. If you didn't complete the last activity, let the students choose their energy source.
- Have them elaborate a script or storyboard and create a commercial promoting using that form of energy.
- If they don't know how to do a script or a storyboard, there is a template on the next page with the key aspects to follow.

Template for Script	
Steps	Description
Define the Goal	What is the message or story you want to tell? What action or emotion do you want to evoke?
Write the Dialogue	<p>1. Introduction: Introduce the topic in an engaging manner Example: <i>Do you know that clean energy can save the world?</i></p> <p>2. Message: Develop the message in a clear, short way Example: Clean energies, such as solar, wind, hydropower, or geothermal, are key to fighting against climate change, ensuring affordable energy for all of us, and protecting the planet.</p> <p>3. Conclusion: End with a call to action or a thought-provoking message. Example: What are we waiting for? Let's say YES to renewable energies!</p>
Template for Storyboard	
Steps	Content
Create the grid	Create a grid on a page with multiple frames. Each frame represents a scene or shot.
Scene Description	In each frame, briefly describe what will happen in that scene. Example: "The girl looks at the sun" or "The camera zooms in on the SDG logo."
Add Dialogue or Narration	Below each frame, write the dialogue or narration that will be spoken. Example: "Clean energy sources, such as solar, wind, hydropower or geothermal, are key to fight against climate change, ensure affordable energy for all, and protect the planet".
Include camera directions	If you're creating a video, include any camera movement. Example: Close-up on the girl as she says: "Do you know that clean energy can save the world?"
Identify Transitions	Mention how one scene transitions to the next. Example: "Fade out" or "Cut to."
Time Estimates for Each Scene	Estimate each scene's time so the video will flow smoothly and be within your time constraints.

Format: Depending on the resources available, you can have your students film the commercial and play it for the class. They can also present the script record or interpret a radio commercial. Depending on your context, you can provide them with [digital storytelling tools](#).

Digital storytelling uses multimedia forms, such as videos, images, audio recordings, and interactive elements, to present ideas and stories.

Remind them to create messages that reflect an equitable and respectful vision of men and women.

4. Presentation

Students can present their work to the class after creating their commercials. Have the students comment on their favorite aspects of the various commercials shown.



For
Advanced
Learners

ACTIVITY FOUR CARBON FOOTPRINT CALCULATOR

Photo credit: Shutterstock

Link to SDG7 Learning Objective: Students will be able to interpret their energy usage and assess how they can become more energy efficient in their daily lives.

Time Frame: 45 minutes

Suggested Ages: 15 to 17 or Advanced Learners

Materials Needed: A device with a connection to the internet. For schools with restricted access to the internet, jump from step 1 to step 4 and create a conversation about what aspects of daily living contribute the most to each student's carbon footprint and how we can change it.

Procedure:

1. Useful information for the introduction

A carbon footprint is the number of greenhouse gases emitted by an individual, company, or organization's activities. We produce greenhouse gas emissions from burning gasoline when we drive, burning oil or gas to heat our homes, or using electricity from coal, natural gas, and oil. Globally, the average carbon footprint per person is close to 4 tons.

2. Class Discussion

To start the conversation, you can discuss as a group some of these issues:

- The concept of a carbon footprint.
- The number of greenhouse gases emitted by an individual, company, or organization's activities.
- How the [calculator](#) works.
- Navigate through the web page [Our World in Data](#) to see the evolution of the world's carbon footprint over the last centuries. You can also use this information for the class discussion.

3. Calculating our carbon footprint

Using this survey from [footprint.conservacion.org](#), have students calculate their household or transportation carbon footprint. Give them some time to experiment with inserting different values and see how the footprint changes.

4. Final debate

Ask your students what surprised them and what they expected. Afterward, you can compare and contrast energy usage and explore what aspects of daily living contribute the most to each student's carbon footprint and how we can change it. Emphasize that individual change is necessary, as well as collective change.



