



D2.1 Reports on the Energy area in the bi-regional STI cooperation addressing societal challenges

ALCUE NET

Latin America, Caribbean and European Union Network on Research and Innovation

Latin America, Caribbean
and European Union

Network on Research and Innovation

EU-CELAC SOM Working Group on Energy

Mexico – Spain

**ALCUE NET: Latin America, Caribbean and European Union Network on Research
and Innovation**

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1 Objective of the thematic report

The present thematic report has been prepared to offer a concrete overview of the activities carried out in the renewable energies area in support to the implementation of the Joint Initiative for Research and Innovation (JIRI) and to serve as supporting element for the decision making process which will be carried out during the Senior Officials Meeting that will take place on the 3rd and 4th of April 2014 in San José, Costa Rica.

2 Bi-regional Cooperation Activities in the Energy Area

a. Thematic area background in Latin America, Caribbean and the European Union

The energy present situation is one of the greatest challenges faced by our society today. Social progress and well-being of people, industry and economy depend on safe, secure, sustainable and affordable energy. Addressing energy challenges through transformative science and technology solutions has become a priority for both governments of developed countries and emerging economies. Countries are increasingly recognising the potential role of emerging energy technologies capable of responding to the major challenges of climate change, energy security, and access to energy. Energy solutions, comprising not only energy production but also energy efficiency, namely the existing building stock and transport sector, would make energy consumption more affordable for consumers as well as create employment. Appropriate management of the energy resources, a proper infrastructure (smart grids), energy storage systems and market regulations are needed as well.

The analysis of research issues, priorities and emerging energy technologies, as well as the activities of several energy agencies and key actors increasingly focus on policy and market analysis and system integration issues.

The work is rapidly expanding as a response to the present challenges of an unsustainable global energy structure and the expansive clean energy economy. Clean energy investments are building the foundation for new industries and job growth. The EU agreed to implement the 20-20-20 objectives: reducing emissions of greenhouse gases by 20%, increasing energy efficiency to save 20% of energy consumption, and to reach 20% of renewable energy in the total energy consumption in the EU by 2020. To reach these goals, both federal governments and the private sector will have to invest in clean energy development and deployment for major new energy efficiency benefits.

Intensified RTD cooperation between research institutions, universities and the private sector from Europe and Latin America and the Caribbean is crucial to establish the pathway of the policies in the field of emerging energies.

The Working Group on Renewable Energies for Societal Challenges aims at fostering cooperation and coordination among EU-CELAC countries which could impact on smart regions development while assuring a sustainable energy supply thus contributing to the mutual development of policies, fostering synergies

between EU and LAC countries helping to develop joint initiatives/programmes and foster innovations for social benefit in order to:

- Address specific problems that have a global character, on the basis of mutual interest for EU-CE-LAC region, with a win-win perspective.
- Support bi-regional competitiveness through strategic partnerships in the field of energy by engaging the CELAC countries' scientists to work in and with Europe and viceversa.
- Integrate the scientific community working in the energy field and support the JIRI process.
- Promote an EU-CELAC operative platform to implement joint initiatives in the renewable energies area.

The activities carried out in support to the scientific policy bi-regional dialogue between the European Union and Latin America and the Caribbean for the renewable energies area in the frame of Working Group on Renewable Energies for Societal Challenges have sought the following objectives:

- Generating a thematic bi-regional dialogue both at a technical and a political level in support to the implementation of the JIRI's Road Map in the renewable energies area, particularly in bio-energy, wind energy, solar –photovoltaic and thermal energy, and energy efficiency.
- Identify and bring together stakeholders representing industry, researchers and policy makers from EU and LAC, the European Commission and the EU and LAC technology platforms.
- Developing relevant background documentation for the identification of current principal policy, institutional and technical limitations and opportunities; possibilities for policy coordination (policy components, sharing of experiences and best practices).
- Identify cooperation activities to be developed in renewable energies among EU and Latin American and Caribbean countries and identify appropriate instruments, mechanisms and funding schemes for coordinating and financing joint research, technology development and innovation activities.
- Discuss European and Latin American public policies concerning the renewable energies
- Produce inputs for the Renewable Energies SOM working group.

Specific research and innovation areas in bioenergy, wind energy, solar energy (as described in the Working document 1 integrated in the Energy WG thematic report) and energy efficiency identified as priorities of common interest and on which the cooperation should focus include:

Bioenergy

1. Biomass availability and supply

2. Conversion processes
3. Markets and regulatory framework
4. Sustainability

Photovoltaic

1. Solar resources prediction and monitoring
2. Quality Assurance Procedures
3. Stand alone systems
4. Advanced grid integration & large integration of PV in building areas

Solar thermal

1. Quality Assurance Procedures oriented to the use of certified equipment and its certification, certifications integration, installers harmonization, equipments and installers.
2. Thermal energy storage mainly in distributed generation

Wind energy

1. Wind Resource Assessment and short term forecasting
2. Wind Turbines: technology for regional manufacturing
3. Removing barriers and promoting deployment and acceptance of wind energy: market obstacles, environmental issues, capacities

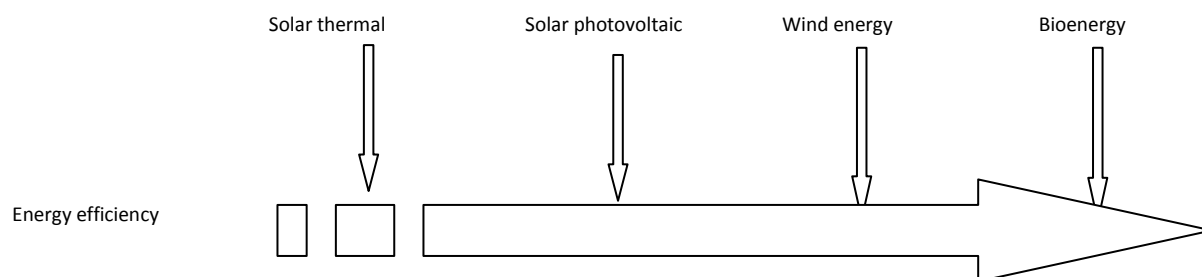
Energy efficiency focus areas:

1. Increasing energy efficiency in buildings
2. Heating and cooling
3. Increasing energy efficiency in industry and SMEs
4. Increasing energy efficiency of energy-related products
5. Innovative financing for energy efficiency
6. Citizen Engagement, capacity building, governance and communication for energy efficiency main energy

Following the great interest on energy efficiency demonstrated by the European Commission in its last communication about energy technologies and innovation sent to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions, two strategic approaches towards Energy Efficiency have been proposed within the implementation plan of the activities in the frame of ALCUE NET project in the energy area.

Two strategic approaches to energy efficiency:

i) the “Integrated Road Map” by the EC that will put forward key research and innovation actions to be undertaken in the next 6 years and will be the basis for EU, national and multi-Member State activities (the latter based on the variable geometry model), and can serve as well, as a basis for private investments in energy research and innovation. In this approach energy efficiency is horizontal to solar thermal, solar photovoltaic, wind and bioenergy;



ii) energy efficiency approached based on the EU energy efficiency policy, where the full potential of energy efficiency, focusing on end use consumption is prioritized and according to the “Secure, clean and efficient energy Challenge”. These areas are related to buildings: heating & cooling, industry aspects and products development. This approach has been further elaborated through a series of documents prepared by the experts supporting the SOM Working Group in Renewable Energies. Full description in the “Position paper on energy efficiency non-paper” integrated into the Energy WG thematic report.

The formulation of recommendations, activities and narrowing down of areas has taken into consideration the SET Plan which since 2008 has been the centre-piece of the EU research and innovation policy in the field of energy. It is the reference point for European, national, regional and private investment.

