



**Universitat de les
Illes Balears**

Facultat de Turisme

Memòria del Treball de Fi de Grau

ENVIRONMENTAL CONCERNS OF THE TOURISTS AND RESIDENTS OF MALLORCA

Amelia María Vidal Canals

Grau de Turisme

Any acadèmic 2015-2020

DNI de l'alumne: 45611825L

Treball tutelat per Tomás Lejarraga
Departament d'Economia de l'Empresa

Paraules clau del treball:
Tourism, Sustainability, Mallorca

INDEX

1. PROJECT ABSTRACT.....	6
2. INTRODUCTION	7
3. OBJECTIVES	7
4. METHODOLOGY.....	8
5. RESULTS - SURVEY ANALYSIS	
5.1. GENERAL INFORMATION	8-9
5.2. SUSTAINABILITY KNOWLEDGE.....	10
5.3. TRANSPORT SECTOR	11-18
5.4. RESOURCES	18-24
5.5. RECYCLING	25-30
5.6. ECOTAX	31-33
5.7. IMPROVEMENT PROPOSALS.....	34-38
6. CONCLUSIONS.....	39
7. BIBLIOGRAPHY.....	40-46

TABLES, GRAPHS AND PHOTOS INDEX

Graph 1: Tourists' age range.....	10
Graph 2: Residents' age range.....	10
Graph 3: Subjective opinion of tourists on sustainability.....	11
Graph 4: Subjective opinion of residents on sustainability.....	11
Graph 5: How tourists usually travel	12
Graph 6: How residents usually travel.....	12
Graph 7: What residents think about public transport.....	13
Graph 8: The importance tourists give to public transport in vacation.....	13
Graph 9: Which mean of transport tourists think has the less CO2.....	16
Graph 10: Which mean of transport residents think has the less CO2.....	16
Graph 11: Carbon dioxide emissions from passenger transport. EEA, 2016....	16
Graph 12: GHG emissions (Equivalent tons of CO2). Informe OTLE, 2015.....	17
Graph 13: The residents' opinion in front of the airport expansion.....	17
Graph 14: The importance tourists give to find a non-overcrowded airport on vacation.....	18
Graph 15: The importance tourists give to find car rentals on vacation.....	18

Graph 16: How many travelers do tourists think that came to Mallorca on July 2019.....	18
Graph 17: Tourists' opinion of months with less water scarcity in Mallorca.....	21
Graph 18: Residents' opinion of months with less water scarcity in Mallorca.....	21
Graph 19: Tourists' opinion of which cities have the less water resources.....	21
Graph 20: Residents' opinion of which cities have the less water resources.....	22
Graph 21: The importance tourists give to find golf courses on vacation.....	23
Graph 22: The importance residents give to find golf courses on vacation.....	23
Graph 23: Number of hours tourists use the air conditioning on summer.....	23
Graph 24: Number of hours residents use the air conditioning on summer.....	23
Graph 25: Tourists' worry to find non-overcrowded beaches on vacation.....	24
Graph 26: Residents' worry to find non-overcrowded beaches on vacation.....	24
Graph 27: Residents' opinion regarding whether the beaches and forests in Mallorca are clean.....	24
Graph 28: Recycling rate of tourists.....	26
Graph 29: Recycling rate of residents in Mallorca.....	26
Graph 30: Development of all packaging waste generated, recovered and recycled, EU, from 2007 to 2017.....	26
Graph 31: Tourists' opinion about single-use plastics.....	28
Graph 32: Residents' opinion about single-use plastics.....	28
Graph 33: Tourists' knowledge about non-recyclable materials.....	29

Graph 34: Residents' knowledge about non-recyclable materials.....	29
Graph 35: Residents' opinion about Deposit Return Schemes systems.....	30
Graph 36: Tourists' knowledge about Ecotax.....	33
Graph 37: Residents' knowledge about Ecotax.....	33
Graph 38: Tourists' opinion about Ecotax.....	34
Graph 39: Residents' opinion about Ecotax.....	34

TABLES

Table 1: Rank of numbers of travelers in Spanish airports in July 2019.....	18
Table 2: Evolution of the water reserves of the Balearic Islands from march 2019 to march 2020.....	20
Table 3: Groups of establishments.....	33

IMAGES

Image 1: Mallorcan golf courses.....	22
Image 2: Zero waste grocery store.....	31
Image 3: Fruits and vegetables in bulk from Es Mercat de L'Olivar.....	31

1. PROJECT ABSTRACT

ABSTRACT

Environmental awareness is a topical issue, both the acts of governments and those of individuals have their footprint on the environment. The investigation of this project tries to find out the level of environmental concerns that our visitors have and also that of our residents have. The results obtained by means of tables and graphs allow us to locate where each behavior fails, and from there to find a solution to each problem. Topics range from CO₂ emissions in transport, the scarcest resources on the island and how to generate less CO₂ in our day by day; also, how the correct recycling works worldwide and how to reduce waste on a daily basis; the importance of the Ecotax of the Balearic Islands and finally, an analysis of what the respondents' proposals for improvement are, since each grain of sand counts for a change for the better. It will be analyzed how the responses of the profile of a tourist change in front of the responses of a resident, and the pros and cons of each one. Now it is the time to make big changes to fight against climate change and achieve a sustainable tourism in the long term.

RESUMEN

La conciencia ambiental es un problema de actualidad, tanto los actos de los gobiernos como los de las personas individuales tienen su huella en el medio ambiente. La investigación de este proyecto intenta averiguar el nivel de preocupaciones ambientales que tienen nuestros visitantes y también el de nuestros residentes. Los resultados obtenidos mediante tablas y gráficos permiten localizar donde falla cada comportamiento, y a partir de aquí buscar una solución a cada problema. Los temas abarcan desde las emisiones de CO₂ en el transporte, los recursos más escasos de la isla y de cómo generar menos CO₂ en nuestro día a día; también cómo funciona el correcto reciclaje a escala mundial y cómo reducir residuos en el día a día; la importancia de la Ecotasa de las Islas Baleares y, por último, un análisis de cuáles son las propuestas de mejora de los encuestados, ya que cada grano de arena cuenta para un cambio a mejor. Se analizará cómo varían las respuestas del perfil de un turista al de un residente, y los pros y contras de cada uno. Es la hora de hacer grandes cambios para luchar contra el cambio climático y conseguir un turismo sostenible a largo plazo.

2. INTRODUCTION

This final degree Project has the aim to analyze the existing differences between the environmental concerns of tourists and residents of Mallorca.

Tourism has increased each year in the Balearic Islands (Aena, 2019), and as a result of this mass tourism (Yoeli-Rimmer, 2017) the "tourism phobia" has increased (Preocupación por el aumento de turismofobia en Palma, 2017).

Ideally, both tourists visiting Mallorca, and their own residents should be aware of their environmental impact. It is important that tourists treat the island as if it was their home, and they take a positive message of the experience.

To analyze their environmental concerns, I have created two surveys with 20 questions each. The first survey is aimed to tourists and I collected 30 responses. The other is aimed at residents and I collected 60 responses. For each question there is a correct (or more correct) answer. I will analyze and compare the answers to learn tourists' and residents' environmental concerns and examine how they differ.

3. OBJECTIVES

This final degree Project has the aim to analyze the existing differences between the environmental concerns of tourists and residents of Mallorca. The main objective is to know their knowledge and inquire what they would want to change in the city of Palma in order to make it more sustainable.

The results from this study can help the public administration to develop campaigns to inform tourists and residents about their environmental impact, and to inform them about the islands' environmental problems and scarce resources.

The idea of this project is original. I hope that other researchers will follow up this work, examine the question with more and better data, and address the limitations that I encountered.

4. METHODOLOGY

METHODOLOGY

I created two surveys and distributed them, using Google Forms. The original idea was to create only one and distribute it only among tourists. Due to the health alert declared by the World Health Organization and the lockdown implemented by the Spanish Government in the months of March and April, 2020, tourism was banned in Spain and the opportunities for collecting responses vanished. Therefore, I decided to refocus my research question and compare the responses I already had collected from tourists with responses from local residents. To do so I created a second survey aimed at residents. The survey to residents was distributed through social media and WhatsApp.

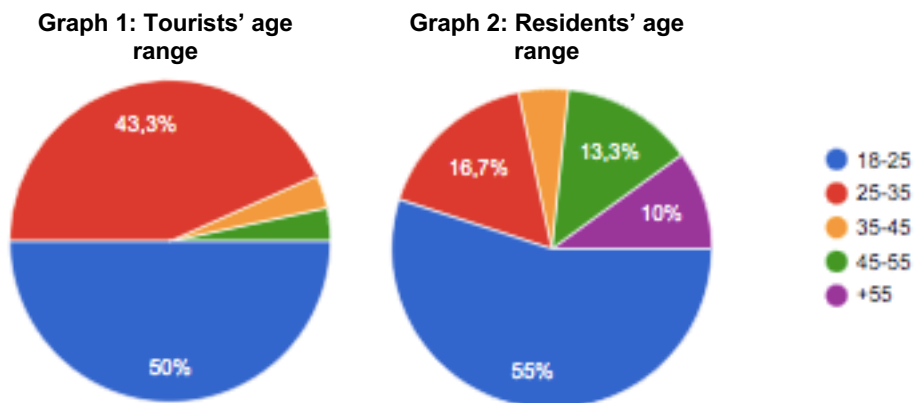
5. RESULT - SURVEY ANALYSIS

5.1. GENERAL INFORMATION

The original goal was to gather approximately 120 answers from tourists in touristic areas in the island: Andratx, Palmanova, Magaluf, Ciudad Jardín, El Arenal, Valldemossa, Palma Airport, Center of Palma. Unfortunately, due to the health alert, I was only able to gather 30 responses, from tourists located at the center of Palma and Palmanova, from 1st to 14th March. Responses by local residents amount to 60.

The first question for tourists was regarding their nationalities. From the first questionnaire to tourists I got plenty of nationalities, being German persons a 23,3% of the answers. I also found many Spanish tourists from different cities (Salamanca, Galicia, Cataluña, Cádiz, Valencia...) a little amount of other nationalities in Europe, like Italy or Russia; and a little amount from South America (Cuba and Honduras).

From the second questionnaire to residents, I had an 81,7% of residents from Mallorca, a 18,4% of people that live in Mallorca but came from another city, and only a 1,7% from Menorca.



The age range from tourists was 50% from 18 to 25 years, 43,3% from 25 to 35 years, 3,3% from 35 to 45 years and 3,3% from 45 to 55 years. I encountered problems to ask adults, who refused to answer my questions.

