LOCAL AGENDA 21 FOR BOZCAADA, TURKEY WITH TARGET 100% RENEWABLE ENERGY AND ECO-LABELING PERSPECTIVE

by

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LOCAL AGENDA 21 FOR BOZCAADA, TURKEY WITH TARGET 100% RENEWABLE ENERGY AND ECO-LABELING PERSPECTIVE

Local Agenda 21, followed by many local authorities around the world, aims to reach a mutual goal of sustainable development (with its economic, social, and environmental dimensions) within the destination location. Thus, because of its unique status, Turkey's Bozcaada Island has been investigated. The concept's importance is due to the obvious risks generated as a result of existing mass production and consumption patterns, especially where the product is the destination itself, covering waste generation and energy consumption parameters.

For the tailor-made study, information was gathered from the Bozcaada District Governorship and through field studies conducted from May 2005 to September 2006, although the lack of a data recording system made data gathering difficult. Following a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, efforts are directed towards a "Target 100% Renewable Energy" identity in addition to the current brand name, "Organic Island Bozcaada". Other main sustainability related headings for the thesis' Local Agenda 21 concept are the application of a GEP Green Energy Production Technologies Ltd. state-of-the-art Waste-to-Energy plant (with 6000kg/day waste minimizing, thermal energy generation for 106 houses, and 34,187,047kg of CO_2 production over 25 years), along with a Life Cycle Assessment (LCA) study realized through GaBi4 engineering software. In addition, along with suggestions for environmental quality raising investments, an environmental evaluation from an Eco-Labeling perspective of feedstock supplying tourist accommodation services to the subject plant creates a competitive edge for environmentally sound business approaches.

The study's value is in making contemporary proposals towards sustainable tourism development: a destination approach to related stakeholders, role distribution, awareness raising on waste management, Target 100% Renewable Energy, and environmentally sound tourist accommodation services. The findings suggest that, given the integration of proposals, Bozcaada may be a remarkable pilot area for developing the Local Agenda 21 concept within Turkey.

HEDEF %100 YENİLENEBİLİR ENERJİ VE EKO-ETİKETLEME PERSPEKTİFİ İLE BOZCAADA–TÜRKİYE İÇİN YEREL GÜNDEM 21 UYGULAMALARI

Günümüzde yerel yönetimler tarafından takip edilen Yerel Gündem 21 uygulamaları beldelerde sürdürülebilir kalkınmanın ekonomik, çevresel, sosyal boyutlarından ortak hedefe ulaşmayı amaçlar ve Türkiye`de konuşlu Bozcaada statüsünden ötürü bu kapsamda incelenmiştir. Kavramın önemi kitlesel üretim ve tüketimden doğan risklere bağlı olup beldenin kendisi ürün olduğu ve içeriğinde atık üretimi, enerji tüketimi kriterleri bulunduğunda artmaktadır.

Beldeye özel çalışmalar için bilgiler Bozcaada Yerel Yönetimi ve Mayıs 2005-Eylül 2006 saha çalışmaları ile derlenmiş, düzenli veri kayıt sistemi olmadığından zorluklar yaşanmıştır. Varolan "Organik Ada Bozcaada" kimliğinin yanı sıra Yerel Gündem 21 uygulamaları çerçevesinde kimlik oluşumu için gerekli kriterler Strength-Weaknesses-Opportunities-Threats (SWOT) analizi ile saptanmış ve belirlenen "Hedef %100 Yenilenebilir Enerji" kimlik oluşumu için çalışmalar gerçekleştirilmiştir. Söz konusu çalışmalar GEP Yeşil Enerji Üretim Teknolojileri Ltd. Şti. iştigal konusu olan 6,000kg/gün atık minimize ederek 106 hanenin ısınma ihtiyacını 25 yılda 34,187,047kg CO_2 üreterek karşılayabilen Atıktan-Enerji tesisinin Yaşam Döngüsü Değerlendirmesinin (YDD) GaBi4 mühendislik programı ile saptanmasını kapsamaktadır. Tezde vurgulanan Yerel Gündem 21 kavramını besleyen sürdürülebilirlik bağlantılı diğer başlıklar yakıt hammaddesi sağlayıcıları arasından seçilen turist konaklama servislerinin çevresel değerlendirmesinin Avrupa Birliği (AB) Eko-etiket perspektifinden rekabetçi avantaj sağlayan çevre dostu işletmeler olarak ele alınmasıdır.

