



Sustainable tourism: Saving water and energy in the hotel sector of Pachuca City Mexico

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Abstract

The hotel sector and tourism activity already occupy the first places in some countries as a source of income, however, the impact of the tourism sector is little studied, only the use of water and energy can be raised considerably in a place where it is developed this activity. In Mexico, policies are being applied to promote sustainable tourism, which, even though they are optional and not obligatory, are demonstrating that it can be economically profitable for tourism companies. In the case of Pachuca, a small city in Mexico, it is taken as an example of how the impact of tourism activity can be reduced and its costs reduced by 131,438.91 annual dollars for saving water and energy. However, something that is also observed is that companies to apply environmental measures require that other companies adopt them and that they be effective.

Keywords: Tourism; Sustainability; Water; Energy; Consumption

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1. Introduction

The tourist activity in Mexico represents 8.6 percent of GDP, since it is one of the favorite destinations for tourists; The World Tourism Organization said that in 2016 it ranked number 9 in the list of countries that received the largest number of foreign visitors. On the other hand, direct foreign investment in tourism in Mexico during the last year reached 1,620 million dollars, which represents an important source of income and employment (INEGI, 2017). However, this growth in tourism also represents environmental costs and pressures on natural resources.

In Mexico, total costs due to depletion and degradation to the environment reached 4.6% of GDP in 2016. In this sense, we should propose new forms of sustainable use. Production and consumption in the tourism sector represents not only conserving natural resources, but also making economic resources more efficient. Through this article, our objective is to know the impact of the saving of water and energy resources in the hotel sector analyzing a small city of 500 thousand habitants through the implementation of sustainable technologies in hotels. The estimate method used to identify possible water and energy savings is based on a research of case studies and successful experiences, as well as recognize the technology and the proportions of reduction according to it, on the other hand, also presents a theoretical framework based on economics and environmental education as strategies for reducing consumption. The sources of information used have been taken from Datatur, the official source of statistics related to the tourism, as well as some other secondary sources such as INEGI, PROFEPA; SECTUR, and others.

2. Sustainable tourism

Today there is confusion about the concept of sustainable tourism with that of ecotourism, since multiple authors refer to this type of tourism only as one where people come to be in contact with the environment, but sustainable tourism has to see with all kinds of tourism and the impact it has on the environment. In this article we will take the definition of the World Tourism Organization (UNWTO, 2016), according to which, "Sustainable tourism" is defined as "one that takes full account of the current and future economic, social and environmental implications that imply meet the needs of visitors, the industry, the environment and the host communities."

Sustainable tourism seeks to conserve the means that allow it to develop its activity, including the environment, and must consider an inclusive social participation to democratize decisions and assume the responsibilities involved in the conservation of the natural and cultural heritage of a locality or region (Roldán, 2017).

With this, it is clear that sustainable tourism, is the tourism sector or companies in the tourism sector by applying measures and actions aimed at the conservation of natural resources, cultural heritage, landscape, communities, among others, with the purpose that tourists manage to maintain a satisfactory stay without leaving a negative environmental footprint on the territory.

Regarding the tourist ecological footprint, there is a wide literature that talks about the carrying capacity of a tourist destination, sustainable construction of hotels, among others (WWF, 2002; Fernandez, 2010; Butler, 2006).

For Fernandez (2010), the sustainability of tourism (considering them as companies) is not a priority or a topic of their agenda; it is in the first place the profitability and in dealing with customers. On the other hand, Martínez Alier and Schlüpmann (1992) in their work "The ecology and the economy", affirm that an economic system in which sustainability is included, is not only better for the environment but even for the economy is more profitable, this through adopting measures that save energy, reduce pollution and make efficient the use of natural resources.

From this point of view we share this hypothesis that the business tourism sector is not concerned about natural resources and the environment, until it is economically affected, and that its yields begin to decrease due to the negative actions that were carried out in the environment (Velazquez and Lara, 2017; Labra, 2015). However, some changes to sustainability in the hotel tourism sector have occurred from the implementation of technologies that allow saving water and reducing energy consumption, which translates as a reduction in fixed costs.

3. Tourist policy

For this we analyze case studies and the framework of tourism policy in Mexico, which focuses on two actions: 1) Classification and hotel certification, through various categories and distinctions which focus on the quality of services and their social and environmental responsibility; 2) Sustainable tourism management, with the purpose of seeking sustainable development in natural spaces (SECTUR, 2017).

These environmental actions are a framework to direct and promote changes in national tourism activity, however, they can be delineated according to the characteristics of each region and by the different levels of government, including at the local -municipal level- which is where they make all the policies effective. It is important to point out that within the certifications there are different types, which range from certifications for transport, for hotels, restaurants, beaches, touristic spaces, and etcetera. Likewise, the level of quality also varies, from cleaning, waste management, water, customer service, efficiency and modernization, good practices, among others.