The age range from residents has been bigger, due to the fact that nobody refused to answer. I got 55% of residents between 18 and 25 years; 16,7% of residents between 25 and 35 years; 5% of residents between 35 and 45 years; 13,3% of residents between 45 and 55 years and a 10% of residents of more than 55 years.

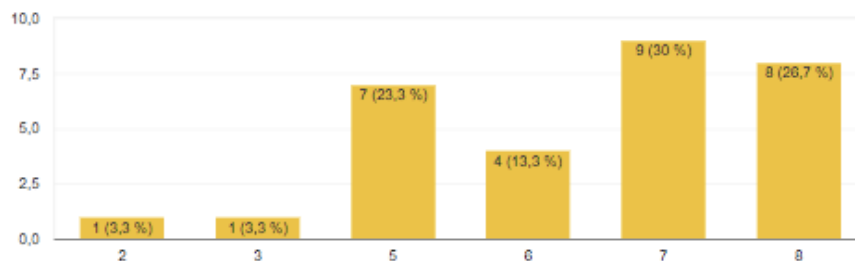
RESULTS

Results are discussed by area of knowledge: transport, resources, ecotax, recycling, proposals...

5.2. SUSTAINABILITY KNOWLEDGE

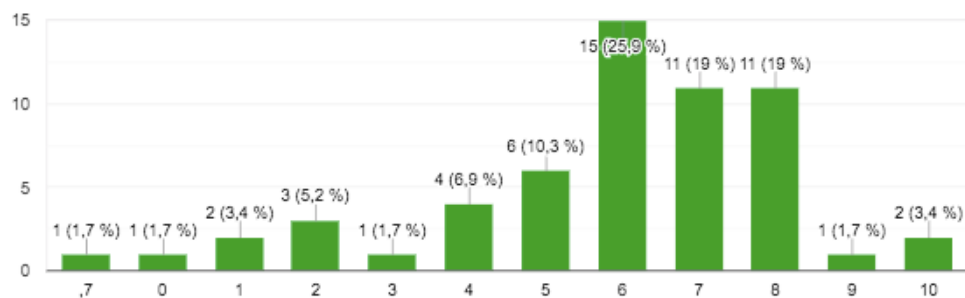
One of the general questions I asked tourists and residents was how much they thought they know about sustainability. Considering a 10 that they are experts, and a 1 that they know nothing. I just wanted to know their honest opinion about their actual knowledge before analyzing the following questions.

Graph 3: Subjective opinion of tourists on sustainability



Graph 3 shows the opinion of tourists about their own sustainability knowledge. Most of the answers are between 5 and 8, what can be considered a medium-high knowledge, but no one considers themselves experts.

Graph 4: Subjective opinion of residents on sustainability



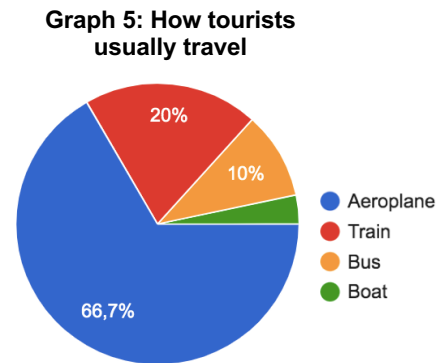
On the other side, residents' answers are way more varied. Although we have more or less most of the answers between a 5 and 8, we have people who consider they know nothing about sustainability, and others who consider themselves experts. Now it's difficult to compare the answers, because these are subjective opinions. We will see the real knowledge through the analysis of the following questions.

5.3. TRANSPORT SECTOR

I started asking about transports, as I found that the transport sector represents the 40% of the total amount of CO2 emissions in Spain (MAFEX, 2017).

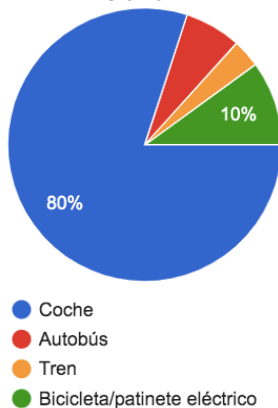
I asked tourists: "How do you usually travel?" and I obtained these answers:

Blue area represents airplane, 66,7%, majority of answers. We already know that most of the tourists came to Mallorca in airplane, but this means that they also travel in airplane most of the time. Only 20% travels by train, and 10% in bus.



Next, I asked residents how they moved inside the island, assuming that they use the airplane to to travel abroad.

Graph 6: How residents usually travel inside the island



The residents make around 2.6 million journeys daily, of which 55% are made by private car, according to data from the diagnosis of the Balearic Government's Mobility Master Plan (GOIB, 2017).

Inside the island, 80% of the interviewed residents use their car to move around the island. Only a 20% uses another transport like bus, train or bike. The situation it's worse than it seems: *"Balearic Islands is close to have one car per habitant with one of the highest averages in Spain: 850 vehicles per 1,000 inhabitants. A figure that is well above the state average set at 675 vehicles per 1,000 inhabitants"* (Fueris, 2017).

We can not really compare both answers due to the fact that Mallorca is an island, and we cannot use train as much as, for example, Europeans can; but we see that tourists and residents usually choose the most pollutant means of transport.

How affect this numbers of cars to the environment? In January, the Organization of Consumers and Users alerted that the city of Palma (along with other Spanish cities), exceeds the levels of suspended particle contamination recommended by the World Health Organization. (OCU, 2020).

In the General Directorate of Traffic website, we can see the numbers of vehicle fleet circulating on each city. In Balearic Islands, we have more or less 1.030.451 vehicles circulating. Approximately 722.905 are cars, and 142.291 motorcycles. Let's take a look into the "vehicle per inhabitant" column: the Balearics have 883 cars per 1.000 habitants, which is far more than other cities, and the highest in the rank. (DGT, 2018). We see that there is an excessive car use in the islands.

In summer, these numbers are even worse, due to car rentals. The Balearic government tried to put limits to car rentals some years ago, but finally dismissed this action. (Pinya, 2018).

What could we do in order to minimize the impact of these vehicles on green house emissions? One way could be promoting electric cars or "Carsharing"

"Carsharing" in Palma, under the brand *Muyon*. This company offers car renting in the center of Palma with electric cars. They say that "this model contributes to decongesting public spaces occupied by private vehicles, which tend to remain parked 22h a day on average. A shared car can replace more than 15 owned cars, promoting a friendlier, more comfortable and sustainable city" (Galán, 2019).

Electric cars will have discounts in taxes and special prices in public car parks or the blue zone in the center. "The idea is to limit penalties and incentivize the use of clean vehicles with a series of advantages for drivers". (Fueris, 2017).

Public transport could be a more sustainable alternative. I asked residents: 'what do you think about the public transport of the island?'

38,5% of the residents said that they use their cars, because public transport is very limited. The 55% said, they would use the public transport if it gets better.

In the previous paragraphs, we mentioned that more or less 2,6 million journeys are made daily by the residents in private car, but one of the Mobility Plan goals is to increase from 10% to 15% the use of public transport, and from 2% to 9% the bicycle use. (GOIB, 2017).

Each year the number of car registrations on the Balearic Islands keeps arising. The number of car registrations in 2018 in the Balearics was 68.656, compared to 2017, the number was 63.717, and in 2016, the number was 56.057. (DGT, 2016,2017,2018).

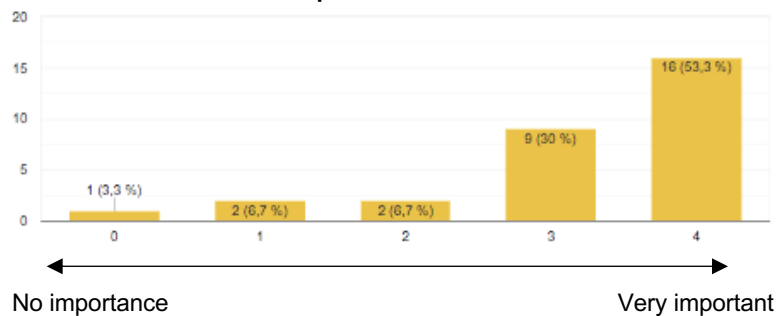
With these answers, we can assume that residents prefer taking their car and do not mind on the CO2 emissions that they can generate. They think that it's easier, and comfortable, but also, this can lead us think that if public transport was more attractive, they would reduce their car use.

On the other side, we also need to know the opinion of the tourists. I asked them to rate from 0 to 100 the importance they give to find public transport on vacation. The majority rated as very important to find public transport in their vacation.

Graph. 7: What residents think about public transport in Mallorca



Graph 8: the importance tourists give to find public transport in vacation



As the responses show, tourists and residents think public transport is useful and important. The problem is that residents are more used to take car instead of searching how to move in public transport, because they do not consider public transport efficient. On the other side, tourists find public transport very important, and it should be attractive and accessible for them, so that car rental use can be reduced.

Some companies in Mallorca have started making changes in order to improve their services. All of this contributes to a reduction of private transport, that can be very attractive also for residents, and not only tourists.

One example is TIB, who made a total renewal of the fleet with 220 new buses. Of the total fleet, 217 are vehicles with sustainable propulsion, which represents 99%, and only 3 buses run on diesel. Of these, 197 are Compressed Natural Gas (90%), 9 are 100% electric, 9 are Hybrid-electric and 2 vehicles are CNG Hybrids. Moreover, more frequency and stable hours have been applied, and more direct itineraries to gain competitiveness with respect to the private vehicle, which translates into time savings. (¿Qué mejoras notarán los usuarios del transporte público de Mallorca?, 2019)

TIB has also recently made a sustainable mobility project in natural spaces and beaches in Mallorca, financed by the sustainable tourism tax.

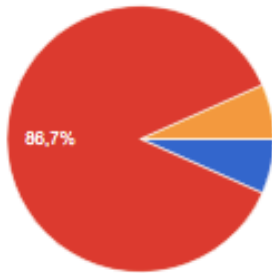
The main areas of action are the Serra de Tramuntana, the Formentor peninsula, the Son Real estate, Cala Varques and the Mondragó Natural Park. The planned works include the construction of new stops, road marking actions on the network of roads and highways, and the creation of car parks outside protected areas. (TIB, 2016)

The measures of the Mobility Plan will reduce the weight of the car by 20% in the set of displacements. (GOIB, 2018).

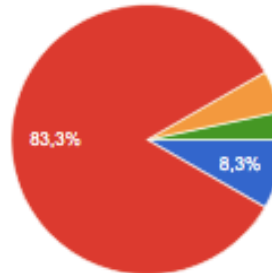
Another example is EMT, for the center of Palma, who has recently applied some sustainable changes: they increased the bus fleet and made it more sustainable because more than 50% of the buses run on natural gas, which is less pollutant and more silent. (EMT, 2020).

