

# MASTER ON ENERGY TRANSITION

Master's programme  
curricula



## Introduction:

The growing concentration of greenhouse gases in the atmosphere and the consequent global warming has put the world at the verge of a profound climate crisis. The adaptation to a new paradigm where CO<sub>2</sub> emissions are drastically reduced without compromising the comfort and welfare of populations is the biggest societal challenge of our time.

The purpose of the Master in Energy Transition is to form the future generations of professionals that will take in hand the society transformations required to a build a zero CO<sub>2</sub> emissions society. The transformations that are required range from the way energy is produced, distributed and consumed, to the way the landscape is planned, built and people and goods are transported. To successfully perform these fundamental society transformations, it is essential to adopt a holistic approach taking in account the specific knowledge of the different areas entailed.

The approach of the master in energy transition (MET) is to provide a truly interdisciplinary training, covering earth sciences, engineering, economics, political and sociology.

MET has as hosting institutions three renowned European universities with complementary expertise: Universidade de Lisboa (UL) – Portugal; Universidad Politécnica de Madrid (UPM) – Spain; and Université Toulouse 3/ Paul Sabatier (UT3/PS) – France. Furthermore, the master has as associated partners several research and business centres, as well as enterprises (both SME and large) from five different countries, which will be involved in the definition of the master curriculum and training, and will also propose internships for the master students.

During the master, students will be in contact with several relevant stakeholders from academy, industry and society engaged in the area of energy transition in different countries.



The master is composed of three semesters where an intensive interdisciplinary training in the different energy transition related subjects takes place. Each of hosting universities will be responsible for one semester in the following order: semester 1- UL; semester 2 - UPM; semester 3 - UT3/PS.

During the master's fourth semester the students will undertake a practical training in one of hosting or associated partner institutions and will complete a master dissertation.

MET wants to attract excellent students with different scientific backgrounds, from all parts of the world, therefore the language used in all the master trainings is English.



Curricula proposal	Keywords	ECTS
Climate change	Future climate conditions; Adaptation to climate change	
Sustainability, urban and industrial metabolism	Sustainability indicators; Reduce, reuse and recycle	
Smart cities and sustainable urbanism	New landscapes and living spaces design; Territorial management; City interconnected networks (energy, information, transport...)	
Sustainable and smart buildings	NZEBs; $\mu$ -grids; Delocalized energy production and storage Electric mobility; public transports; active modes	
Technologies for energy transition: Low carbon energy sources & storage	Renewable energy technologies; Hydrogen; Energy storage technologies	
Energy Systems management	Hardware; Software platforms; Flexible reconfigurable systems; maintenance and fault management	
Smart grid and DC grid technologies	Sensors, (smart) metering, interconnectivity, service continuity; DC-AC converters; Standardization; Safety	
Communication networks and data harvesting	Digitalization; IoTs, Communication protocols; Information and communication networks; Big data & cyber security	
Geopolitics and governance	International energy governance; public policies for energy transition	
Future energy market	Policy and regulatory opportunities, New markets & business models; New energy players; Services and data as product, carbon economy	
Smart citizens and social issues	Role of citizens; Engaging citizens; Human-centric systems; Ethical issues and social acceptance	
Socio-economics toolbox	Life Cycle Analysis; Life Cost Analysis; Risk Management: Planning; Public procurement	
Practical Training & Projects	Software development, lab work, projects	
Specialized seminars	*	



## Proposed seminars themes

Food and agriculture
Ecosystem services and market failures
Local currency vs Bitcoins
The role of innovation in energy transition
Sharing and cooperative economy
New governance models
Material resources for energy transition
Fault diagnosis & tolerance in energy systems
Lighting and smart lighting systems