STEP 2

RESEARCH

For
Beginners
or Advanced
Learners

ACTIVITY ONE EXPLORING THE TOPIC OF CLEAN ENERGY AND THE ENERGY TRANSITION

Photo credit: istock

Link to SDG7 Learning Objective: Students will gain knowledge on the **key elements of SDG 7** and why clean and renewable energy is crucial for sustainable development.

Time Frame: 60 minutes

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials needed: Research Worksheet printed out or written by the students

Procedure:

1. Research can be completed independently in a computer lab, as a homework assignment, by talking to community members, by visiting a library, or as a classroom activity.
2. Give students a copy of the Research Worksheet or post the questions at the front of the room. Worksheets can be adapted based on the local context and the time allocated for the activity.
3. After students have completed the activity, lead a session where students make a presentation of their research.

Useful links for research

Ages 12 to 14 or Beginners	Ages 15 to 17 or Advanced Learners
Video Clean energy for a greener future (UNOPS)	Video Setting the Scene for SDG7 (Sustainable for All)
Article and visual data <ul style="list-style-type: none">• SDG Index Interactive map• What is Goal 7	Articles and visual data <ul style="list-style-type: none">• SDG Index Interactive map• What is Goal 7• UN Women SDG7

Student Research Worksheet - Ages 12 to 14 or Beginners

Name:	
Country:	
Local Community:	
Research Questions	Answers
In your own words, what is renewable energy?	
What is the most significant source of energy worldwide?	
What type of energy does your country use the most?	



Activity
Extension

An alternative approach to the following research worksheets is to assign each pair of students a different country or community, assigning countries from various locations and ecosystems. Then, bring students back together to compare what they learned and how they can apply basic principles to determine the most appropriate renewable energy strategy in a specific location.

Student Research Worksheet - Ages 15 to 17 or Advanced Learners

Name:	
Country:	
Local Community:	
Research Questions	Answers
In your own words, what is renewable energy?	
Which country uses the most renewable energy, with a percentage of almost 100%?	
Describe the geography of your country and how this could affect renewable energy use. For example, is it in a cold climate that needs heat? Does it have an abundance of rivers that could be used for hydropower? Is it primarily urban, with industry, transportation, and higher energy consumption per capita?	
Are there any policies or government incentives in your country that encourage using clean energy?	
What renewable energy sources could be adopted in your home country or community based on the information gathered? Describe your vision for renewable energy in your country.	
How can we ensure everyone in your country has access to clean and sustainable energy, especially women and girls?	



STEP 3

INVESTIGATE



For
Beginners
or Advanced
Learners

ACTIVITY ONE

OUR CONTRIBUTION TO THE ENERGY TRANSITION

Photo credit: istock

Link to SDG7 Learning Objective: Students will reflect **on their energy practices**, making SDG7 relevant to their daily lives, and how renewable energy sources could be implemented in their lifestyles, schools, and communities.

Time Frame: 60 minutes

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials needed: School Investigation Worksheet or questions written or posted in the classroom

Procedure:

1. Useful information for the introduction

In this activity, students will act as detectives working to find clues. They will take notes, ask questions, and speak with peers, teachers, and school leadership.

2. School Investigation

- Pair students together in groups of 2 - 4 and give students a copy of the School Investigation Worksheet.
- Allocate 20 minutes for students to work together to answer the questions. You can also have the students walk around the school, interviewing facilities managers or other staff.

3. Reflection

After students have completed the activity, lead a discussion session where students share and compare answers. Ask the students:

- Are there areas in the school where we can work together to improve the school's energy usage?
- How can we ensure that all students understand the importance of clean energy and how to practice energy conservation practices?
- How can we encourage students to be mindful of energy usage?
- How can we provide more access to clean energy for students?

4. Beginning to take action

You can assign students to be responsible for turning off the lights, checking that everything is unplugged at the end of the day, or ensuring that devices are powered off when they aren't in use. This is a small-scale activity that can give students a sense of purpose. You can use this [worksheet](#) to facilitate this activity.