Regarding CO2 emissions, I created a simulated scenario, and I asked tourists and residents: "which of these means of transport has less CO2 emissions for one person travelling from Barcelona to Madrid?"

Graph 9: Which mean of transport tourists think has the less CO2



Graph 10: Which mean of transport residents think has the less CO2



- Bus
- Train
- Airplane
- Car

Here I obtained very similar answers. More or less, 87% of tourists, and 83% of residents guessed that train can be the best option to that simulated scenario. We can say that they have a very similar idea of which are the less contaminant means of transport.

Let's analyze why train is the less contaminant mean of transport. One way to know it is measuring its environmental impact analyzing the CO2 emissions per passenger and kilometer traveled. (Agencia Europea de Medio Ambiente, 2016).

As we see in the graph from the website of the "Agencia Europea de Medio Ambiente" the medium that causes the most carbon dioxide emissions is the airplane. Assuming, for example, that it has 88 people on board, it would turn out that it emits 285 grams of CO2 per passenger and kilometer. Then would come trucks, cars, motorcycles, buses, and then, the train/railway. The train would be the most correct answer to the question I created, since it would emit only 14 grams of carbon dioxide and would be the one that would transport more people: 156. (2016).

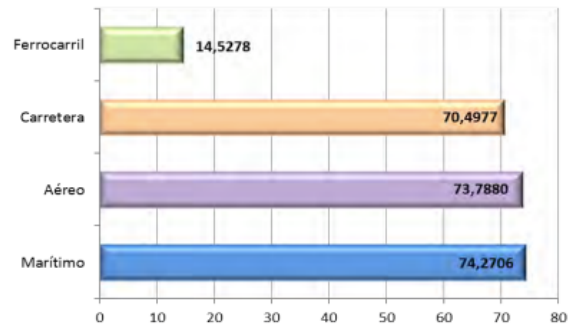
Graph 11: Carbon dioxide emissions from passenger transport. AEMA, 2016.



On the *Informe OTLE* in 2015 we see another graphic comparison:

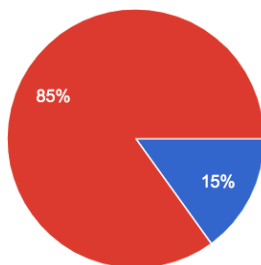
“All modes except the railway have a proportion of Greenhouse Gas (GHG) emissions per similar unit of energy consumed, slightly more than 70 equivalent tons CO₂ per TJ consumed. Rail transport, by employing mostly as energy source electricity, it has a level of direct GHG emissions that is almost five times lower than the rest of the modes⁶³. That is, the energy consumed by the railroad is the one that produces the least direct GHG emissions” (OTLE, 2016).

Graph 12: GHG Emissions (Equivalent tons of CO₂) Informe OTLE 2015



I asked residents what they think about the ongoing project to expand Palma airport. There have been many controversies among this project.

Graph 13: The residents' opinion in front of the airport expansion



- Estoy a favor
- Estoy en contra

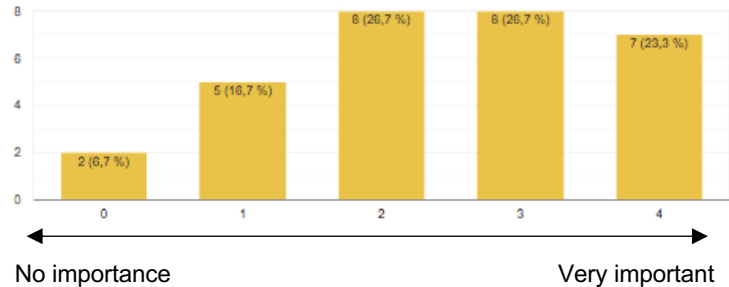
Activists denounced that AENA is hiding the true dimension of the expansion, since instead of referring to the increase in airport capacity, which aims at 4 million more passengers until 2025, to exceed 34 million (the maximum capacity set by DORA, the Airport Regulation Document) appeals that without the Son Sant Joan works it will be saturated. (Última Hora, 2020).

Most of the answers are against this expansion. Residents see already too much tourism, we saw it some years ago, when they wrote on the buildings phrases like: “tourists go home” (Pintadas contra los turistas en Mallorca, 2016).

I asked tourists to rate from 0 to 100 the importance they give to find a non-overcrowded airport on vacation.

The answers show that more or less half of tourists are worried about an overcrowded airport.

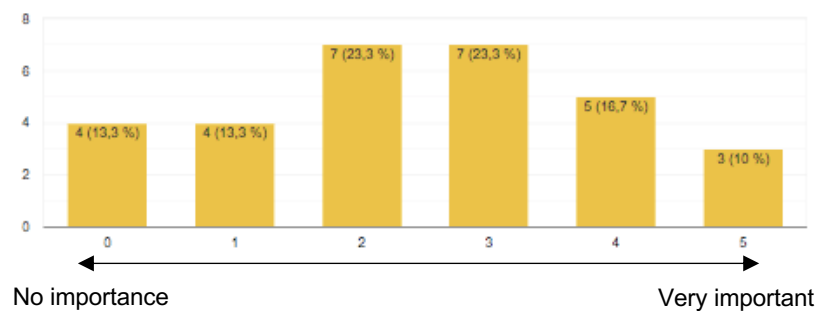
Graph 14: The importance tourists give to find a non-overcrowded airport on vacation



Graph 15: The importance tourists give to find car rentals on vacation

I also asked them to rate from 0 to 100 the importance they give to find car rentals on vacation.

There are many different answers, but it seems to be medium importance for tourists.

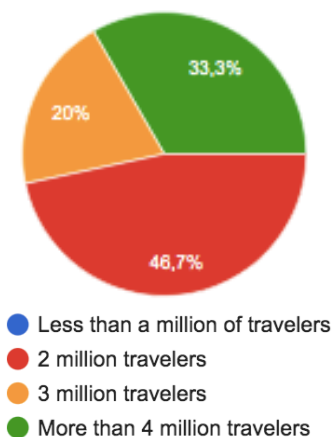


Another question regarding transport to tourists was: "How many travelers do you think arrived at Palma Airport last July 2019?"

46,7% guessed that the correct answer is 2 million travelers, 33,3% guessed it's more than 4 million travelers, and 20% guessed that it's 3 million travelers. No one guessed it was less than a million travelers.

The correct option is more than 4 million passengers. The exact number is 4.207.218 (Aena, 2019). Not so many figured out the huge number of travelers visiting our island in one month, only the 33,3% of them.

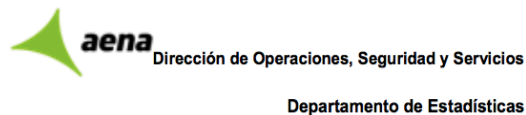
Graph 16: How many travelers think tourists came to Mallorca on July 2019. AENA



I asked them this because last summer the government drop a campaign to raise awareness of water scarcity. It consisted on place during May a "special transparent baggage" on the airport collection belts with the amount of water collected in the Balearic Islands in summer compared to the liters collected from the country of each participating flight. (Última Hora, 2019). This may cause a reflection on tourists' water waste in the island.

As we see in table 1, Palma Airport has been the 3rd most visited airport in Spain for July 2019. In the statistics of AENA we can see that the number of annual passengers increase every year. (AENA, 2019).

Table 1: Rank of number of travelers in Spanish airports in July 2019. AENA



Aeropuertos	PASAJEROS	
	Total	% Inc 2019 /s 2018
ADOLFO SUÁREZ MADRID-BARAJAS	5.944.835	7,5%
BARCELONA-EL PRAT J.T.	5.360.997	3,8%
PALMA DE MALLORCA	4.207.218	-0,6%
MALAGA-COSTA DEL SOL	2.228.460	3,8%

5.4 RESOURCES

Water is one of the scarcest resources in the summer on the island, due to the inexistence of rivers and low water reservoirs. The lowest level of water it is usually in summer months. In April the water reserves of the Balearics were more or less the 67%, which is a "normal level". (GOIB, 2020)

In 2015, the Council of Ministers approved the Hydrological Plan of the Balearic Islands; which has now been replaced by an updated version, corresponding to the 2015-2021 cycle, from the entry into force of Royal Decree 51/2019. (GOIB, 2019). This plan embraces many programs related with water, rural development, climate change, biodiversity, forests, coasts, tourism, transport, science...

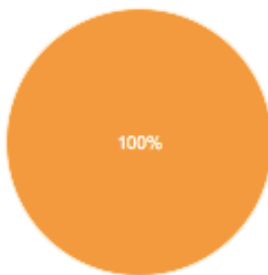
In GOIB (Govern de les Illes Balears) website, we can see the evolution of the quantity of groundwater in the Island of Mallorca. At "Portal del Agua" of the Balearic Islands we observe that the months of really low % of water of 2019 were June, July, August September and October. (GOIB, 2020).