On the other hand, as we mentioned these guidelines are outlined according to each region considered by local authorities and business associations, such is the case of the Mayan Riviera where a plan was incorporated to reduce water consumption for lodging centers, going from 18 to 9 liters per second, that is, reduced by half. For the aforementioned, no complex additional system was required; an objective was simply achieved to reduce water consumption through the reduction of water pressure¹. Where it got the most impact was in the showers of the rooms, these are the ones that issue more water in the hotels, because the consumption of the water resource depends directly on the client (Buisán, 2006).

¹ Another recommendation in the efficient use of water is the substitution of taps for those that require less pressure, this can mean a saving of 50% of the water, guaranteeing an efficient use Viñuales (2000)

The operation program results affirmed that in average half of the water consumption by sprinklers in the hotels was saved, in addition that the 130 centers of lodging that affiliated to the program, had an economic benefit in the expense of this resource , confirming in this way what was said by Martínez Alier and Schlüpmann (1992), where being sustainable is being profitable because resources are saved, with this it is verified that sustainability does not have to be separated from the economy, but on the contrary, they are more associated than it seems.

Another premise that we observe is that most companies tend to imitate the behavior of other companies that have proven the feasibility of sustainability. That is, there is great skepticism on the part of the owners and managers of the hotels to introduce changes, even when these are favorable economically and environmentally. However, when one or several hotels begin to implement these actions, the others also decide to do so. This is the case of environmental policies in Mexico, which are not coercive but voluntary and that damage caused to the environment is not penalized with proportional punishments (Castillo et al., 2007).

In this sense we take into account the Comprehensive Management Plan for the use of water in hotels, which is a tool to achieve the goal of saving water, in addition to linking it with the Energy Management Plan, it is more effective, its content is focuses on the following 5 aspects:

- 1- Implementation of efficient technologies (points of consumption, pumping, control)
- 2- Include the water facilities in the Hotel Maintenance Plan
- 3- Study facilities optimization projects
- 4- Study projects for the reuse of gray water generated in the hotel
- 5- Sensitize employees and customers about the efficient use of wáter

In the case of Pachuca, the Government of the State of Hidalgo, in coordination with the Federal Government, encouraged the creation of financing programs, which can be used through the BANCOMEXT Tourism Sector Financing Program, which is a financial support to complement the sources of tourism investment project resources, with the purpose of promoting regional development, direct and indirect employment and the linkage to suppliers. This program is oriented to projects that are considered as recreational tourism (beach and colonial cities), business tourism, health tourism and retirement communities. It is mainly aimed at companies or groups developing hotels, marinas, golf courses, timeshares and companies that provide tourist services. The program supports with financing projects for the construction, equipment, extensions, renovations, working capital and sales of tourist projects developed in Mexico.

4. Analysis

The hotels offer in Pachuca is varied and versatile, with five-star hotels, without reaching the category of grand tourism. Hotels in Pachuca have a business focus, this can be seen in the hotel chains with their versions for the attention of this type of tourism, such as Camino Real, Holyday Inn Express, Fiesta Inn, Mission Express Pachuca, among others.

