journals, Renewable Energy has the highest number of citations per article, of 18.5, and the highest impact factor: 6.274. This shows that publication are made in all kind of journals, specialized in renewable energies or not, and their impact and number of citations is low compared to other RE topics such as Technical analysis of wind, PV, hybrid, and biomass systems, and calculation of CO_2 reduction by RE technologies [10], [11].

Table 3. Journals with a high number of publications about universities and renewable energies in the period 2006-2020

JOURNALS	TP	TC	TC/TP	IF
IEEE Publications	14	23	1,6	NA
International Journal of Green Energy	4	30	7,5	NA
Renewable Energy	4	74	18,5	6,274
Sustainability (Switzerland)	4	5	1,3	2,576
Energy Procedia	3	19	6,3	0,545

TP: Total publications; TC: Total citations; IF: Impact Factor

The articles with the highest number of citations are shown in Table 4. The article with the higher number of citations (42) was Renewable energy and its university level education in Turkey (Kecebas and Yumurtaci 2011), published in 2011, by researchers from Afyon Kocatepe University. This a comprehensive compilation of renewable energies implementation in Turkey, presenting the challenges and ways to improve its teaching at the university level.

Table 4. Papers with the highest citation numbers

Title	Journal	Authors	Year	TC	AU	TR
Renewable energy and its university level education in Turkey	Energy education science and technology Part B-social and educational studies	Mehmet Yumurtaci, Ali Kecebas	2011	42	2	ND
The levels of awareness about the renewable energy sources of university students in Turkey	Renewable Energy	Yelda Karatepe, Seçil Varbak Nes¸, Ali Keçebas¸, Mehmet Yumurtacı	2012	34	4	31
Optimal design and financial feasibility of a university campus microgrid considering renewable energy incentives	Applied Energy	Munir Husein, Il-Yop Chung	2018	32	2	75
An investigation on renewable energy education at the university level in Turkey	Renewable Energy	Abdurrahman Karabulut, Engin Gedik, Ali Keçebas, Mehmet Ali Alkan	2011	32	4	21
Experimental based energy performance analysis and life cycle assessment for solar absorption cooling system at University of Californian, Merced	Energy and Buildings	Yin Hanga, Ming Qub, Roland Winstonc, Lun Jiangc, Bennett Widyolar, Heather Poiry	2014	29	6	87
Modelling and performance analysis of a stand-alone hybrid solar PV/Fuel Cell/Diesel Generator power system for university building	Energy	Chaouki Ghenai, Maamar Bettayeb	2019	27	2	33
Energy and economic analysis of solar photovoltaic plants located at the	International journal of heat and technology	D. Mazzeo, N. Matera, P. Bevilacqua and N. Arcuri	2015	18	4	23

University of Calabria						
Internet of things (IOT) for smart solar energy: A case study of the smart farm at Maejo University	Conference: 2017 International Conference on Control, Automation and Information Sciences (ICCAIS)	Oran Chieochan, Anukit Saokaew, Ekkarat Boonchieng	2017	17	3	9
Renewable energy and environmental awareness and opinions: A survey of university students in Canada, Romania, and Turkey	International Journal of green Energy	Eralp ÖzilV, Ismet Ugursal, Ugur Akbulut, Alper Ozpinar	2008	15	4	9
Design of large scale prosuming in Universities: The solar energy vision of the TUC campus	Energy and Buildings	Dimitrios Hasapis, Nikolaos Savvakis, Theocharis Tsoutsos, Konstantinos Kalaitzakis, Spyridon Psychis, Nikolaos P. Nikolaidis	2017	15	4	38
A renewable energy solution for Highfield Campus of University of Southampton	Renewable and Sustainable Energy Reviews	Naci Kalkan, Kutalmis Bercin, Ozcel Cangul, Mario Gonzales Morales, Magdoom Mohammed Kulam Mohamed Saleem, Izzat Marji, Angeliki Metaxa, Eleni Tsigkogianni	2011	15	8	41
Converting campus waste into renewable energy - A case study for the University of Cincinnati	Waste Management	Qingshi Tu, Chao Zhu, Drew C. McAvoy	2015	14	3	41
Optimization of solar energy system for the electric vehicle at university campus in Dhaka, Bangladesh	Energies	Nusrat Chowdhury, Chowdhury Akram Hossain, Michela Longo, and Wahiba Yaïci	2018	14	4	25
An integrated tool to monitor renewable energy flows and optimize the recharge of a fleet of plug-in electric vehicles in the campus of the University of Salento: Preliminary results	Proceedings of the 19th World Congress The International Federation of Automatic Control Cape Town, South Africa.	T. Donateo, P.M. Congedo, M. Malvoni, F. Ingrosso, D. Laforgia, F. Ciancarelli	2014	13	6	15
Comparison of solar power output forecasting performance of the Total Sky Imager and the University of California, San Diego Sky Imager	Energy Procedia	S. M. I. Gohari, B. Urquhart, H. Yang, B. Kurtz, D. Nguyen, C. W. Chow, M. Ghonima, J. Kleissl	2014	12	8	9
An integrated photovoltaic/wind/biomass and hybrid energy storage systems towards 100% renewable energy microgrids in university campuses	Sustainable Energy Technologies and Assessments	Al-Ghussain, L Ahmad, A D Abubaker, A M Mohamed, M A	2021	12	3	54