**Table 2: Evolution of the water reserves of the Balearic Islands – March 2019 - March 2020
GOIB, 2020**

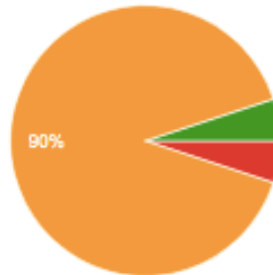
Illa / Massa d'Aigua Subterrània (MAS)	Codi	mar-19	abr-19	mai-19	jun-19	jul-19	ago-19	sep-19	oct-19	nov-19	des-19	gen-20	feb-20	mar-20
MAS Pollença (UH Almadrava)	1805M1	32%	31%	31%	31%	31%	30%	49%	31%	51%	60%	73%	32%	31%
MAS Bunyola (UH S'Estremera)	1808M1	73%	71%	69%	67%	65%	60%	63%	62%	69%	78%	85%	87%	86%
MAS Penya Flor (UH Alaró)	1809M2	71%	69%	62%	52%	50%	41%	40%	37%	39%	60%	63%	81%	76%
MAS Caimari (UH Ufanes)	1810M1	46%	82%	56%	52%	50%	46%	76%	94%	100%	100%	100%	72%	72%
MAS Sa Pobla (UH Pla d'Inca-Sa Pobla)	1811M1	51%	44%	38%	35%	28%	22%	18%	24%	29%	41%	53%	67%	57%
MAS Llubí (UH Pla d'Inca-Sa Pobla)	1811M2	65%	61%	60%	55%	48%	40%	41%	42%	52%	54%	60%	65%	63%
MAS Sa Vileta (UH Na Burguesa)	1813M1	70%	64%	60%	56%	59%	64%	64%	69%	76%	77%	75%	72%	72%
MAS Xorrigo (UH Pla de Palma)	1814M1	71%	71%	64%	63%	63%	61%	60%	60%	64%	69%	69%	69%	70%
MAS Sant Jordi (UH Pla de Palma)	1814M2	26%	24%	23%	21%	17%	25%	21%	26%	65%	67%	49%	50%	47%
MAS Pont d'Inca (UH Pla de Palma)	1814M3	45%	41%	37%	34%	31%	26%	27%	28%	41%	47%	48%	52%	51%
MAS Son Reus (UH Pla de Palma)	1814M4	64%	64%	63%	61%	59%	58%	57%	56%	59%	63%	65%	67%	68%
MAS Son Real (UH Sa Marineta de Petra)	1816M2	48%	49%	48%	44%	44%	44%	45%	47%	50%	50%	39%	41%	41%
MAS Son Servera (UH Artà)	1817M2	94%	78%	77%	86%	83%	80%	77%	75%	75%	75%	77%	82%	84%
MAS Sant Llorenç (UH Artà)	1817M3	87%	83%	81%	79%	76%	71%	67%	63%	61%	61%	60%	75%	77%
MAS Son Talent (UH Manacor)	1818M1	73%	71%	68%	65%	59%	54%	56%	58%	61%	63%	75%	76%	75%
MAS Sant Salvador (UH Felanitx)	1819M1	14%	15%	13%	7%	4%	5%	5%	29%	40%	56%	44%	42%	4%
MAS Cala d'Or (UH Marina de Llevant)	1820M2	47%	49%	49%	48%	46%	44%	43%	42%	43%	19%	49%	54%	55%
MAS Pla de Campos (UH Lluçmajor-Campos)	1821M2	58%	52%	59%	59%	59%	64%	67%	64%	80%	84%	73%	61%	66%
MALLORCA Conjunt (mitjana ponderada)		64%	60%	58%	55%	51%	50%	50%	51%	64%	69%	69%	71%	69%

This graph helps explaining the following question that I made to tourists and residents: "which would you say are the months with more water scarcity in Mallorca?".

Graph 17: Tourists' opinion of months with less water scarcity in Mallorca



Graph 18: Residents' opinion of months with less water scarcity in Mallorca



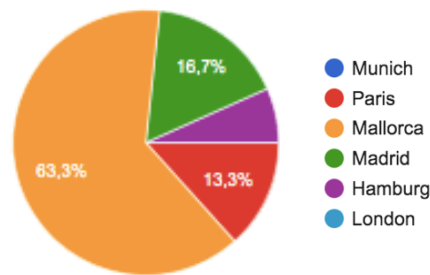
- January-February-March
- April-May-June
- July-August-September
- October-November-December

100% of the tourists answered between July-August-September as the ones with more water scarcity, but there has been a 10% of residents that answered wrong.

It seems that tourists know better the water scarcity months in Mallorca, which should be the other way around. It's important that our residents are aware of the water scarcity in the island.

I also asked tourists and residents to compare water scarcity between cities. I asked tourists “which of the following geographical regions has the less amount of water resources per capita?” to choose between Munich, Paris, Mallorca, Madrid, Hamburg and London.

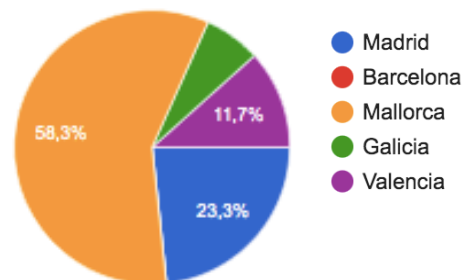
Graph 19: Tourists’ opinion of which cities have less water resources



The 63,3% asked correctly that the city with more water scarcity is Mallorca. There has been a 16,7% that answered Madrid and another 13,3% that answered Paris. Mallorca can easily be the region with less water because it’s an island and it has not rivers or lakes.

If we compare Mallorca to cities in Germany, like Hamburg, we see that the climate is oceanic, and there are abundant rainfalls throughout the year and also there is Elbe river, which is one of the major rivers of Central Europe.

Graph 20: Residents’ opinion of which cities have less water resources



To residents I asked: “which of these geographical regions has the less amount of water resources per capita?” to choose between Madrid, Barcelona, Mallorca, Galicia and Valencia.

Only the 58,3% of the residents knew that Mallorca has the less water resources. A 23,3% thinks that the correct answer is Madrid and other 11,7% that is Valencia. Mallorca is the city with less water scarcity between all the choices; In Galicia, for example, there are consistent rainfalls throughout the year, which does not happen in Mallorca.

If we compare both questions, it seems that tourists know better which cities have the more water scarcity than residents of Mallorca. This a problem, residents have to be conscious about water scarcity in the island and not waste it.

Image 2: Mallorcan golf courses. Mallorca.org

One activity or sport that carries a lot of water consumption is golf. Nowadays in Mallorca we have 23 golf courses distributed among the island. In this photo that is a screenshot from Mallorca.org we can see the distribution of them.



From one study that the *Geological and Mining Institute of Spain* made about ground waters and golf courses in 2001, we can see how golf courses work around Spain. They analyzed that:

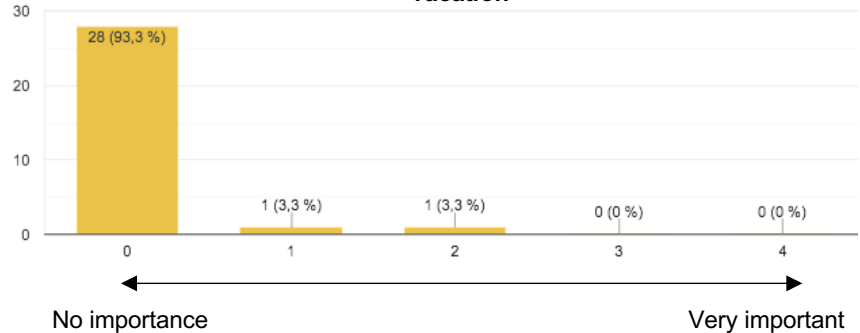
The distribution of the golf courses is not homogeneous in the territory: they are mainly concentrated in Andalusia, the Balearic Islands, Valencia and Catalonia with almost 60%. The average consumption of a standard 18-hole golf course can be between 1,500 and 2,000 m³/day in the months of maximum irrigation, which totals between 150,000 and 300,000 m³/year. This supposes a minimum annual consumption of more than 30 hm³ in the whole of the Spanish territory” (Durán, 2001)

The real problem is that: “Golf courses base their existence on the presence of large lawns, which require high volumes of water for their maintenance, especially in regions with a Mediterranean climate, with high losses by evaporation and little rainfall.” (Durán, 2001)

One good new is that some golf courses have started reducing their water consumption, like the resort Arabella Golf Mallorca, which reduced a 23,6% its water consumption of reclaimed irrigation water. (Real Federación Española de Golf, 2018).

To know the degree of importance that tourists give to find golf courses on vacation I asked them to rate from 0 to 100 this importance.

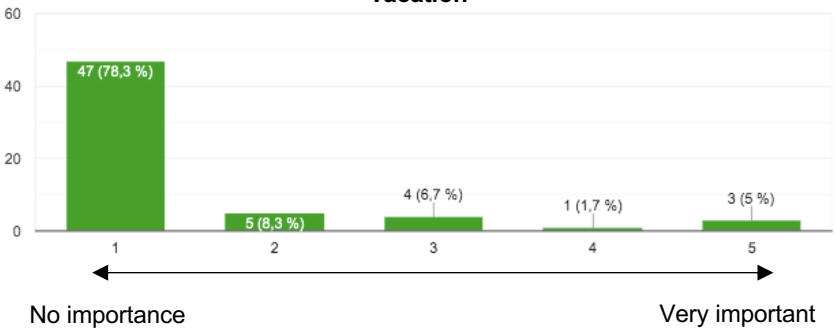
Graph 21: The importance tourists give to find golf courses on vacation



In graph 21, we see that 93,3% of the tourists answered they care 0%, and in graph 22, 78,3% of the tourists care a 0%.

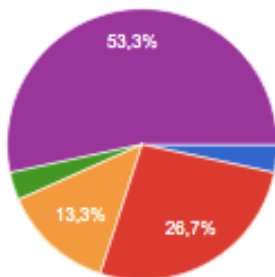
These answers are really positive in terms of water saving and golf seems to be more important to residents.

Graph 22: The importance residents give to find golf courses on vacation

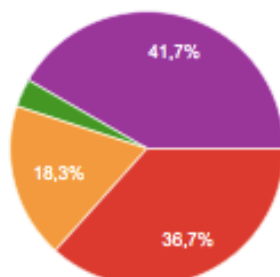


Another resource that tourists and residents use on a daily basis is energy. I asked them: "how many hours do you leave the air conditioning on during summer?"

Graph 23: Number of hours tourists use the air conditioning in summer



Graph 24: Number of hours residents use the air conditioning in summer



- All day
- 2-3h per day
- 4-5h per day
- 6-7h per day
- I do not use air conditioning

53,3% of the tourists said they do not use air conditioning, 26,7% use it between 2 and 3 hours per day, and a 13,3% use it between 4 and 5 hours per day;

41,7% of the residents said they do not use air conditioning, 36,7% use it between 2-3 hours per day, and a 18,3% use it between 4 and 5 hours per day.

It is positive that almost the 50% of the answers lead to a non-use of air-conditioning, knowing the high temperatures we face on summer in Mallorca. It seems that tourists use less time the air conditioning than residents and seem to show more concern about the electricity use.

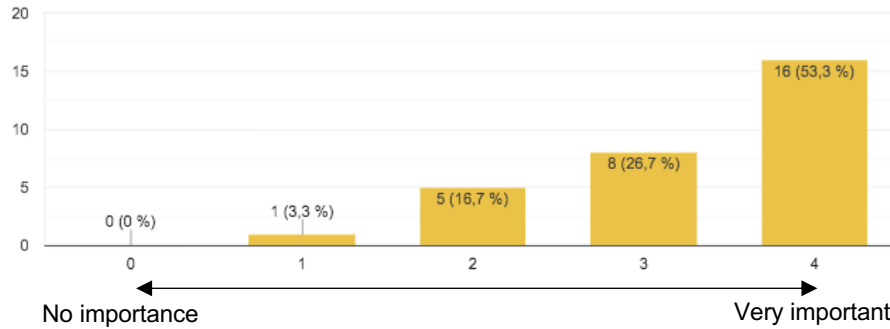
We will simply analyze how electricity is making CO₂ emissions to the atmosphere. If we analyze some kinds of energy like butane, fuel, electricity, natural gas and propane we see that the electricity is the energy that generates the most CO₂ emissions, with 0,649 kg CO₂/kWh. Then, we have fuel, which emits far less emissions, only 0,287 kgCO₂/; then we have butane and propane that emit the same emissions: 0,244 kgCO₂/kWh, and finally, the cleanest energy is natural gas, which emits only 0,204 kgCO₂/kWh. (Fundación para la Eficiencia Energética y el Medioambiente, no date).

