



OBSERVING AND MONITORING
THE ALGARVE TOURIST DESTINATION
Contributions for its Sustainable Development

GLOBAL REPORT 2023
RESULTS OF TOURISM SECTOR COMPANIES

Scientific Committee:



Sponsors:



Technical Information

COORDINATION

João Albino Silva | CinTurs | FEUAlg

Luís Pereira | CinTurs | ESGHT-UAlg

Jorge Andraz | CEFAGE | CinTurs | FEUAlg

Rui Nunes | FEUAlg

RESEARCH FELLOWS

Milene Lança | CinTurs | FEUAlg

Christina Muhs | CinTurs | FEUAlg

Ana Rita Manjua Rijo | CinTurs | FEUAlg

Joana Ferreira | CinTurs | FEUAlg

Hannah Franz | CinTurs | FEUAlg

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GRAPHIC DESIGN

Ana Rita Rijo | CinTurs | FEUAlg

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1. INTRODUCTION

In 2021, the project *Observation and Monitoring of the tourist destination Algarve: Contributions to its sustainable development* (MONITUR) was implemented with the goal of creating an information system centred on monitoring sustainability to offer stakeholders relevant information to support decision-making processes. The project's objective consists of developing a model to evaluate and monitor tourist activity in the Algarve and establishing an online information system that encourages the transmission of knowledge.

The project involves three distinct and complementary activities. First, a model to assess the sustainable tourism development of the Algarve, including relevant dimensions and indicators, is designed. Second, data collection is carried out on several occasions during the high and low seasons to gather information to feed a set of selected indicators. The data collection includes primary (surveys to tourists, residents and stakeholders in the tourism industry) and secondary information sources. The third activity involves the implementation of an online decision support system to ensure the spread of information to the agents and facilitate the transfer of knowledge.

This report contains the dissemination of data collection with companies in the hotel management sector in the year of 2023. The project's findings regarding the tourist and resident data collection, can be found in additional reports available on the MONITUR website.



2. METHODOLOGY

The study presented in this report was conducted between July and October 2023. The data was collected from respondents through an online survey, disseminated by the Association of Hotels and Tourist Resorts of Algarve (AHETA) to all members.

A total of 65 valid questionnaires were collected. Incomplete questionnaires with non-response rates above 10% were discarded, as the missing data could compromise the study's statistical results (Hair, Black, Babin & Anderson, 2014).

The questionnaire was available in Portuguese. The questionnaires consisted of 17 closed-ended and 7 open-ended questions, related to energy management, water management, solid waste management and environment and climate changes.

The data was processed and analysed using SPSS software. Descriptive statistics were computed to analyse the survey data.

3. TOURISM SECTOR COMPANIES' RESULTS 2023



3.1. Energy Management

This section reports the results regarding energy consumption, the usage of renewable energy sources and actions to optimise energy consumption.

In what concerns Energy Management, the majority of companies take some sort of action to optimize energy consumption (Table 1).

Table 1. Actions to optimise energy consumption.

Does your company take action to optimise energy consumption (e.g. low-energy lighting such as LEDs, etc.)?	N	%
Yes	60	96.77%
NR	2	3.23%

Source: Own elaboration. NR - No response

The month with most data available regarding energy consumption is August (45.16%), followed by June (25.81%) and finally May (16.13%) (Table 2). The months of April and September only have one consumption registered.

Table 2. Months of energy consumption.

What was the last month for which you have available data of energy consumption? (in KWh)	N	%
April	1	1.61%
May	10	16.13%
June	16	25.81%
July	3	4.84%
August	28	45.16%
September	1	1.61%
NR	3	4.84%

Source: Own elaboration. NR - No response

On average, approximately 27.59 KWh of energy is consumed per overnight stay in a representative tourism accommodation establishment and 75% of the sample present an energy consumption equal and below 32.14 KWh per overnight stay. (Table 3)

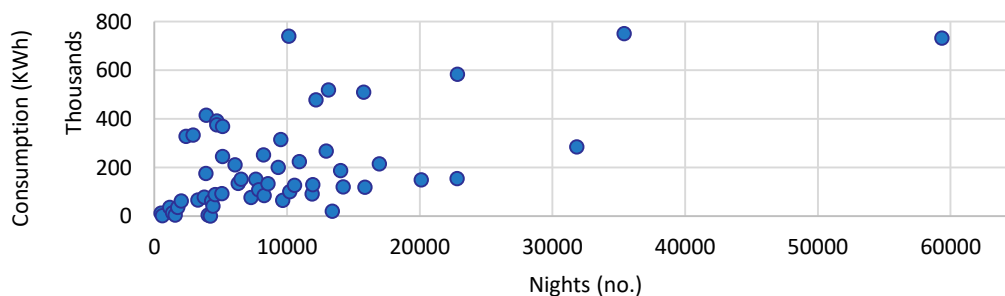
Table 3. Descriptives of total energy consumption and energy consumption per overnight stay.