The second article in citations number (32), was titled: Optimal design and financial feasibility of a university campus microgrid considering renewable energy incentives, [12], presents a model named

Micro grid Decision Support Tool (MDSTool), for technical, economic and financial feasibility simulation of micro grids. The authors used it to design a microgrid for the Seoul National University, in South Korea, analyzing technical feasibility, and the different types of incentives like those related to investment, taxes, and grid ancillary services. Another three articles between the most cited ones are related to the students at institutions in Turkey, Canada and Romania. One of them is about the levels of awareness around renewable energy sources [13], and describes the results of surveys made by the university on students in three Turkish universities. Authors for this article found that one of the main reasons for higher awareness in Turkish students about renewable energies was the education level of their parents, and the school institution they attended. Another publication about renewable energy education at the university level [14], studies how renewable energies subjects are taught in Turkey. This study concluded there is a lack of expertise in the subject in Turkey due mainly to the lack of an undergraduate program about this subject, which is taught only at master and doctorate levels. The last one [15] analyses a survey made to university students in Canada, Romania, and Turkey, and explores the awareness of renewable energies for students at several universities in the three countries.

Five more of the articles in table 4 are about analysis and design of RE systems for universities. Modelling and performance analysis of a stand-alone hybrid solar PV/Fuel Cell/Diesel Generator power system for university building [16], presents the analysis of a hybrid off grid system for the University of Sharjah administration building in Arab Emirates. An analysis of PV System for the University of Calabria in Italy [17], presents the amount of energy generated by flat plate photovoltaic systems, using weather data generated by a station located at the university. Hasapis et al, [18] present the technical and economic feasibility of a PV system for the University of Creta, in Greece. Kalkal et al, [19] present the design for Off-grid PV and Heat Pump systems for energy generation in the Highfields Campus at the University of Southampton in England. The researchers concluded that PV system did not reduce greenhouse emissions to a great extent, but it did reduce costs considerably. Tu et al [20], explored the conversion of wastes at the university of Cincinnati into energy. They analyzed transformation of cooking oil to biodiesel, paper to biomass pellets and food residues to biogas. All the options were economically and technically viable, and generated environmental benefits, mainly in reduction of waste generation and greenhouse gases.

Two articles in table 4, between the most cited were about electric mobility. Chowdhury et al [21], presented the design of a PV system for the electric vehicle at university campus in Dhaka, Bangladesh with the energy generated, supplying the charging station for electric vehicles, and using the rest of the energy for the national grid. The other one by [22] explores the possibility of connecting the charging station for electric car at University of Salento, in Italy, by means of a tool that predicts power generated by PV roofs, and consumption form buildings. Benefits in terms of GHG reductions were analyzed

The next three were about Life Cycle Analysis, Internet of Things applied to RE Systems, and comparison of solar power output by sky imaging. The study made by [23] for universities in California and Indiana in the USA, shows the energy experiments made at a solar system for solar cooling, and its analysis making different configurations and analyzing their performance, economic and environmental benefits for solar powered absorption cooling system at the University of California, Merced. The study made by [24] used IOT (Internet of Things) technology to develop a solar cell system for a green farm, in order to show in real time the current charging and voltage for a smart farm at Maejo University in Thailand. Gohari et al [25] used two different Sky Imagers in two locations: a PV plant at Nevada, USA (TSI), and at the University of California (USI) in San Diego. Authors compared their performance efficiency in short term power output forecasting, concluding that the USI is better than TSI in short time forecasting, due to their technical characteristics.