One option to reduce energy emissions is to use renewable energy. The government of the Balearic Islands approved on 2015 some strategies regarding renewable energy and energy efficiency. For example, photovoltaic solar energy and wind power energy, and many others.

Today, terrestrial wind energy and photovoltaic are the two technologies that have achieved a degree of maturity and market penetration sufficient to represent a percentage significant in the Spanish energy mix. The photovoltaic and wind industrial sectors have reliable products and accumulate years of experience and technological evolution. For this reason, the Balearic Islands' renewable energy strategy must focus in photovoltaic and wind energy. (Adrover, 2015).

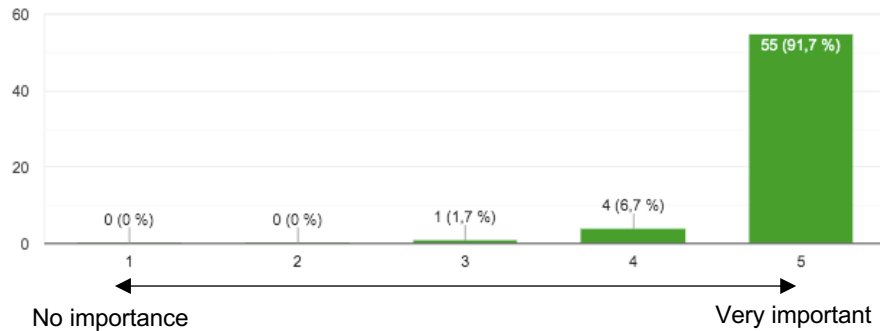
Another worry that can affect tourists and residents is massification of public spaces. I asked tourists and residents to rate from 0 to 100 the importance they give to find non-overcrowded beaches on vacation:

Graph 25: Tourist's worry for finding non-overcrowded beaches on vacation



As seen in the graph 25, 53,3% of tourists consider it very important, but it's only half of them. Instead, in graph 26, 91,7% of the residents consider very important to find a non-overcrowded beach. We can conclude that massification in natural areas like beaches can be way more annoying to residents.

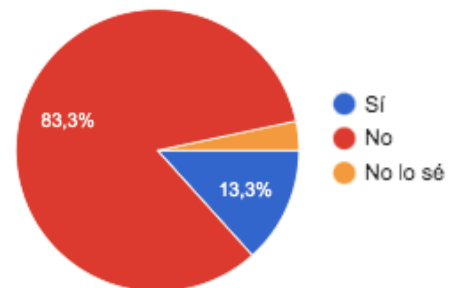
Graph 26: Resident's worry for finding non-overcrowded beaches on vacation



Another concern regarding residents worries about sustainability can be how clean we keep our beaches and forests. I asked residents: "do you think that beaches and forests are clean?".

83,3% of them think that our beaches and forests are not clean. Only a 13,3% think they are, and just a 3,3% do not know. The reality is that our natural spaces are not clean enough, and most of the residents are aware about this.

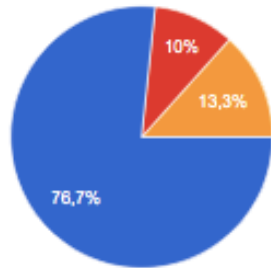
Graph 27: Residents' opinion regarding whether the beaches and forests of Mallorca are clean



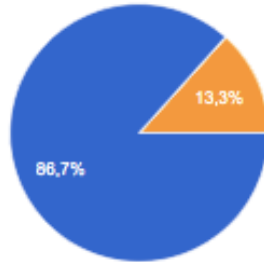
5.5 RECYCLING

I asked tourists and residents: “do you recycle in your home town?”

Graph 28: Recycling rate of tourists



Graph 29: Recycling rate of residents in Mallorca



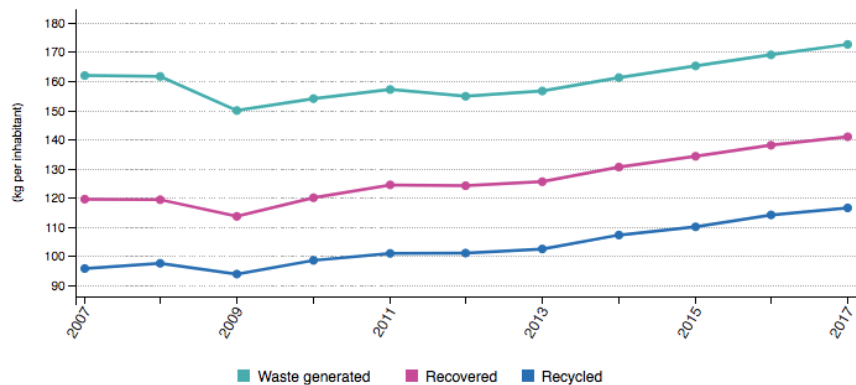
● Yes
● No
● Sometimes

76,7% of tourists answered they recycle at home, a 13,3% recycle sometimes and a 10% do not recycle. On the other side, 86,7% of the residents recycle and a 13,3% recycle sometimes. Residents seem to recycle more than tourists. It is good to see that more or less the 80% of the responses recycle daily, but some experts say it is no longer enough (Gallego, 2018).

From the Eurostat website we can check the comparison of the waste generated by the European countries. We can see that Spain was been reducing the waste generated (Waste statistics, 2016).

In this next graph, we can see the difference between waste generated, recovered, and recycled in the European Union. As we see, although we reduce the waste, not everything is properly recycled or recovered.

Graph 30: Development of all packaging waste generated, recovered and recycled, EU, 2007-2017. Eurostat, 2020



“Recycling is divided into ‘material recycling’ (the reprocessing to the original material) and other forms of recycling (including the reprocessing for other purposes such as organic recycling).” (Eurostat, 2020).

“Recovery includes recycling, energy recovery (e.g. as fuel in cement kilns or blast furnaces), other forms of recovery and incineration at waste incinerators with energy recovery.” (Eurostat 2020).

To avoid the waste of materials, is necessary to adapt the system to a circular economy. “A circular economy aims to maintain the value of products, materials and resources for as long as possible by returning them into the product cycle at the end of their use, while minimizing the generation of waste” (Eurostat, 2020).

Let’s talk about some of the principal and most difficult to recycle materials: plastics. In particular, single-use plastics. One great new is that the European Parliament voted on 24 October for single-use plastics ban. (European Commission, 2019). But why the ban of single-use plastics? Because...

Plastic residues, including microplastics, are now being found in marine species – and subsequently in the human food chain. Plastics are a convenient, adaptable, useful and economically valuable material, but they need to be better used, reused and recycled. The proposal focuses on the 10 single- use plastic items most commonly found on European beaches. These represent 86 % of all single-use plastic items on beaches, and about half of all plastic marine litter. The Directive includes a ban on plastic items such as straws, cotton swabs made from plastic, plastic plates and cutlery, plastic coffee stirrers and plastic balloon holders. (European Commission, 2019).

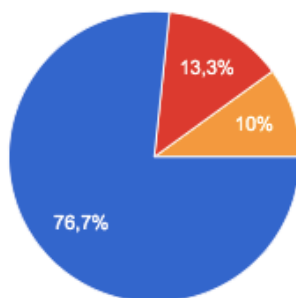
These single-use plastics mentioned above, can last in our oceans for years. For example, the worst are fishing lines, that can take up to 600 years to biodegrade, and many fish in the ocean get caught up in them. Disposable diapers and plastic bottles can take 450 years to break down. Plastic beverage holders can last 400 years, aluminum cans 200 years, Styrofoam takeaway cups can take 50 years, plastic grocery bags 20 years, and cigarette butts 10 years. (Whiting, 2018).

There is also an arising thought about the fact that there will be more plastic in the ocean than fish. (Hornak, 2016).

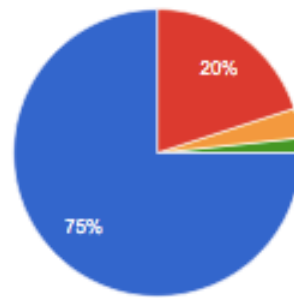
This is understandable, due to the fact that we already have “islands of plastic”, known as the Great Pacific Garbage Patch with undetermined size, and formed mainly from plastics from land sources and ships, which are transported to a large region located in the middle of the North Pacific Ocean. There the marine current, together with the winds and the atmospheric pressure produce a circulation that encompasses the floating debris and keeps them united in that body of water. (Elias, 2017).

Let’s see how much of single-use plastics know tourists and residents. I asked them: “what do you think about single-use plastics?”

Graph 31: Tourists’ opinion about single-use plastics



Graph 32: Resident’s opinion about single-use plastics



- I am against single-use plastics
- I think that they must be removed from bars/restaurants
- They are useful sometimes
- I do not mind
- I use them a lot

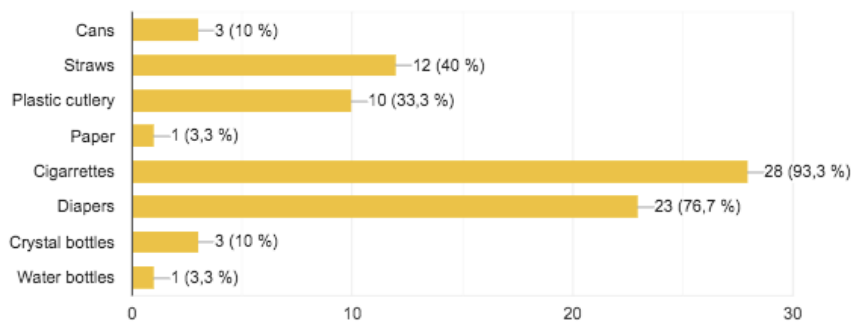
On the one side, 76,7% of tourists said they are against single-use plastics, a 13,3% said they have to be removed from bars or restaurants, and another 10% use them sometimes. On the other side, 75% of the residents are against them, a 20% think they are useful sometimes, and a 3,3% said they do not mind.