	Energy Consumption (KWh)	Energy Consumption per overnight stay (KWh)
Mean	205814.9	27.59
Median	134206	19.96
Standard Deviation	191965.9	29.16
Quartile 25%	71335	9.85
Quartile 75%	300230	32.14

Source: Own elaboration.

Figure 1 presents the scatter plot of energy consumption in relation to the Number of overnight stays in the accommodation establishments. Clearly, the data is more concentrated closer to the origin of the plot, up to 400 KWh and up to 20000 overnight stays. The scatter plot clearly shows a positive correlation between the two variables, which means that energy consumption is directly correlated with the number of overnight stays.

Figure 1. Energy consumption.

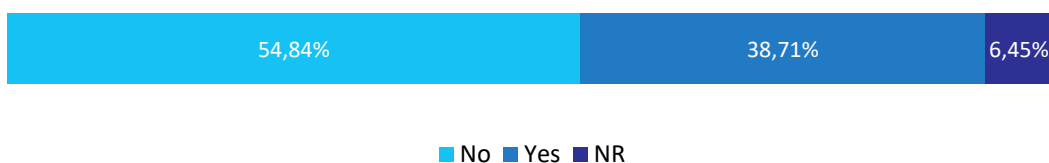


Source: Own elaboration.

Regarding the usage of renewable sources, such as solar panels, biomass, wind power, among others, a significant number of the companies do not use renewable energy sources (54.84%) (Figure 2).

Figure 2. Usage of renewable energy sources.

Does your company use renewable energy sources (e.g. solar panels, biomass, wind power, etc.)?



Source: Own elaboration. NR - No Response

From the companies that use renewable energy sources ,more than half uses less than 40% of energy from a renewable source (54.17%) and approximately one fifth of the firms use 100% of renewable energy (20.82%) (Table 4).

Table 4. Percentage of electricity from renewable sources.

If so, what percentage of your electricity needs are met by renewable energy sources?	N	%
0% - 40%	13	54.17%
60%	1	4.16%
100%	5	20.82%

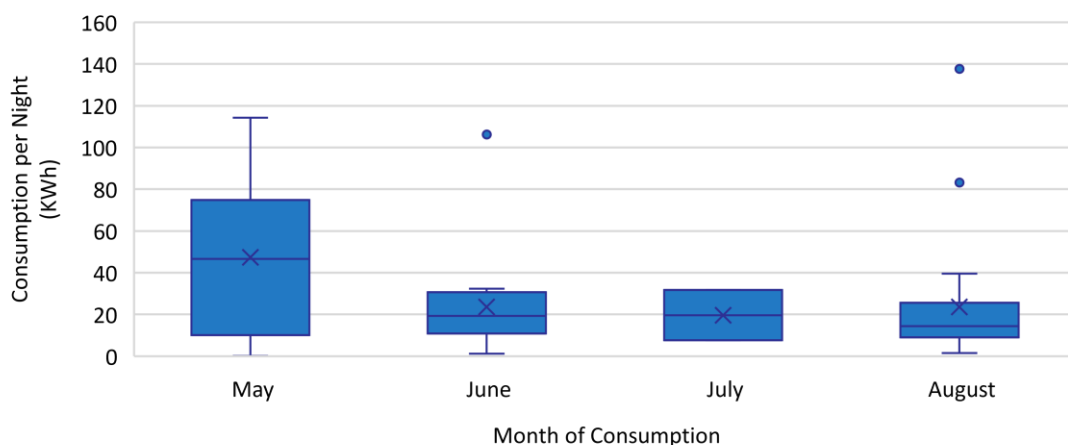
Source: Own elaboration.

Figure 3 illustrates the distribution of energy consumption per overnight stay through the months of May, June, July and August¹. It is possible to observe a larger distribution in May compared to August and June.

¹ The months of April and September were not considered to the plot since there was only one input for each month.

Additionally, one outlier was detected in the month of June, with a value greater than 100KWh per overnight stay, and two in August, with the highest value approximately 140 KWh per overnight stay followed by the second highest value, 83.16 KWh per overnight stay. The mean values presented on Table 3 are influenced by these outliers.

Figure 3. Distribution of energy consumption per night between the May and August.



Source: Own elaboration.