School Investigation Worksheet

Where does your school's energy come from?	
Does your school's energy come from renewable energy sources? If not, what is your school's primary source of energy?	
Does your school have air conditioning? If so, where does the energy to support this come from?	
What part of your school uses the most energy?	
Are there programs or policies in your school encouraging sustainable energy practices?	
Is your school involved in community projects related to clean energy or the energy transition?	
What is the biggest problem in your school? How can you help your school community in this area?	

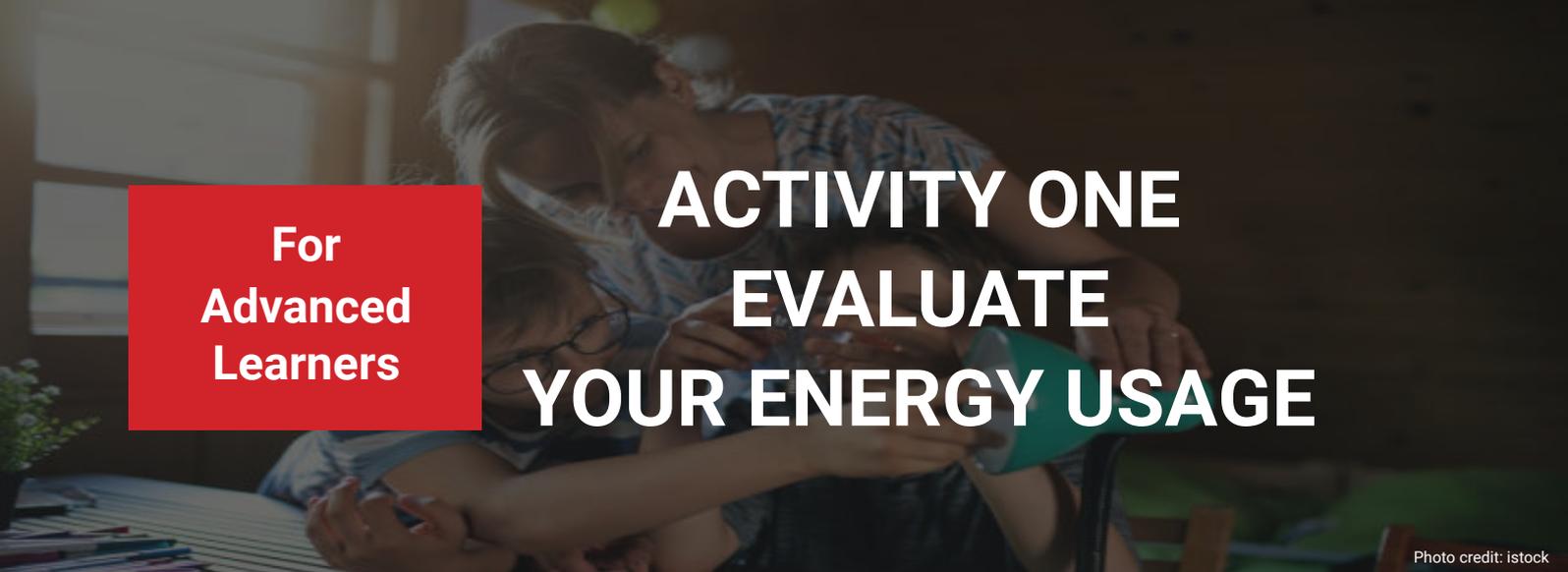


- Have the students work together with another school. Facilitators can set up a virtual meeting with a school in another community or country to share the results of this activity.
- Emphasize the crucial importance of sharing knowledge, innovations, and technology across countries to help drive access to clean energy and the energy transition, which will support the overall achievement of sustainable development.



STEP 4

ADDITIONAL DATA ACTIVITIES



For
Advanced
Learners

ACTIVITY ONE

EVALUATE YOUR ENERGY USAGE

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **identify and outline** energy-saving behaviors that can be applied in their day-to-day lives.

