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The Nexus Between Tourism and Renewable Energy Resources in the Island of Crete, Greece

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Abstract

Investigation of the relationship between renewable energies and tourism industry in the island of Crete, Greece is important for economic and environmental reasons. Renewable energies are abundant in this island while Crete is a popular and attractive tourist destination. Development of renewable energies has a positive impact on climate change mitigation while promotion of green tourism increases its sustainability and reduces its ecological footprint. Development of renewable energy systems as well as tourism industry in Crete has positive impacts on the regional economic growth. Various renewable energy technologies are currently mature, reliable and cost-effective and they can be used in various applications without any financial support. Existing renewable energy installations operating in Crete for heat and electricity generation including energy systems installed in hotels have been examined. Solar energy is the most widely used benign energy source in Cretan hotels. The possibility of developing energy tourism as a new alternative option for the local tourism industry has been discussed. The nexus between renewable energies and tourism industry in the island of Crete results in various economic, social and environmental benefits. Therefore its relationship should be increased in the future due to the resulted benefits.

Keywords: Crete; energy needs; Greece; hotels; renewable energies; sustainability; tourism.

1. Introduction

Use of renewable energy resources for energy generation replacing the use of fossil fuels is attractive and desirable for mitigating climate change which is destabilizing global ecosystems and human societies.

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Tourism industry is growing steadily worldwide and its GHG emissions into the atmosphere are increasing. Use of various renewable energy technologies in all sectors of tourism industry is going to assist in the reduction of carbon emissions and in the achievement of the proposed global targets for climate change mitigation in the coming years. Sustainable energies have increasing use in many tourist destinations including their application in hotels worldwide. Crete is rich in various renewable energy resources particularly in solar and wind energy which are currently used for electricity and heat generation. Its tourism industry is well developed and the island is considered as the most attractive tourist destination in Greece and one of the most popular for vacations in Eastern Mediterranean region. Many renewable energy technologies are currently mature, reliable and cost-effective due to technological innovations and advancements during the last decades. Some of them are currently used in Cretan hotels for heat, cooling and electricity generation. They are also used in stand-alone grid connected installations generating electricity partly used in tourist accommodation facilities. Renewable energies and tourism industry in Crete are currently interconnected and interwoven. However the nexus between them should be increased in the future since it will offer many economic, social and environmental benefits in the island.

2. Literature survey

2.1 Renewable energy use in tourist accommodation

A report on sustainable tourism and renewable energy in Cocachimba, Amazonas, Peru has been published [1]. The authors stated that in this area there are not enough accommodation facilities to cover the tourist demand which is increasing due to its rich flora, fauna and the presence of the famous Gata waterfall. They proposed that new accommodation lodgings should be created covering their heating and power requirements with the local renewable energy resources. A publication on renewable energy opportunities for tourism in islands has been reported [2]. It was mentioned that energy supply in insular areas is dominated by fossil fuels while the price of electricity provided to the hotels is high and non competitive. However electricity bill is an important cost item for island's hotels. The report analyses the potential contribution of four renewable energy technologies to the island's tourism sector: a) Solar water heating, b) Solar air-conditioning, c) Sea water air-conditioning, and d) Solar-PV. Application of renewable energy technologies in the development of low-carbon tourism in Changsha, China has been examined [3]. The author mentioned that the rich local renewable energy resources in this area can contribute in the development of low carbon rural tourism. He stated that solar energy, solid and gaseous biomass, hydropower and wind energy could cover the energy needs of rural tourism. A study on the use of renewable energy to achieve tourism sustainability in Mediterranean islands has been published [4]. With reference various islands including among others Sicily, Corsica, Cyprus, Sardinia and Crete the author mentioned that these islands attract many tourists since they are rich in natural resources and cultural heritage. She concluded that insular areas should promote the use of renewable energy technologies in order to address the challenges and vulnerabilities of the future promoting also "qualitative tourism". An investigation on the factors affecting the willingness of tourists to pay for renewable energy use in hotels in Greece has been realized [5]. Their results indicated that marital status and educational level of travelers are not statistically significant factors in the willingness to pay more. Rather environmental-conscious and adequately informed tourists are willing to pay extra for accommodation in a green hotel. The nexus among CO_2 emissions, GDP, renewable energy and tourism in the top 10 most-visited countries during 1995-2011 has been studied [6]. The author

