

SUSTAINABLE ENERGY

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MSc in Sustainable Energy Systems

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Renewable Energy Sources: Perspectives and challenges

Editorial

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It is with great excitement that we welcome you to the first issue of the newsletter of the joint master in Sustainable Energy Systems of the Open University Cyprus and Frederick University. Whether you are a current or a prospective student, a faculty member at Frederick University or elsewhere, or alumni, we hope you will find all the information you need about a program of study that recognises our present and future energy demands, over-reliance on fossil fuels and contribution to climate change, and aspires to provide the world with the next generation of scientists to tackle these energy and environmental challenges. We are proud of our curriculum and of the tradition of excellence here and are certain that we can offer you an outstanding academic experience.

The joint master in Sustainable Energy Systems is a taught multi-disciplinary international programme suitable for applicants from engineering, architecture, planning and other relevant backgrounds, intended to incorporate the latest developments not only in the international scientific field, but also in the European and national regulatory and legal framework. Students will also be acquainted with the required knowhow for monitoring and evaluating the energy efficiency of building systems, of buildings, of renewable and conventional energy systems and of indoor environmental quality conditions, in accordance to legal and best-practice requirements, so as to be able to carry out energy renovation, retrofitting and refurbishment projects. Furthermore, they will learn to evaluate, by means of applying standards and models, the environmental performance of buildings, as needed in order to implement the environmental labelling schemes.

The Programme is designed to stimulate and encourage novel and imaginative solutions with respect to their implementation in a real market and a rapidly developing economic environment, surrounding the energy sector and the built environment. The Programme involves theoretical and hands-on learning methods aiming at producing skilled professionals who will be able to effectively enter the competitive European market of energy experts. Graduates of the programme acquire a strong qualification that assists them in the professional progress. The degree greatly enhances the employability of our graduates in public and semi-public organisations, whose work is related to the implementation of energy and environment related legislation and to the operation of the energy market, or in the power generation, the construction and the building materials industries. The programme is composed by 90 ECTS (European Credit Transfer System).

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Professor on energy systems since 2010 at the Department of Mechanical Engineering at the Aristotle University Thessaloniki, is the Vice-chairman of the Governing Board of the Open University Cyprus, and Member of the Academic Board of the Joint Distance Learning MSc in Sustainable Energy Systems.

Ever since the publication of the White Paper on “Energy Policy in the European Union”, back in 1995, the utilisation of renewable energy sources has been formally recognized as a main tool for promoting both sustainability and economic growth. As it has been proven by success stories like the Danish example, it can be a powerful tool for achieving economic, ecological and social benefits on a community and local level. The new goal of the European set for 2030, namely a 40% cut in greenhouse gas emissions compared to 1990 levels, a minimum share of 27% of renewable energy consumption and at least 27% energy savings compared with the business-as-usual scenario is certainly a noble one, although one may argue that target is certainly ambitious, especially in the light of the economic stagnation and the geopolitical uncertainties troubling Europe.

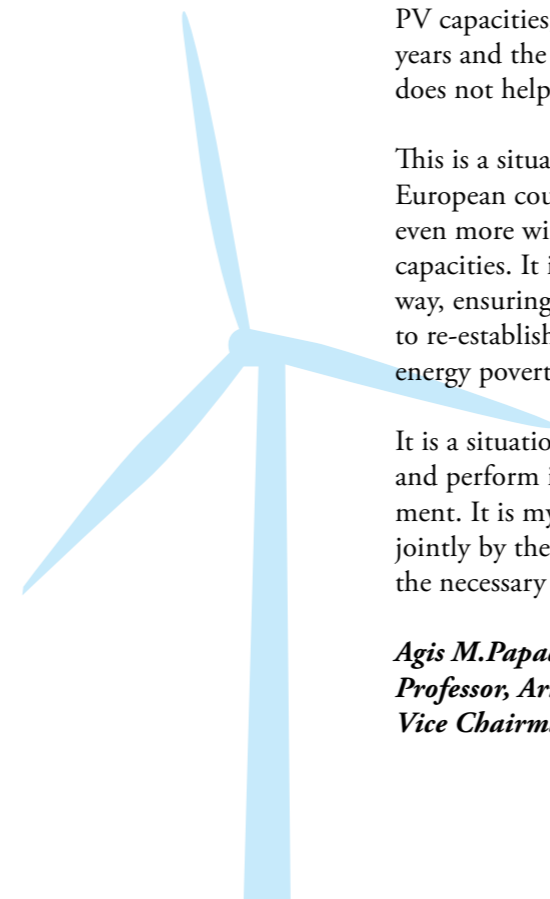
Both policy makers and stakeholders have, however, to keep in mind that the cost of implementing such an energy policy cannot be anything but high, and becomes even more so as the development of renewables is reaching a critical point, where new, major investments in infrastructure are needed. This not only poses a problem for the national budgets, but it also may turn into a problem for the acceptability of renewables by the final consumer, who is eventually asked to cover this cost.