Topics identification:

Energy Research Areas	Topics
WIND ENERGY	- Advancement of small/medium-scale wind turbines in EULAC countries - Integration of wind generation into existing electricity grids
BIOENERGY	- Development of cost-effective and sustainable advanced bioenergy technologies with biomass feedstock flexibility - Cost-effective biomass availability, supply and storage systems optimization to reduce feedstock uncertainty for bioenergy production. - Assessing and monitoring the four dimensions of sustainability (economic, environmental, social and institutional) for bioenergy to ensure governance and compliance with biomass value chains sustainability goals.
SOLAR THERMAL	- Solar technology development for industrial process heat - Solar resource assessment - Energy Storage technologies
SOLAR PHOTOVOLTAIC	- Novel concept in cost-effective constructive systems based on solar technology in buildings and urban areas
ENERGY EFFICIENCY	- Novel concept in cost-effective constructive systems based on solar technology for the built environment

The narrowing down of areas has been the result of expert consultations and the organization thematic focused workshops/meetings in the frame of previous INCO NETs and ALCUENET bringing together relevant stakeholders from EU-LAC countries in order to:

- (i) identify pilot funding initiatives for cooperation on renewable energies,
- (ii) identify priority areas for cooperation in energy efficiency,
- (iii) address and design top-down synergies, initiatives and measures.

Two workshops have taken place in Mexico City (October 2013 and March 2014) focused on Renewable Energies taking stock from the priority areas identified through several activities carried out under previous INCO NETs (EULARINET, EUCARINET, ENLACE). Additional expert meetings will be focused on the identification and design of further joint initiatives for cooperation and promoting innovation.

As part of the activities in the frame of the ALCUE NET project in energy, a mapping and analysis of country potential is in process. It includes:

- Collection, processing and centralization of key information focused on the renewable energies in LAC and European Union (1st phase)
- Analysis of country potential -critical mass of researchers and research organizations from both the private and public sectors; and current cooperation with European counterparts -irrespective of whether funded by the Framework Programme (exhaustive list of on-going relevant -national, regional and EU-LAC- STI programs, projects platforms (ETPs) with relevance to the thematic areas) (2nd phase)
- Strategic analysis for STI cooperation in the energy field by analyzing the current status of energy research based in their research base whether academic or industrial potential and interest towards international cooperation within key areas of bi-regional interest in energy to support the development of a strategy for cooperation in STI on energy issues between both regions.
- Follow up of the activities of existing “Observatories”- “Observatorio de Energía Renovable para América Latina y el Caribe” under OLADE (Organización Latinoamericana de Energía), several observatories on energy for energy indicators, new sectoral regulations, etc. operated in Spain, other.
- Development of a strategy for cooperation in STI in energy issues between both regions.

Actions to promote and support networking and exchanges between research organisations in on-going or planned projects:

- **Establishing thematic networks:** The network composed of experts in bioenergy, solar and wind energy has been regularly involved in most activities coordinated by the INCONets (EULARINET,

ENLACE, EUCARINET and ALCUENET) and other projects like ACCESS to MEXCYT, etc.

- Further linkage with regional thematic nets (Rembio, Mesomaerican nets and CYTED) will be reinforced through an on-line tool through ALCUENet web.
- **Synergies** between ALCUENET, ERANet LAC projects and CYTED (Iberoamerican Programme on Science and Technology for Development). First steps done through the 1st ALCUENET-CYTED Thematic Meeting on October 23rd, 2013, where the co-leaders of the EU-CELAC Energy WG, together with the thematic area managers of CYTED, and key thematic experts, met and elaborated draft documents which will serve as the basis for a joint working plan.
- **Capacity building:** Mobility programmes available for the exchange of EU-LAC scientists is being promoted seeking synergy with bilat-project activities as well as through other projects.
- **Policy dialogue meetings and regulatory frameworks:** The priority objective is to promote policy convergence between EU and LAC countries.

The development of long term strategic proposals in order to better linking research and technological cooperation structures and nets as a first step towards what, in the medium or long term, could become LAC Technological Platforms on renewable energies. The coordination of national research institutions and organizations from both the private and public sectors organizations is in the core of these initiatives. This coordination takes international cooperation to the next level so that collaboration is not limited to actions with maximum duration of 4-5 years that once completed disappear, making it difficult to ensure continuity of projects, new initiatives that could arise from these, and so on. As an example, the National Mexican Centres for Energy Research in Mexico (CEMIE) are virtual centres aimed at coordinating research institutions and private sector entities working in the same renewable energy subareas to develop research projects, career development activities and exchanges according to a work programme agreed upon by all the organizations involved in each Centre. These centres are envisaged to become self sustainable and reach a level where international participation will be possible as their activities develop over the time.

Existing networks also would benefit from these initiatives. The many networks working in renewable energies in LAC –including the various CYTED nets related to energy like Gestión y eficiencia energética para un desarrollo sostenible (GEESOS); Red Iberoamericana de Energía (REDIENE); Red iberoamericana para el uso de energías renovables y diseño bioclimático en viviendas y edificios de interes social and others - reveals the existence of a critical mass on which to build future structures of technological and research cooperation.

The Energy WG, as a first step to that end, has looked for synergies between CYTED (*Iberoamerican Programme on Science and Technology for Development*), ALCUENET and ERANet LAC projects. As starting

point, the first ALCUENET-CYTED Thematic Meeting on October 2013 involved the co-leaders of SOM-working groups together with partners of both projects and the thematic area managers of CYTED, as well as thematic experts and NCPs. The EU-CELAC Energy Working Group is preparing draft proposals to be further elaborated and which will serve as the basis for a joint working plan looking for complementarities with the strategic projects on energy within CYTED.

The INCO Nets ENLACE and EUCARINET have strongly contributed to the implementation of the JIRI.

In addition, several non-EU-CELAC initiatives have been present in the works of the SOM Working Group in Renewable Energies, being the International Renewable Energy Agency (IRENA) one of them since the main objective of this Agency is to disseminate best practices in the field of renewables as the principal platform for international cooperation in the field, a centre of excellence on renewable energy and a repository of policy, technology, resource and financial knowledge. This includes the promotion of the widespread and increased adoption and the sustainable use of all forms of renewable energy globally, including in the EU and CELAC countries, in particular to bring down costs and also to increase market experience, and support activities for countries in their transition to a renewable energy future.

- b. Political framework: EU-CELAC Senior Official Meetings (JIRI), EU-CELAC Summits (Action Plan 2013-2015)

As a result of the European Union, Latin America and Caribbean (EU-CELAC) Senior Officials Meeting (SOM) hold on March 28-29, 2011 in Brussels, the working mechanism and roadmap to go forward the implementation of the EU-LAC Joint Initiative for Research and Innovation (JIRI) were approved.

The Joint Initiative aims at contributing to sustainable development and social inclusion in six priority areas of cooperation¹ related to key global societal challenges as mentioned in the Innovation Union Communication².

The renewable energies area was one of the specific areas³ selected in the Senior Officials Meeting celebrated in 2011, for defining bi-regional activities on which the enhanced bi-regional cooperation will be developed within the framework of the Joint Initiative.

¹ Priority areas of cooperation: Energy, Environment and Climate Change, Agro Food, Health, Information and Communication Technologies, and horizontal activities regarding S&T policies focused in both institutional and human capital formation.

² Innovation Union key documents, including the Innovation Union Communication can be downloaded from:
http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=keydocs

³ Bio-economy, including food security, Biodiversity and Climate Change, ICT and Renewable Energies.

The Renewable Energies SOM Working Group has worked in a series of recommendations for activities and lines for action for potential EU-LAC collaboration in renewable energies which include:

- Coordinated activities funded through specific projects, joint/coordinated calls and 'twinning'.
- Actions to promote and support networking and exchanges between research organisations in on-going or planned projects, and for the establishment of thematic networks and strengthening capacity building and regulatory framework.
- The development of long term strategic proposals in order to better linking research and technological cooperation structures and nets as a first step towards what, in the medium or long term, could become LAC Technological Platforms on renewable energies.

Additionally, in order to further support the S&T bi-regional dialogue, CONACYT Mexico and MINECO Spain, as co-leaders of the Renewable Energies Working Group, with the support of MINCYT as coordinator of ALCUENET project, promoted a dialogue with CYTED (Iberoamerican Programme on Science and Technology for Development) on possible synergies between CYTED, ALCUENET and the ERANet LAC projects. The first ALCUENET-CYTED Thematic Meeting took place on October Wednesday 23rd, 2013, where the co-leaders of the EU-CELAC SOM Working Groups of Energy, ICT, Biodiversity and Bioeconomy together with the thematic area managers of CYTED, and key thematic experts, met to discuss in parallel sessions on said possible synergies and elaborated draft documents which will serve as the basis for a joint working plan.