3.2. Water Management

This section shows the results regarding water consumption, water sources, monitoring of water consumption and actions to optimise water consumption.

The majority of the companies in the study (93.55%) take actions to optimize water consumption, such as lowering toilet water consumption, lowering flow shower heads and taps or dripping irrigation for gardening, among others. (Table 5)

Table 5. Actions to optimise water consumption.

Does your company take action to optimise water consumption? (e.g. low water consumption toilets, low flow shower heads and taps, drip irrigation for gardening, etc.)	N	%
No	4	6.45%
Yes	58	93.55%

Source: Own elaboration

Taking into consideration all the tasks that take place in the companies surveyed, the majority uses public water supply as the water source (96.77%), while very few use an artesian borehole as their main water source. (Table 6)

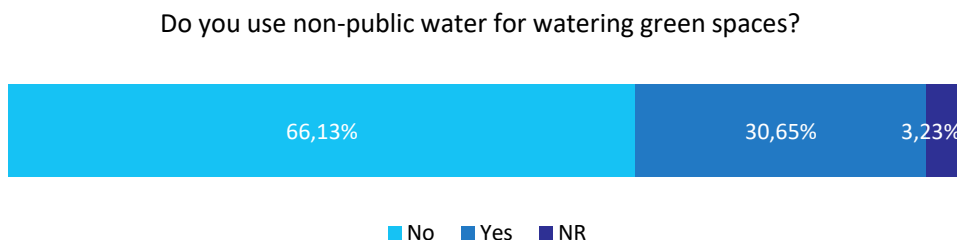
Table 6. Origin of the water used.

In the context of the various operations that take place in your establishment, please indicate the origin of the water used:	N	%
Artesian borehole	2	3.23%
Public water supply	60	96.77%

Source: Own elaboration

On the matter of the usage of non-public water for the irrigation of green spaces, less than half of the companies use non-public water for that purpose (30.65%). On the other hand, 66.13% use public water for watering green spaces. (Figure 4)

Figure 4. Usage of non-public water for watering green spaces.



Source: Own elaboration. NR - No Response.

Water consumption is on average 0,74 cubic meters per overnight stay, and half of the companies surveyed present a consumption per overnight stay equal or less than 0.36 cubic meters. (Table 7)

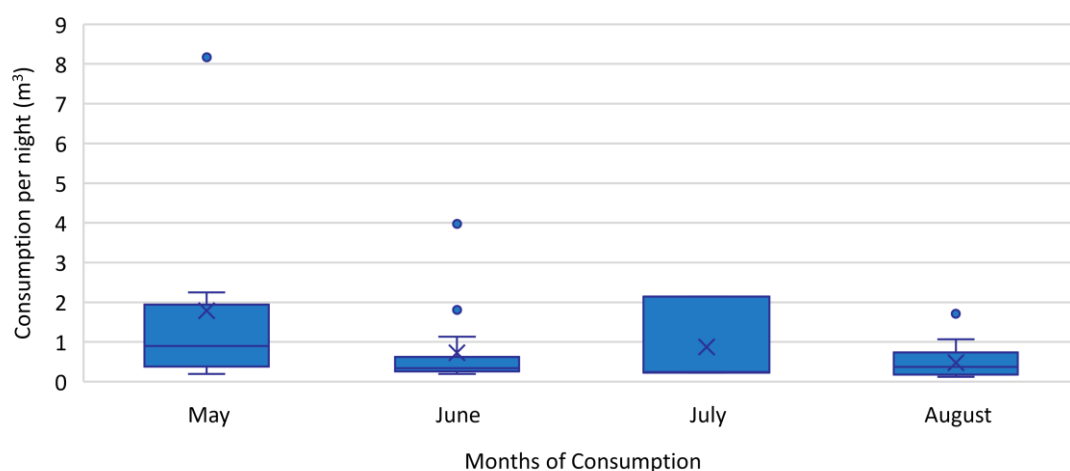
Table 7. Descriptives of total water consumption and water consumption per overnight stay.

	Water Consumption (m ³)	Water Consumption per overnight stay (m ³)
Mean	4902.73	0.74
Median	3261	0.36
Standard Deviation	6436.20	1.21
Quartile 25%	1800.5	0.20
Quartile 75%	5223	0.76

Source: Own elaboration

Figure 5 is a representation of water consumption distribution per overnight stay through the months of May, June, July and August¹. It is possible to observe a larger distribution in May and July compared to August and June. It is noticeable the presence of outliers in this plot: the outlier with the highest value is in the month of May, with the value of 8.17 m³ per overnight stay; the two following are from June, with 3.97 m³ and 1.81 m³ per overnight stay; and finally from August, with 1.71 m³ per overnight stay.

figure 5. distribution of water consumption per night between the May and August.