found that renewable energies mitigate CO_2 emissions while the increase in GDP and in tourism increases carbon emissions. He suggests the promotion of sustainable tourism and the adoption of clean technologies in tourism industry. A report on renewable energy solutions for tourism has been published [7]. The authors mentioned that in order to reduce the negative environmental impacts of tourism, high priority should be given in renewable energies. They also stated that renewable energies will offer financial benefits aligning hotel industry with the concept of green tourism. An investigation on the use of renewable energies in the hotel industry for improving its sustainability has been made [8]. The authors studied two successful applications of sustainable energies in hotels located in Australia and Sweden. They concluded that the use of sustainable energy technologies in the hotel industry can be combined with positive economic results. A report on the use of renewable energies in hotels located in five EU regions including East Attica, Sicily, Alpes-Maritimes, Andalusia and Madeira has been released [9]. The authors investigated the use of various renewable energy technologies, including solar passive, solar thermal, solar-PV, biomass and geothermal energy, in hotels. They mentioned that the most promising and market accepted renewable energy technologies were solar thermal energy (including solar cooling), grid connected solar-PV and geothermal heat pumps. A publication on the interaction of renewable energies and tourism evaluating their potential in tourism industry has been reported [10]. The authors mentioned that renewable energy sources can be considered as an attractive element within the mass tourism which in some cases can increase the attractiveness of a specific area to visitors. A research on the impacts of renewable energy and tourism investments on international tourism with reference the G20 countries has been published [11]. The authors mentioned that their results indicated that promoting both renewable energy and tourism investments should be considered as the major driving forces of tourism development in the G20 countries. A study on the relationship between tourism demand, renewable energies and economic growth has been implemented [12]. The authors stated that their investigation provided empirical evidence regarding the relation between renewable energies, tourism and economic growth. They also mentioned that low and high income countries should implement sustainable economic growth that focuses on eco-tourism or green tourism and on renewable energy production.

2.2 Energy tourism

A study on energy tourism focusing in the city of Gussing, Austria has been published [13]. The authors mentioned that energy tourism consists of a new niche-tourism segment offering a knowledge-driven and meaningful holiday experience. They stated the example of the eco-energy region of Gussing, Austria which indicates that expert-oriented tourism can be developed offering various benefits to the local economy and contributing in the mitigation of climate change. A report on energy tourism has been published [14]. The authors mentioned the interrelationship between energy and tourism focusing on energy tourism as a niche of industrial tourism. They stated that energy tourism is a new perspective on the energy and tourism nexus. A hotel located in Vienna, has been transformed in a zero-energy balance hotel [15]. This has been achieved with the use of solar thermal panels, solar-PV technology and ground source heat pumps. Additionally the hotel encourages its guests to use low-carbon transportation while it uses recycling in its daily operations.

2.3 Renewable energy applications in hotels

A report on key renewable energy solutions for SME hotels has been published due to the implementation of an EU project funded from the Intelligent Energy Europe program [16]. The report has identified many renewable energy solutions which can be used in SME hotels. These include: biomass, combined heating and power, geothermal energy, solar-PV electricity, solar thermal systems, wind energy, micro hydro power and deep water cooling. A study on the barriers to invest in renewable energies in the Cretan hotel industry has been implemented [17]. The authors stated that hoteliers consider economic, institutional and human-related factors as barriers for investing in these benign technologies. They also mentioned that perceived barriers differ among hotels with different financial and energy performances. An investigation on the tourists' preferences for choosing to stay in hotels equipped with energy saving systems and renewable energy technologies with face to face interviews in Crete has been realized [18]. The authors mentioned that their results indicated that 87% of them would prefer to stay in hotels equipped with sustainable energy systems while two thirds (2/3) of them would be willing to pay for surcharges for staying in such hotels. A report on the use of renewable energies in Cretan hotels has been published [19]. The author stated that hotels in Crete currently utilize various renewable energies including solar thermal, solar cooling, solar-PV, solar passive, solid biomass and geothermal heat pumps while solar thermal energy is the most widely used in them. A study on the feasibility of creating net zero carbon emission hotels in Mediterranean region has been made [20]. The author mentioned that the combined use of solar thermal energy, solar-PV and high efficiency heat pumps providing heat, cooling and electricity in hotels could zero their net carbon emissions due to energy use. A review on the production of biodiesel from waste cooking oil by various processes has been published [21]. The authors stated that waste cooking oil is a cost-effective and promising feedstock for the production of renewable diesel oil. An estimation of the carbon intensity of the tourism industry in Crete, Greece has been published [22]. The author stated that its carbon intensity is in the similar range as in other European countries while if the carbon emissions due to international transportation of tourists were not included in the estimations then the resulted carbon intensity would be significant lower than the initial value.