Time Frame: 60 minutes

Suggested Ages: 15 to 17 or Advanced Learners

Materials Needed: Calculating your energy usage worksheet printed out or projected

Procedure:

After collecting data, have students analyze their primary sources and uses of energy. What can they live without? What can they never sacrifice?

1. Useful information for the introduction

In our households, we use energy for various purposes: space and water heating, space cooling, cooking, lighting, or electrical appliances. According to [Our World In Data](#) (2023), in some countries, energy consumption is so low that it hardly registers. Beyond burning some solid fuels for cooking, people consume barely any energy. Meanwhile, in the wealthiest nations, a person consumes as much as 100 times more than some of the poorest countries.

2. Assessment of energy usage

Have your students use the worksheet below to calculate their energy usage. For this activity, they must multiply the hours by the energy consumption associated with each category. For a list of common appliances and their energy usage by hour, please click this [link](#).

3. Reflection

After the students calculate their energy usage, either have them answer the following questions on a worksheet or in a class discussion:

- Take some time to reflect on your energy usage. Is most of your energy used to " fulfill basic needs," such as cooking? Or is it used for other items, such as taking a vacation flight or heating a swimming pool?
- What are some ways in which you can improve energy sufficiency in your day-to-day lives?
- What energy-saving habit will you implement this month? Write down one goal for your energy-saving habit.

You can also agree on an energy-saving habit as a class or a school.

Calculating Your Energy Usage

Item	Hours per day	
Lighting		
Lightbulb		(Number of Hours) x (energy usage per hour) = _____
Other		(Number of Hours) x (energy usage per hour) = _____
Technology		
Mobile phone		(Number of Hours) x (energy usage per hour) = _____
Computer		(Number of Hours) x (energy usage per hour) = _____
TV		(Number of Hours) x (energy usage per hour) = _____
Other		(Number of Hours) x (energy usage per hour) = _____
Transportation		
Walking		(Number of Hours) x (energy usage per hour) = _____
Biking		(Number of Hours) x (energy usage per hour) = _____
Riding in a car or driving		(Number of Hours) x (energy usage per hour) = _____
Taking the bus		(Number of Hours) x (energy usage per hour) = _____
Other		(Number of Hours) x (energy usage per hour) = _____
Cooking		
Using the microwave		(Number of Hours) x (energy usage per hour) = _____
Using the stove		(Number of Hours) x (energy usage per hour) = _____
Other		(Number of Hours) x (energy usage per hour) = _____
Total estimated daily energy usage:		



For
Beginners
or Advanced
Learners

ACTIVITY TWO

INTERACTIVE MAP

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **articulate** how SDG7 is interconnected with other SDGs.

Time Frame: 60 minutes

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials Needed: [Interactive map](#) tool.

Procedure

Useful information for the introduction

The SDG Index ranks countries based on their performance across 17 goals. The [interactive map](#) is an easy and highly visual way to access this data. The progress of each country is shown through a color-coding system:

- Green: SDG achieved
- Yellow: Challenges remain
- Orange: Significant challenges remain
- Red: Major challenges remain
- Grey: Information Unavailable

Project the [interactive map](#) onto a visible spot for all the students.

Guide students through the map by clicking on the different countries they choose

- 1. Select your country on the map** to view its details. In the left panel, click the “Country Profile” option to view in-depth information about your country’s progress.
- 2. Ask students questions** to promote analysis and discussion.
 - How many countries have achieved SDG7? What are these countries?
 - What country is first in the ranking of the SDG Index?
 - How many countries have achieved SDG13: Climate Action? Are these the same as the ones that have achieved SDG7? Why or why not?
 - How many countries have achieved SDG5: Gender Equality? Are these the same as the ones that have achieved SDG7? Reflect on the intersection of these SDGs.

For
Beginners
or Advanced
Learners

ACTIVITY THREE CLEAN ENERGY INFOGRAPHIC

Photo credit: istock

Link to SDG7 Learning Objective: Students will increase their understanding of the **barriers and solutions** for achieving affordable and renewable energy globally.