Both answers are really similar, residents and tourists seem to be using less-single use plastics nowadays.

Now we will analyze if tourists and residents recycle properly. I asked them “which of the following materials are non-recyclable?”

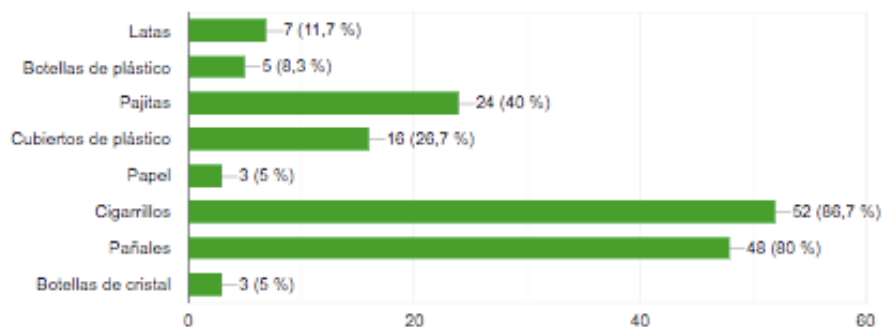
In graph 33, we see the answers of tourists. Only the 40% knew that straws are non-recyclable; a 33,3% knew that plastic cutlery are non-recyclable; instead, the 93,3% knew cigarette butts are non-recyclable, and 76,7% knew diapers are non-recyclable.

Graph 33: Tourists' knowledge about non-recyclable materials



In graph 34, only 40% of residents knew straws are non-recyclable; only a 26,7% knew plastic cutlery are non-recyclable; the 66% knew that cigarette butts are non-recyclable, and the 80% knew diapers are non-recyclable.

Graph 34: Residents' knowledge of non-recyclable materials



In general, it seems that tourists know more than residents about recycling plastics and other daily waste.

What options could be good to minimize the effects of these plastics?

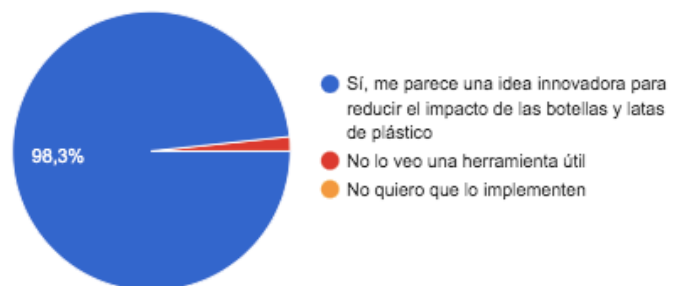
Some countries have applied a system called “Deposit return schemes” or DRS. These deposits have proven to be efficient systems to collect plastic bottles and other items, in order to reuse or recycle them. “they are systems where consumers buying a product pay a small amount of money which will be reimbursed when they bring the container to a collection point once they have finished using it.

There are many benefits of implementing DRS. The first and most obvious one is the environmental benefit. By putting a financial incentive to bring containers back for recycling, rather than discarding them, deposit return schemes ensure that more materials can be kept in the system. In terms of quality, DRS provide high outputs as they rely on separate collection, and therefore provides high-quality materials, allowing bottle-to-bottle recycling. This leads to a reduction of both discarded waste and natural resources extraction – as producers have access to a larger amount of secondary raw materials. Plastic bottles are one of the biggest contributors to the plastic pollution crisis, having a strong impact on marine biodiversity. In Europe, until now, 10 countries have already implemented deposit return schemes: Croatia, Denmark, Estonia, Finland, Germany, Iceland, Lithuania, Netherlands, Norway, and Sweden. All of which have achieved significant results. (Condomine, 2019).

This has not been applied in Spain, but it could be. I asked residents “would you like to have plastic recycling machines in supermarkets?”

Graph 35: Residents’ opinion about DRS systems

With a 98,3% of the residents saying they would like this system to be applied, we can say this will be for sure welcome in Mallorca to reduce plastic waste.



Other option can be changing our consume habits, to buy with less plastic. There is one method called bulk buying. This method can be applied on every grocery shopping we do, it's about to carry our bags and pots to a bulk supermarket, in order to avoid plastic bags, and always choosing fruits and vegetables without plastic package. This trend is called "zero waste". This Zero waste includes waste prevention, but also giving a 2nd life to the things we already have.

Image 2: Zero waste grocery store

Another good option could be buy local. Lately the government in Mallorca is supporting local products, from providers in the Island.



The insular ministry Jaume Alzamora has announced that: he plans to promote the consumption of local product in large stores, since it is, he assured, a practice that directly benefits Mallorcan production companies, their workers and the business fabric with which they have created synergies". He has considered that distributing to the citizens food produced on the Island at the moment will help, at the same time, to "improve and consolidate the economy and to reduce the costs and effects for the climate generated by insularity". (Mallorca Diario, 2020).

In our local markets, for example Es Mercat de l'Olivar, we can find little stands with great variety of fruits, vegetables, meat, fish, cheese, "embutidos"... without any package.

Image 3: Fruits and vegetables in bulk from Es Mercat de l'Olivar



5.6. ECOTAX

“An ecotax (short for ecological taxation) is a **tax** levied on activities which are considered to be harmful to the environment and is intended to promote environmentally friendly activities via economic incentives.” (Wikipedia).

On December 29, 2017 was published in the Official Gazette of the Balearic Islands (BOIB) the modification of Decree 35/2016, of June 23, where is developed the Tax Law on tourist stays to impulse measures of sustainable tourism in the Balearic Islands. (BOIB, 2016).

The “Agència Tributària de les Illes Balears” made the normative on 2016, and on their website they published a general information manual, where it is indicated the type of establishments where the tax is applied, divided into 8 groups: (Agència Tributària de les Illes Balears, 2016).

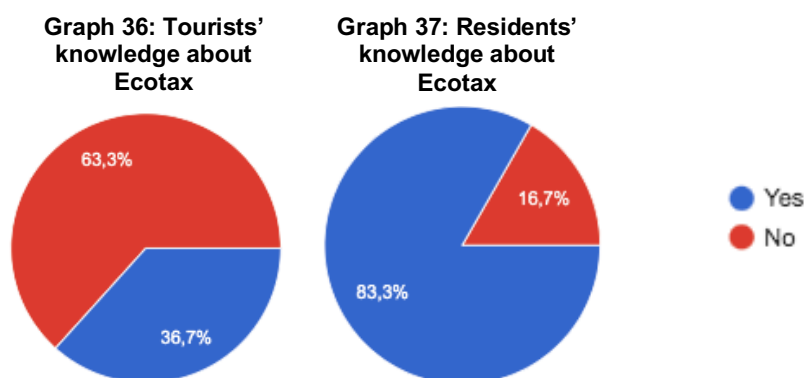
- GROUP 1: Luxury Hotels, 5* hotels, Rural hotels, City Hotels...
- GROUP 2: 4* Hotels, 4 keys Apartments, Apartment Hotels...
- GROUP 3: 3* Hotels, 3 keys Apartments, 3* City Hotels...
- GROUP 4: 1* Hotel, 1 key Apartments, 1* City Hotels...
- GROUP 5: 2* Hostels, 3* Hostels, Residence hotels...
- GROUP 6: 1* Hostels, 1* Residence Hostels, Pensions...
- GROUP 7: Refuges, Shelters, Inns...
- GROUP 8: Tourist camps, tourist holiday homes...
- GROUP 9: 2* Hotels, Vacation Cities of 2*, 3*,4*, 2* City Hotels...

The price charged to the tourists depend on the group they stay in, the season and the nights. In the graph, we see the different prices depending on the group:

Table 7: Groups of establishments, ATIB.

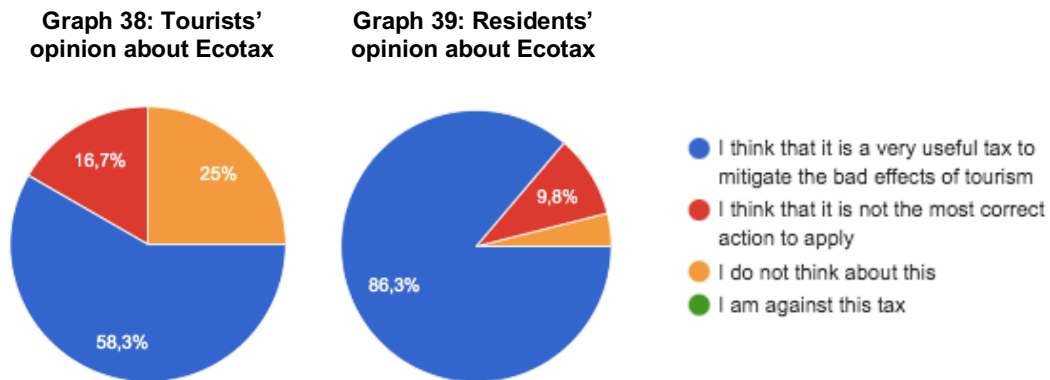
Clases de establecimientos turísticos	Euros/día de estancia o fracción
Hoteles, hoteles de ciudad y hoteles apartamentos de cinco estrellas, cinco estrellas gran lujo y cuatro estrellas superior.	4
Hoteles, hoteles de ciudad y hoteles apartamentos de 4 estrellas y 3 estrellas superior.	3
Hoteles, hoteles de ciudad y hoteles apartamentos de una, dos y tres estrellas.	2
Apartamentos turísticos de cuatro llaves y cuatro llaves superior.	4
Apartamentos turísticos de tres llaves superior.	3
Apartamentos turísticos de una, dos y tres llaves.	2
Establecimientos de alojamiento no residencial de empresas turístico residenciales.	4
Viviendas turísticas de vacaciones, viviendas objeto de comercialización de estancias turísticas y viviendas objeto de comercialización turística.	2
Hoteles rurales, agroturismos, hospederías y alojamientos de turismo interior	2
Hostales, Hostales residencia, pensiones, posadas y casas de huéspedes, campamentos de turismo o campings	1
Albergues y refugios	1
Otros establecimientos o viviendas de carácter turístico	2
Embarcaciones de crucero turístico	2

I asked tourists and residents, “do you know what the Eco Tourism tax is?”



63,3% of the tourists did not know about the Ecotax. On the other side, only 16,7% of the residents did not know about the tax. It is clear that residents know more about the Ecotax. It seems unusual that tourists do not know about a tax they pay to stay here on vacation.

I also asked them: "what do you think about this Ecotax?". Here only answered the ones who knew about the tax.



