1. Publishable Summary.

1.1. Project context and objectives.

The 2015 University Strategy aims to position the university in the centre of a change of social and productive model based on the knowledge triangle: education, research and innovation. In this context and in line with our commitment to promoting excellence, the University of Castilla La Mancha took part in the call for applications from the Ministry of Education with an ambitious project aimed at creating excellence in the combination of education and cutting-edge research, together with an increase in transfer capacity. On October 27 2011, the CYTEMA project, the Energy and Environment Science and Technology Campus, was awarded the status of regional “Campus of International Excellence” (CIE) by the Secretary-General for Universities.

CYTEMA is a commitment by the UCLM to teaching, research and innovation in energy and the environment, which are areas of enormous relevance today and in the future for socio-economic policies at both national and international level. Despite their relevance it is still necessary to consolidate substantially certain educational aspects within the international community. This project utilises the strengths of our university in energy and environment R&D+I. The university has fifteen research institutes, more than fifty research groups and more than 500 researchers working on energy and the environment in the fields of engineering, experimental sciences, social and legal sciences, architecture, the arts and humanities and health sciences. Our proposal received collaboration from two prestigious European universities, Paris-Est Créteil University and Eindhoven University of Technology. The proposal was also supported by cutting-edge companies such as ELCOGAS, INDRA and SOLARIA and by important institutions such as the National Centre of Hydrogen and Fuel Cell Experimentation (CNH2), the Institute of Photovoltaic Concentration Systems and the Albacete Science and Technology Park (PCYTA). Furthermore in the first year the University of UAE also entered the project the University and the Moroccan University of Abdelmalek Essâadi entered in the second year. This means we are able to integrate capacities from public and private organisations and establish stable, effective links between the private and public sector. UCLM has been able to improve its international position, boost cooperation in R&D and high level qualified teaching and thus achieve the strategic objective of CYTEMA: To make the University of Castilla La Mancha a reference in Europe for energy and environment science and technology by 2020.
The proposal for the campus of international excellence aims to consolidate a model of social and territorial integration. There are five specific objectives: i) To position UCLM as a prestige institute of post-graduate studies with the International Doctorate School ii) To promote the interdisciplinary nature of research through programmes of excellence in R&D and the mobility of researchers between national and international centres; iii) To participate in high-level knowledge networks; iv) To bring citizens closer to the reality of teaching and research at UCLM; and v) To increase the level of energy and environmental sustainability of the UCLM campus.

Strategic objectives CYTEMA CIE

The project, which initially included 12 actions, has only received partial funding from the Ministry of Education, Culture and Sport (MECD) in the form of the 2010 and 2011 university strengthening grants to the total value of less than one million euros and a further four million euros received from the INNOCAMPUS programme, promoted by the Ministry of the Economy and Competitiveness. Furthermore, due to the passing of the Law on Budget Stability and Financial Sustainability, the regional government of Castilla La Mancha has been unable to execute the loan of 2.9 million euros granted by the MECD for the partial funding of the project. This substantial reduction in funding has made it necessary to reconsider the intended activities. Furthermore, the budget transfer which UCLM annually receives from the regional government included a transfer of 98 million euros for 2012 and 2013 and 105 million euros for 2014, which is considerably less than the 156 million initially agreed for the 2011 budget, bearing in mind
that it was this contribution from the regional government of Castilla La Mancha which was the basis of the CYTEMA proposal.

However, despite the dramatic recession, a series of activities for the ten lines of proposed action has been undertaken, seeking excellence through a commitment to links with the community, promoting cutting-edge research and the internationalization of the University of Castilla La Mancha. To this end and in order to react to the new economic situation and to make an improved adaptation of the available resources, we applied for and were awarded an extension of the grants from the grants from the MEC University Strengthening subprogramme.

Table 1 shows the actions initially proposed for the Campus of International Excellence, grouped together according to the project’s three areas of activity. The type of action is also described.

The actions from the strategic axis “Improvement of Teaching and Adaptation to the EHEA” have received partial funding in the form of strengthening grants from the Campus of International Excellence programme. The activities conducted as part of these actions have been financed through these grants and from the UCLM’s own funds. Actions 5 and 6 of the strategic axis “Scientific Improvement and Knowledge Transfer” have benefitted from funds made available by the INNOCAMPUS programme, while action 9 has received partial funding from strengthening grants. The other two actions included in this axis and the actions from the axis “Campus Transformation and Interaction with the Community” have received no specific funding. Therefore, due to lack of resources, it was decided, to terminate actions 7 and 8, aimed at creating experimental platforms. The three proposed activities related to campus transformation and interactions with the community were financed directly by UCLM.
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Table 1: Typology of CIE-UCLM actions 2011
1.2. Description of work undertaken and principal results.