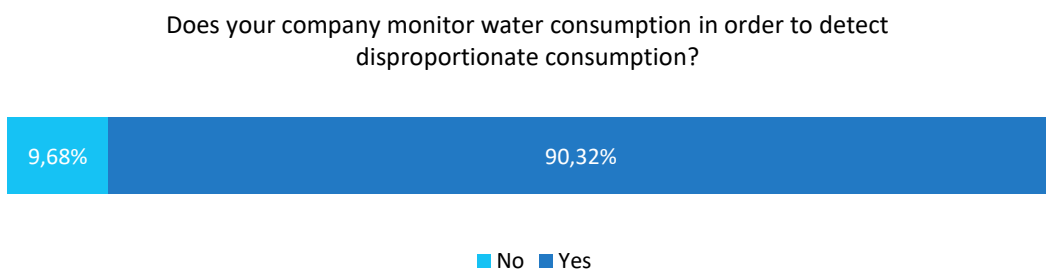


Source: Own elaboration

¹ The months of April and September were not considered to the plot since there was only one input for each month.

Still regarding water consumption, most companies monitor consumption to detect disproportionate consumption (90.32%), leaving approximately 10% of the companies without monitorization of water consumption (Figure 6)

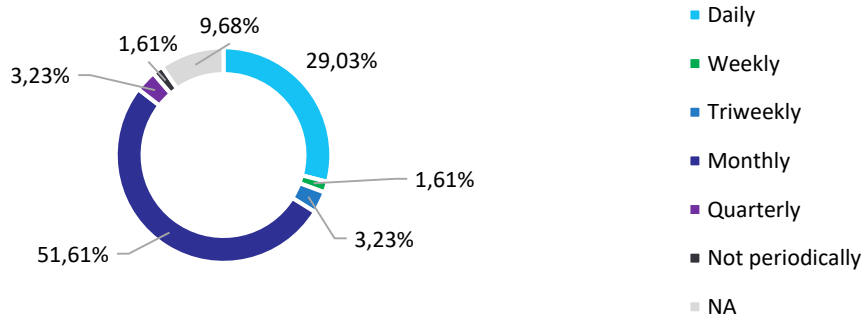
Figure 6. Monitoring of water consumption.



Source: Own elaboration

More than half of the companies monitor their water consumption on a monthly basis (51.61%), followed by a daily monitorization (29.03%). (Figure 7)

Figure 7. Periodicity of water consumption analysis.

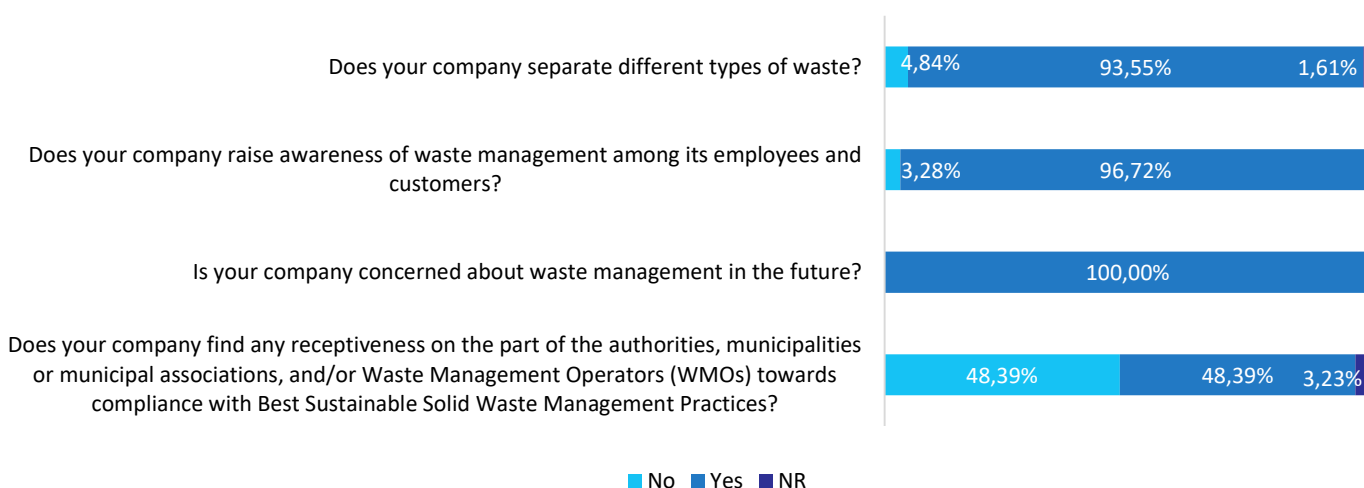


Source: Own elaboration. NA - Not Applicable

3.3. Solid Waste Management

Regarding solid waste management, a great portion of the companies in the study separate different types of waste (93.55%) and raise awareness of waste management among its employees and customers (96.72%). (Figure 8). All companies show concerns about waste management in the future. In what concerns receptiveness from authorities towards compliance with Best Sustainable Solid Waste Management Practices close to half of them find receptiveness (48.39%) and the same number of companies don't (48.9%).

