CAMPUS FRANCE

RENEWABLE ENERGIES

Renewable energies, 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 energies come from a variety of sources: the sun, wind, water, and geothermics, as well as firewood, crop residues, biogas, biofuels, urban or industrial waste, and heat pumps. In order to protect the environment and to mitigate climate change, carbon-free energies 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 energies in their first years of higher education, including HVAC systems and marketing. 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). With its strong output of hydraulic, wind, and geothermal energy, France is Europe's second largest producer of renewable energy after Germany. Thanks to France's abundant wood resources, biomass accounts for 43% of its renewable energy output whereas hydraulic accounts for 25%, biofuels 10%, and heat pumps 7%.

When France signed the European Union's "2020 Energy & Climate Package," it set the goal of having renewable energy account for 23% of its final energy consumption. By the end of 2013, renewables, primarily wood and hydraulic energy, accounted for 14.2% of the total energy consumption. Photovoltaic energy has reached and surpassed the goal of 5,300 MW in continental France and 5,700 MW in French overseas territories. Other forms of marine energy are emerging. In fact, in 2016-2017, two pilot farms will be operating 11 marine turbines.

The French law on energy transition aims for 32% of French energy to be renewable by 2030 whereas the European Union has set a target of 27%.

RELATED FIELDS

• Ecology • Energy • Physics• Public health • Environmental science • Marine science • Earth and space sciences • Life sciences and health • Transportation • Urban planning

SUBFIELDS

• Bioenergy • Biomass • Wind energy • Energy efficiency • Geothermal energy • Hydraulics • Carbon-free energy • Marine energy • Photovoltaic energy

BY THE NUMBERS

- € 24 million spent on renewable energies in 2012
- Renewable energy sector produced 24.8 Mtep of primary energy in 2013
- 23% of energy originating from renewable sources by 2020
- Renewable energy accounts for 14.2% of total energy consumption (2013)
- 11% increase in renewable energy production between 2012 and 2013.

Sources : French Ministry of Ecology, Sustainable Development, and Energy
www.developpement-durable.gouv.fr

USEFUL LINKS

- Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME): www.ademe.fr
- Alliance Nationale de Coordination de la Recherche pour l'Énergie (ANCRE): www.allianceenergie.fr
- Association Savoyarde pour le Développement des Énergies renouvelables (ASDER): www.asder.asso.fr
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA): www.cea.fr
- Comité de Liaison des Énergies Renouvelables (CLER): www.cler.org
- Écosources.info, portal with data on renewable energies: www.ecosources.info/
- EDF Énergies Nouvelles: www.edf-energies-nouvelles.com
- Enercoop, a cooperative devoted to green electricity: www.enercoop.fr
- Grenelle Environnement: www.legrenelle-environnement.fr
- Groupe Énergies Renouvelables, Environnement et Solidarités (GERES): www.geres.eu
- French Ministry of Foreign Affairs and International Development (MAEDI): www.diplomatie.gouv.fr>Politique étrangère de la France>Environnement et développement durable
- French Ministry of Ecology, Sustainable Development, and Energy (MEDDE): www.developpement-durable.gouv.fr>Énergie, air et climat
- Observatoire des Énergies Renouvelables (Observ'ER): www.energies-renouvelables.org
- Planète énergies, online encyclopedia: www.planete-energies.com
- Pôle d'Excellence Rurale Énergies Nouvelles (PEREN): www.peren.org
- Syndicat des Énergies Renouvelables (SER): www.enr.fr
- Université Virtuelle Environnement & Développement Durable (UVED): www.uved.fr

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RENEWABLE ENERGIES

LICENCE LEVEL

(BACCALAURÉAT + 2 ANNÉES D'ÉTUDES SUPÉRIEURES) – L2

• **Brevet de Technicien Supérieur (BTS),** une quinzaine, préparé dans des Lycées et Écoles, publics ou privés : Bâtiment ; Constructions métalliques ; Design d'espace ; Domotique ; Enveloppe du bâtiment ; Études et économie de la construction ; Fluides, énergies, environnements ; Systèmes constructifs bois et habitat ; Travaux publics, ...