Last year a committee of international experts evaluated CYTEMA and awarded the project an “A” - the highest grade possible. The committee highlighted the university’s effort despite the difficult economic and budget situation. The evaluation was a great incentive to all the researchers and administration and services staff at the UCLM related to the campus of international excellence. The team has continued to work its hardest over the last year so as to keep up the standards of excellence.

The report mentioned as strong points, among other things, CYTEMA’s clear strategic vision and its prioritization of actions in changing circumstances, its strong local and international connections, the focus on innovation and use of the services provided by the university, the links with vocational training, the large number of research groups dedicated to energy and environment and the notable progress made in issues of student mobility.

The relatively limited progress in the 5 R&D programmes of excellence and the gap between the improvement in teaching and the university’s commitment to the community on one hand and with scientific production, on the other, were both considered as weak points.

Scientific improvement and transfer are, therefore, one of the challenges CYTEMA faces. Great effort has been made in this area, without forgetting other objectives.

The activities undertaken must be viewed in the context of the substantial budget reduction mentioned in the introduction to this report. The CYTEMA CIE provides for three strategic axes of activity:

- Improvement to teaching and adaptation to the European Higher Education Area
- Scientific improvement and knowledge transfer
- Transformation of campus and interaction with the community.

The figure 1 below aims to outline and show a framework of the main actions carried out. This helps to contextualize the actions and visualize interactions.

Regarding the first of these axes, Improvement to teaching and adaptation to the European Higher Education Area, the most important activity is the Creation of the International Doctorate School - IDS – approved by the Regional Government of Castilla by
Decree 49/2013, of 25/07/2013 in order to promote high quality doctorate programmes with an international mention. As of the date of this report, 18 programmes have been recognized by RD 99/2011. Eleven of these programmes are linked to CYTEMA lines of research. Three are interuniversity programmes (Interuniversity Doctorate in Oenology, Viticulture and Sustainability; Interuniversity Doctorate in Nanoscience and Nanotechnology; Interuniversity Doctorate in Sustainable Chemistry). The IDS is complemented by the creation of the Centre of Postgraduate Studies, recently created to offer UCLM’s own qualifications. Furthermore, in order to increase the number of internationally recognised doctorates specific grants have been created, as part of the CYTEMA-PUENTE programme, to give PhD students access to study at prestigious international centres in the field of energy and the environment.

Figure 1: Actions of the Energy and Environment Science and Technology Campus

The Energy and Environment Knowledge Week –E2KW 2013, an international, multidisciplinary congress was organised. More than 140 researchers from 14 countries took part. Research in the field was discussed and proposed from all possible perspectives. Prestigious researchers from NASA, European University Institute, Global Research Centre for
Low Carbon Analysis (China) and IMDEA were also present as well as representatives of leading firms in the application of energy efficiency measures.

As part of links with vocational education and training, VET students have continued to carry out work placements in university research group labs and the call for Mixed Teaching Collaboration Projects in Energy and Environment has been repeated, with the acceptance of 14 projects. In this line the *University Vocational Training* Network has been consolidated as a network comprising all the agents involved in a higher level VET college specialising in Energy and Environment. As part of this network encounters, such as the CYTEMA Summer Campus, have taken place and will continue to take place with the participation of representatives of regional politics, entrepreneurs, university and VET students and teachers. In this regard, the e-book “Teaching Experiences in Energy and the Environment. Vocational Training Network” has been published.

Finally within the framework of the action “UCLM in the world”, a series of actions has been developed, aimed at consolidating language training, bilingual qualifications, and the creation of dual qualifications, as well as increasing the geographical sphere of influence of CYTEMA. We would like to highlight here the creation of the UCLM-international and UCLM-online divisions, the Learn Languages Programme, the My Oxford English course, as well as the three bilingual qualifications and the association of the Abdelmalek Essâadi University from Morocco. Furthermore, student exchanges with the associate universities, specifically with the Paris-Est Creteil University have continued.

Another of the important results of the UCLM in the world action is the launch of the Erasmus Mundus IBRASIL Project. This project is supported by a consortium of 20 universities from around the world, of which UCLM is the only Spanish member. It is coordinated by the universities of Lille (France) and Estadual Paulista (Brazil). It involves the mobility of 177 students, of whom 144 are Brazilian students visiting Europe. The dates planned are December 2104, December 2015 and June 2016. The call for first mobility programme was open until last 16 February. The data obtained shows the UCLM is the European university with most applications presented by Brazilian students, a total of 19. UCLM is also the second university, after Porto University, in number of grant applications received with a total of 144. The number of grants to be awarded among members for this first year totals 56 mobility grants.
With regard to the second strategic axis **Scientific Improvement and Knowledge Transfer** it is important to note that UCLM has six university-company chairs related to subjects from the Campus of Excellence: the Quando Chair, the Elcogás Chair, the Indra Chair, the Santander Chair of Corporate Social responsibility, the Miguel Fisac Lafarge Foundation Chair and since 2013 the ENRESA chair. The activities developed under these agreements allow other members of the community to be integrated in the aims and objectives of CYTEMA and they foster the development of research and knowledge transfer activities.