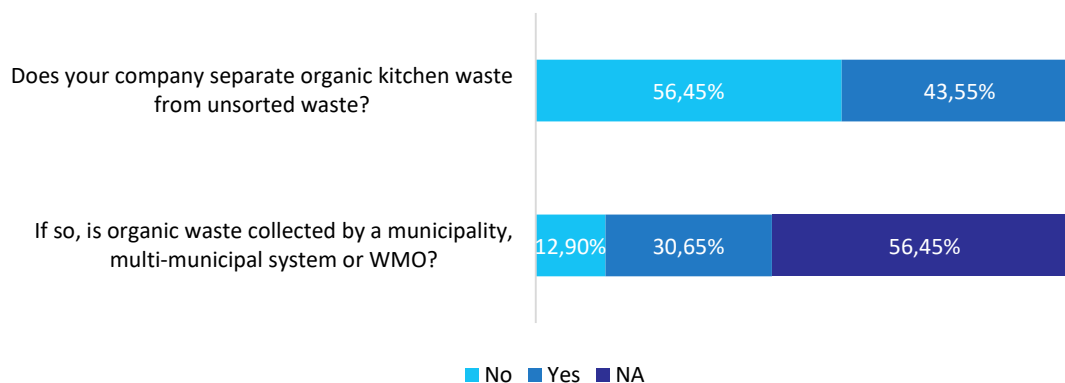
Figure 8. Solid waste management.



Source: Own elaboration; NR - No Response.

In the matter of organic kitchen waste, more than half the companies do not separate organic kitchen waste from unsorted waste (56.45%). Considering the ones that separate the organic waste from the unsorted one, 30.65% of them have their organic waste collected by a municipality, multi-municipal system or waste management operators (WMO) (Figure 9).

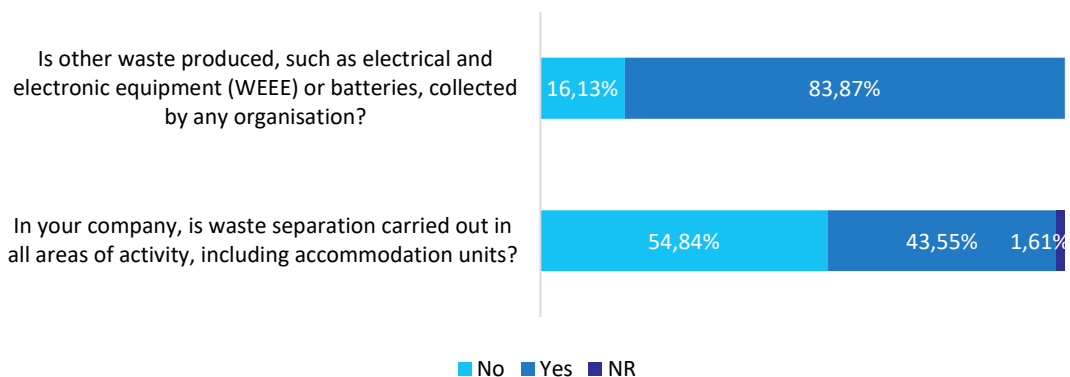
Figure 9. Separation and collection of organic waste.



Source: Own elaboration. NA - Not Applicable

In the topic of electrical waste, the majority of the respondents have their waste of electrical and electronic equipment or batteries collected by an organization (83.87%). Around 54.84% of the companies do not have a waste separation carried out in all areas of activity (including accommodation units). (Figure 10)

Figure 10. Electronic waste and waste separation.



Source: Own elaboration; NR - No Response

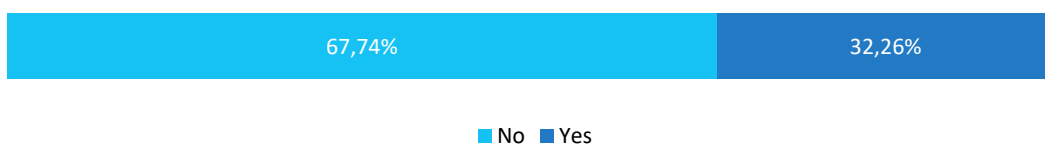
3.4. Environment and Climate Change

In this section, results are presented regarding climate change mitigation schemes, actions and certification.

