Renewable Energy

Renewable forms of energy, already a major research focus in France, include bioenergy, geothermal energy, thermodynamic heating, solar energy (thermal, photovoltaic, concentration), wind energy, hydroelectric and marine energy, and hydrogen-based generation.

Beneficial to the environment, renewable energy comes from a variety of sources: the sun, wind, water and geothermal energy, as well as wood, crop residues, biogas, biofuels, urban and industrial waste, and heat pumps. In order to protect the environment and to mitigate climate change, carbon-free sources of energy and sustainable development are now priority research areas.

The goal is to ensure greater energy efficiency by developing clean technologies and alternatives to technologies that depend on fossil fuels. Renewable energy development seeks to ensure high output and low emissions.

Students may begin studying some aspects of renewable energy in their first years of higher education. However, at the Master level, students decide to specialize in engineering (systems, energy efficiency, etc.), physics (electricity, materials, etc.), or chemistry. Sustainable development is a component of programs in management and the environment.

International

France is rich in renewable energy sources. It has Europe’s fourth largest forest area after Sweden, Finland, and Spain (source: Food and Agricultural Organization of the United Nations). In terms of absolute levels of production, France ranks second in solid biomass, hydropower, biofuels, renewable wastes, and geothermal power.

From 1990 to 2020, renewable energy grew by 84% in mainland France. The share of renewable energy in total final energy consumption was 19.1% in 2020.

In accordance with the ‘France 2030’ Investment Plan, €500 million will be invested in renewable energy, particularly to improve on- and offshore wind, and photovoltaic.

Useful links

- Réseau pour la transition énergétique (CLER): www.cler.org
- Écosources, a portal with data on renewable energies: www.ecosources.org
- Groupe Énergies Renouvelables, Environnement et Solidarités (GERES): www.geres.eu
- Observatoire des énergies renouvelables (Observ’ER): www.energies-renouvelables.org
- Planète énergies, an online encyclopedia: www.planete-energies.com

Sources:
- www.ecologique-solidaires.gouv.fr

- 72% increase of primary production of renewable energies since 2005 in France (2021)
- 19.3% share of renewable energies in France’s total energy consumption (2021)
- 500 million euros of investment in renewable energies, in particular to improve current technology in on- and offshore wind, and photovoltaic.

Related fields

- Earth and space sciences
- Ecology
- Energy
- Environmental science
- Life Sciences and Health
- Marine Science
- Physics
- Public health
- Transportation
- Urban Planning

Subfields

- Bioenergy
- Biomass
- Carbon-free energy
- Energy efficiency
- Energy transition
- Geothermal energy
- Hydraulics
- Marine energy
- Photovoltaic energy
- Solar energy
- Wind energy
- Wood
**Field of Study**

**Commission des Titres d’Ingénieur**

**www.campusfrance.org** > Resources center > Panorama of Higher Education and Research in France > Degrees > The Brevet de Technicien Supérieur (BTS)

**Professional Licence**

**NATIONAL DIPLOMA – 3 YEARS OF HIGHER EDUCATION – L3**
180 ECTS credits

Several available concentrations are relevant to renewable energy:
- Management and maintenance of energy facilities, track in Maintenance and operation of renewable energy equipment
- Control of energy, electricity, and sustainable development, with the following tracks: Renewable and electrical energy control, Renewable energy and energy control; Renewable and alternative energy systems; Management of projects in electrical and renewable energy, Technical coordination for the optimization of renewable energy, Renewable energy, and electricity; Management, Sciences and technologies of renewable sources of energy, Control of energy and renewable energy; Renewable energy and energy efficiency
- Control of electricity and energy, with tracks as Assistant and Technical Adviser for Renewable Electrical Energy
- Occupations in Energy, environment, and climate engineering, with the following tracks: Eco-management of renewable energy; Electrical energy and the environment; Renewable energy, Energy efficiency and renewable energy for sustainable buildings; Climate engineering, renewable energy, and energy efficiency; Energy control and renewable energy, Occupations in Renewable energy (production, exploitation, maintenance); Heat systems, energy efficiency and renewable energy; Cooling technologies and renewable energy; Exploitation of renewable energy and the energy transition.

The Bachelor Universitaire de Technologie (B.U.T.) offers the following specializations: civil engineering and sustainable construction, occupations in the energy transition and energy efficiency.