• **Diplôme Universitaire de Technologie (DUT)** en Génie civil construction durable, dispensé au sein d'une vingtaine d'Instituts Universitaires de Technologie (IUT) rattachés aux Universités.

• **Diplôme d'Études Universitaires Scientifiques et Techniques (DEUST),** filière Sciences, technologies, santé bâtiment et construction spécialité Bâtiment et construction, proposé dans 4 Universités.

(BACCALAURÉAT + 3 ANNÉES D'ÉTUDES SUPÉRIEURES) – L3

• **Diplôme d'Études En Architecture (DEEA),** 1er cycle de 3 ans (180 ECTS) et grade de Licence, délivré par une vingtaine d'ENSA, comptabilise 4 200 heures de formation au total, dont 2 200 heures encadrées. Il comprend l'acquisition des bases d'une culture architecturale ; des processus de conception ; de la compréhension, de la pratique du projet ; un rapport d'études et sa soutenance, ainsi que deux stages obligatoires d'environ 6 semaines. L'obtention du DEEA permet la poursuite d'études en Master.

• **Diplôme Grade 1 (180 ECTS),** reconnu par l'État, délivré par l'École Spéciale d'Architecture (ESA). www.esa-paris.fr

• **Licence Professionnelle** Sciences, technologies, santé mention Génie civil et construction, spécialité Conception en architecture métallique, 1 an (60 ECTS), proposée à l'Université de Bretagne Occidentale (UBO) - IUT de Brest. www.iut-brest.fr

• **Assistant en architecture**, diplôme d'établissement, en 3 ans à l'École des Ingénieurs de la Ville de Paris (EIVP). www.eivp-paris.fr

MASTER LEVEL

MASTER (SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

Students pursuing master's degrees in sciences, technologies, and health can specialize in renewable energies:

• Three specializations are available in the renewable energies and intelligent systems program: - eco-technology, - mechatronics, - information processing.

• Chemistry specialization in new and renewable energies

• Electronics and energy management with a specialization in new and renewable energies

• Physics and engineering sciences with specializations in: - strategies and management in energetics and renewable energies, - new and renewable energies - renewable energies and efficient management of electrical energy

• Materials science with a specialization in materials for renewable energies

• Physical sciences for the environment with a specialization in energy systems and renewable energies

• Science and technology for renewable energies.

www.campusfrance.org>Trouvez votre formation>Master

Program taught in English:

• Master Energy: Renewable Energy, Science and Technology

https://www.universite-paris-saclay.fr/en/education/masters

MASTER OF SCIENCE IN MANAGEMENT (MSC) (SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

• European Joint Masters of Science in Management and Engineering of Environment and Energy: www.mines-nantes.fr/en/Study/Masters-of-Science-English-taught/ME3

• Project Management for Environmental and Energy Engineering: http://www.mines-nantes.fr/en/Study/Masters-of-Science-English-taught/PM3E

MASTER OF BUSINESS ADMINISTRATION (MBA) (SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

An English-language MBA program is offered by IPAG, a French private institution of higher learning:

• Energy and Sustainable Development Management:

www.ipag.fr/programmes/mba/

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER (SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

French engineering schools offer engineering and master's degrees accredited by the CTI (Commission des Titres d'Ingénieur). Several specializations are available:

• alternatives for energy of the future,

• thermal energy,

• environment, construction, and energy,

• energy engineering and environment,

• HVAC engineering and energetics,

• energy systems and renewable energies, etc.

• List of accredited engineering programs:

www.cti-commission.fr/-Liste-officielle-des-programmes-d-

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (MS, SPECIALIZED MASTER'S DEGREE) (M2 +1 YEAR OF HIGHER EDUCATION)

Labeled by the Conférence des Grandes Écoles (CGE), the specialized master enables students to earn an institutional credential attesting to dual competence. Numerous specializations related to the environment are available:

• energy efficiency,

• renewable marine energy,

• renewable energies,

• renewable energies and their production system,

• energy performance and renewable energies.

Programs taught in English:

• International Environmental Management

• Water Utility Management

Information on MS degrees:

www.campusfrance.org/fr/ressource/les-masteres-specialises-ms

List of MS programs: www.cge.asso.fr/nos-labels/ms