In what concerns climate mitigation schemes, such as CO₂ compensation, low energy systems, among others, 32.26% of companies are involved in at least one of those schemes (Figure 11).

Figure 11. Climate mitigation schemes.

Is your company involved in climate change mitigation schemes (e.g. CO₂ offsetting, low energy systems, etc.)?



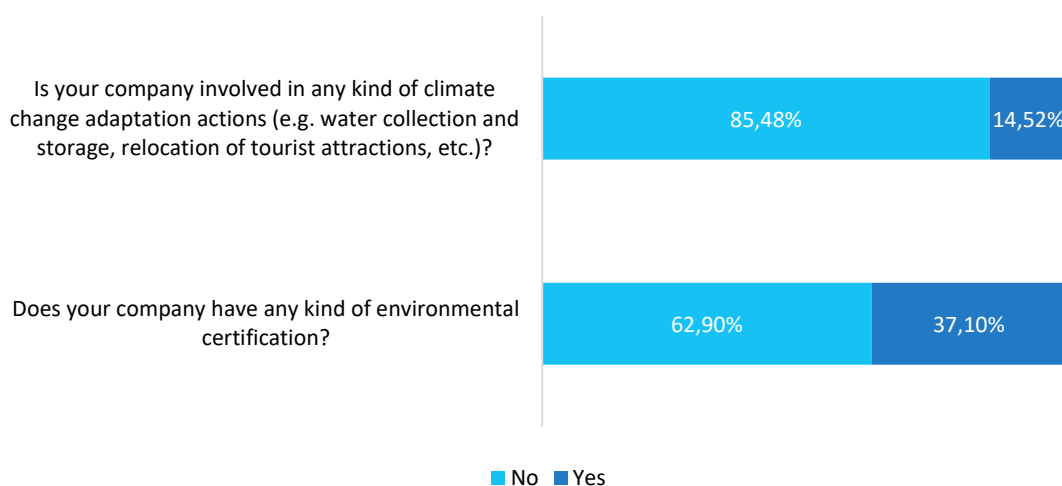
Source: Own elaboration

Below we can find a list of the climate change mitigation schemes described by respondents:

- Awaiting investment proposals
- CO₂ compensation
- Reduce water and electricity consumption
- More efficient equipment and solar energy
- GHG Protocol
- Energy with GDO Certificate
- LEDS
- Solar panels
- Photovoltaic panels
- Electric cars
- Green Key programme
- Total remodeling of the unit 2023/2024
- Reuse of water bottles
- Filtered water system
- Reduction of food waste
- Paperless check-in
- Eco-garden
- Electric car charging
- Winter and summer timetables and set points
- More efficient systems and solar energy

When addressing the topic of climate change adaptation, a great portion of the respondents do not take any action (85.48%). Regarding certification, approximately 37.10% of companies have an environmental certification of some type. (Figure 12)

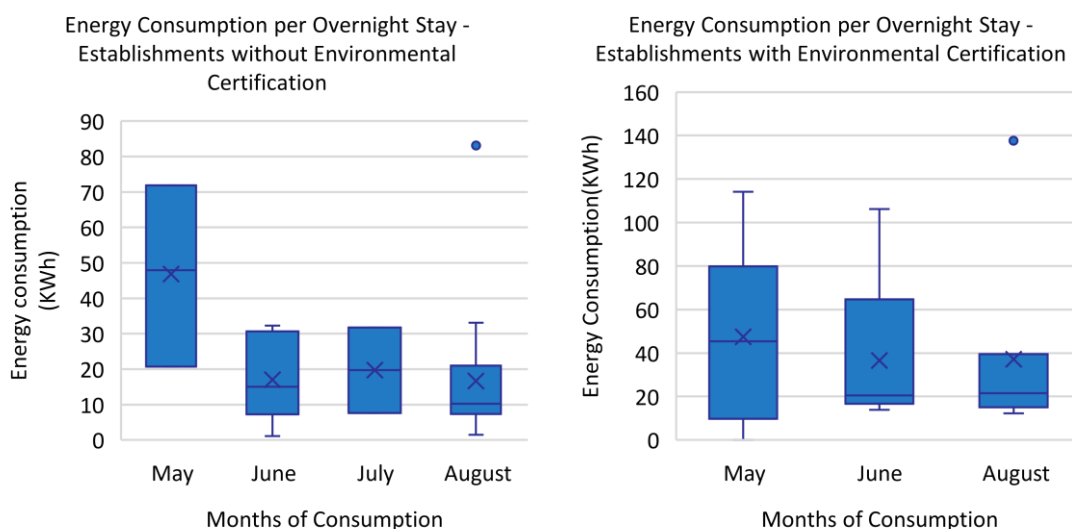
Figure 12. Climate change actions and certifications.