Time Frame: 60 minutes

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials needed: computer or cell phone with a design program (canvas, PowerPoint) or paper, colored pencils, and cut images.

Procedure:

1. Useful information for the introduction

An infographic visualizes information or data designed to present complex ideas quickly, clearly, and effectively. They combine text, images, and graphics and can be put in pie charts, diagrams, timelines, and flowcharts. Here are some examples of institutions that use infographics to explain these concepts and statistics:



- [International Energy Agency](#): Statistics about energy and gender, focused on employment and access.
- [United Nations](#): Why invest in renewable energies? A visual graphic explaining the consequences of fossil fuel use and the energy transition roadmap.
- [Our World in Data](#): Energy consumption and production shown by countries and its evolution since 1800.
- [UN Environment Programme](#): An infographic illustrating the challenges and potential solutions related to SDG7.

2. Brainstorming

Students can identify key concepts or statistics to include in an infographic based on the examples and previous activities. For instance, they might create a visual chart representing the list of renewable energy sources and their advantages and disadvantages from Step One.

3. Divide students into small groups

Based on the concepts or statistics they want to focus on, have students identify the main ideas they wish to include in their infographic.

4. Design the Infographic

Students can use free online tools like Canva, Piktochart, Infogram, or Microsoft PowerPoint to create infographics. Ask the students to keep their infographics simple and visually engaging. For schools with limited or restricted access to the internet, infographics can be drawn or made by cutting and pasting images.

5. Presentation

Each group presents and explains their infographic to the class. The rest of the class can ask their peers questions. Some possible questions include:

- Why did you choose this topic and type of infographic?
- What challenges did you encounter, and how did you overcome them?

Find out when World Energy Day is celebrated, and display the student's work in a visible location to share their efforts and raise awareness.



STEP 5

TAKE ACTION



For
Beginners
or Advanced
Learners

ACTIVITY ONE INNOVATION

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **cooperate** with others to develop action plans to achieve SDG7 in their communities.

Time Frame: One semester

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials needed: Dependent on type of action project

Procedure:

1. Useful information for the introduction

Innovation involves generating new ideas, methods, products, services, or solutions that have a significant positive impact and value. It also involves transforming creative concepts into tangible outcomes.

2. Class Discussion

If you have done the activity in Step 3 or Activity One in Step 4, your students have a sense of the energy situation in their school, community, or country. Now, think collaboratively about a new project that has never been done before. Here are some ideas:

- For the school, it could be investing in forms of renewable energy or joining a global movement like the Earth Hour
- As a teacher, this could include hosting a workshop on Education for Sustainable Development for your fellow teachers.
- For students, this could be creating a new prototype for a sustainable city that uses clean energy and displaying that innovation in the hallway.

Art is a powerful tool for creating an impact. Your students can design an art exhibition about SDG7. Get inspired by the Carbon Ruins Exhibition held by the Manchester Museum in England.

3. Designing and implementing the project

Have your students define their goals and create a roadmap for their chosen project, setting clear deadlines for each step. On the next page, you will find an Action Planning Template to help you ask the right questions as you guide the students' projects.

4. Presentation

Have the students present the results of their projects.

Action Planning Template

Describe your idea or action.

Where will you implement your action?
Your school, classroom, or local community?

What is your #1 goal in completing this action?
How many people do you want to reach?
What exactly will you accomplish?

What do you know about this topic? Use research, facts, and statistics you gathered.

What are your next steps for completing this action?

For
Beginners
or Advanced
Learners

ACTIVITY TWO

RAISING AWARENESS

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **cooperate** with others to develop action plans to achieve SDG7 in their communities.

Time Frame: One semester

Suggested Ages: 12 to 14 or Beginners and 15 to 17 or Advanced Learners

Materials needed: This depends on the type of campaign. This could include online or offline presentations, posters, cell phones with cameras and videos, paper, colored pencils, etc.