Representatives of the Members of the SOM Working Group in Renewable Energies, co-lead by Mexico and Spain, met back to back with the workshop on March 12, 2014.

A series of recommendations for pilot activities grouped into three main lines for actions were presented to the representatives of the Members of the Renewable Energies SOM Working Group co-lead by CONACYT Mexico and MINECO Spain.

Lines for action for pilot activities for potential EU-LAC collaboration in renewable energies:

- Coordinated activities funded through specific projects, joint/coordinated calls and 'twinning'.
- Actions to promote and support networking and exchanges between research organisations in on-going or planned projects, and for the establishment of thematic networks and strengthening capacity building and regulatory framework.

- The development of long term strategic proposals in order to better linking research and technological cooperation structures and nets as a first step towards what, in the medium or long term, could become LAC Technological Platforms on renewable energies.

The following table is an abstract of the recommendations towards the implementation of pilot activities according the three main lines for action:

Line for action	Activity	Work progress
1. Joint calls and project based proposals. <i>Collaborative research and innovation activities funded through specific projects, joint/coordinated calls and/or "twinning".</i>	1.1. Proposal for a joint call on Bioenergy (biomass availability and conversion process) together with the Bioeconomy working group	Both groups to evaluate viable ways to implement a joint call in biomass & conversion processes. Implementation through EULAC ERANet scheme under consideration.
	1.2. Proposal for a number o joint calls solar - photovoltaic and thermal- and wind energy	A set of themes for mutual interest in solar energy, both photovoltaic and thermal, and wind energy areas have been identified. The co-leaders of the WG exchanged points of view with the Members of the group in order to explore their interest and possible commitment in bi- tri- or multilateral cooperation on said areas/topics and invite other interested countries. Implementation through ERANet LAC
	1.3. Project based proposal in bioenergy and solar energy.	As an alternative way to implement pilot activities, these proposals have been projected with a broader scope covering different subareas for potential EU-LAC collaboration in bioenergy and solar energy. Due to the size and complexity of these activities (estimated time to reach the goals are 4 years) the proposals could be further developed (emphasizing impact on societal challenges) and evaluate the viability to be implemented through funding agencies like IADB as such or to include the activities as part of their initiatives.
	1.4. Twinning- Further expansion of potential on-going national projects with focus on the research subareas identified	It is envisaged to advance on this through ALCUENet as tasks on this issues are included.
2. Networking and exchanges <i>Actions to promote and support networking and exchanges between research organisations in on-going or planned projects</i>	2.1. Establishing thematic networks	The network composed of experts in bioenergy, solar and wind energy created as a result of the activities of the working group has been regularly involved in the activities coordinated by the INCONets and other projects like ACCESS to MEXCYT, etc. Linkages with regional thematic nets (Rembio, Mesomaerican nets, CYTED, etc) established

		and will be reinforced through an on-line tool through ALCUENet.
	2.2. Beginning capacity building	Mobility programmes available for the exchange of EU-LAC scientists in EU and LAC universities and research organizations as well as IRSES and other existing instruments in Marie Curie and other national programmes is being promoted seeking synergy with bilat-project activities as well as through other projects where the Members of the WG participate, as well as the co-leaders of the other WGs.
	2.3. Policy dialogue meetings and regulatory frameworks	A program of workshops on different policy and regulatory aspects, to promote common views and best practices on specific issues is included in the tasks of ALCUENet. The priority objective is to promote policy convergence between EU and LAC countries.
3. Long-term strategic proposal	3.1. Opening of each other's programmes is part of the long-term strategic proposal which envisages the establishment of LAC Technological Platforms that could be linked to ETPs	The co-leaders of the WG invited other countries (Members of the WG initially) to evaluate their interest and capacities to join the actions. Contacts with organizations related to RE like OLADE and IRENA on-going. Representatives from these organizations have participated in ALCUENET activities and supported the WG on the technical level.

The analysis of appropriate instruments for coordinating and financing joint research, technology development and innovation activities set on the agendas. The co-leaders of the group have followed up the first approached to funding agencies (BID, LAIF, AECID, FAI) looking for possible funding schemes and compiled additional information from other countries.

c. EU framework programme and past experiences

The European Union seeks to reinforce its cooperation in Science and Technology (S&T) with different regions of the world so as to increase its capacity to solve global issues and major challenges. To this end, the INCO-Nets provided by the European Commission through the 7th Framework Programme for Science and Technology (FP7) have served as instruments to deepen the bi-regional dialogue on research policy and to strengthen the bi-regional coordination of science and technology cooperation between the EU and other regions.

The thematic working groups established at the SOM 2011 to go forward the implementation of the JIRI have been supported by several initiatives and projects, like EULARINET Project, which concrete results in the Renewable Energies area include:

- Basic lines of EU-LAC cooperation in bioenergy, solar energy and wind energy
- Working documents on EU-LAC joint priorities in the three areas
- Subareas for potential collaboration and topics were identified in line with the priorities of the SET Plan and LAC
- Proposals for activities in renewable energies for the consideration of the Renewable Energies SOM Working Group.

The ALCUENET Project is now acting as a concrete support mechanism for bi-regional S&T policy dialogue according to the recommendations of the Summit Process and SOM meetings.

The activities within ALCUE NET in the Energy thematic area, and more specifically in Renewable Energies, are aimed to lead up to the implementation of specific activities expecting to eventually evolve into a full bi-regional cooperation platform or net involving all relevant stakeholders and undertaking support activities ranging from foresight to agenda setting and actual joint instrument implementation in the energy theme.

At the operational specific level ALCUE NET is contributing to support the S&T bi-regional dialogue throughout the organization of workshops and both technical and policy level meetings.

Several workshops have followed the EULARINET Latin American-European Workshop on Wind Energy in Rio de Janeiro, Brazil, and in Mexico City focused in the definition of bi-regional pilot activities in solar energy -both photovoltaic and thermal, bio-energy and wind energy.

Recent activities in the EU-CELAC renewable energies area are:

- ALCUE NET – CYTED Thematic Meeting on Renewable Energies, Biodiversity & Climate Change, Bioeconomy and ICT in CONACYT, Mexico on October 23, 2013.
- ALCUE NET European-Latin American Workshop on Renewable Energies-CONACYT, Mexico, October 24-25, 2013.
- ALCUE NET European-Latin American Renewable Energies Policy Dialogue Meeting- Mexico, March 11-12, 2014

d. Towards Horizon 2020

Energy research and innovation is one of the key priorities in Horizon 2020. Addressing the key societal challenge "Secure, clean and efficient energy" it has been conceived to support the transition to a reliable, sustainable and competitive energy system.

To make the transition to a competitive energy system, a number of challenges, such as increasingly scarce resources, growing energy needs and climate change need to be overcome.

The Energy Challenge in Horizon2020 is structured around seven specific objectives and research areas:

- Reducing energy consumption and carbon footprint
- Low-cost, low-carbon electricity supply
- Alternative fuels and mobile energy sources
- A single, smart European electricity grid
- New knowledge and technologies
- Robust decision making and public engagement
- Market uptake of energy and ICT innovation

The main priorities in the first phase 2014-2015 are: Energy Efficiency; Low Carbon Technologies; Smart Cities and Communities; Reinforcing and updating of the SET Plan (Development of an Integrated Road Map for the SET Plan which will contribute to define priorities across the entire energy system through one consistent agenda at EU level from research to market uptake.)

This challenge-based approach in Horizon2020 will give the researchers more freedom to come up with innovative technology solutions.

International cooperation with strategic partner countries and global technology leaders will support European energy and climate objectives and contribute to the global efforts to mitigate climate change and reduce CO2 emissions. In line with the objectives of the EU's strategy for international cooperation in research and innovation, all activities are open for third country participants, while certain partner countries are also specifically targeted in a number of topics like Brazil that will continue with partnering initiatives in bioenergy, specifically biofuels (LCE 13 – 2015: Partnering with Brazil on advanced biofuels).