58,3% of the tourists who knew about Ecotax think that it is useful to mitigate the bad effects of tourism, a 25% do not think about it, and a 16,7% think that it is not a correct action to apply.

On the other hand, 86,3% of the residents who knew about the tax say it is useful, and only a 9,8% think it is not.

It seems that residents feel the Ecotax way more useful than tourists. This can be because tourists do not really know how this tax works and what is done with the collected money.

In fact, the Ecotax is very useful if the money collected is invested in environmental projects. For example, last year the government of the Balearics, designed 27 environmental actions, like investing in renewable energies in touristic zones of the Islands, or the solarization of the large roofs of the industrial estates in the Balearic Islands; also, improvements on the treatment plants and desalination plants. (Domblás, 2019).

Regarding waste, it includes the implementation of a pilot test of the deposit and return system whereby citizens who return containers to machines will receive money in return." This last one would be a great fact because we have analyzed that deposit and return system would be welcomed by residents. (Domblás, 2019).

5.7. IMPROVEMENT PROPOSALS

The last question of the surveys was to name some sustainability actions to apply to the city of Palma in order to make it more sustainable.

From tourists I collected 22 proposals (I discarded the ones saying "I do not know"); and from residents I collected 59 proposals. I am going to group them together classifying them into categories:

TOURISTS' PROPOSALS REGARDING:

NATURAL SPACES

- "To have the government clean the beaches and not volunteers"

PUBLIC TRANSPORT

- "Electric public transport"
- "Cheaper public transport"
- "Make bicipalma more accessible to tourists, and cheaper"
- "More public transport"

TRANSPORT

- "Do not allow the circulation of vehicles through the city and increase the public transport service"
- "Regulate the cruises"
- "To implement car sharing and public transport"

ENERGY/RESOURCES

- "Solar panels"
- "More solar energy"
- "Put filters on every tap so we don't have to buy bottled water"

TOURISM

- "Zone restriction and moderate the tourism"
- "Reduce the amount of tourism"
- "Limit the number of tourists allowed (without tax to prevent social exclusion)"

WASTE/RECYCLING

- "Deposit system for bottles"
- "Avoid single-use plastics"
- "Remove single-use plastics from bars and markets"
- "More garbage cans, more controls, less plastic bags in Mercadona and grocery stores"
- "Recycle, reuse, go to second hand markets"
- "Recycle bottles"
- "Less plastic bottles and cans"
- "To tax pollutant factories and to give financial and commercial advantages to not pollutant factories"

RESIDENTS' PROPOSALS REGARDING: (traduced into English)

NATURAL SPACES

- "To promote a nature and local life tourism, with hiking trails, and avoid tourism areas like Palmanova, Magaluf, Calas de Mallorca... that make a difficult coexistence with residents, and the loss of respect for traditions and thoughts"
- "More clean-ups and make citizens conscious about it"
- "Make the island much more local (carrots do not have to be in plastic bags, they get in your car, from your car to the car and from the car and from the car to your kitchen"

TRANSPORT

- "To limit the vehicle access to the city and to the beaches (in high season of tourism), build a bike path"
- "Transform the city into pedestrian, and with improved and more efficient public transport and the other vehicles which enter the center have to pay a tax"
- "Pedestrianize the whole city, only circulation for residents and public transport."
- "Ban taxi drivers who vote against public transport, nationalize companies like TIB that are controlled by German companies"
- "More bike paths"
- "More radical limitations against cruise tourism"
- "Increase the subway lines, something similar to Madrid Central"
- "Limitation of the circulation of vehicles through the center based on their registration since the distances on the island are very short."
- "A service for the use of bicycles, electric bicycles and electric scooters that is effective, affordable and useful as the "bicing" of Barcelona"
- "More ACIRE areas. Pedestrianize the entire old town."
- "Choose days with total stop of mechanical Transport, only on foot"
- "Incentivize car sharing ... Free transportation for school"
- "Maintenance of public water infrastructures More facilities to use the electric scooter, expand the SFM network, reduce the n° of cruises/day"

PUBLIC TRANSPORT

- "Increase public transport frequency through torrents with constant flow"
- "Improve the public transport"
- "To be less strict with bicycles"
- "Promote less pollutant transports"
- "Electric tram, close access to cars"
- "Electric buses"
- "Promote public transport"
- "More battery charging points for electric and hybrid cars, that the mobility of certain streets is restricted."
- "Improve public transport (although we would not stop using the car, I think we would use it much less)"
- "Schedules and bus routes from Palma more comfortable and until later"
- "Put more bus frequencies, free public transport"
- "That all vehicles be electric and with a renewable energy source"
- "Palma bikes are very difficult to take"

ENERGY

- "Hydroelectric energy generation"
- "Renewable energies"
- "Subsidize solar panels in buildings and particular houses, promote activities of social awareness on responsible hydric resources use"
- "Sources of energy efficiency, more green areas, renewable energy ..."
- "That the power plant be modernized since it currently generates a lot of pollution. Implement renewable energy sources in homes such as solar panels, without the rates being exorbitant or bureaucratic processes being complex."

WATER

- "Ban freshwater pools, ban golf courses, or if you want golf courses buy water to Nordic countries, raise taxes (ecotax) to water wasters (private pools), raise taxes to the ones not recycling at homes (it should be free workshops to citizens, like the driving license, recycling licenses..."
- "More water fountains"
- "Water fountains to refill water bottles"
- "Clean streets with reused water, control the good use of water throughout the island in companies and individuals."
- "Purify water in restaurants and homes, increase the use of glass bottles instead of plastic and increase recycle plastic and paper"

TOURISM

- "Put limits to cruises, limit hotels, ban foreign businesses, limit the number of travelers in summer, prohibit rent a cars... "
- "Stop "prostituting" the island for the benefit of entrepreneurs who then invest the money outside of Mallorca and Spain, stop paying the water treatment plants that the hotels use, they must pay for EVERYTHING"
- "Limit the number of tourists, limit the use of rental cars, basically limit everything tourists do"
- "Avoid overcrowding on the coast (as an alternative, instead of investing in new hotels in the coastal zone, investing in those that already exist and increasing their quality)"
- "Reduce the number of cruises and sun & beach tourism"
- "Hotel chains would have to implement the use of recycled water for their toilets, for example, so as not to use single-use plastic etc. etc. but instead of putting fines on them, take away their licenses for a while!"

WASTE/RECYCLING

- "Recycling education, fines for littering, ashtrays on beaches..."
- "More bins in the city, supermarkets with less plastic"
- "Plastic bottles recycling machines like in Germany"
- "Encourage the use of recyclable bags (because even if they charge us for the plastic bag, we continue to use these bags) and avoid overcrowding on the coast (as an alternative, instead of investing in new hotels in the coastal zone, investing in those that already exist and increasing their quality)"
- "Not sell single-use plastics"
- "Improve the resource recycling, increase sanctions for dirtying the environment"
- "Do not put litter bins on beaches and control that everyone takes their garbage, raising awareness in advertisements..."
- "Implement recycling machines"
- "Force massive chains like McDonald's not to lie to us and recycle!"
- "Real recycling"
- "Compulsory recycling course in schools and institutes. More awareness that we have to recycle."
- "Workshops on how to make our own soap, gel, shampoo. and countless things that can be done."
- "Go to the supermarket with your own plastic bottle to refill the soap for those who do not want the powder"

5. CONCLUSIONS

As we have seen on the results, there are many different opinions or proposals to achieve a more sustainable city, or island. It is very interesting to see what a person has to say, because every opinion counts, and every action has its future impact. Changing the behavior of our visitors makes that they treat our territory like their home, and it is needed more ecological education and consciousness.

The answers show that there is not an actual consciousness about the transport emissions, most of the tourists and residents use the most pollutant means of transports, such as airplanes and cars to travel and move around. A positive aspect is the increasing need on public transport on both tourists and residents, as we have seen in most of the proposals.

We have analyzed that water is one of the scarcest resources for the island, specially in high season; minimizing activities that consume tons of water and change daily habits can reduce water waste. Based on the analysis, we have obtained that electricity is the one generating the most CO₂ emissions; but on the other side tourists and residents seem to reduce their waste every time, and be in favor of renewable energies along with local producers support which leads to a reduction of international transport and CO₂ emissions. In some aspects, we found out that tourists have more sustainability knowledge than residents.

In many cases residents feel saturated about the quantity of tourists and overcrowded public means, specially in high season. There is the need to find alternative ways to create a sustainable tourism, to decrease the demand on summer, and increase it the rest of the year, which would be favorable for the inhabitant's coexistence in the island.

The results show that for tourists and residents recycling the waste properly is important, ditching single-use plastic, and choosing to reduce and re use things, which can lead to reduce the total waste generation assuming a circular economy. Also, their arising worry about the plastic waste in the oceans, the forests and the beaches can lead to a cleaner environment for all the visitors and inhabitants.

After studying these results, we can conclude that our visitors and our residents need to learn more sustainable ways to travel. It would be important to foster an agreement between the needs of residents and those for tourists from their proposals and establish courses and advertising to promote environmental awareness.