2.4 Impacts of large scale renewable energy systems on tourism industry

A study on the impacts of wind farms on rural tourism in Portugal has been made [23]. The authors interviewing the visitors found out that many of them criticized the proximity of wind turbines to medieval architecture while a clear majority of them accepted their presence. The visitors also stated that wind farms had no impact on their choice of destination. A report on the economic impacts of wind farms on Scottish tourism has been published [24]. The report mentioned that the effects of wind farms on tourism are so small and that wind farms and tourism in Scotland are compatible. It also stated that few very large farms are preferable than a large number of small farms regarding their impacts on tourism. An investigation on the relationship between tourist demand and wind turbine construction has been realized [25]. The authors mentioned that existing studies based on interview data indicated a negative impact of wind turbines on tourist demand. They stated that their work also confirms the negative relation between wind turbines and tourist demand for municipalities not located near the coast. A study on the effect of wind power installations on coastal tourism has been made [26]. The authors questioned more than 1,000 tourists in beaches at Delaware, USA regarding the effect of wind turbines on their

destinations' selection. Approximately one quarter of them stated that they would make another selection if an offshore wind farm was located 10 km from the coast. However a higher percentage of tourists found attractive and worth-visiting such an installation.

The objectives of the current work include the investigation of:

a) The current applications of renewable energy technologies in Crete including their applications in tourism industry,
b) The current status of tourism industry in the island, and
c) The interrelationship and synergies between renewable energies and tourism in Crete.

Initially the renewable energy technologies used in hotels and in various other applications in Crete are examined and the current status of tourism in the island is presented. The possibility of developing the "energy tourism" in Crete is mentioned. The synergies the relations and the impacts between those two sectors are presented and the resulted economic, environmental and social benefits are discussed. The implementation of the current study has various limitations concerning a) the present and future contribution of renewable energies in covering the total annual heat, cooling and electricity demand in Cretan hotels, b) the present and future contribution of renewable energies in covering the annual heat and electricity demand in the island, and c) the quantification of increasing the linkage between renewable energies and tourism industry in the regional development of Crete.

3. Renewable energy systems operating in Crete

Island of Crete is rich in various renewable energy resources particularly in solar and wind energy. Additionally, due to the existing large olive tree groves in the island, large solid biomass resources are also available. Hydro-power is limited while geothermal fluids of high or low enthalpy have not been found so far. Energy derived by sea waves and tides is not exploitable. Renewable energies are currently used for power and heat generation with different technologies which are mature, reliable and cost effective. Existing commercial renewable energy installations in Crete generating heat, cooling and electricity include:

1. Passive solar energy systems for space heating and cooling in buildings,
2. Solar thermal energy systems for heat generation, particularly for hot water production. Solar thermo-siphonic systems with flat plate solar collectors are mainly used generating hot water at 50-70^{o}C,
3. Solar-PV systems for power generation either in grid-connected or in stand-alone systems,
4. On-shore large scale grid-connected wind farms generating electricity,
5. Solid biomass burning systems for heat generation mainly for space heating and for hot water production. The main biomass sources used include wood pellets, olive kernel wood and fuel wood,
6. Use of biogas produced in two sewage treatment plants as well as in bio-reactors fed with organic food wastes for heat and electricity generation,
7. Hydro energy in two seasonally operated small size plants for electricity generation,
8. High efficiency heat pumps including geothermal heat pumps for space heating and cooling.

Additionally construction of pump storage systems combined with wind farms for electricity generation is planned in the future in Crete. Renewable energy systems currently operating in Crete are presented in table 1.