Even though participants from industrialized and emerging countries outside of the EU will not receive automatic EU-funding, like Brazil and Mexico, there are good opportunities concerning participation from third countries. In addition Mexico has implemented a special fund to finance the participation of Mexican researchers in Horizon2020, and Brazil is developing dedicated partnering initiatives EU-Brazil.

Horizon 2020, aims at tackling societal challenges by helping to bridge the gap between research and the market. This market-driven approach will include creating Public-Private Partnerships to bring together the resources needed for addressing specific societal challenges outlined in Horizon 2020.

A possible PPP in the field of biobased industries explicitly mentioned in Horizon 2020 is BRIDGE - Biobased and Renewable Industries for Development and Growth in Europe. This public Private Partnership for biobased industries includes “Optimising efficient processing through R&D and Biorefineries upscaling in large-scale demo/flagship biorefineries”.

In addition, among the R&D topics in the Innovation Challenge, there is Biorefineries for optimising efficient processing (Primary conversion: refining of biomass into its valuable components; and Secondary conversion: Valorisation of intermediates and products (biotechnological, chemo-catalytical, thermo-chemical, hybrid & combined processes, downstream processes)).

Since part of the activities within ALCUE NET in the Energy thematic area, and more specifically in Renewable Energies, are aimed to lead up to the implementation of a full bi-regional cooperation platform or net involving all relevant stakeholders and undertaking support activities ranging from foresight to agenda setting and actual joint instrument implementation in the energy theme, these initiatives may serve as model schemes to be mirrored in LAC.

3 Cooperation Actions and instruments: Road Map for implementation

Action	Activity	Work progress	Instruments ⁴	Indicators + Impact
Scientific areas/topics	-EU-CELAC Thematic Workshop on Renewable Energies (October 2013 Mexico)	DONE	ALCUENET WP2 + SOM WG	-Research areas validated -Narrowing down to topic level (1 st phase) -Impact assesment report
	-EU-CELAC Expert / Policy dialogue (March 2014)	DONE	ALCUENETWP2 +EU-CELAC SOM WG Members ERANet LAC joint calls	-Research topics for Joint calls in ERANet LAC identified -Funding schemes for implementations (WG Members agencies)
Observatory/ Mapping	-Collection, processing and centralization of key information focused on the renewable energies in LAC and Europe (1 st phase)	DONE	Report on state of the art EU and LAC S&T	Report delivered
Capacity Building	-Mobility programmes available for the exchange of EU-LAC scientists is being promoted seeking synergy with bilat-project activities as well as through other projects.	ON-GOING	EU-MEX Innova and Bilateral agreements + JRC	Number of exchanges
Innovation	- Thematic expert workshop on Renewable Energies and Energy efficiency / Innovation (Spain)	In progress	ALCUENETWP2 +EU-CELAC SOM WG Members	Planned joint activities
Opening of programmes /Synergies w. on-going initiatives/programmes	-1 st ALCUENET-CYTED Thematic Meeting on October 23 rd , 2013, EU-CELAC Energy WG, e thematic area managers of CYTED, key thematic experts	DONE	Draft documents as basis for a possible joint working plan.	Impact assessment q.

⁴ Include instruments (Key tools) to implement the further cooperation actions: EU-CELAC Working Groups, ALCUE NET Project, ERANet-LAC Project, CYTED and other thematic projects and Initiatives (Technology Platforms, Joint Technology Initiatives, etc)

Establishing thematic expert groups in support to the EU-CELAC SOM WG - Further linkage with regional thematic nets (Rembio, Mesomerican nets and CYTED)	On-line tool	In progress	ALCUENET	Number exchanges
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Annual Work Plan	
Activities	Timeline
Analysis of country potential -critical mass of researchers and research organizations from both the private and public sectors; and current cooperation with European counterparts -irrespective of whether funded by the Framework Programme (exhaustive list of on-going relevant -national, regional and EU-LAC- STI programs, projects platforms (ETPs) with relevance to the thematic areas) (2 nd phase)	November 2014
Thematic expert workshop on Renewable Energies and Energy efficiency / Innovation (Spain) – a) funding initiatives (twining of projects, other innovative financial tools for cooperation on renewable energies b) identify priority areas for cooperation in Energy supply	October 2014
Strategic analysis for STI cooperation in the energy field by analyzing the current status of energy research based in their research base whether academic or industrial potential and interest towards international cooperation within key areas of bi-regional interest in energy to support the development of a strategy for cooperation in STI on energy issues between both regions.	2015

4 Formulation of topics to be considered in the activities of the ERANet-LAC project

Topic suggestions for bi-regional cooperation in the following research areas:

Scientific research area: Wind Energy

Short background on the scientific research area

Although the most developed of the modern renewable energy technologies, the wind energy sector still has a low global penetration of its estimated technical potential (estimated at 0.4%).

The European wind energy sector is the most developed, with present R&D work focussed on offshore wind power and designing larger wind turbines. The Latin America and Caribbean wind energy sector is in its infancy with development being driven mainly by Brazil and Mexico. R&D goals for LAC include resource mapping, and the establishment of local manufacturing capabilities and support services.

However, as highlighted in (A) the main research priority topics of the ENLACE and EUCARINET projects, and (B) the EERA joint programme on wind energy⁵, EU and LAC countries share similar research interests, including:

- The integration of wind energy conversion systems into electricity transmission networks, and
- The design and implementation of small to medium-scale wind turbines for use in remote locations

These are the scientific research areas proposed here.

Added value of EU-CELAC cooperation in this area

With over 30 years of development experience, Europe is the world leader in the design and manufacture of wind energy conversion systems. Conversely, in the most advanced of the Latin America and Caribbean markets, the implementation of utility-scale wind is just 10 years old and can be described as being in its 'emerging market' phase. However, with excellent wind resource availability, these LAC markets are growing rapidly and provide attractive opportunities for investment from the European wind sector. The topics discussed here provide opportunities for mutual research and development between EU and LAC partners, leading to stronger linkages between the wind energy sectors.

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

- Increased export of small/medium wind turbine technology and manufacturing capability from EU countries to LAC countries

Reduced loss of available wind energy due to improved interconnection and electrical grid control. For example, in 2010, the equivalent of 150 GWh of wind power was lost in Germany alone because grid operators had disconnected the wind turbines due to overproduction, which had increased by 69% compared to 2009⁶.

⁵ European Energy Research Alliance (www.eera-set.eu) – Joint Programme on Wind Energy

⁶ Sewohl, A. (2012), "Wind power losses from grid disconnections up by as much as 69 percent", BWE (German Wind Energy Association), www.wind-energie.de/en/infocenter/articles/wind-power-losses-grid-disconnections-much-69-percent

Specific call topic suggestion – Wind energy

TOPIC 1: WIND
ENERGY

Advancement of small/medium-scale wind turbines in EULAC countries

Specific challenge: Why is this topic relevant and which societal challenges does it address?	The specific challenges of this topic are: 1. Optimisation of small/medium-scale wind turbines to meet local wind regimes and regional infrastructure requirements (including ‘tropicalisation’ of turbine design, reduced maintenance requirements, integration into low-voltage grids). 2. Promotion of increased awareness of the potential of small/medium wind turbines at community/SME/agricultural levels.
Scope: Added value gained from EU-CELAC cooperation for both regions	Small/medium-scale wind turbines offer manufacturing opportunities for emerging markets (EU based research institutions are already exploring the continued development of small/medium-scale wind turbines⁷). This topic will allow EU R&D and manufacturing institutions to expand into LAC markets, whilst allowing LAC countries to develop technologies specific to their technical and social needs.
Expected impact for both regions:	Increased awareness of small/medium-scale wind turbines Closer inter-regional links between R&D institutions, wind turbine manufacturers, policy makers and end-users. Increased penetration of wind energy (an issue for European AND Latin America and Caribbean countries). New turbine designed specifically for tropical environments (specific meteorological conditions, hurricanes, warmer/humid climates, atmospheric particles, lightening strikes)
Type of action suggested: Research project, networking activities, mobility etc.)	Networking and capacity building Mobility between EU and LAC researchers/manufacturers R&D into design and manufacture of location optimised wind turbine