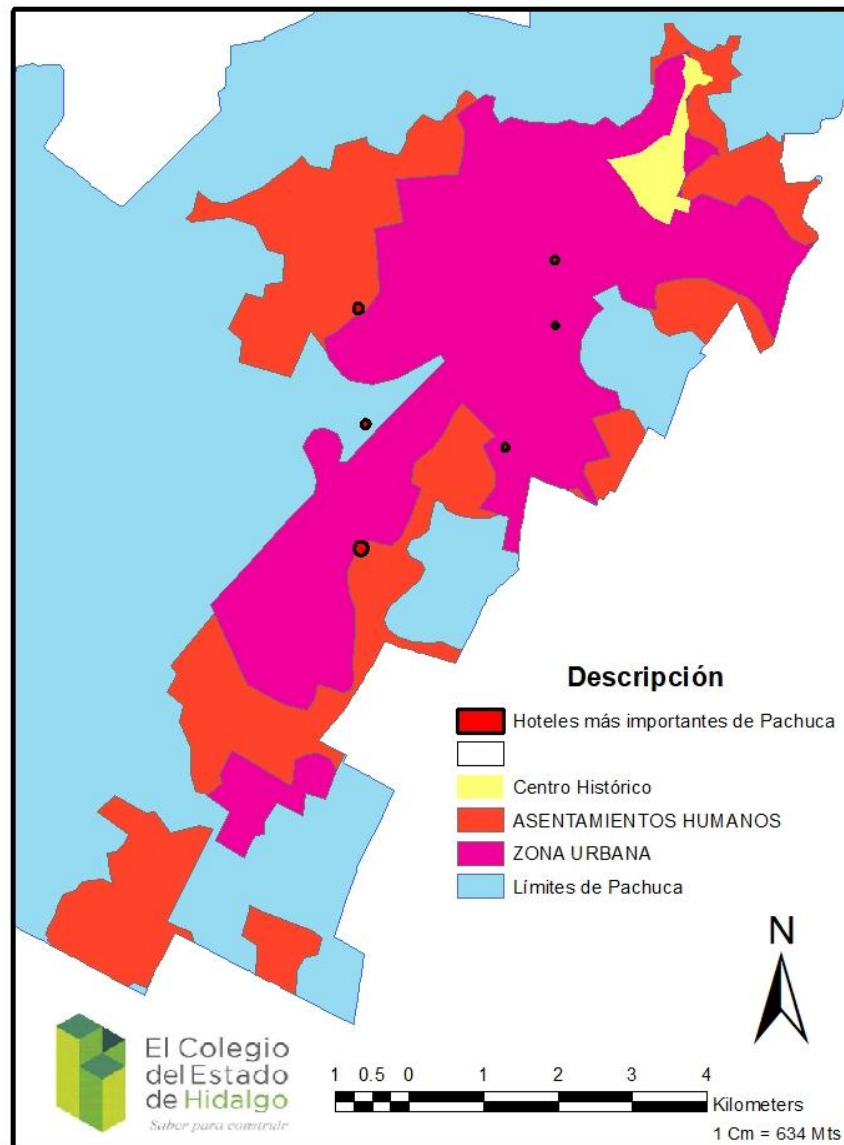


Figure 1. Growth of the city of Pachuca de Soto and location of its most important hotels (Source: Elaboration with data from CONABIO and Google Maps using ArcGIS software - ArcMap)

The average occupancy of rooms nationwide during 2016 was 60.3% (DATATUR, 2016), in the case of Pachuca not being a preferred tourist destination, is reflected in the report of the National Statistical Information System of the Tourism Sector in Mexico (DATATUR, 2016) an average hotel occupancy in Pachuca of 35%, however the hotel industry continues to grow as in 2014, 956 rooms were already counted, according to Tourism Competitiveness Agenda, Pachuca 2013-2018 (SECTUR, 2014), which indicates that the capacity of current lodging is of 1,148 rooms in hotels, and a total of 1,471 total rooms (see Table 1) adding the rooms of motels, guest houses and others (more current figures from non-governmental sources account for the end of 2016 1,529 rooms).

Table 1. Accommodation Capacity in Pachuca

Type of establishment	Number	Rooms
Hoteles	20	1,148
Moteles	9	283
Guesthouse	1	20
Others	4	20
Total	34	1,471

Source: (SECTUR, 2014), *Tourism Competitiveness Agenda, Pachuca 2013-2018*.

With regard to sustainable development, there is the Distinctive "S" that is granted as a recognition of good sustainable practices, in the development of tourism projects and the commitment of tourism companies operating in Mexico under the global criteria of Sustainability granted and promoted by the Federal Tourism Secretariat.

In addition, there is the Tourist Environmental Quality Certificate, this certificate is also issued by the Federal Government through the Secretary of Tourism (SECTUR), based on regular environmental audits where the processes of a tourism company are monitored considering pollution and environmental risks that these they can produce, in addition to implementing good environmentally friendly operation and engineering practices.

Of the 20 hotels registered in the city of Pachuca (see Table 2), only one has the certification, the Fiesta Inn Pachuca hotel belonging to the Posadas de Latinoamérica group, which was relocated to Plaza Gran Pachuca and the property evicted became the Hotel Gamma Pachuca as of August 2016, also belonging to the group Posadas de Latinoamérica, however, this transition must be re-accredited by SECTUR to keep the aforementioned certification.

Table 2. Hotels with certification of Tourist Environmental Quality

State	Number
AGUASCALIENTES	2
BAJA CALIFORNIA	1
BAJA CALIFORNIA SUR	2
CHIAPAS	1
CHIHUAHUA	1
COAHUILA	1
COLIMA	1
DISTRITO FEDERAL	3
GUERRERO	3

Table 2. Cont.