Procedure:

1. Useful information for the introduction

Raising awareness inspires people to take action, change behaviors, or support a cause. It involves campaigns, discussions, presentations, or social media posts that bring attention to an important issue. For example, raising awareness about SDG7 means informing people about its goals, effects, and ways to accomplish it.

2. Goal and content

Have students define the main objectives of their campaigns. They could be about:

- the gender gap in energy employment
- the transition to renewable energies in their school or community
- raising awareness about the environmental impact of fossil fuels
- an energy efficiency campaign
- advocating to leadership and teachers to take a stance on fossil fuels
- raising money for an NGO that focuses on sustainable energy.
- selling artwork or sustainable food and using the funds raised to donate to an energy conservation organization

3. Audience

Have students decide who they want to reach with their campaign. Will it be other students, your community, private businesses, or the local government? Once the audience has been chosen, the appropriate approach to reach this audience can be selected.

4. Campaign medium

Have students choose how to carry out their campaign. This could include online events, workshops, social media posts, flyers, posters, or pamphlets to be distributed in schools, businesses, or public spaces, as well as interviews on the local radio or in newspapers.

5. Collaboration

One of the most critical SDGs is SDG17: Partnerships for the Goals. For campaigns to be successful, encourage students to collaborate with local businesses, organizations, or influencers already working on sustainable energy issues and support them in engaging experts to help promote the campaign.



**For
Advanced
Learners**

ACTIVITY THREE CAREER DAY

Photo credit: istock

Link to SDG7 Learning Objective: Students will be able to **cooperate** with others to develop action plans to achieve SDG7 in their communities.

Time Frame: One day

Suggested Ages: 15 to 17 or Advanced Learners

Procedure:

1. Useful information for the introduction

- With the economy being greened, it is crucial to help students make connections about how they can apply what they have learned about SDG7 to their futures.
- Students can turn a passion or interest in sustainability and clean energy into a full-time career!
- Organize a career day at your school. Industry experts can talk to the students about careers.

2. Steps to hosting a green career day could include



Speak to your school leader or administration for permission. This is best done at least 3 months in advance.



Solidify a date for the career day.



Recruit fellow teachers and staff for a Career Day



Create a committee to help organize and plan the event.



Involve the Parent Teachers' Organization to help plan and see if any parents would like to be speakers.



Start the publicity for the event and ensure that fellow teachers promote it to their students.

-  **Find** and contact industry speakers for the event. Ensure you collect their bios and company information to circulate to the students and teachers.
-  **Remember** to remind speakers before the event, including the timing, location, and other information. If your school has regulations for outside guests to visit campus, ensure all forms and procedures are in place.
-  **Ensure** you have all the logistics, including securing the proper space for all guests, students, and attendees.
-  **Prepare** the students for the day by ensuring you have communicated the dress code, the purpose of the career day, and to prepare any questions in advance.
-  **Enjoy** the career day! Send thank-you notes to speakers for attending, and debrief with your committee members on the successes.
-  **Teachers can also have** their students research or discover potential careers in energy, especially clean energy, as a homework assignment.

Please [click here](#) for a complete, detailed resource on planning a career day.

Additional Global Schools Action Ideas!



Make a Comic/Video/Mural

Have your students choose a nonrenewable or renewable energy source, such as coal, nuclear, wind, tidal, solar, etc. Then, they can create a comic, mural, video, or TikTok demonstrating how the energy works and its environmental impact.



Host Live Communication Programs

Hold a daylong workshop or session in your school and invite professionals and experts to discuss clean energy and the environmental impact of fossil fuels. Examples of experts can include workers at a local energy plant, engineers, and others. The experts can discuss the environmental impact of non-renewable energy and teach your students about job opportunities in sustainable energy.



Organize an excursion to an energy site with a community partner

During the excursion, discuss the pros and cons of different energy sources.



Be an Advocate for SDG7

Have your students create a speech or position paper advocating for clean energy at a school assembly. They can also be spokespersons in their community, raising public awareness of clean energy. Students can also write a letter to their school director, local school board, or government officials.