⁷ CEWind and Flensburg University of Applied Sciences
(http://www.uni-flensburg.de/fileadmin/ms2/proj/inees/Documents/Projects/wind_workshop/A_Small_Scale_Wind_Turbine_with_Reduced_Maintenance_Requirements_SWTRM_.pdf)

Specific call topic suggestion – Wind energy

TOPIC 2: WIND
ENERGY

Integration of wind generation into existing electricity grids

Specific challenge: Why is this topic relevant and which societal challenges does it address?	Integration of wind generation to power systems is a growing research topic due to its impact on the operation of electricity networks across the world. Most wind turbines use induction generators, which require special attention since their electrical performance can vary significantly from their synchronous generator counterparts used in conventional power plants. It is necessary to quantify the behaviour in the electrical variables in power systems relating to the operation of the wind farms in order to take precautionary measures or simply monitor the reliability of the electrical grid.
Scope: Added value gained from EU-CELAC cooperation for both regions	These solutions need integrated approaches, both in terms of research and development of advanced technological solutions, as well as deployment. The focus on integration to grids will result in commercial-scale solutions with a high market potential.
Expected impact for both regions:	Closer links between academic, network operators, wind farm developers, and policy makers in LAC and EU countries. More efficient use of available wind energy (an issue for European AND Latin America and Caribbean countries).
Type of action suggested: Research project, networking activities, mobility etc.	Networking and capacity building Promotion of mobility between research centres in the EU and LAC Support the development of grid codes that will lead to better integration of wind energy (policy and regulatory level). Research into modelling and software development to support wind energy integration into electricity networks. Improved short-term wind resource forecasting techniques to support better national energy system management

Scientific research area - Bioenergy

Short background on the scientific research area

Today, biomass covers about 80% of renewable energy sources in World. For Europe the renewables share of biomass in the total primary energy is more than 60% and is one of the key primary energy sources for the 20% renewable energy sources target in 2020. Biomass is widely used for heat and power (under different forms) as well as for biofuels production for road transportation sector. It is expected that next generation sustainable biofuels for transport will be used in light and heavy duty vehicles by 2020, and additional growing volumes in aviation and marine fuels.

However, biomass has some special handling and processing features that require resolution for successful deployment. In particular, biomass logistics is complex and costly and presents challenges in conversion process design due to some peculiar chemical features of biomass. Also, the advanced conversion technologies (either thermochemical or biochemical) still hamper a severe bottleneck before becoming mature that is the lack of biomass flexibility as feedstock. A third key topic is the sustainability dimension for biomass production and uses.

Added value of EU-CELAC cooperation in this area

CELAC is an important strategic partner for Europe to advance in the supply of sustainable bioenergy sources. CELAC countries are characterised by huge feedstock availability, high potential for liquid biofuels, and high economic growth. CELAC has furthermore an outstanding scientific expertise in many biofuel technologies, thus being on the one hand a mere source of biomass, and on the other hand a very valuable scientific/technical partner for cooperation in equal terms.

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

The expected long-term impact to establish a trans-national cooperation between CELAC and EU research to solve common problems, facilitating the sharing of ideas and assets, and encouraging strategic work towards the common goal of deployment of advances biofuels technologies and to explore the possibilities for joint technology development.

Specific call topic suggestion - Bioenergy

TOPIC 1: Development of cost-effective and sustainable advanced bioenergy technologies with biomass feedstock flexibility

Specific challenge: Why is this topic relevant and which societal challenges does it address?	To develop cost-effective bioenergy production processes based on biomass feedstock flexibility. The lack of biomass flexibility is a current bottleneck that hampers biomass technologies to become mature.
Scope: Added value gained from EU-CELAC cooperation for both regions	Develop innovative biological, thermochemical and chemical routes from all fractions of biomass, including wastes with integration of first and advanced generations technologies (eg., through engineered microorganisms) for improving conversion processes and the products output shall be at least 70% bioenergy.
Expected impact for both regions:	This topic shall enhance innovations on decentralised small-scale biorefineries using as largest as possible feedstock flexibility. As a result this shall improve cooperation between scientists, professionals, farmers associations and industry of EU and LAC making the whole process more sustainable.

Type of action suggested: Research project, networking activities, mobility etc.	Research projects (Research & Innovation Actions); access to infrastructures (EU and LAC); Mobility human resources.
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Specific call topic suggestion - Bioenergy

TOPIC 2: BIOENERGY	Cost-effective biomass availability, supply and storage systems optimization to reduce feedstock uncertainty for bioenergy production.
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Specific challenge: Why is this topic relevant and which societal challenges does it address?	Development of toolbox for helping on decision making process for bioenergy production based on information about biomass availability, supply, storage and transport. Also sustainability criteria (economical, social, environmental and institutional) should be taken into account.
Scope: Added value gained from EU-CELAC cooperation for both regions	Both EU and LAC have a bottleneck with large-scale collection and storage of biomass for bioenergy. There is a need to establish cost-effective agriculture residues and forestry residues supply chains (including pre-processing, storage and transport) according at a regional/national level and developing interfacing system analysis (market interdependencies, policies impacts and supply-demand models).
Expected impact for both regions:	Different value chains are competing for biomass feedstocks, including non-bioenergy uses. This topic shall enhance innovations on biomass supply and logistics that can be learned and tested in each region (EU and LAC).
Type of action suggested: Research project, networking activities, mobility etc.	Research projects (Research & Innovation Actions); Networking activities (CSA); Capacity Building.

Specific call topic suggestion - Bioenergy

TOPIC 3: BIOENERGY	Assessing and monitoring the four dimensions of sustainability (economic, environmental, social and institutional) for bioenergy to ensure governance and compliance with biomass value chains sustainability goals
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Specific challenge: Why is this topic relevant and which societal challenges does it address?	Sustainable use of biofuels depends of stable long-term policy framework with higher levels of interdependency between EU and LAC countries. Therefore an EU-LAC framework for the development a sustainable biomass production and use is necessary. This shall benefit job creation, rural development, economic growth and GHG emissions reduction.
Scope: Added value gained from EU-CELAC cooperation for both regions	Research is needed to evaluate different national/regional perspectives of biofuel sustainability, especially with regard to subsidies schemes for agricultural, including aquaculture, and forestry land, trade barriers, national energy security, ethical issues and poverty reduction. Projects should target improving databases using comparable indicators for assessing life cycle analyses for existing and advanced biofuel (gaseous and liquids) value chains from biomass.
Expected impact for both regions:	To contribute for a global biofuel market and for a future policy environment for biomass to be eligible as a world commodity. This topic is expected to improve cooperation amongst EU and LAC scientists, international voluntary schemes and national biofuel certification schemes, to ensure governance and trustable compliance with sustainable bioenergy goals.

Type of action suggested: Research project, networking activities, mobility etc.	Networking activities (Coordination & Support Actions); Capacity Building.
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Scientific research area – Solar energy (photovoltaic and thermal)

Short background on the scientific research area

It is important to develop and bring to market affordable, cost-effective and resource-efficient technology solutions to decarbonise the energy system in a sustainable way, secure energy supply and complete the energy internal market. Research activities in solar energy cover: Photovoltaics, Concentrated Solar Power, Renewable Heating and Cooling, Energy Storage.

Added value of EU-CELAC cooperation in this area

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

Specific call topic suggestion – Solar thermal energy

TOPIC 1: SOLAR
THERMAL

Solar technology development for industrial process heat

Specific challenge: Why is this topic relevant and which societal challenges does it address?	A 20% percentage of the world's primary energy goes to heat industrial process and is mainly supplied with fossil origin energy. A significant percentage of this amount could be replaced by solar thermal energy, but the solar technology requires to be adapted for the requirement of these industries. Some of these industries are: food process, pasteurization, drying process, mining and textile industry. The range of temperatures required in most of these industrial processes is 60 to 250 C. It is necessary to develop technology using solar power, heated fluids in that temperature range.
Scope: Added value gained from EU-CELAC cooperation for both regions	To optimize in terms of thermal efficiency, cost reduction, and adaptation of solar thermal devices such as solar flat plate collectors, evacuated tubes, cylindrical parabolic concentrators to the requirements of these industries in different regions of the EU and LAC.
Expected impact for both regions:	Both regions would count with new highly efficient technologies and engineering methodologies for coupling industrial processes to solar energy source available in the regions, which would have important economic and environmental implications in regions.