All these publications, and specially the most cited ones have in common that they come from USA and Europe, mainly, and area about technical feasibility and GHG emission reductions of RE systems at university buildings for electricity or calefaction mainly. The kind of RE utilized is varied including photovoltaic, solar thermal, wind, biomass, and hybrid systems.

3.5 Global trends

Global trends in research, investment, design, and teaching headed in relation to universities and renewable energy, include the technical and/or economic analysis of renewable energy projects at the universities (36%). The inclusion in the curricula of renewable courses or research is the next topic in importance (23%). Other common subjects are laboratories, locations, and research projects about renewable energies (13%); analysis of RE existing facilities (8%); solar radiation or wind potential analysis (7%); and analysis of knowledge or awareness about benefits of renewable energies in the university's population or surrounding communities (7%). At the end is the analysis of energy efficiency, reduction in GHG, zero carbon buildings, etc. (5%), and life cycle analysis of renewable energies implementation. Fig.3 shows the comparative participation of these topics in the analyzed documents:

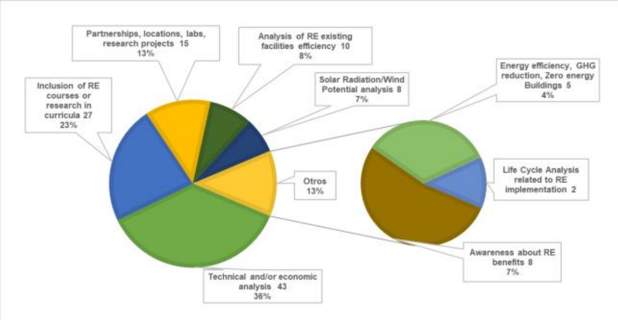

Fig.3 Topics about renewable energies and universities (2005- Oct 2021)

From all the energy types, photovoltaic has 81 publications, all the type of renewable energies had 69 publications, 25 about hybrid processes (solar/wind); 11 about thermal solar, 7 about biogas, followed by other like biomass, geothermal hybrid(various), and hydrogen with 4, 2, 2, and 1 publication respectively. This is according to the general trend at the global level in which the main RE type used has been and continues being hydroelectric power, but it is diminishing. Biofuel's consumption is the next one in importance, but its consumption has been steadying the last 10 years, but solar energy consumption started a continuous growing demand from 2014, while geothermal has been constant. All the other types of RE energy have a low production related to these ones. Publication reflects the growing interest mainly in solar energy generation [1].

3.7 Use of renewable energies at the buildings and campuses

The main subject covered in all of the studies was that of designing and analyzing technical, economic and financial feasibility to provide RE to the universities, mainly by means of grid connected or off grid PV and hybrid (PV/Wind) systems [12], [18], [26]–[28]. Regarding this, [29] made a review about campus microgrids around the world, concluding that PV is the main type of energy used at universities, followed by hybrid systems. Some papers were found about different RE types: Pabna University of Science & Technology in Bangladesh researchers presented an electric energy generation system based in solar energy and biogas obtained using human and kitchen waste[30]. Alhamid et al studied the use of thermal energy as input for a cooling system at the University of Indonesia [31], and Ruiz et al studied the feasibility to implement a biomass gasification system for energy generation at a small scale for an USA university campus [32]. Almost all the authors concluded that besides advantages due to the reduction of energy costs for universities operating these systems, they are used as live laboratories to conduct research, and for teaching purposes. Several studies are about analysis of solar and wind potential for universities campuses were projects are to be implemented [25], [33]–[36].

Another important research goal for universities is the analysis and improvement of existing RE systems. Power generation and consumption forecasting, optimization of existing facilities, and connecting new systems as those for charging electric vehicles are the main explored topics [21], [22], [24]. Besides, utilization of RE to power electric cars at university campuses was studied by [21] in Bangladesh, and at the university of Salento, Italy, [22] for optimizing an existing system for recharge of plug in electric vehicles.

The possibility of the surrounding community to provide RE solutions for energy demands at the university, generating an adequate design including producers, consumers, and storage systems in energy-hubs ~~such~~ was analyzed in the system proposed for a university in Portugal [37], [38]. Some projects consider the inclusion of the university in renewable energy generation based in government programs such as that proposed for Dalhousie University, by [39].