Go to [SDGs in Action](#) or view [The Lazy Person's Guide to Saving the World](#) for more ideas you and your students can do to make an impact!



SDG7 Best Practices

Best Practice 1

Sustainable Use of Energy at Harare International School, Zimbabwe

Teachers in charge: Sarah Santillan-Isern, Brenda Makokoro, Nomusa Shamu

Through experiential learning, students developed a profound understanding of sustainable energy by participating in hands-on activities and solving real-world problems. They designed energy-efficient solutions like solar-powered devices and explored biomimicry to improve their designs by mimicking nature's efficiency. Observing energy transformations and testing energy-converting devices gave them insights

into conservation and resource management. This approach emphasized the importance of wise natural resource management and the societal implications of technology, ultimately equipping students to make responsible decisions and fostering a commitment to a sustainable future while connecting scientific concepts to real-life applications.



Best Practice 2

Advancing SDG7 at Delhi Public School, Lava, Nagpur, India

Teacher in charge: Shahnaaz Ojha
Learners: Whole-of-School activity

As part of their commitment to SDG 7, Delhi Public School, Lava, Nagpur, India, has implemented impactful renewable energy projects on campus. Solar panels installed on the rooftop generate a portion of the school's electricity, with excess energy contributed to the National Grid, offsetting the costs of the school's electricity bill through government subsidies provided in return. This initiative has effectively reduced the school's reliance on non-renewable energy. The school further reduced its energy consumption by using rainwater harvesting systems that channel rainwater to underground sumps, thus striving to achieve SDG indicator 7.2.1, increasing the renewable energy share in the total final energy consumption.

Recognized twice as a Green School by India's Centre for Science and Environment, the school maintains a 60% green cover and designs classrooms with ventilation that minimize the need for air conditioning and LED light bulbs. Students actively participate in these sustainability efforts, encouraging their families to adopt solar energy, practicing mindful electricity use, and conserving water. The school collaborates with the NGO "Energy Swaraj" and introduced the "Unironed Mondays" to save energy. These measures have successfully reduced the school's electricity consumption and bills while promoting a culture of informed and conscious energy use among students, who report similar energy-saving practices at home.





Best Practice 3

Promoting the use of sustainable and energy-efficient cooking solutions in a rural area at Nabuganyi R/C P/S School in Kayunga, Uganda

Teachers in charge: Shiella Atto and Samanya Lucy
Learners: 9-15 year-old students

During the 2023/24 school year, teachers and students at Nabuganyi R/C P/S School identified deforestation caused by firewood use as a key issue and researched energy-efficient alternatives. Through hands-on participation, students contributed to the project and gained practical knowledge of renewable energy concepts and environmental conservation.

With the guidance of skilled facilitators, the school community came together to build an energy-saving stove using locally available materials such as bricks for the main structure, tiles for insulation and heat retention, cement and clay for binding and reinforcement, and other materials like sand and water for construction. The stove was designed to use less firewood by optimizing combustion, cooking large quantities of meals at once, improving efficiency by reducing the need for multiple cooking sessions, and quickly reaching higher cooking temperatures—further decreasing firewood consumption.

Since its construction, the school's firewood use has decreased by over 50%, reducing the need to cut down trees. The project has raised awareness about sustainable practices and empowered students

to advocate for renewable energy solutions within their communities. The same stove design has now been implemented in four additional schools in the Nabuganyi community.





Best Practice 4

Promoting Sustainable Energy Solutions at San Estanislao de Kotska School, Málaga, Spain

Teacher in charge: Jose Alberto Peña
Learners: 16-year-old students

First-year high school students have just completed the construction of an impressive wind turbine featuring a dual-turbine design. This turbine can charge a 12-volt battery, which will later be converted to 220 volts of alternating current for use in the garden's irrigation system. They intend to install this wind turbine at the current Environmental Center, which houses part of the school's garden. This began a series of projects to provide the Environmental Center with facilities designed and built with sustainability and energy efficiency in mind.