Type of action suggested: Research project, networking activities, mobility etc.	Develop joint projects between researchers from both regions on the topic where some of their products are building pilot plants and demonstration systems. It is suggested to do it in the food sector. Duration: 2 to 3 years
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Specific call topic suggestion – Solar thermal energy

TOPIC 2: SOLAR
THERMAL

Solar resource assessment

Specific challenge: Why is this topic relevant and which societal challenges does it address?	For the use of the solar energy resource it is necessary to know the potential in different regions of Europe, Latin America and the Caribbean. At present there are different solar technologies that can be used for broad population sectors, but due to the lack of information about the amount and quality of the resource, even in regions with high insolation, they are not used. There are different models developed in Europe for the assessment of the resource, but these models should be validated for other climate regions.
Scope: Added value gained from EU-CELAC cooperation for both regions	Build solar metric databases (global, direct and diffuse radiation) for information in different regions of EU and LAC. Validate mathematical models with weather information and satellite images to determine the solar potential in a 1km x 1km grid. Homologation of the data basis in both regions.
Expected impact for both regions:	LAC would count with a data base for the development of the technology and EU will validate the models used for the solar assessment in other geographic regions. From the scientific point of view, it will be reached a better understanding of the energy resource in the regions thereby enabling the development of solar technologies. From the economic point of view, this knowledge will contribute to the development of an industry that uses the resource.
Type of action suggested: Research project, networking activities, mobility etc.	Develop a bi-regional project which expected results are solar data bases available on any common computer platform with Time distributions for any day of the year with a high spatial resolution. Duration: 2 to 3 years.

Specific call topic suggestion – Solar thermal energy

TOPIC 3: SOLAR
THERMAL

Energy Storage Technologies

Specific challenge: Why is this topic relevant and which societal challenges does it address?	Solar energy is electromagnetic energy incident on the earth's surface intermittently. This energy can be stored as thermal, chemical or electrical energy. The existing technologies such as supercapacitors, thermal storage tanks sensible heat or solar fuels production requires further development for mass use.
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Scope: Added value gained from EU-CELAC cooperation for both regions	To study, improve and develop new heat storage technologies
Expected impact for both regions:	Both regions would count with new technologies for storing solar energy. Research groups in the region on the issue would be strengthened. The development of this technology will increase the use of solar energy in all sectors, transforming the world's energy system.
Type of action suggested: Research project, networking activities, mobility etc.	Develop joint projects between researchers from both regions on the subject. Duration: 3 years.

Scientific research area – Solar photovoltaic energy

Short background on the scientific research area

Sustainability architecture comprises vast dimensions such as construction, design, planning, electrical systems, mechanical engineering, etc.
Envelope is one of the most common approaches in construction sector to get Energy Efficiency. Innovation and research have great impact on social challenge as well as SME.

Added value of EU-CELAC cooperation in this area

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

Specific call topic suggestion – Solar photovoltaic energy

TOPIC 1-SOLAR
PHOTOVOLTAIC:

NOVEL CONCEPT IN COST-EFFECTIVE CONSTRUCTIVE SYSTEMS BASED ON SOLAR TECHNOLOGY IN BUILDINGS AND URBAN AREAS

Specific challenge: Why is this topic relevant and which societal challenges does it address?	It promotes the massive use of solar energy at competitive levels on new and existing buildings. This topic aims to improve the energy efficiency of new and existing constructions in urban areas using novel construction elements based on photovoltaic technology. Supplementary hybrid systems that improve the energy use in buildings might be considered. It is expected that novel constructive systems based on PV technology supports the transition to a reliable, sustainable and competitive energy system. For instance, it will help to minimize the peak power consumptions typical in urban areas. It can also help the development of smart grid infrastructure.
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Scope: Added value gained from EU-CELAC cooperation for both regions	Added value is the expertise of EU in architectural projects in which some design passive solutions have been already applied to approach to zero-energy buildings. Exploring new material and design to get maximum performance or at least to reduce the energy demand to reach comfort inside buildings. From the EU point of view a technological transference could be achieved to disseminate their experience and CELAC on the other hand to implement a low tech solutions. This topic aims to support a better integration of solar energy technology on architecture with different climates, geography, built environment and socio economic conditions. It will give research scientists from both region a better understanding, from an holistic point of view, how to develop and integrate novel constructive materials based on photovoltaic materials. SME's from both regions will play an important role in the development of this topic. The bi-regional collaboration will help achieve global certificates and standards for the integration of PV and energy efficient technology in buildings.
Expected impact for both regions:	Worldwide several local SME's actively participate in the construction and the real estate sector. New standard and policies both in Latin America and Europe are pushing the construction and real estate sector towards more green and energy-efficient buildings. In this regard, the development of this topic should help to support innovative products in SME for the development of PV and energy efficient technologies constructive elements. New scientific knowledge will be generated in the development and use of constructive systems based on solar technology in buildings and urban areas. It will enhance the development ecological buildings friendly with environment, low carbon and new approaches in urban planning that include efficient use of energy criteria. It will create awareness about the importance and possibilities of low carbon urban areas.
Type of action suggested: Research project, networking activities, mobility etc.	Option A) To develop joint research projects or pilot projects (including SME) focus on the development of cost-effective new constructive systems based on solar technology in buildings and urban areas. This project should consider different climatic and geographic conditions. Option B) networking activities, academic mobility in short visit.

Scientific research area – Energy efficiency

Short background on the scientific research area

Energy efficiency in Europe is addressed by both short-term and long-term EU policies. The EU is aiming to progressively decrease primary energy consumption by 2020 and 2030. Research and demonstration activities within this area will focus on buildings, industry, heating and cooling, SMEs and energy-related products and services, integration of ICT and cooperation with the telecom sector.

Envelope is one of the most common approaches in construction sector to get Energy efficiency.

Added value of EU-CELAC cooperation in this area

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

Specific call topic suggestion

TOPIC 1: Energy efficiency

NOVEL CONCEPT IN COST EFFECTIVE CONSTRUCTIVE SYSTEMS BASED ON SOLAR TECHNOLOGY FOR THE BUILT ENVIRONMENT

Specific challenge: Why is this topic relevant and which societal challenges does it address?	It promotes enlarge penetration of solar energy at competitive levels on buildings. In the case of PV maximize distributed generation. Improving energy efficiency, clean, secure, zero energy building, low carbon emissions. Supporting the transition to a reliable, sustainable and competitive system.
Scope: Added value gained from EU-CELAC cooperation for both regions	To support a better integration of solar energy on architecture with different climates, geography, built environment and socio economic conditions. To incorporate SME (small medium enterprises)
Expected impact for both regions:	Ecological buildings friendly with environment, low carbon and new approaches in urban planning that include efficient use of energy criteria. Productive chain of construction sector and the real estate sector New scientific knowledge
Type of action suggested: Research project, networking activities, mobility etc.	To develop join research project , networking activities, academic mobility in short visit, seminars , incorporate SME (<i>small medium enterprises</i>)

5 Summary of EU-CELAC SOM decisions-making issues

- Joint Calls proposal analyzed
- Appropriate instruments analyzed for coordinating and financing joint research, technology development and innovation activities.
- Dedicated coordinated support action in renewables/energy efficiency in support to the implementation of the EU-CELAC JIRI.

6 Annex I: Working Document



ALCUE NET – Latin American, Caribbean and European Union Thematic Workshop on Renewable Energies and Energy Efficiency

CONACYT - Consejo Nacional de Ciencia y Tecnología
Mexico City - October 24th – 25th, 2013

Working document 1.

ALCUENET activities in Renewable Energies

To advance in the objectives of the project, the implementation process has been organized around different thematic areas, one of them addressing Societal Challenges through action in the Energy thematic priority of the Joint Initiative for Research and Innovation components.

The activities within ALCUE NET in the Energy thematic area, and more specifically in Renewable Energies, are aimed to lead up to the implementation of specific activities expecting to eventually evolve into a full bi-regional cooperation platform or net involving all relevant stakeholders and undertaking support activities ranging from foresight to agenda setting and actual joint instrument implementation in the energy theme.