In general, the big number of studies are concentrated in the analysis of feasibility for PV systems, and hybrid PV/Wind systems implementation. These publications are made all around the world, showing the growing interest to achieve sustainable universities while academic community gets benefits from having these systems I their campuses to teach and research.

3.8 Inclusion of Renewable Energy courses in the curricula

Some experiences about the inclusion of renewable energy courses have been published regarding graduate and postgraduate programs in ER, and in other disciplines such as engineering and social sciences. Studies analyze the integration of these courses in the curricula, and the way they contribute to the enhancement of RE implementation in their countries. One of them at the Federal university of Parana, Brazil proposed a teaching and research line for a postgraduate program having an interdisciplinary perspective be-tween environmental and social sciences [40]. At Jordan universities and University of Washington researchers presented the results of implementing diverse renewable energies courses for engineering and electronic engineering, respectively [41], [42], [43].

The need to include in engineering and non-engineering curricula, courses about energy efficiency using innovative methods, laboratory and problem-based learning methodology was a common need shown in the papers [45] [46]. Many studies focused also on RE laboratories. For example Pastor et al, proposed and analyzed the implementation of renewable energies remote laboratories in Jordan; the University of the Basque Country in Eibar, used a laboratory-wind pump for problem-based learning, and presented it as a successful case for creative and cooperative thinking [41], [42]. Bachmann et al, presented a successful initiative mixing an Alternative Fuel Vehicle lab with problem-based learning at the Madison University, making the students and surrounding community to get interested in growing up the use of alternative fuels for transportation [46]. Drexel University, in Georgia, USA developed another successful case of problem based and project-based learning at engineering technology program [47]. The strategy had a strong component of renewable energies courses, and incentives to relate science and engineering with real life problem solution for the students. University in Campinas, Brazil presented its Living Lab, integrating facilities about teaching and research to develop subjects such as energy efficiency, distributed generation and electric mobility [48].

Although there were a big number of papers dealing with the inclusion if RE courses in curricula, few of them analyze in a comprehensive and global way the number and kind of graduate and postgraduate programs and their effectivity to fulfill the RE industry needs. Only one of them analyzed 100 renewable energy courses in the USA by means of surveys, finding that the manufacturing aspects in RE were not emphasized in the majority of them [44].

3.6 Laboratories and research

Main topics about laboratories and research were:

- Implementation of live laboratories dedicated to renewable energies research and teaching
- Solar and wind potential for universities campuses.
- Economic and technical analyses of conventional configurations in PV and hybrid PV/wind systems
- Technical analyses to including other types of renewable energies
- Improvement of stablished RE systems already implemented at the universities
- Programs, incentives and partnerships with local institutions and communities.

Living labs are initiatives between universities, public authorities, and citizens to create, evaluate, invest in technologies, prototypes, services, markets in real-life contexts. This kind of collaborative work stimulates innovation, and involvement of many stake-holders in order to obtain better results in research [49]. However, in this review, few papers talk about this. A good example of live laboratories applied to research and teaching was that of University of North Dakota, which has power electronic devices, wind turbines, PEM fuel cells and electrolyzes to generate hydrogen [50]. The experience showed that the implementation of these labs was an excellent strategy that motivates students towards RE study and research. University of Campinas in Brazil have a live laboratory that includes three different types of RE, and several systems for data collecting, systems control, energy efficiency measurements and implementation [48].

Maneechot et al [51] implemented a RE park with a power supply from solar energy, gas, and wind at Kamphaeng Phet Rajabhat University in Thailand. In this park, they used Smart Meter Technology, information, demand side management, and communication technology, to manage energy in the park in an efficient way.

Another centralized initiative is the Energy research Frontier Center, a part of a strategy of the US department of Energy for researching in RE. This center is based in solar energy, especially solar fuels [52]. One of the main goals is research in solar energy storage by artificial photosynthesis. One of the most important research projects is that about cells for solar driven splitting of CO_2 into CO and O_2. The cells work by means of dye-sensitized photo electrosynthesis. In the future, this technology is expected to generate methane for solar power generation. The main research interests include the scale up of these systems for real conditions operation [49]. [53].

Although energy efficacies and some types of RE generation can be implemented a small scale, and universities are an ideal space for their implementation because of the multiple benefits they can bring for environment and for the knowledge pf a big university community of these technologies by learning by doing, few experiences were found in this review.