Çalışma sürdürülebilir turizm kalkınmasına katkı sağlayabilecek paydaşlarca üstlenilmesi gereken görev dağılımı, izlenecek yol, atık yönetiminde bilinçlendirme, Hedef %100 Yenilenebilir Enerji, çevre duyarlı turist konaklama servisleri hususlarında yardımcı olmaktadır. Tez çıktıları, önerilerin gerçekleşmesi durumunda Türkiye`de Yerel Gündem 21 çalışmalarının gelişmesi için Bozcaada`nın pilot bölge olacağı yönündedir.

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LIST OF SYMBOLS

Symbol	Explanation	Units used
CH_4	Methane	kg
CO	Carbonmonoxide	kg
CO_2	Carbondioxide	kg
H_2	Hydrogen	kg
N_2	Nitrogen	kg
O_2	Oxygen	kg
$C_2 H_6$	Ethane	kg
$C_3 H_6$	Propylene	kg
SO_2	Sulphurdioxide	kg

LIST OF SYMBOLS/ABBREVIATIONS

Symbol	Explanation
A	Armagrandi Hotel
C	Capraz Holiday Village
DBMS	Data Base Management System
EPDK	Energy Market Regulatory Authority
EU	European Union
GEP	Green Energy Producer
GIS	Geographical Information System
IA	Impact Assessment
ICZM	Integrated Coastal Zone Management
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
MSW	Municipal Solid Waste
NGO	Non Governmental Organizations
R	Rengigul Small Hotel
RDF	Refuse Derived Fuel
SD	Sustainable Development
SME	Small and Medium Enterprise
SWOT	Strengths – Weaknesses – Opportunities – Threats
TEDAŞ	The Turkish Electricity Distribution Incorporated Company
UNEP	United Nations Environment Program
WWTP	Waste Water Treatment Plant

INTRODUCTION

By definition, destination management can include regulations, initiatives, operations, and techniques to shape both development and tourism related activities. In the case of Bozcaada, the environmental dimension of Sustainable Development (SD) has been the priority concern [1]. From the field studies conducted in the period May 2005 – September 2006, it has been concluded that few environmental issues are concerned. An action plan has been suggested within the scope of the thesis for implementing the Local Agenda 21, and, as a result of the Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, the identity "Target 100% Renewable Energy" was settled on. Considering the current resources on the island and available environmentally sound waste minimizing technologies, a state-of-the-art Waste-to-Energy plant has been designed and evaluated from a Life Cycle Assessment (LCA) standpoint. Such applications in reality will lead Bozcaada to more systematic, continuous economic growth, through a planned development, and thus to sustainable tourism development: a destination approach.

Given the current state of the destination management on Bozcaada and comparing it to existing good examples of best practice worldwide, actions are automatically directed to workable approaches for sustainability of the destination which also cover the EU Eco-label award for tourist accommodation services. Bozcaada is a carefully chosen spot for developing models since the interactions with participating actors are relatively easy, and the understanding for most of the parameters affecting the destination management are already present. [2, 3, 4].

The two applications investigated in the study are crucial for brand making in respect of Bozcaada "Target 100% Renewable Energy", for which 60% of the target can be realized through the existing windmills and the proposed plant within the scope of the thesis. However, the latter is only possible by implementing advanced technologies, raising public awareness, and by getting the support of political incentives [5].