At the operational specific level ALCUE NET is contributing to support the S&T bi-regional dialogue throughout the organization of this first *ALCUE NET European-Latin American Workshop on Renewable Energies* focused in renewable energies and energy efficiency, particularly, in validating topics for cooperation in solar energy (photovoltaic and thermal), wind and bio-energy, as well as in defining further bi-regional priority areas for pilot activities in energy efficiency to finally contribute to implement the EU-LAC (European Union – Latin America and Caribbean) Joint Initiative for Research and Innovation (JIRI).

EU-LAC cooperation on bioenergy

Working session 1. Review priority areas-topics, training and recommendations (*Discussions and elaboration of recommendations on bioenergy – agree on focus for biomass – energy/bioeconomy thematic areas.*)

Common specific subareas for EU-LAC cooperation on bioenergy

The identified research subareas for potential collaboration in bioenergy are:

1. Biomass availability and supply
2. Conversion processes
 - 2.1. Heat and/or power production
 - 2.2. Biofuels for transport
3. Markets and regulatory framework
4. Sustainability

Common research priorities for EU-LAC cooperation on bioenergy

1. **Biomass availability and supply:** The general opinion among experts is that, although there is a considerable potential for biomass feedstock production in LA (also for export to the EU), biomass availability (both residues and areas for the cultivation of energy crops taking into account non-competition for agricultural land, non-irrigated production and high biodiversity conservation) in LA has not been assessed yet. Therefore, biomass availability and logistics is a very relevant topic for specific research that could be addressed in joint EU-LA cooperation.

Research priorities on biomass availability and supply:

- 1.1. Harmonization of methodologies to assess the potential for biomass production in LA including environmental and socio-economic aspects and limitations, including the development of availability-cost curves for different sources of biomass (energy crops, forestry and agriculture residues, wastes) and geographical locations; development of interfacing systems analysis (supply-demand, market interdependencies, impact of policies)
- 1.2. Development of new high-yield agricultural and forest systems based on the breeding of crops and trees optimized for biomass production for multiple uses.
- 1.3. Development of efficient biomass logistic systems (harvesting/collection/storage) for different conversion concepts at different, appropriate scales
- 1.4. Development of efficient harvesting and collection systems for agro-forest residues and wastes to increase biomass availability
- 1.5. Production of algae at a competitive cost within the context of bio refinery concepts
2. **Conversion processes** for heat and/or power and biofuels production: Regarding conversion technologies experts agreed to prioritize research activities in the technologies for producing liquid biofuels for transport rather than technologies for producing heat and power.
 - 2.1. Research priorities on conversion processes - Biofuels for transport:
 - 2.1.1. Improve current conversion processes to their full potential (biodiesel, bio ethanol from starch-sugar) for valorisation of waste streams, higher GHG reduction, increased flexibility for different raw materials and lower cost

- 2.1.2. Research on advanced technologies for biofuels production, especially if residues are used as feedstock. Develop thermo chemical and biochemical conversion processes with feedstock flexibility for different lignocellulosic biomass (BtL, LC bio ethanol, biogas, biohydrogen)
- 2.1.3. Develop integrated bio refinery concepts making full use of a variety of biomass feed stocks to obtain bioenergy, biofuels and high-value bio products
- 2.1.4. Conversion processes of algae within the context of biorefinery concepts
- 2.1.5. Demonstrate at pilot and industrial scale the reliability and performance of new technologies

2.2. Research priorities on conversion processes - Heat and/or power production:

- 2.2.1. Improvement and innovation on design and performance of biogas digesters (
- 2.2.2. Development of energy-efficient and cost effective technologies for biogas and syngas upgrading
- 2.2.3. Identify optimal gasification conditions for different biomass fuels, demonstrate reliable operation of gasification CHP
- 2.2.4. Increase system efficiency and reduce emissions (e.g. particulate emissions) from stoves, boilers and CHP plants from micro to large scale
- 2.2.5. Hybrid systems. Integration with other renewable technologies (e.g. solar thermal, geothermal, etc), for both heat and power generation

3. Markets and regulatory framework

3.1. Research priorities related to markets and regulatory framework:

- 3.1.1. To transfer long-term experience of European standardization bodies for setting up biofuels standards in LA
- 3.1.2. To transfer long-term experience of European standardization bodies for setting up biofuels standards in LA

- 4. **Sustainability:** There is a general consensus about sustainability of biomass production and use being a key issue in LA. Strategies and policies are needed to ensure the economic, sustainable and equitable future development of bioenergy in the region. Research is needed to understand the different perspectives of biofuel sustainability, especially with regard to ethical issues, national energy security, subsidies schemes for agricultural products, trade barriers and poverty reduction. This is important to ensure the efficiency and acceptance of biofuel certification schemes in a global biofuel market.

Research priorities related to sustainability:

- 4.1. Further development of indicators and coherent methodology (i.e. LCA) to assess and monitor the three dimensions of sustainability: economic, environmental, social
- 4.2. Generate and collect data required and carry out sustainability assessment of existing and potential promising production chains (land, feedstock, process, fuel use) based on relevant, transparent and science-based data and tools
- 4.3. Evaluation of performance of institutional and regulatory frameworks in LA to develop alternative ways to ensure governance and compliance with sustainability goals

EU-LAC cooperation on solar photovoltaic energy

Working session 1. Review priority areas-topics, training and recommendations (*Discussions and elaboration of recommendations on solar photovoltaic energy*)

Common specific subareas for EU-LAC cooperation on photovoltaic energy

Five research subareas for potential collaboration in solar photovoltaic energy:

1. Solar resources prediction and monitoring
 - 1.1. Solar radiation components measurement for characterisation of solar concentrations systems.
 - 1.2. Performance evaluation of different PV technologies for different climate conditions.
2. Quality Assurance Procedures
 - 2.1. Codes, standards and regulations.
 - 2.2. Use of certified equipment and certification of equipments, certifications integration, installers' harmonization (equipments and installers).
 - 2.3. Life cycle analysis LCA
3. Stand alone systems
 - 3.1 Micro-grids & hybrid systems
 - 3.2 Demand side management DSM
 - 3.3. Smart grids and intelligent inverters
 - 3.4. Systems Quality assurance of Solar Home Systems. SHS
 - 3.5. Water solar PV pumping and treatment
4. Advanced grid integration & large integration of PV in building areas
 - 4.1. Identification of potential areas for large PV plants deployment and demonstration (airport) or PV building integration
 - 4.2. Integration of PV in Smart Buildings
 - 4.3. PV for electrification of City suburb
 - 4.4. Grid Impact of PV systems
5. Capacity building
 - 5.1. Reinforcement and development of technical competence to ensure the PV systems quality and the evaluation of conformity on the whole chain.
 - 5.2. Capacity and expert training of human resources

EU-LAC cooperation on solar thermal energy

Working session 1. Review priority areas-topics, training and recommendations (*Discussions and elaboration of recommendations on solar thermal energy*)

Common specific subareas for EU-LAC cooperation on solar thermal energy

With the aim of determining the lines of cooperation between European and Latin American institutions and organisms, the subareas have been split in two such as; basic research and demonstration projects.

1. Basic research common interests

- Studies of solar resources in Latin America including social, geographical, economic and industrial issues.
- Metrological standards
- Components and control systems
- Thermal energy storage (phase-change materials, fluid heat transfers, advanced systems, mechanical storage configuration)
- Development of critical concentrator materials (receivers, solar fields)
- Water-use footprint (desalinization, water treatment, toxicity treatments...).
- Solar thermal technologies in buildings.
- Training and scientific interchanges programs EU+LAC (doctoral and senior profiles)

2. Demonstration common activities

- R+D developments addressed to Latin American geographical needs (mirrors, electric systems, heat transmission fluids, receivers, solar fields, among others). Mainly Fresnel in Argentina and Dish Stirling in Mexico
- Direct Solar Steam (quality, purity...)
- Solar concentration thermal generation applied to both heating and cooling and electricity
- Improvement in the environmental and water-use footprint
- Solar Hydrogen production and other solar subproducts
- Hybridization systems (biogas, natural gas, biomass, geothermal)
- Distributed generation (low-medium installed capacity) in isolated areas.

