



Sustainable Energy Technology

Research and innovation are indispensable to take Sustainable Energy to the next level.

Diploma	MSc Sustainable Energy Technology
Credits	120 ECTS, 24 months
Starts in	September
Language of instruction	English
% International students	60-80%

Sustainable Energy Technology includes renewable energy sources (such as solar energy, wind energy, and energy from biomass) and technologies designed to improve energy efficiency. A transition to Sustainable Energy is necessary to meet the growing global demand for energy and to address the threat of climate change caused by greenhouse gas emissions. This transition will require fundamental innovations affecting the world's energy landscape.

Securing a sustainable energy future implies an energy transition that will require a new generation of dedicated engineers and researchers capable of developing, optimising, and integrating sustainable energy sources including solar power, wind power, and energy from biomass. Because of the intermittency of these sources storage of energy is an important factor for success. This requires innovative batteries and research into hydrogen as an energy source. New technologies need to be integrated into existing power networks and market structures.

The design of new forms of energy distribution, energy market structures, and smart grids is necessary to satisfy the energy needs of modern societies.

Systems integrators of the energy transition

Engineers in Sustainable Energy Technology have a broad knowledge of the field and can act as the system integrators of the energy transition. They can bring different energy subsystems together into one system. Their engineering skills include renewable energy generation, distribution systems, and storage. In addition they can integrate systems that can manage the fluctuating energy supply and demand. They are also aware of the challenges of the energy market and innovation management. There is a lot of demand for engineers in this field, because governments and industry have ambitious plans for investments in sustainable energy.

Curriculum in Sustainable Energy Technology

First Year (60 EC)			
1 st quarter	2 nd quarter	3 rd quarter	4 th quarter
Renewable Energy	Profile course level 1	Profile course level 2	Profile course level 3
Technical Writing	Profile course level 1	Profile course level 2	Profile course level 3
Energy System Optimization	Profile course level 1	Profile course level 2	Profile course level 3
Economics and Regulations of Sustainable Energy Systems	Presentation skills System Integration Project		
Second Year (60 EC)			
1 st quarter	2 nd quarter	3 rd quarter	4 th quarter
Electives/Internship	Graduation Project		

1 EC = 28 hours of study, according to the European Credit Transfer System (ECTS).
Total number of credits in the MSc programme = 120 EC

For more information on all courses, please visit: www.studyguide.tudelft.nl

The Master programme in Sustainable Energy Technology offers students in the first quarter an overview of the sustainable energy field, followed by a choice of one out of six Profile Clusters that contain three profiles.

Clusters

We offer the following 6 Profile Clusters:

- **Autonomous systems:** Wind, Solar, Storage
- **Solar systems:** Solar, Storage, Power
- **Biomass/Solar systems:** Biomass, Storage, Solar
- **Wind & Economics:** Wind, Economics, Power
- **Solar & Economics:** Solar, Economics, Power
- **Biomass and Economics:** Biomass, Economics, Storage

Profiles

- **Wind Energy:** Assessing wind resources. Adapting wind turbines to their environment and applying wind turbines in an (offshore) wind energy system.
- **Solar Energy:** Researching and developing photovoltaic devices. Designing and integrating photovoltaic systems in a variety of applications.
- **Biomass Energy:** Understanding the pros and cons of using biomass as an energy source. Designing and analysing biomass-based energy processes.
- **Power:** Integrating renewable energy sources in DC and AC systems and grids. Connecting storage and e-mobility to electricity grid.

- **Storage:** Assessing the potential of various storage technologies like batteries, hydrogen, and their applications.
- **Economics & Society:** Integrating economic and societal aspects in sustainable energy projects, innovation processes, policies, and transitions.

In addition, students work in their first year in groups on a System Integration Project designing a Sustainable Energy System for a specific situation that includes multiple renewable energy sources, energy transport, etc. In the second year students can follow electives or do an internship. They work on their Graduation Project in one or a combination of the profiles of their cluster.



Nga Phùng (Vietnam)

The environment has always interested me. Renewable energy is very important for our future. I am from Vietnam and I did my Bachelor study in Civil and Environmental Engineering at the Kyushu University in Japan. I really wanted to continue my studies in Sustainable Energy. Looking at university rankings and scholarship possibilities, I became interested in studying at the TU Delft. Before I came to Delft I followed the Solar Energy Course by Arno Smets on edX to get an impression. The master programme

is broad and allows you to explore many fields in sustainable energy. You can then make the most suitable choice for your thesis topic based on your background and interests. We also have a very international student population. This really contributes to the experience, because you hear about the energy situation in many countries. The professors respond well to our questions and feedback. They really are world class and it's inspiring how they share their knowledge and care about our learning.