6. BIBLIOGRAPHY

A

Adrover Barceló, M.; Comas Hernández, B.; Gallego Fernández, A.; Llauger Rosselló, J.; Nadal Fiol, P.; Sureda Gomila, B. (2015). Energías Renovables y Eficiencia Energética en las Islas Baleares: estrategias y líneas de actuación. Conselleria d'Economia i Competitivitat, Govern de les Illes Balears:
<http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST5325ZI190898&id=190898>

Aena (2018-2019). Estadísticas de tráfico aéreo, Informes anuales. Aena.es:
<http://www.aena.es/csee/Satellite?pagename=Estadisticas/Home>

Aena (2019). Estadísticas de tráfico aéreo, Informes mensuales, Julio. Aena.es:
<http://www.aena.es/csee/Satellite?SiteName=Estadisticas&anyo=2019&=Page&cid=1144247795704&pagename=Estadisticas%2FEstadisticas&periodoInforme=Mensual>

Aena (2017-2018-2019). Estadísticas de tráfico aéreo, Informes anuales. Aena.es:
<http://www.aena.es/csee/Satellite?pagename=Estadisticas/Home>

Agencia Europea de Medio Ambiente (2016). Emisiones de dióxido de carbono procedentes del transporte de pasajeros, Infographic. Agencia Europea de Medio Ambiente:
<https://www.eea.europa.eu/es/pressroom/infografia/emisiones-de-dioxido-de-carbono/view>

Agència Tributària de les Illes Balears (2016). Tributos autonómicos, Manual informativo general, A.T.I.B. 709. Agència Tributaria de les Illes Balears:
<https://www.atib.es/TA/contenido.aspx?Id=11087>

B

BOIB (2016). Ley 2/2016, 30th March, Balearic Ecotax. Bulletí Oficial del Estat:
<http://www.caib.es/eboibfront/pdf/es/2016/42/946557>

C

Condomine, P, (2019). Deposit return schemes: resolving plastic waste. Government Europa: <https://www.governmenteuropa.eu/deposit-return-schemes-plastic/91699/>

D

DGT (2016, 2017,2018). Seguridad Vial, Tablas estadísticas, Matriculaciones definitivas. Dirección General de Tráfico: <http://www.dgt.es/es/seguridad-vial/estadisticas-e-indicadores/matriculaciones-definitivas/tablas-estadisticas/>

DGT (2018). Anuario Estadístico General. Dirección General de Tráfico: <http://www.dgt.es/Galerias/seguridad-vial/estadisticas-e-indicadores/publicaciones/anuario-estadistico-de-general/Anuario-estadistico-general-2018.pdf>

Domblás, N, (2019). Ecotasa: El Govern presenta 27 proyectos ambientales. Periódico de Ibiza: <https://www.periodicodeibiza.es/noticias/baleares/2019/10/28/1116595/ecotasa-govern-presenta-proyectos-ambientales.html>

Durán, J. J., Fernández, M. L., López-Geta, J. A., & Robledo, R. M (2001). LAS AGUAS SUBTERRÁNEAS Y LOS CAMPOS DE GOLF. UNA APROXIMACIÓN INTEGRADORA. Instituto Geológico y Minero de España http://aguas.igme.es/igme/publica/sim_aguas_almeria/comunicacion4.pdf

E

Elias, R. (2017). The effect of the submarine effluent of Mar del Plata city (38 LS) on sediment, contaminats and macrobenthic community View project Poliquetos de Sudamérica View project. <https://www.researchgate.net/publication/313468624>

EMT (2020). *Puja al bus i suma't al canvi!* Empresa Municipal de Transports.
<https://pujaalbus.org/flota-mes-sostenible/>

European Commission (2018). Environment department, Circular Economy Action Plan. European Commission:
https://ec.europa.eu/environment/circular-economy/index_en.htm

European Commission (2019). European Parliament votes for single-use plastics ban. Environment for Europeans, European Commission:
https://ec.europa.eu/environment/efe/news/european-parliament-votes-single-use-plastics-ban-2019-01-18_en

Eurostat (2020). Circular Economy, Overview. Eurostat:
<https://ec.europa.eu/eurostat/web/circular-economy>

F

Fueris, Q, (2017). Baleares tiene ya casi un coche por habitante. El Mundo:
<https://www.elmundo.es/baleares/2017/04/29/590453bb46163f71718b465b.html>

Fueris, Q, (2017). Baleares tiene ya casi un coche por habitante. El Mundo:
<https://www.elmundo.es/baleares/2017/04/29/590453bb46163f71718b465b.html>

Fundación para la Eficiencia Energética y el Medioambiente (no date). Gas Natural, Butano, Electricidad, Propano y Gasóleo: ¿Qué energía emite más CO2? Fundación para la Eficiencia energética y el Medioambiente:
<http://www.f2e.es/es/gas-natural-butano-electricidad-propano-y-gasoleo-que-energia-emite-mas-co2>

G

Galán, R (2019). “Carsharing”: El alquiler de coches por horas llega a Mallorca. Diario de Mallorca:
<https://www.diariodemallorca.es/palma/2019/01/24/carsharing-alquiler-coches-horas-llega/1385741.html>

Gallego, J.L (2018). No basta con reciclar envases, hay que ir a por el resto. La Vanguardia.<https://www.lavanguardia.com/natural/20180521/443681739328/ecogagello-exito-reciclaje-envases-debe-extenderse-a-otras-fracciones-de-residuos.html>

GOIB (2017). Pla Director de Mobilitat de les Illes Balears. Diagnosi p.1. Govern de les Illes Balears <http://www.caib.es/govern/rest/arxiu/3056664>

GOIB (2017). El Govern presenta el diagnòstic de mobilitat de les Illes Balears, que serà el eix del nou Pla Director de Mobilitat. Govern de les Illes Balears:
<http://www.caib.es/govern/sac/fitxa.do?codi=3056653&lang=es>

GOIB (2018). Las medidas del Plan de Movilidad permitirán reducir un 20% el peso del coche en el conjunto de desplazamientos. Govern de les Illes Balears: <http://www.caib.es/pidip2front/jsp/es/ficha-noticia/stronglas-medidas-del-plan-director-sectorial-de-movilidad-de-las-illes-balearsstrong-strong2019-2026-permitiraacuten-reducir-un-20-el-peso-del-coche-privado-en-el-conjunto-de-desplazamientosstrong>

GOIB (2019). Revisión anticipada del Plan Hidrológico de las Islas Baleares. Portal del Agua de las Islas Baleares. Govern de les Illes Balears:
http://www.caib.es/sites/agua/es/revisia_anticipada_del_pla_hidrolagic_de_les_illes_balears/

GOIB (2020). Las reservas hídricas de las Illes Balears se sitúan en el 67%. Govern de les Illes Balears: <http://www.caib.es/pidip2front/jsp/es/ficha-convocatoria/9439550>

GOIB (2020). Evolució de les reserves hídriques a les Balears durant el darrer any. Portal del Agua de las Islas Baleares, Govern de les Illes Balears:
https://www.caib.es/sites/agua/es/evolucion_de_las_reservas_hidricas_e_indice_de_sequia-22867/archivopub.do?ctrl=MCRST259ZI153361&id=153361

H

Hornak, L (2016). Will there be more fish or plastic in the sea in 2050?. BBC News: <https://www.bbc.com/news/magazine-35562253>

M

MAFEX (2017). El papel del transporte ferroviario ante los retos medioambientales, p.2. Asociación Ferroviaria Española: [https://www.mafex.es/wp-content/uploads/2019/01/Np-sostenibilidad-ver.on .pdf](https://www.mafex.es/wp-content/uploads/2019/01/Np-sostenibilidad-ver.on.pdf)

Mallorca Diario (2020). El Consell pide a los supermercados que adquieran producto local. Mallorcadiario: <https://www.mallorcadiario.com/el-consell-pide-a-los-supermercados-que-adquieran-producto-local>

Mallorca.org (no date). Los campos de golf en Mallorca. Mallorca.org: <https://www.mallorca.org/es/campos-de-golf.html>

Mercat de l'Olivar (no date). Frutas y verduras. Mercat de l'Olivar: https://www.mercatolivar.com/es/puesto_category/frutas-y-verduras/?covid_advice=hide

O

OCU (2020). *OCU alerta que la contaminación por partículas en suspensión supera las recomendaciones de la OMS*. Organización de Consumidores y Usuarios: https://www.ocu.org/organizacion/prensa/notas-de-prensa/2020/emisiones_contaminantes_280120

OTLE (2016). Informe Anual 2015, p.192. Observatorio de Transporte y Logística de España: http://observatoriotransporte.fomento.es/NR/rdonlyres/0AE839CF-9E00-46F3-A27C-88B14AC37715/136237/INFORME_OTLE_2015.pdf

P

Packaging waste statistics (2020). Context, Definitions: recycling and recovery. EUROSTAT: https://ec.europa.eu/eurostat/statistics-explained/index.php/Packaging_waste_statistics#Recycling_and_recovery_targets

Packaging waste statistics (2020). Development of all waste generated, recovered and recycled, EU, 2007-2017. EUROSTAT:
https://ec.europa.eu/eurostat/statistics-explained/index.php/Packaging_waste_statistics

Pintadas contra los turistas en Mallorca (2016). "Tourist go home; Refugees welcome". EL MUNDO:
<https://www.elmundo.es/baleares/2016/04/12/570cea6546163f193c8b45d7.html>

Preocupación por el aumento de turismofobia en Palma (2017). CANAL4 DIARIO: <https://canal4diario.com/2017/08/04/preocupacion-por-el-aumento-de-turismofobia-en-palma/>

Pinya, M. (2018). Baleares descarta limitar los coches de alquiler en verano, hasta 54.000 en agosto. Diario de Mallorca:
<https://www.diariodemallorca.es/mallorca/2018/04/21/govern-descarta-poner-limite-coches/1306354.html>

Q

¿Qué mejoras notarán los Usuarios del Transporte Público de Mallorca? (2019). Economía de Mallorca, El Periódico Económico de les Illes Balears:
<http://economiademallorca.com/art/22334/que-mejoras-notaran-los-usuarios-del-transporte-publico-de-mallorca>

R

Real Federación Española de Golf (2018). Arabella Golf Mallorca reduce un 23,6% su consumo de agua regenerada de riego en el último año.
<https://www.rfegolf.es/Noticias/NewsDetails.aspx?NewsId=9276>

T

TIB (2016). Proyecto de movilidad sostenible en espacios naturales y playas de Mallorca. Transports de les Illes Balears:
<https://www.tib.org/es/web/ctm/noticies-esdeveniments/-/veure/projecte-mobilitat-sostenible-espais-naturals-i-platges-de-mallorca>

U

Última Hora (2019). Singular equipaje en el aeropuerto de Palma para concienciar sobre la escasez del agua. Última hora: <https://www.ultimahora.es/noticias/local/2019/06/26/1090389/singular-equipaje-aeropuerto-palma-para-concienciar-sobre-escasez-del-agua.html>

Última Hora (2020). La Plataforma contra la ampliación del aeropuerto provoca una primera movilización. Última hora: <https://www.ultimahora.es/noticias/local/2020/02/21/1143317/aeropuerto-palma-movilizacion-por-ampliacion.html>

W

Wikipedia. Ecotax definition. The Free Encyclopedia: <https://en.wikipedia.org/wiki/Ecotax>

Waste Statistics (2016). Total waste generation, Figure 3: waste generation, excluding major minerals wastes. EUROSTAT: https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics#Waste_generation_excluding_major_mineral_wastes

Whiting, K. (2018). This is how long everyday plastic items last in the ocean. World Economic Forum: <https://www.weforum.org/agenda/2018/11/chart-of-the-day-this-is-how-long-everyday-plastic-items-last-in-the-ocean/>

Y

Yoeli-Rimmer, O. (2017). Mass tourism in Mallorca: trouble in paradise. Cafebabel: <https://cafebabel.com/en/article/mass-tourism-in-mallorca-trouble-in-paradise-5ae00bf4f723b35a145e8195/>