1 LITERATURE REVIEW

Tourism being now world's largest service industry is not only a powerful economic force but is a factor in the physical environment as well and reciprocally the environment is the core of the tourism product. Since more attention is now being paid to the environment, projects that are economically feasible but not environmentally desirable remain inbuilt. Profitability in tourism depends on maintaining the attractiveness of the destination people want to experience. Tourism has the power to enhance the environment, to provide funds for conservation, to preserve culture and history, to set sustainable use limits in terms of energy and resources management, and to protect natural attractions, and has also the power to destroy if not properly planned and implemented [6].

1.1 Definition of Sustainable Development (SD) for Tourism

SD must become a normal way of thinking and acting by a majority of the global community and it cannot be the exclusive purview of the enlightened segments of a society or of an industry. If SD is to be an effective model for the future, it must be a workable approach to ensuring that we can replace what we consume and that in the process of consumption we do not create by-products that pollute or destroy the ecosystem on which future generations depend [6].

At the local level, SD is achieved by steering local development activities to simultaneously achieve three objectives; which are matching with SD dimensions:

a) Increased local social welfare;
b) Greater, and more equitably distributed, local economic wealth; and
c) Enhanced integrity of local ecosystems [7].

Local Agenda 21 processes to create a shared vision for local development that is consistent with the SD concept and is instigated by numerous local authorities. These processes in conjunction with decentralization policies originating at the national level are transforming local governance and reorienting the process of local development in communities throughout the world. Tourism is one of the many external forces influencing the direction and options for local development. The question of whether tourism can be sustainable –that is, whether it can contribute to local SD- is addressed in the context of the Local Agenda 21 process [7].

While other sectors of the economy are undoubtedly the greatest focus of concern, tourism is increasingly being brought under the microscope regarding its role in contributing to the long-term well being of the planet. To date, the criticisms directed at tourism from an impact of development standpoint have tended to focus on the deterioration of natural and cultural environments that tourism can cause. Due to its pervasive and diverse nature, tourism affects, and is affected by, many factors relating to our social and economic wellbeing. Besides potential environmental impacts on land, marine and water and atmospheric basis, the resources consumption issues are of great importance. Along with high water demand issues the use of nonrenewable resources from the point of energy consumption is perhaps the best single example; tourism depends heavily on the fuel that is burned to realize necessary energy supply for transporting travelers, heating up accommodation services, etc. Therefore, any policies that affect the use of petroleum based fuels will affect the tourism sector [6].

1.2 Progress for SD in Tourism

Tourist activities, as traditionally defined by the tourism industry, fundamentally involve the transportation and hosting of the tourism consumer in a local community, i.e., “tourist destination”, where the “tourist product” is consumed. No other global industry structures itself in such a way that the consumer is brought to the product, rather than the product being delivered to the consumer. This structural difference

produces unique social impacts upon the local tourist community, including the interruption of local customs and lifestyles, the spread of infectious diseases, changes in local demographics, and changes in local housing and labor markets [7].

The concepts of conservation, preservation, and environmental protection have always had as their goal to desire to prevent the destruction of desirable natural conditions and species as forming the content of SD [6]. The humanity seeks in the SD the three dimensions which are; economic, social and cultural development. In parallel, there is also the recognition that growth that is consumptive and \ or destructive cannot continue unabated without serious impacts on the natural environment on which we depend for life itself [8].

There is a need to enunciate several key premises and critical areas on which SD policy, as it applies to tourism should be based for a healthy progress.

a) In seeking to implement initiatives to support SD in tourism, an understanding and implementation of actions will by necessity involve the seeking and acceptance of concepts, methodologies and approaches of individuals from a broad range of disciplines [6].
b) Previous experiences for sustainability in tourism play a major role in defining workable actions. These experiences need to be screened and assessed for their continued relevance and significance [6].
c) The SD lifestyle generally believes that the natural ecosystem is preferable to artificially built environments or settlements. Therefore preserving the focus are as it is or close to its original state is of great appreciation when it comes to “tourist product” [6].
d) Today few advanced nations having small populations possess most of the world’s wealth and consume most of its resources. The answer for “Sustainable for whom?” question is important for the decision making [6]. The share of total energy consumption met by renewable energy grew only slightly between 1990 and 1999. Projections of future energy demand imply that the growth rate of

energy from renewable sources needs to more than double to attain the EU indicative target of 12% by 2010 [9].