By incorporating renewable energy solutions like this one, the school is not only supporting sustainable infrastructure development but also providing valuable hands-on learning experiences for students, fostering environmental awareness and practical skills. This initiative aligns with the school's commitment to SDG7, ensuring access to affordable, reliable, sustainable, and modern energy for all.





STEP 6

SHARING STUDENT WORK

SHARING STUDENT WORK

Photo credit: Izabella, Global Schools Advocate Alumni, Brazil

This final step aims to increase the outreach of the activities and enhance the student's sense of agency. Adopting a peer-to-peer approach makes them multipliers for SDG7 within their community. Some ideas for activities can be:



Hosting events

Host an exhibition in the school lobby or courtyard. This is where everyone in the class can showcase their projects and share their accomplishments. Invite parents, teachers, and other students.

Host a Ted Talk Day. A TED Talk is a showcase for speakers presenting great, well-formed ideas in 10-15 minutes with a conversational approach. Students will speak about their projects. Invite the head of the school, teachers, and parents.

Steps to organize a TED Talk:

- ✓ Create a theme.
- ✓ Create a selection committee.
- ✓ Select your speakers
- ✓ Prepare your speakers: Outline + script, + prepare slides
- ✓ Elaborate on an Event flyer and spread the word!



Writing

- ✓ Encourage students to write a blog post about their work. Share it with socialmedia@globalschoolsprogram.org to feature projects on the Global Schools website and social media.
- ✓ Encourage students to write a short article for the school or local newspaper.



STEP 7

REVIEW AND ASSESSMENT



REVIEW AND ASSESSMENT

Photo credit: istock

Use these questions to assess students' learning through quiz questions, debates, projects, and essays. Feel free to use any combination of questions and activities to engage your students and all they have learned.

Exam or Quiz Questions

Ages 12 to 14 or Beginners

1. What is SDG7? Explain how it links to one other SDG.
2. List one source of renewable energy. Explain its key characteristics and how it contributes to a cleaner environment.
3. How are women and girls affected by the lack of access to clean energy?
4. What is a carbon footprint?

Ages 15 to 17 or Advanced Learners

1. Define carbon footprint. Should the world increase or decrease its carbon footprint to achieve the SDGs?
2. How does the adoption of clean energy technologies contribute to the reduction of greenhouse gas emissions?
3. Explain the concept of the "energy transition." What is it, and what is its significance in addressing climate change?
4. Reflect on why, in some countries, the lack of energy affects women and girls disproportionately.
5. What is one potential governmental policy or project that could be implemented in your country or area that focuses on ensuring access to affordable and sustainable energy for all? How would this policy help achieve SDG 7 and work towards cleaner and renewable energy sources? Consider the role of communities, industries, private businesses, and the economy in implementing your policy/project. What are some potential barriers to success?

Debate Topics

Ages 12 to 14 or Beginners

1. Climate change is not man-made. It is a natural phenomenon.
2. Clean energy is too expensive to implement on a large scale.
3. The energy transition would improve women's and girls' lives.

Ages 15 to 17 or Advanced Learners

1. There should be widespread bans on the use of non-renewable energy sources.
2. Individuals and businesses should be penalized financially for excessive energy consumption.
3. Governments should play a more prominent role in regulating energy usage.

Example Questions for Essays and Projects

Ages 12 to 14 or Beginners

1. Write out three recommendations for your school to practice more responsible energy consumption. Be sure to include evidence on why these policies would contribute to positive environmental outcomes. Be sure to include evidence on why these recommendations are practical and achievable by the school.
2. Consider the intersection of SDG7 with the other SDGs, precisely the societal dimension. How is access to clean and affordable energy linked to human well-being? Draw connections to at least three additional SDGs.

Ages 15 to 17 or Advanced Learners

1. Choose a current renewable energy project in your country. This could be a solar farm, an off-shore wind park, or similar. Analyze this project's impact and long-term effects on different stakeholders, including the community, the environment, and the economy.
2. Select a new, innovative technology that promotes clean energy. Analyze this technology and assess its viability in your country and community.



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