Thesis work and career prospects

Examples of thesis projects are:

- Infield Cable Topology Optimization of Offshore Wind Farms
- A new method for calculating solar irradiance on PV systems facing reflective surfaces
- Sustainability analysis of a new biomass gasification system to produce substitute natural gas based on manure
- Demand Response and Storage Operation in DC Distribution Grids
- The Battolyzer Combined short-and long-term energy storage
- Global Decision-Making For Carbon Capture & Storage

Recent SET graduates

Recent Sustainable Energy Technology (SET) graduates have found positions in companies, universities (as PhD), government, and non-governmental organisations. They act as engineers designing for example wind turbine parks, photovoltaic systems or biomass factories. They work as product developers or consultants advising on sustainable energy projects or as trade or investment analysts. Employers are sustainable energy companies like Eneco, ECN, Sunraid, XEMC Darwind or companies like Shell, Tebodin, Siemens.



Prof. Arno Smets (The Netherlands)

Renewable energy sources and energy efficiency are the key components of sustainable energy. The transition towards a sustainable-energy based society is a major challenge needed to preserve Earth for future generations. The deployment of sustainable energy, like wind, solar, and biomass is rapidly growing in many parts of the world. Improving energy efficiency is high on the agendas of governments and industries. The transition to sustainable energy on a large scale requires system

integration and the design of intelligent electricity grids. Developments like electric mobility, and the fluctuating output of solar and wind power require storage of electrical energy in batteries or fuels. Our master students in Sustainable Energy Technology get the opportunity to obtain a broad knowledge of this exciting field. My own field of research is solar energy and I like to stimulate our Sustainable Energy Technology students to look for a topic of their thesis that combines their knowledge of different fields. My thesis students work for example on new photovoltaic materials and device concepts, the use of photovoltaics for electrical vehicles and planes, and the innovative integration of photovoltaics in the built environment. Another example is the use of photovoltaics in technologies that convert water and carbon dioxide into fuels like hydrogen or syngas. TU Delft offers excellent experts, excellent research facilities for Wind, Solar, Biomass, Power, and Storage and an excellent network with industry. The Economics profile helps students to get a good feel for innovation and market opportunities for these technologies. Some former SET students have started a company after their graduation. For the best students the university may offer a position as a PhD candidate.



Admission requirements and application procedure

Dutch BSc degree/HBO degree

Visit the webpage for information about admission and application:
<http://www.set.msc.tudelft.nl/>

International applicants

International applicants must meet the general admission requirements of TU Delft:

1. A BSc degree (or a proof that you have nearly completed a BSc programme) in Aerospace Engineering, Chemical Engineering, Electrical Engineering, Mechanical Engineering and (Applied) Physics or a field closely related to these programmes.
 2. A BSc Cumulative Grade Point Average (CGPA) of at least 75% of the scale maximum.
- A score of at least 90 on the TOEFL (internet-based test) and a minimum of 21 for each section. Or an IELTS with an overall Band score of at least 6.5 and a minimum of 6.0 for each section. Or proof that you have passed the **University of Cambridge 'Certificate of Proficiency in English'** with a minimum grade B or the University of Cambridge 'Certificate in Advanced English

For international students, the application period starts on October 1 and closes on April 1. To start an MSc application, please complete the online application and pay the refundable application fee of € 100. Next, you will receive an email with the link to upload the required documents.

For more information about the application procedure and studying at TU Delft in general, go to www.admissions.tudelft.nl

Please, note that you should apply early, before December 1, if you wish to apply for a scholarship as well.

Introduction week

All international students will be welcomed with the award-winning introduction programme. The introduction consists of a variety of workshops and projects, during which you will get to know other international students, visit the highlights of Delft and learn the ins and outs of the TU Delft campus.

After this week you will be introduced to the Faculty of Electrical Engineering, Mathematics and Computer Science. During the Master Kick Off, you will receive helpful information about the Dutch education system and meet the fellow students from your programme in a variety of social and educational activities. Please, visit the webpage for information about the programme structure, related research, international opportunities and career prospects: www.set.msc.tudelft.nl

For further information

Please visit the webpage for all details, complete requirements, deadlines and contact information:
www.tudelft.nl/msc/set

General questions regarding admission and application:

International Office
+31 (0)15 27 88012
internationaloffice@tudelft.nl

Questions regarding open days, master information events or any other general questions: info-eemcs@tudelft.nl

Specific questions regarding the programme, curriculum or courses?
info-set@tudelft.nl

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