e) While recognizing that there is a need for global thinking, we also need to recognize that we may need to restrict on where we have the power to act and to make a difference [6]. The development of Eco-label is an important step in this direction. One of the aims of its actions is to make the citizen more sensitive, and to make the sensitive citizen a global citizen [10, 11].
f) While SD as a concept implies forever this may be impractical to deal with. It may be more effective to undertake a less demanding series of phased programs that initiate movement in desired directions rather than delaying action until longer-term programs can be put in place [6]. Periods indicated are short – medium and long runs which cover 4 – 10 – over 10 years' periods accordingly.
g) Regardless of the way in which the values of a society are determined, they will ultimately determine the policies that emerge with regard to SD and the power of different political units will determine the level and form that sustainability will take [6].

Working with individuals \ organizations that are already aware and have responsibility for and a commitment to sustainability is necessary [6]. It can be concluded taking into account the above indicated premises an action agenda to support a SD program for tourism might include the following elements:

a) Maximum total visitation levels to a community / region
b) An obligatory tax to support tourism infrastructure planning, development and maintenance
c) Community supported legislation to protect and preserve unique resources and heritage sites
d) Community, government and industry consensus concerning architectural and living standards
e) Support for standards and certification programs that encourage staff development and the delivery of high quality service.

f) Gain Non Governmental Organizations (NGO) support for knowledge dissemination.

1.3 Strategy Formulation and Goal Determination for Green Island Concept

A tool is necessary to establish a strategy and defining the goal for what is to be sustained. From an overall destination management perspective, the task becomes much more complex. Here the challenges become one of attempting to balance the sustainability dimensions [8].

A scan of the internal and external environment is an important part of the strategic planning process. Environmental factors internal to the case under examination usually can be classified as strengths or weaknesses, and those external to the case can be classified as opportunities or threats. Such an analysis of the strategic environment is referred to as SWOT analysis. The SWOT analysis provides information on that is helpful in matching the case's resources and capabilities to the competitive environment in which it operates [12].

1.4 Destination Development - Green Island Identity

Managing tourism destinations is an important part of controlling tourism's environmental impacts. Destination management can include land use planning, business permits and zoning controls, environmental and other regulations, business association initiatives, and a host of other techniques to shape the development and daily operation of tourism-related activities [1].

The term "destination" refers broadly to an area where tourism is a relatively important activity and where the economy may be significantly influenced by tourism revenues. Destination management is complicated by the fact that a single, recognizable destination may include several municipalities, provinces, or other government entities - in island environments it may be the entire piece of land [1].

The needs, expectations and anticipated benefits of tourism vary greatly from one destination to the next, and there is certainly no "one size fits all" approach to destination management. As local communities living in regions with tourism potential develop a vision for what kind of tourism they want to facilitate, a comprehensive planning framework such as Local Agenda 21 has proved useful and is being used more and more often. For United Nations Environment Program (UNEP), promoting sustainable tourism within Local Agenda 21 processes is a way to strengthen local stewardship of the environment [1].

Society may be viewed as consisting of clusters that change shape constantly as they interface with one another. To complicate matters, a particular citizen belongs to more than one cluster and may change his or her perspective as he or she assumes different roles in society. In the end, however, each person must reach a weighted position with respect to any given issue.

From the standpoint of the tourism sector, the reality is that all questions related to the nature and extent of tourism development must be supported by the community at large. This means that whatever direction tourism development takes in a community, region or country it must have the support of the majority of citizens who are affected by it. This means very simply that the perceived benefits from tourism must be seen to outweigh the total costs (economic, environmental, and social) associated with it. It than becomes necessary to propose an operational allocation of responsibility that remains true to the democratic model and the concept of resident-responsive tourism [6].