Among the actions conducted within the framework of the second strategic axis we highlight the development of five programmes of excellence in R&D: i) natural resources: sustainability and efficient management; ii) energy efficiency and renewable energy innovation: towards a new social production model; iii) environment and climate change; iv) Green IT: the environmental commitment of the information society; v) hydrogen economy and engineering: the future energy alternative. These programmes have been divided into 24 specific actions, coordinated by UCLM research groups and in which researchers from outside Castilla La Mancha have participated. The wealth of science provided by the diversity of national and international groups and institutes, working together on the same programme, has boosted the viability and originality of the results and the media capacity to transmit the results to the scientific community and the business world. Furthermore, a space has been created on the CYTEMA website for information regarding the associate institutions and research groups, both those directly linked to RPDEs and others which are carrying out research related to subjects from the campus of international excellence, although not directly associated with any RPDE.

The development of these programmes, together with the initiative and the quality of the research quality of the groups which comprise CYTEMA means that, despite the economic difficulties, the results in scientific production have maintained an extremely high standard in the period covered by this report. Research groups associated to CYTEMA currently participate in 9 European projects and in 2013 published 273 articles in JCR-indexed journals, of which 164 appear in the first quartile, Q1. It is worth highlighting that the UCLM is situated among the best universities in Spain in publications and academic performance, according to data from the University Ranking by Academic Performance (URAP). UCLM is situated in the twenty-second place in a list of fifty Spanish universities. Many other Spanish institutions did not manage to make the list, which only evaluates the best 2,500 universities in the world. In the international ranking, led by the University of Harvard, UCLM is number 625, ahead of, among others, the
London School of Economics and Political Science. Regarding the areas related to CIE CYTEMA, it should be mentioned that UCLM has managed to position nine scientific disciplines among the ten best in Spain, according to the I-UGR ranking of Spanish universities, according to fields and scientific disciplines (5th edition 2014). This study analyses the research published by public and private Spanish universities in the international journals of greatest impact and visibility in the period from 2004 to 2013. The ten disciplines from UCLM positioned in the national ranking are Ecology and Environmental Sciences (3rd), Electrical and Electronic Engineering (5th), Veterinary Science and Livestock Breeding (5th), Chemical Engineering, Agriculture, Statistics, Civil Engineering, Industrial Engineering, Automatics and Robotics, and Neurosciences. With the exception of the last one, all form part of the CIE subjects.

Furthermore, this strategic axis includes the setting up of SIGIEM, the Information System for Energy and Environment Management and Research, as a decision making tool which provides geographical information in quantity and quality. In addition, a series of actions have been carried out as part of the talent capture programme Energy and Environment Talent Programme, E2TP, such as the Catedra-CYTEMA contracts for the incorporation of prestigious young researchers in UCLM research groups, by which 5 researchers have been at UCLM with a contract signed until January 2014.

Finally, the third strategic axis, Campus Transformation and Community Outreach has involved the development of, among others, a series of actions as part of the INFO-ENE Programme such as the participation, for the first time, in the Summer Sciences Campus, promoted by the Spanish Foundation for Science and Technology (FECYT) and the Ministry of Education, Culture and Sport (MECD) or the joint participation with different business associations in EFENALBA: the Renewable Energies and Energy Efficiency Fair. Furthermore, as part of the Responsible Territory Programme, TERRI-RESP, the Sustainable Development Observatory has been maintained. It is also worth highlighting the signing of a collaboration agreement with RECAMDER, the Federation Network for Rural Development in Castilla La Mancha. This is a framework agreement for the joint development of specific R&D, training and consultancy actions as well as for the joint use of equipment and instrumental media in national and transnational projects related to rural development, in questions concerning energy saving, tourism and heritage recovery.

Finally, the action Mobility and Sustainability 2020 has led to the creation of a series of measures aimed at improving campus sustainability. The most important actions are the Energy
Efficiency Plan which has notably reduced energy consumption and expenditure, the Cloud Computing services to research groups and centres and the actions of the Assistance to Disabled Students Service (SAED) such as an adapted transport service.