3.9 Zero-energy buildings and GHG emission reductions

Only seven articles had as a main topic, life cycle analysis of RE systems: GHG reduction analysis or energy efficiency analysis. Gouveia et al, [54] made a life-cycle assessment of an RE system for a Near Zero Building prototype using grid connected PV and solar thermal system for Porto climatic conditions. Conclusion was made that environmental impacts from energy are reduced when it is generated on site and batteries for PV systems are recycled when their life cycle is over. Kyoto University made a heating system using biomass pellets in a building and analyzed the GHG reduction from that system. As result, a reduction of 50,8% in fossil energy consumption, and 52.8% in CO_2 emissions was achieved [55]. However, the cost of the pellets was an important issue implying that careful planning and management. Aksenova, studied institutional hindrances to implement renewable energy projects at Northern Arizona University, that is an American College & University Presidents' Climate Commitment signatory, having as a goal to become carbon neutral for 2020 [56]. The study found that some of the most important barriers to achieve these goals were the direction politics and priorities of the university administration. They are usually financial and administrative more than related to environmental sustainability, that is the purpose of the goal. Bohm(2018) presented the design and performance as a zero-energy prototype house, showing the predicted and measured energy generation and consume, resulting in the lowest energy consumption of the houses presented in the solar decathlon in 2015 at Buffalo University at New York [57]. Energy consumption at 36 buildings at Renewable Energy Institute at UNAM, in Mexico was studied by means of measurements and surveys. Researchers also proposed non-financial strategies to achieve energy efficiency and saving [58]. University of Szeged, the greenest university of Hungary, presented a project oriented to achieve a higher environmental conscious behavior, and introduce a higher use of renewable energies [59]. Dicle University at Turkey [60] compared the performance of two PV panels, one contaminated and another continuously cleaned, in the energy generation at the campus.

This kind of energy efficiency analyses, net zero buildings and operations, and GHG emission reductions, being at the top of research level, are being made by few universities in the world, those publicly committed with sustainability, green campuses, or GHG emission reductions.

3.10 Partnerships, institutes, awareness and alliances for RE implementation

Partnerships and joint efforts to achieve renewable energies goals are very important in terms of technical assistance, education, financing, and supporting for project planning and implementation. A very interesting partnership presented in the publications analyzed, was made by the Northern Arizona University, the Sustainable Solutions Group and the Center for American Indian Economic development, who developed a Tribal Center for Clean Energy. This center provides assistance, financing, and workforce development for RE implementation, plus developing research initiatives to accelerate RE implementation for tribal communities at the United States [61]. Other interesting initiatives are those in which living labs are implemented by the union of different institutions besides the universities. In them, RE systems are built for university buildings consumption and serve as a place to make research, teaching and workforce development in a cooperative scheme in which all the parts have a benefit. A case is that made by the University of Campinas, and the National Electric Energy Agency in Brazil [48]. In their inform, re-searchers present the detailed characteristics of the living lab, including Smart grid, energy efficiency retrofit in real time, electric mobility, and Internet of Things Data management Systems for education. This live lab is pioneer in Latin America. Another example implemented in Brazil, is the model park for RE of the Center for Alternative Energies, with the University of Northern Rio de Janeiro [62].

Some few studies deal with the awareness at university and surrounding communities about renewable energies. A study made at Nigerian universities, asked personnel working at libraries about their knowledge of the way that RE could be included to generate energy for information and communication technologies at the libraries. This study concluded that awareness between library personnel about this subject is high mainly due to that those libraries use solar energy as its power source [63]. At universities in Northern Cyprus, a study was made in which student form different countries were inter-viewed to measure their knowledge level about RE. Conclusions were that students from countries with high fossil fuels resources have less knowledge about RE, and strategies were proposed to enhance the awareness towards RE in these countries [64]. Students of engineering and economics/business in Romania, Canada and Turkey were interviewed in another study, finding that they did not have big differences about their knowledge and awareness with regards to RE, and that the small differences encountered were related to cultural and socioeconomic issues [15].
All these studies focused on very specific groups and their results are not conclusive about this subject, or their results cannot be extrapolated to other cases. However, methodologies and preliminary results can be of interest as a base for future studies made in a more comprehensive and broader view.