Table 1: Renewable energy systems currently operating in Crete

	Renewable energy technology/system	Electricity	Heat-Space heating	Heat - hot water production	Heat – space cooling
1	Passive solar		Yes		Yes
2	Solar thermal			Yes	
3	Solar-PV	Yes			
4	Wind farms	Yes			
5	Solid biomass burning		Yes	Yes	
6	Biogas	Yes	Yes	Yes	
7	Hydroelectricity	Yes			
8	Geothermal heat pumps		Yes	Yes	Yes

4. Renewable energy systems operating in Cretan hotels providing heat, cooling and electricity

Various renewable energy systems are currently operating in Cretan hotels including:

1. Passive solar systems providing air-conditioning in hotels,
2. Solar thermal systems for hot water production,
3. Grid connected solar-PV systems generating electricity with the net-metering regulations,
4. Solid biomass burning for space heating and hot water production,
5. High efficiency heat pumps including geothermal heat pumps for air-conditioning.

It has been proposed that in the future new renewable energy technologies could be used commercially in Cretan hotels. These include solar thermal cooling providing space cooling, hybrid solar-PV systems providing hot water and electricity as well as small size wind turbines generating electricity adjusted for hotel buildings. Additionally, fried vegetable oils from hotel restaurants are currently used as raw materials for biodiesel production. These used oils are collected regularly, from large size hotels, and transported in industries located outside of Crete for bio-diesel production. Renewable energy technologies currently used in Cretan hotels are presented in Table 2.

Table 2: Renewable energy technologies currently used in Cretan hotels

	Renewable energy technology used	Electricity	Heat - Space heating	Heat - hot water production	Heat – space cooling
1	Passive solar		Yes		Yes
2	Solar thermal			Yes	
3	Solar-PV	Yes			
4	Solid biomass		Yes	Yes	
5	Geothermal heat pumps		Yes	Yes	Yes

5. The tourism industry in Crete

Crete is the second largest island in the Eastern Mediterranean region and the fifth in size in Mediterranean basin. According to the recent census its population was 621,340 inhabitants. The climate is mild with average annual temperature around 20 ^{o}C. Crete has beautiful landscapes, high mountains and gorges, long coastlines and sandy beaches offering opportunities to visitors for unique vacations. Its civilization is very old and since Minoan era through centuries Romans, Byzantines, Arabs, Venetians and Turks have been ruled the island living their cultural footprint. Monuments left from each civilization, ruled the island in the past, are dispersed all over Crete. Local tourist product has been differentiated in various sectors adjusted for tourists with different interests, priorities and preferences. Agro-tourism, religious tourism, mountainous tourism, cultural tourism, conference tourism, cruise tourism, among others, have been developed so far. One positive asset of tourism industry in Crete is the worldwide famous, healthy and delicious local Cretan gastronomy. For the abovementioned reasons Crete is very popular and well known globally among travelers as an attractive tourist destination with a strong brand name. Annual visitors in the island, during the last years, exceeded 5 mil., while most of them are coming during the period from April to October each year. The island has three international airports and six sea ports which are used for tourist arrivals and departures. The majority of tourists arrive in Crete with air transportation while the British, Germans and Scandinavians dominate among its annual visitors. The tourism industry has been developed during the last four decades and it is very important for the Cretan economy. Its share in the regional GDP is currently estimated at 47%. Employment in this industry is increasing offering job opportunities to many local inhabitants offsetting the decrease of employment in agriculture which used to be in the past the main economic activity in Crete. Tourist arrivals in Crete through different transport modes are presented in Table 3.

Table 3: Tourist arrivals in Crete with international flights, domestic flights and ships (2016) [2]

Mode of transport	Number of tourists	% of total
Number of tourists arriving with international flights	3,938,580	74.04
Number of tourists arriving with domestic flights	416,790	7.84
Number of tourists arriving with airplanes	4,355,370	81.88
Number of tourists arriving by ships	963,614	18.12
Total number of tourists arriving in Crete	5,318,984	100

[2] Vourdoubas, 2020

6. Energy tourism in Crete

The abundance of various renewable energy sources in Crete and the existing installations of renewable energy technologies offer the opportunity for the creation of a new segment in the local tourist product. It can be called “Energy tourism” declaring that it combines vacations with a better understanding and knowledge of benign energy technologies which are necessary for mitigation of climate change. This could be desirable for environmental sensitive tourists who are looking for an alternative to the conventional mass-tourism product of