This has become clear in countries such as Cyprus, Greece, Portugal or Spain where significant progress has been made in the utilization of wind and solar energy. The increased contribution of the rather heavily subsidized wind and PV capacities, the results of the recession that hit those countries in the last few years and the remoteness of the electrical systems provide a background that does not help in establishing viable electricity markets.

This is a situation that cannot be compared to the challenges that northern European countries are facing, like abandoning nuclear power or absorbing even more wind power in a unified electrical system with significant depth and capacities. It is a difficult situation that needs to be addressed in a different way, ensuring not only sustainability but also affordability of energy, in order to re-establish economic growth and face the social problems generated by energy poverty.

It is a situation that calls for highly qualified scientific personnel, able to adapt and perform in a rapidly changing, interdisciplinary, international environment. It is my firm belief that the MSc in Sustainable Energy Systems offered jointly by the Open University of Cyprus and Frederick University provides the necessary tools to cope with this challenge.

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Corporate Social Responsibility (CSR) and good environmental performance of buildings

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Economic sustainability seems today to be the key for implementing environmental urban development policies and green building. Businesses of every scale can improve their impact on the built environment, and offer benefits at the same time the local communities, if they are committed in Corporate Social Responsibility. CSR is a set of values and actions that relate to entrepreneurial management and marketing that affects strongly the built environment.

Before the '90s CSR was seen more as a philanthropic institution move than a business practice. Gradually CSR shifted from an ideology to reality since the businesses that adopt it can gain competitive economic advantages from the positive impressions they transmit to employees, clients and consumers. Good environmental performance along with healthy environment added value to shareholders and supporting community projects, is one of the basic activities of a socially responsible business. Recent studies has shown that this approach is becoming an internal agent of wealth creation since a lot of enterprises have increased their profits after the adoption of such action.

One of the main field that good environmental performance is practiced is the development of a sustainable property. Since the built environment is responsible for the 40-50% of all energy use in a lot of cities, a company that adequately responds to the social demand for a sustainable professional space is very close to this goal. The urgency of this demand depends on the "audience" of the enterprise. Large and more global businesses are closer to fulfilling environmental global concerns and that is why their buildings largely obtain green labels from international certification programmes. Local businesses are more affiliated to the maturity and the awareness of each community on environmental issues, which of course has to do with the type of their economic activity. For example, food and beverage businesses are more aware of creating an environmental friendly profile which is why a number of local scale industries are adopting and advertising their sustainable infrastructures (wineries, dairy farms, etc.).



Furthermore countries such as UK have enacted legislation that prevents certain business types for using buildings with low sustainability rating. Many financial organizations and banks have also adopted environmental friendly financing, supporting the development of low carbon, healthy and socially responsible buildings. Environmental risks have also increased their impact on financing decisions for new projects worldwide.

The significance of adopting CSR in the construction industry has also increased. Property developers are committed in choosing constructors that decrease the environmental impact of their projects. These choices are illustrated to the clients. Surveys show that there is an increased section of the population for whom environmental, social and healthy lifestyle plays an important role in purchasing decisions. Additionally there are evidences that new building stock is sold on its sustainability credentials since it capitalizes on the positive perception of the buyers.