Source: Own elaboration

The sample was divided in two samples: the establishments that possess an environmental certification and the ones that don't have certification. Furthermore, a comparative analysis was carried in terms of energy and water consumption per overnight stay. Figure 13 presents the distribution of energy consumption per overnight stay through the months of May, June, July and August, in establishments with and without environmental certification - the months of April and September were not considered for this analysis due to the small sample from each month..

Figure 13. Energy consumption per overnight stay in establishments without environmental certifications VS establishments with environmental certification.



Source: Own elaboration

In terms of energy consumption, the establishments without environmental certification consume less energy per overnight stay on average compared with the certified companies. (Table 8)

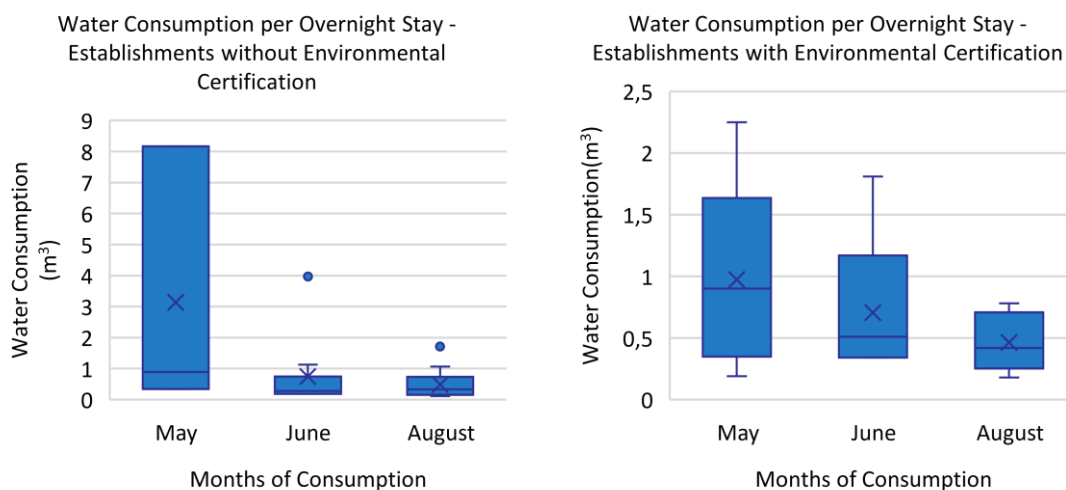
Table 8. Descriptives of total energy consumption and per overnight stay in establishments without environmental certifications VS establishments with environmental certification.

Environmental Certification	No	Yes
Mean	19.80	39.62
Median	13.00	21.36
Standard Deviation	18.32	38.07
Quartile 25%	7.62	14.28
Quartile 75%	26.82	52.25

Source: Own elaboration

Figure 14 presents the distribution of water consumption per overnight stay through the months of May, June, and August, in establishments with and without environmental certification – the months of April, July and September were not considered for this analysis due to the small sample from each month.

Figure 14. Water consumption per overnight stay in establishments without environmental certifications VS establishments with environmental certification.



Source: Own elaboration

The opposite of what was presented in the energy consumption occurs when we observe water consumption – certified firms have less water consumption on average compared with non-certified companies. (Table 9)

Table 9. Descriptives of total water consumption and per overnight stay in establishments without environmental certifications VS establishments with environmental certification.

Environmental Certification	No	Yes
Mean	0.771	0.698
Median	0.293	0.514
Standard Deviation	1.486	0.609
Quartile 25%	0.189	0.306
Quartile 75%	0.735	0.809

Source: Own elaboration

4. CONCLUSION

The surveyed companies revealed that they largely implement environmental sustainability practices, but there is still a lot of room to expand the use of these practices. Indeed, there is evidence that:

- All companies take actions to optimize energy consumption, but a small percentage of them use 100% renewable energy sources;
- Most companies take actions to optimize water consumption, but a small percentage uses non-public water for watering green spaces;
- A great portion of companies monitor their water consumption periodically - more than half on a monthly basis,
- All companies show concerns about waste management in the future;
- Less than half of the companies separate organic waste from unsorted waste;
- More than half the firms are involved in some climate change mitigation scheme and adaptation actions.