the island. They are conscious about the climate change which threatens their societies and the well-being. They are willing to be aware about the benign sustainable and low-carbon energy technologies which could replace fossil fuels and contribute in the mitigation of this severe global environmental thread. "Energy tourism" will be addressed to a small niche segment of the tourist market of the island. During their staying in Crete tourists could visit various local renewable energy installation sites learning about their operation and the basics regarding their technologies. This can be achieved with organized half-day or full-day trips by bus at the existing renewable energy installations combined with experts' presentations regarding their technologies, their operation and their impacts. "Energy tourism" has been successfully developed so far in other tourist destinations in Europe and worldwide. Therefore it can be also promoted in Crete differentiating its tourist product and increasing its competitiveness. Development of "Energy tourism" would result in various benefits to the local and regional economy while it will increase the nexus between renewable energies and tourism industry in the island. Support in the creation of this new type of thematic tourism can be offered from experts who are currently working in the Higher Educational Institutes and Research Centers in Crete.

7. Impacts from the nexus of renewable energies and tourism industry in Crete

7.1 Economic impacts

The involvement and use of renewable energies in tourism industry in Crete will result in many economic benefits. Various investments in renewable energy technologies are currently cost-effective offering positive economic results to investors. The income in the hotels using sustainable energy systems for covering their energy requirements will be increased since existing studies indicate that many tourists are willing to pay more for staying in green non-polluting hotels. They will also increase the sales in enterprises manufacturing these benign energy systems. Investments of renewable energy technologies in hotels for heat and electricity generation will reduce their energy cost achieving an attractive and profitable payback period of the capital used. These investments utilize local endogenous energy resources reducing the cost for importing fossil fuels in Crete. They also increase the direct and indirect local employment during the manufacturing, installation, operation and maintenance phases of the required renewable energy systems. Promotion of "Energy tourism" in the future in Crete could attract many environmentally conscious tourists increasing the annual visitors in the island. Use of renewable energy technologies in Cretan hotels could create net zero or nearly zero energy consumption buildings having also zero or nearly zero net carbon emissions. This is aligned with the European policy for improving the energy performance of buildings.

7.2 Environmental impacts

The nexus of renewable energies and tourism industry in Crete has many positive environmental impacts. Use of renewable energy technologies in various hotels and in other tourist facilities results in the decrease of GHG emissions into the atmosphere and in mitigation of climate change. It decreases the carbon footprint of hotels as well as the carbon intensity of the local tourism industry and supports the achievement of the National carbon emission goals according to the international agreements. Use of fried waste vegetable oils from hotel restaurants for biodiesel production will contribute in the promotion of circular economy increasing the sustainability of the tourism industry. Development of energy tourism in Crete differentiates the tourist product

of the island currently offered to visitors which is mainly based to "mass tourism" and the model of "sea and sun". It will attract environmentally conscious tourists who usually spent more during their holidays. They are interested to combine their vacations with improvement of their knowledge and their experience on renewable energy technologies. They consider that these technologies will support the required energy transformation for the mitigation of climate change. Development of energy tourism in Crete also will attract young scientists and researchers who will choose to organize summer schools and international conferences in clean energy technologies. When all these travelers will return in their homes they will probably use the knowledge and the experience acquired during their holidays for the promotion of these benign energy technologies in their homes and in workplaces.

7.3 Social impacts

The relationship between tourism and renewable energies in Crete has various social impacts. New jobs will be created due to growth of the local industry which is related with manufacturing, installation and maintenance of various renewable energy systems. Increase of employment in the hotel industry related with personnel specialized in the operation and maintenance of the renewable energy systems installed. Increase of employment in the large renewable energy installations in Crete, generating power for the grid, related with personnel specialized in the operation and maintenance of these systems. Future development of energy tourism in Crete will result in many benefits in the local society due to the presence of experts, researchers, students and environmental conscious people interested in applications of renewable energy technologies. This will result in sensitization of the local citizens and in assisting them in the promotion of energy sustainability in their homes and workplaces.