4 Discussion

Universities are perhaps the biggest driver of science and technology in the world. In them, the new theories and techniques that have promoted the progress of humanity are elaborated. Recently, the massification of knowledge in the so-called "knowledge society" forces universities to face a challenge they never had ever before, since knowledge is no longer exclusive to these education centers [65]. The curriculum is an example of this: while most engineering programs include topics such as basic sciences, ethics and those of each discipline, it is difficult to find the inclusion of sustainability within the curricula, and the inclusion of courses on energy alternatives is an exception, more than the rule [43]. Although sustainability should be within the universities and its substantive part, it seems that reality is far from that purpose. It appears they are lagging with respect to companies or industries in applying the knowledge that is undoubtedly within their “walls”. However, there are interesting cases in which universities lead the holistic view about sustainability in their campuses and activities. Drexel University, in Georgia, USA, is a great example of inclusion of sustainability and the general and specific study of energy alternatives [47], that can be taken and even im-proved by many more institutions to global level. If it is achieved, it will not only help in a multidisciplinary generation of solutions to global warming and fossil fuels depletion, but also will encourage the knowledge spread, by the use and benefit of alternative energies in real life being used as living laboratories for teaching and research.

It is evident that sustainability is having a growing interest worldwide. This can be seen in the huge amount of environmentally friendly technological developments, patents, advances and improvements in new technologies and products. And the vast majority are gestated in universities, but their application in their campuses is minimal Because of this, the few cases presented here are an example and something that the directives of the universities should put as a goal from now. Among these examples, we find that the Living Labs are remarkable, which apart from generating energy alternatives, encourages social actors to get involved with the development of sustainable technologies, public entities and people with the leadership of universities [49]. These examples should not be the exception; they should be the rule, so that universities promote, among other things, the use of alternative energies and likewise break the common scheme of having knowledge locked up. In the campuses it can be seen that photovoltaic energy and hybrid systems are the leaders in energy systems implemented [26], [27].
The advantages of using these systems within the campuses are important, as they reduce long-term costs that can be reinvested in research, and besides, investing in them encourages continuous improvement of the installed technology. This is because in many cases, as observed in this study, these facilities are used for research and students' education, that is, they become laboratories for the practice of the academic community [21], [24]. In this sense, universities should think about making investments in an articulated manner between academic and administrative levels, so that it does not remain as an investment in the infrastructure and buildings, but rather that it is projected as an integrative investment to serve as a laboratory for

many purposes. Although photovoltaic systems are the most common within campuses, each location has its characteristics that can be exploited and analyzed within the spectrum of sustainable energy alternatives. Therefore, it is important that universities generate local research projects within their campuses that generate data on the possibilities they must use wind energy and biomass among others. With this research we intend to emphasize the debt that universities generally have with society, since as is evident during the development of this paper, there are few examples of sustainable campuses regarding energy use. And additionally, there is an apparent lack of interest in investing in systems that promote education, awareness and use and appropriation of alternative energies.

5 Conclusion

A systematic review about universities and renewable energies was made. Data bases used were Scopus, Web of Science and Google Scholar, and using the software parsif.al, a total of 197 documents were analyzed. Total number of publications grew year by year and citations per article were 4.5 in average. The country with highest publications number was USA with a total of documents. Arizona State University and Drexel University were the institutions with the most publications. IEEE Publications, Inter-national Journal of Green Energy and Renewable Energy were the journals with highest number of publications. The article: “Renewable energy and its university level education in Turkey” published by the journal Energy education science and technology Part B-social and educational studies, written by Mehmet Yumurtaci and Ali Kecebas in 2011 had 42 citations, the highest number of all the studies included. The main energy type in the documents was photovoltaic, followed by RE in general, hybrid systems (PV/wind), and wind. Technical and/or economic analysis of renewable projects at the universities; inclusion in the curricula of renewable courses or research and laboratories, locations and research projects about renewable energies; and solar radiation or wind potential analysis were the main subjects. As an alternative and interesting subject Zero-energy buildings and GHG emission reductions were analyzed for RE implementation projects. One of the best initiatives found were those of living labs, in which universities implement RE systems in order to teach and research at the same time that energy efficiency grows and GHG emissions diminish. Few research papers about new developments were found. One of those was using IOT (Internet of Tings) researched real time information of the charging and consumption on a solar farm; solar cells used for splitting of CO_2 into CO and O_2, and different configurations to PV/wind such as biomass, biogas, and hydrogen. In general, research relating universities and RE were limited to the technical and economic feasibility of systems; description of courses and living labs for RE, showing that the RE inclusion in the universities nowadays is still in its early development. South American countries were almost absent, except the University of Campinas in Brazil, and the University of Northern Rio de Janeiro, showing that in this continent this subject is not widely being explored yet.

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