**www.campusfrance.org** > Students > Studying in France > Find your program

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**Licence**

**BREVET DE TECHNICIEN SUPÉRIEUR (BTS)**

**NATIONAL DIPLOMA – 2 YEARS OF HIGHER EDUCATION – L2**
120 ECTS credits

The BTS in fluid, energy, and household automation is offered with three options:
- > climate and fluid engineering
- > cooling and air conditioning
- > household automation and adjoining buildings

**www.campusfrance.org** > Resources center > Panorama of Higher Education and Research in France > Degrees > The Brevet de Technicien Supérieur (BTS)

**Master**

**NATIONAL DIPLOMA – 5 YEARS OF HIGHER EDUCATION – M2**
120 ECTS credits

Master’s level concentrations and tracks related to renewable energy include the following:
- Automation and electrical systems, track in Electrical energy and sustainable development
- Chemistry and materials sciences, track in Materials for new energy technologies
- Law-related tracks: Law and the management of energy and sustainable development; Natural resources and renewable energy law
- Economics of the environment, energy, and transportation, tracks in Management of sustainable development projects in ocean energy settings; Economics of energy and sustainable development
- Electronics, electrical energy, and automated systems, tracks in Coastal eco-engineering; intelligence and energy measures for new forms of energy
- Energy and heat, track in Renewable energy strategy and operations
- Energy tracks: Energy choices for a decarbonized future; Energy, ecology, and society; Fluids for sustainable energy; Heat engineering and energy; Thermal engineering; Sustainable energy engineering; Energy management in tropical island settings; Management of renewable energy networks; Energy management, sources, storage and conversion; Solar energy materials and processes; Energy physics and the energy transition; Processes, renewable energy, and geosciences; Heat sciences
- Civil engineering, track in Construction engineering (Management and integration of energy efficiency and renewable energy)
- Process and bioprocess engineering, track in Energy process engineering
- Geoenergy, track in Geosciences
- Environmental management, renewable energy track
- Physics, tracks in Applied physics of renewable energy; New energy technologies; Basic and applied physics (energy physics and the energy transition)
- Environmental risk (environmental engineering and new forms of energy; Energy transition (integrating renewable energy in island settings)
- Materials sciences, tracks in Advanced energy materials; New and renewable energy
- Earth and planetary sciences, tracks in energy geosciences; eco-construction
- Materials sciences and engineering, track in Materials for renewable sources of energy

**Programs Taught in English**: Clean and Renewable Energy; Electrical Energy for Sustainable Development; Renewable Energy; Renewable Energy & Civil Engineering

**www.taughtie.campusfrance.org**

Engineering schools also propose Master’s programs with various concentrations and tracks:
- Chemistry, tracks in Chemistry and materials sciences for energy and sustainable development; Green chemistry
- Electronics, electrical energy, and automation, track in Electrical energy (conversion, materials, sustainable development)
- Energy, track in Durability of energy materials and structures

**Programs Taught in English**: Biomass and Waste for Energy and Materials; Electrical Energy for Sustainable Development; Energy for Solar Buildings and Cities; Energy & Sustainable Cities; Hydraulic and Civil Engineering; Smart Energy; Solar Energy

**www.taughtie.campusfrance.org**

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**Beyond the Master level**

**DIPLÔME PROPRE AUX ÉCOLES D’ARCHITECTURE (DPEA)**

**INSTITUTION DIPLOMA – 1 OR 2 YEARS OF HIGHER EDUCATION**

**www.cge.asso.fr/formations-labellisees/liste-formation-ms**

**DIPLÔME SPÉCIALISÉ® (MS)**

**INSTITUTION DIPLOMA – 1 YEAR OF HIGHER EDUCATION**

**www.campusfrance.org** > Resource center > Panorama of Higher Education and Research in France > Degrees > Mastère spécialisé® programs

**List of MS programs**: www.cge.asso.fr/formations-labellisees/liste-formation-ms

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**Réseau des Écoles d’Ingénieurs de France**

**www.ingenieurs-france.org**

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**www.ingenieurs-france.org** > Degrees > Find a degree > Field of study > Brevet de Technicien Supérieur (BTS)

**www.ingenieurs-france.org** > Degrees > Find a degree > Field of study > Master’s programs

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**www.ingenieurs-france.org** > Degrees > Find a degree > Field of study > Beyond the Master level

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**www.ingenieurs-france.org** > Degrees > Find a degree > Field of study > List of accredited engineering programs

ECTS: European Credit Transfer System

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