BIBLIOGRAPHY

Hair, J., Black, W., Babin, B. & Anderson, R. (2014). *Multivariate Data Analysis: Pearson New International Edition, 7^o Edition*, London: Pearson Education.

INE (2019). *Statistical Yearbook of Algarve Region - 2018*, Lisbon: Statistics Portugal, I.P.



APPENDIX



Exmo(a). Senhor(a), o objetivo deste inquérito é conhecer os aspetos ambientais presentes na gestão das empresas de turismo no Algarve. As suas respostas serão tratadas a nível estatístico no âmbito do **Projeto MONITUR** de apoio à atividade do **Observatório para o Turismo Sustentável do Algarve**, que está a ser desenvolvido pela **Universidade do Algarve** e serão usadas unicamente para fins científicos. Não existem respostas certas ou erradas e este inquérito é anónimo e confidencial. AS SUAS RESPOSTAS DEVEM RELACIONAR-SE COM A EMPRESA PELA QUAL ESTÁ A RESPONDER. Agradecemos antecipadamente a sua colaboração.

1. Gestão de Energia

- 1.1. A sua empresa adota ações para otimizar o consumo de energia? (por exemplo: iluminação de baixo consumo como LEDs, etc.)
 Sim Não
- 1.2. Qual foi o seu consumo de energia elétrica (em KWh) do último mês em que tem dados disponíveis?
Mês: _____
Consumo: _____
Quantas dormidas registou nesse mês? _____
- 1.3. A sua empresa utiliza de fontes de energia renovável? (por exemplo: painéis solares, biomassa, energia eólica, etc.)
 Sim Não
- 1.3.1. Se sim, que percentagem das suas necessidades de energia elétrica é satisfeita por fontes de energia renovável? _____%

2. Gestão de Água

- 2.1. A sua empresa toma ações para otimizar o consumo de água? (por exemplo: sanitários de baixo consumo de água, chuveiros e torneiras de baixo caudal, rega gota-a-gota para jardinagem, etc.) Sim Não
- 2.2. No contexto das diferentes operações que têm lugar no seu estabelecimento, indique a origem da água utilizada:
 Rede pública Tratamento/reciclagem
 Furo artesiano Outra: _____
- 2.3. Utilizam água sem ser da rede pública na rega de espaços verdes? Sim Não
- 2.4. Qual foi o seu consumo de água (em m3) no último mês em que tem dados disponíveis?
Mês: _____
Consumo: _____
Quantas dormidas registou nesse mês? _____
- 2.5. A sua empresa efetua controlo ao consumo de água de modo a detetar consumos desproporcionais? Sim Não
- 2.5.1. Se sim, os consumos são analisados com que periodicidade? _____

3. Gestão de Resíduos Sólidos

- 3.1. A sua empresa separa diferentes tipos de resíduos? Sim Não
- 3.2. A sua empresa desenvolve ações de sensibilização de gestão de resíduos junto dos seus colaboradores e clientes? Sim Não
- 3.3. A sua empresa está preocupada com a gestão de resíduos no futuro?
 Sim Não
- 3.4. A sua empresa encontra recetividade por parte das autoridades, de municípios ou associações municipais, e/ou de Operadores de Gestão de Resíduos (OGRs) para o cumprimento das Melhores Práticas Sustentáveis de Gestão de Resíduos Sólidos? Sim Não
- 3.5. A sua empresa faz separação de resíduos orgânicos de cozinha dos resíduos indiferenciados? Sim Não
- 3.5.1. Se sim, os resíduos orgânicos são recolhidos por algum município, sistema multimunicipal ou OGR? Sim Não
- 3.6. Outros resíduos produzidos, como equipamentos elétricos e eletrónicos (REEEs) ou pilhas, são recolhidos por alguma entidade? Sim Não
- 3.7. Na sua empresa, a separação de resíduos é efetuada em todas as áreas de atividade, incluindo nas Unidades de Alojamento? Sim Não

4. Ambiente e Alterações Climáticas

- 4.1. A sua empresa está envolvida em esquemas de mitigação das alterações climáticas (por exemplo, compensação de CO2, sistemas de baixa energia, etc.)?
 Sim Não
- 4.1.1. Se sim, especifique quais: _____
- 4.2. A sua empresa está envolvida em algum tipo de ações de adaptação às alterações climáticas (por exemplo, recolha e armazenamento de água, realocação de atrações turísticas, etc.)?
 Sim Não
- 4.3. A sua empresa tem algum tipo de certificação ambiental? Sim Não