State	Number
HIDALGO / Pachuca*	1
JALISCO	1
MÉXICO	5
MICHOACÁN	2
MORELOS	1
NAYARIT	2
NUEVO LEÓN	5
OAXACA	2
PUEBLA	1
QUERÉTARO	2
QUINTANA ROO	8
SINALOA	4
SONORA	1
TABASCO	2
VERACRUZ	3
YUCATÁN	2
ZACATECAS	3

Source: Procuraduría Federal de Protección al Ambiente (2012)

In accordance with the goals established in Tourism Competitiveness Agenda, Pachuca 2013-2018 and in conjunction with the 2012-2016 Municipal Development Program, as of 2015, Pachuca's registered hotels have implemented sustainable practices that are environmentally friendly, through an imposed adaptation that It is intended to be voluntary, reaching almost three quarters of all providers of tourism services, implicit in this is the gradual updating of equipment, maintenance in the facilities, the separation of organic and inorganic waste and training of staff, the municipality being the driver and supervisor of compliance with these standards and standards.

5. Results

5.1. Energy savings

With regard to energy, based on the National Commission for the Efficient Use of Energy, of the total cost of operations in hotels, a fifth represents energy costs, and is increased by the type of lighting, machinery, and own use of the rooms, being in the five strongest bimonthly expenses in a hotel, which estimates for 2015 an average consumption per room of 11.36 kWh per year. Calculating the total consumption of the hotels in Pachuca, where the number of rooms is multiplied by the average consumption per room, we find that the hotel industry in Pachuca is 13,041.28 kWh per year, a figure that can be reduced to 6,530.64 kWh per year with the correct application of sustainable practices such as the change of incandescent bulbs and saving

bulbs now by led bulbs that optimize the light energy avoiding wasting heat energy. According to a study by Pyme Energy Check Up, 23.6% of energy consumption in tourist accommodation is also used to provide sanitary hot water; 18.7% for refrigeration and 18.3% for heating.

5.2. Saving water

Regarding the average use of water, in the hotels of Pachuca consumption is 62,853 m³ per year, this calculation is based on the 1,148 rooms spending an average of 150 liters, the result is divided among the 20 hotels in the city; Another way to measure it is for each square meter an average of 15 liters is spent, under a standard of 25 square meters per room (SECTUR, 2014), this does not refer to the exclusive consumption of the client, but covers the maintenance and cleaning of the rooms. This amount can be reduced to 54,243 liters per year with water-saving technologies or even just reducing water pressure.

Table 3. Comparative table of energy and water saving in the hotel sector in the City of Pachuca

	Energy	Water
Consumption without saving technology	13,041.28 kWh	62,853 m ³ /year
Consumption with saving technology	5,216.51 kWh	31,426.5 m ³ /year
Savings in physical quantities	7,824.77 kWh	31,426.5 m ³ /year
Economic savings	71,367.37 dollars	60,071.00 dollars

Source: Calculations with average information on water and energy costs of the commercial sector CAASIM (2018) and CFE (2018)

6. Conclusions

For more than thirty years, the City Council of Pachuca, with support from the State Government, has promoted tourism in order to boost its socioeconomic development, sustainable through a planned modernization of the city. For this to happen it is essential to promote sustainable tourism as well as to create hotel infrastructure fully planned and this is reflected in the following points:

- The alteration of the ecosystems and natural resources, visualized in the future, will inevitably lead to the creation of problems (Boullon, 2006), that is why they are not included as priority, or preferential, not escaping from this tourism, and in this sense the hotel industry.
- The development and growth of these economic units of the hotel industry is the responsibility of the owners of the same, but must not detract from the obligation of the State to be a participant so that the conditions are as similar as possible, in addition to exercising supervision over the rules and goals that are established in the economic and sustainable development.
- An incentive that helps the city of Pachuca to project itself as a sustainable city, it is necessary to transform the infrastructure, care for the environment and the culture of society with

responsibility, this will promote the development of the city. In the hotel industry, more specialized studies are required so that this can converge with this development.

- The main indicators in this industry are the use of Water and Energy, which must be addressed and monitored to achieve the objectives of the Competitiveness Agendas of the Tourist Destinations of Mexico 2013-2018.
- Hotels in Pachuca must adopt environmentally friendly attitudes and measures, having a real long-term benefit in saving consumption, contributing in turn to the economic development of the city.
- The hotel industry can generate competitive advantages in its economic development, as a consequence of the correct application of sustainable measures in the buildings and in the culture of its personnel.
- Tourism is an alternative to the delayed arrival of industries in cities, which generally have a marked participation of the tertiary sector, due to the lack of full employment in economic matters.
- The tourism policy in constant transformation must not ignore the intrinsic and superior values (Azqueta et al., 2007) that must meet a value that goes beyond a local context since they seek a global benefit, for it the organism with such authority for it, is the National Institute of Anthropology and History (INAH), worrying about the conservation of the buildings that conserve history, or public spaces for the society.

As a final reflection we reiterate that we should not behave like heirs who waste their fortune, on the contrary we have the duty to conserve the resources that have been lent to us by future generations.

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