Since environmental education and awareness is increasing at the younger generations the sustainable property development clientele will progressively increase. CSR, rating tools and green labeling would also increase promises for a favorable future for sustainable built environment professionals.

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Electricity demand flexibility

“FlexiWatts”

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Holds a Doctor of Philosophy (Ph.D.) degree in numerical analysis and a Doctor of Technology (D.Tech.) higher doctorate degree in energy policy and energy systems optimization from Loughborough University, U.K. He is the Chairman of the Cyprus Energy Regulatory Authority and a member of the Academic Board of the Joint Distance Learning MSc in Sustainable Energy Systems.

The key to changing the balance of power between utilities and their customers is the customers' ability to control when and how they use electricity and for that demand flexibility is very important. “Flexiwatts” come from demand flexibility, which is using communication and control technology to shift electricity use across hours of the day. The premise is to use smart technology to move things like air conditioning, water heating, and electric vehicle charging to times when load is lower and electricity is cheaper. Devices now have the capability to control those functions and can be programmed to know when the lower price periods are. Demand flexibility need not complicate or compromise customer experience. Technologies and business models exist today to shift load seamlessly while maintaining or even improving the quality, simplicity, choice, and value of energy services to customers.

A utility business model that accurately values for distributed energy resources (DERs) can potentially lower system wide costs while contributing to the foundation of a reliable, resilient, affordable, low-carbon grid of the future. But if utilities' plan for the future is just to build more infrastructure on both sides of the meter, their costs could be significant. Customers are going to invest in DERs. If utilities don't send the right price signals, customers will invest in a way that serves their own best interests instead of a way that serves system-level best interests.

To make demand flexibility work, customers must have some form of time varying pricing. It could be time-of-use pricing, which increases the price of electricity during the highest priced daily periods. Or it could be real-time pricing, which sets hourly electricity prices, or critical peak pricing, in which the grid operator reserves the right to increase the price sharply at certain peak hours. The best pricing is pricing that reflects utility costs. Real time pricing is an example of that. Demand charges sometimes are and sometimes aren't. Technology specific pricing is shortsighted. Pricing consumers can use to their advantage should be an option for all customers. Customers can have demand flexibility with minimal investment.

Solar and battery storage are commonly noted as the biggest threats - and opportunities - for the utility business model, but when consumers use their electricity may matter just as much to utilities as if they produce it themselves. What utilities must recognize is that while widespread solar-plus-storage is likely years off for many of them, demand flexibility is available to customers now and makes load defection an increased reality. Demand flexibility is a critical third technology along with solar and battery storage. For many of the things batteries can do for a customer, it can do them much cheaper.



The opportunity is available equally to vertically integrated investor owned utilities, deregulated transmission and distribution providers, and retail electricity providers in deregulated markets. The keys are offering rates that encourage changes in customer behaviors and to take advantage of the changes they make.

Utilities need to understand “flexiwatts” as a way to get to grid cost reductions, not just a threat to revenues. They can then construct rates reflecting utility marginal costs to ensure that customer bill reduction (and thus, utility revenue reduction) can also lead to meaningful grid cost decreases. Having taken these steps, utilities should be able to see where demand flexibility will take them and harness enabling technology and third-party innovation to build customer-facing business models that target both lower bills for their customers and reduced sunk costs. State regulators can support utilities in making a transition by pushing them to see demand flexibility as an opportunity instead of a threat. They can frame demand flexibility as a potentially lower-cost alternative to a subset of traditional grid infrastructure investment. They can also support the introduction of new rate structures that balance the potential complexity of highly granular rates against the large value proposition for customers and the grid and facilitate utility-private sector partnerships likely to lead to innovation. Given the benefits this should be a near term priority. It is a big opportunity and a cost-effective opportunity.

**Dr Andreas Poullikkas, PhD, DTech,
Chairman, Cyprus Energy Regulatory Authority**



Applications

Applications for the Joint Distance Learning MSc in Sustainable Energy Systems are filled in and submitted electronically, through the University's website at www.ouc.ac.cy.

For the academic year 2016-2017, the application period will be from **15 March 2016 until 09 May 2016.**