8. Results

1. Island of Crete has abundant renewable energy resources particularly solar and wind energy. Various grid connected large, medium and small scale solar-PV systems and large on-shore wind farms currently operate in the island generating electricity which is partly used in hotels and in other tourist facilities. Renewable energy technologies which are mature, reliable and cost effective are already used in Cretan hotels. They generate heat, cooling and electricity covering partly their energy requirements and reducing their carbon footprint. The most widely used is solar thermal energy technology producing hot water. Passive solar energy systems and grid connected solar-PV systems are also used in them. Solid biomass is used occasionally for heat generation while high efficiency heat pumps, including geothermal heat pumps, are widely used in them for air-conditioning.
2. Tourism industry is the main industry in the island generating currently almost half of its GDP. During the last years approximately 5 mil. visitors arrive annually in the island while the most of them come with international flights. Regional authorities are trying to differentiate the tourism product of the island promoting thematic tourism. Combination of tourism with the existing renewable energy systems operating in the island would enrich the local tourist product offering many benefits and increasing the nexus between tourism industry and renewable energies.
3. Various synergies between renewable energies and tourism exist in the island of Crete. Replacement of

fossil fuels and electricity generated by them with renewable energies in tourism industry would result in many economic, social and environmental benefits. Liquid wastes of hotels are used for the production of renewable vehicle fuels. The increased use of renewable energies in Cretan hotels in the future would assist in the achievement of the Greek targets regarding climate change mitigation and the efforts for achieving carbon neutral Europe until 2050.

Further research should be focused on multi-criteria assessment of new renewable energy technologies which could be used in the future in Cretan hotels including for instance the solar thermal cooling technology and the hybrid solar-PV systems. Additionally new policies should be developed for encouraging the hoteliers to promote sustainable energy investments in their enterprises while the existing barriers hindering the use of these benign energy technologies should be removed.

9. Discussion

There are many positive synergies between hotel industry and renewable energy sources which result in many economic, environmental and social benefits. Increase of this relationship is necessary, feasible and desirable in order to achieve the global targets regarding the reduction of GHG emissions and to mitigate climate change which has undesirable impacts in the hotel industry, in local societies and in planetary ecosystems.

1. International studies and practices indicate that locally available renewable energies can be used for providing energy in hotels. Various renewable energy technologies which are currently mature, reliable and cost-effective can be used in them. Some environmentally conscious tourists are willing to pay more for staying in green hotels using sustainable energies during their operation. Use of sustainable energy technologies in them increases their environmental and energy sustainability as well as the sustainability of the regional tourism industry and economy while it triggers local growth.
2. Island of Crete is offered for the development of energy tourism differentiating the current tourist product of the island attracting more environmentally sensitive tourists. Energy tourism has been already successfully developed in some European territories.
3. Hotels in Crete are already using renewable energy technologies during their operation while the locally available benign energy resources in the island could cover all their energy requirements zeroing their carbon footprint due to energy use. Existing hotels in Europe are covering all their energy needs with, reliable and cost-effective, renewable energy technologies achieving net zero energy balance. This fact proves the economic feasibility of using renewable energy technologies for covering all the requirements in heat, cooling and electricity in hotels. Wastes from hotel restaurants' like fried vegetable oils are used for the production of biodiesel which is used as a vehicle's fuel.

Investigation of the impacts of large scale renewable energy installations on the attractiveness of tourist destinations indicates that while they are undesirable for some tourists, others consider them as local sight attractions which they would like to visit during their vacations. To my best knowledge there is not any published research regarding the impacts of on-shore wind farms currently operating in Crete on tourism.

10. Conclusions

Various renewable energy technologies currently used in Crete for power, heat and cooling generation have been mentioned as well as their applications in Cretan Hotels. The possibility of exploiting additional benign energy technologies using the local energy resources in the future in Cretan hotels has been mentioned. The future development of "Energy tourism" in Crete has been proposed taking into account the successful experience in other European territories. It has been indicated that the relationship between tourism industry and renewable energies in Crete results in many economic, social and environmental benefits. This relationship should be strengthened in the future. Reduction of the environmental footprint of tourism industry in Crete requires the replacement of fossil fuels, used in hotels and in other tourist activities, with renewable energies and low carbon energy technologies. Existing barriers hindering the use of low or zero carbon energy technologies in Cretan tourism industry should be removed. Innovative renewable energy technologies which currently are not mature and cost effective should be financially supported in order to be improved and used in the future in the local tourism industry.

11. Recommendations

Development of further relationships between renewable energies and tourism industry in the island of Crete, Greece should be pursued. Existing barriers should be removed and sensitization of all stakeholders including public authorities, hotel owners and general public should be promoted. Particularly the future use of various innovative benign energy technologies like hybrid solar-PV and solar thermal cooling in hotels should be promoted. Additionally new public policies increasing the linkage of tourism with renewable energies should be developed and promoted in Crete.

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