EU-LAC cooperation on wind energy

Working session 1. Review priority areas-topics, training and recommendations (*Discussions and elaboration of recommendations on wind energy*)

Common specific subareas for EU-LAC cooperation on wind energy

Identified research subareas for potential collaboration:

1. **Wind conditions:** three strategic objectives -resource, design condition and forecast-distributed into five research topics:
 - a. Sitting of wind turbine generators in complex terrain and forested areas
 - b. Wakes in and between wind farms
 - c. Extreme wind speeds
 - d. Knowledge of wind behaviour above 100m high
 - e. Short term forecasting
2. **Manufacturing processes and operation of wind turbine generators:** the objectives of cooperation would be the optimization of logistic and production processes, and the attainment of an adapted and optimized Operation & Maintenance strategy.
3. **Small wind turbines:** efforts should be made to improve the related technology, and improve knowledge on resource and sitting, including the influence of buildings on distributed wind power potential.
4. **Wind energy integration:** harmonisation of grid code requirements, its planning, the development of technical and market mechanisms to improve electric system flexibility, and the spread-out of the smart grid concept.
5. **Capacity building and training**
6. **Environment and deployment**

Common research priorities for EU-LAC cooperation on wind energy

3. Wind Resource Assessment: computational tools, sodar and lidar technology
4. Wind Turbines: technology for regional fabrication
5. Removing barriers and promoting deployment and acceptance of wind energy: market obstacles, environmental issues, formation and training

Working session 2: Strategic approaches to Energy Efficiency

- Integrated Road Map
- Lines of cooperation between European and Latin American institutions and organisms and selection/agreement on those on which specific initiatives can be developed

(Please refer to the ALCUENET Non paper on energy efficiency)

7 Annex II Position paper on energy efficiency



POSITION ON ENERGY EFFICIENCY (2013)

NON PAPER

On 25 October 2012, the EU adopted the Directive 2012/27/EU on energy efficiency. This Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20 % headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date. It lays down rules designed to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy, and provides for the establishment of indicative national energy efficiency targets for 2020.

Following the great interest on energy efficiency demonstrated by the European Commission in its last communication about energy technologies and innovationⁱ sent to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions, a new approach towards Energy Efficiency is proposed within the implementation plan of the ALCUE NET.

In order to identify the areas into which the energy efficiency might be approached from the point of view of the European Commission, two strategic approaches have been defined.

The first approach should be based on the future integrated roadmap currently under development in the UE.

The second approach will be based on the EU energy efficiency policy, where the full potential of energy efficiency, focusing on end use consumption is prioritized. It is clear that investing in energy efficiency brings savings to consumers and allows industries to be less dependent on energy prices, reduce their costs and increase their competitiveness.

Following the example of the progress obtained in the SET Plan, the Smart Cities and Communities European Innovation Partnership started as the energy efficiency component of the SET Plan and now integrates at the level of cities and communities real scale applications of energy, transport and ICT innovative solutions.

Cities and Communitiesⁱⁱ are based on buildings, so research and demonstration activities will clearly focus on buildings. Buildings, with nearly 40% of final energy consumption, are a high priority. In this way significant progress would be achieved through the increase of the rate of energy efficient renovations for existing buildings and also making new buildings nearly zero-energy ones. To this purpose research on new building materials, designs for integrating renewables into buildings, and new concepts and business models for energy efficient building renovation, need to be developed and demonstrated. Another important issue in order to increase the energy efficiency in cities is the combination with renewable energy use in

heating and cooling process. Also technologies that enable active consumer participation will allow energy efficiency improvements in networks, making more use of ICT. Finally and related to the transport sector, low emission and electric vehicles are encouraged.

As conclusion research and demonstration activities will focus on buildings, SMEs and industry including energy-related products while uptake measures will address market failures and governance gaps across all sectors.

Then the main energy efficiency focus areas should be:

- Increasing energy efficiency in buildings
- Increasing energy efficiency in combination with renewable energy use in heating and cooling
- Increasing energy efficiency in industry and SMEs
- Increasing energy efficiency of energy-related products
- Innovative financing for energy efficiency
- Citizen Engagement, capacity building, governance and communication for energy efficiency

The work programme should cover the following topics:

A – Increasing energy efficiency in buildings

A1: Innovative solutions for increasing the rate, depth and applicability of building renovation techniques in existing buildings

A2: Addressing the gap in knowledge and skills in the construction sector

A3: Increasing energy performance of existing buildings through process and organisation innovations

B – Increasing energy efficiency in combination with renewable energy use in heating and cooling

B1: Development and demonstration of innovative highly energy efficient heating and cooling solutions

B2: Uptake of effective heating and cooling solutions by removing the existing barriers

C – Increasing energy efficiency in industry and SMEs

C1: Increasing energy efficiency in industry and SMEs through development and demonstration of innovative solutions

C2: Increasing energy efficiency in industry and SMEs through organisational and process innovation

D – Increasing energy efficiency of energy-related products

D1: Development and demonstration of very efficient energy-related products

D2: Driving the market change dynamics towards highly efficient energy-related products.

E: Innovative financing for energy efficiency

E1: Increasing energy efficiency through improving the financeability and risk profile of energy efficiency investments across sectors

E2: Development of credible pipeline of innovative EE investment projects

E3: Development and market roll-out of innovative energy services. (Energy Services

F: Citizen engagement, capacity building, governance and communication for EE

F1: Consumer engagement for energy efficiency

F2: Higher energy efficiency through improved governance.

F3: Capacity building, networking and best practice sharing in sustainable energy

G: Smart Cities and Communities

G1 Smart Cities and Communities solutions integrating energy, transport, ICT sectors

Low energy districts: through the integration and management of:

- Supply of energy with predominant exploitation of local resources (waste heat, renewables, storage).
- Cost-effective retrofitting of buildings without significant disruption for tenants (use of sustainable materials).
- Optimisation of mobility demand.
- Cross-cutting ICT solutions for the design and overall management of energy/transport systems.

Integrated Infrastructures: through the integration of physical infrastructures such as core networks, street scenes, lighting, etc. to create new forms of value through re-use and repurposing. This might also imply exploitation of synergies between requirements for smart grids, broadband infrastructures and in general poly networks.

Sustainable urban mobility: through the integration of energy/ fuelling infrastructure with vehicle fleets powered by alternative energy carriers for public and private transport, including logistics and freight-distribution. Implications on energy management, and in the case of electromobility the impact on the electricity grid, of the deployment of high numbers of vehicles and/or the alternative fuel blends performance should be assessed.

G2 Development of system standards for smart cities and communities solutions

G3 Establishing networks of public procurers in local administrations on smart city solutions

ⁱ http://ec.europa.eu/energy/technology/strategy/doc/comm_2013_0253_en.pdf

ⁱⁱ http://ec.europa.eu/energy/technology/initiatives/doc/2012_4701_smart_cities_en.pdf

8 Acronyms

ALCUE	América Latina y Caribe – Unión Europea
ALCUE NET	Latin America, Caribbean and European Union Network on Research and Innovation
CYTED	Ibero- American Programme for Science, Technology and Development
EC	European Commission
ENLACE	Enhancing Scientific Cooperation between European Union and Latin America.
ERA	European Research Area
ERANet-LAC	Network of the European Union, Latin America and the Caribbean Countries on Joint Innovation and Research Activities
ERA-Nets	European Research Area Networks
ETPs	European Technology Platforms
EU	European Union
EUCARINET	Strengthening the Sustainable Scientific Cooperation between Europe and the Caribbean
EULAC	European Union, Latin America and the Caribbean
FP7	Seventh Framework Programme
INCO-NETs	Platforms bringing together policy makers and stakeholders of an individual targeted region
JIRI	Joint Initiative for Research and Innovation
LA	Latin America
LAC	Latin America and the Caribbean
LATPS	Latin America Technological Platforms
NCPs	National Contact Points for the Seventh Framework Programme
RTD	Research & Technological Development
S&T	Science & Technology
S,T&I	Science, Technology and Innovation
SMEs	Small and Medium Enterprises
SOM	Senior Officials Meetings
STI	Science Technology and Innovation
TP	Technology Platform
WG	Working Groups
WP	Work Programme