Destination development models are discussed on international platforms and are candidates for EU Business Awards. Named benefits of such models can be described as follows:

- Productive development of locals as a result of the creation of micro/small businesses or improvements in their competitiveness,

- Synergies generated through associations, local development, regional integration of isolated population centers,
- Re-evaluation of the cultural heritage,
- Improved health and sanitary conditions,
- Wealth creation through complementary development (visitors` transit hubs, services offered to visitors all along the route: lodging, guides, small provisions shops, maps, leaflets, etc.)

From the environmental point of view,

- The active protection of natural sites,
- Promotion of scientific activities researching into biodiversity, creation and spread of environmental awareness, protection of species native to the area.

As per the repercussions there is a potential risk that waste generated by tourist activity, which is calculated as 1.1kg/waste/capita for Malta and Bozcaada, may affect the environment if it is not correctly separated and disposed of. This can be resolved by training and giving the visitors clear instructions [13, 14, 15]. As contrary to the fact that the potential risk is generated from waste the same fact can also be turned into benefits. There are certain technologies which serve environment by both minimizing waste generated and turning it into energy [16].

From the literature survey, it has been understood that there is no scientific definition for “Green Island” identity and from the extended survey it has also been understood that nations have named their islands with this identity by not taking into consideration environmental issues. The Green Island of Taiwan is a good example for the case [17].

1.5 Eco-Labeling For Tourist Accommodations

The Eco-label scheme is part of an overall approach to community policy on environment and industry for contributing to sustainable production and consumption patterns and SD [18].

The European Union (EU) Eco-label is awarded to products or services which fulfils the scheme's requirements to limit the main environmental impacts from the three phases of the service's life cycle (purchasing, provision of the service, waste). In particular they aim to:

a) Limit energy consumption,
b) Limit water consumption,
c) Limit waste production,
d) Favor the use of renewable resources and of substances which are less hazardous to the environment,
e) Promote environmental education and communication [19].

EU Eco-label is addressed to product and services and not to producers and productive sites and when it comes to hotel structure it is defined as the provision of sheltered overnight stay structured in rooms, with all their contents, including at least a bed fit for use, offered as main service to tourists behind a fee. This definition points out the five dimensions in which the lodging concept can be identified.

a) Provision of a room,
b) Provision of a bed,
c) Being the main service of the accommodation,
d) Application of a fee for the service,
e) Being addressed to tourists [20].

In the case of tourist accommodation service, the ecological criteria should be divided into mandatory criteria, all of which must be complied with and optional criteria, only a number of which need to complied with [19]. EU Eco-label is a guarantee for high environmental performance and is the best way to tell the guests about the efforts on environmental measures and quantified quality performance [21].

1.5.1 Advantages of Having an Eco-label for Waste-to-Energy Priority Given Tourist Accommodation Services

Once an accommodation service is awarded the Eco-label that status will bring certain advantages together with itself. To name a couple `Sunwing Resort Kallithea` can be taken as reference, because its perspective is clearly indicated on the entry form:

a) Eco-label will strengthen staff's and stakeholders` motivation for its further improvement and will prove that it is possible to lead others towards environmental sustainability through their own example.
b) Accepting Eco-label as an additional incentive to reduce operating costs by reducing the consumption of natural resources which results in strengthening the competitive advantage.
c) Recognizing Eco-label as a social responsibility, because of the money they earn from the business operation, to help the local community improve its knowledge in activities that contribute to sustaining the natural environment.
d) Guarantee that the guest and stakeholders will not be exposed to any danger by its operations. Therefore the hotel ensures that along with consumption issues, recycling facilities will be offered, healthy and biological products with longer life cycle will be purchased, and at least same quality services will be offered with equivalent services with no environmental benefits [21].

Application of an Eco-label to tourist accommodation may have important implications to their possibility to stand out from other non labeled elements from the same product group [10].

It is a known fact that very few accommodation services in EU can get their environmental standards inline with EU Eco-labeling criteria [2]. In addition to the EU Eco-labeled hotels list (See appendix 3) it is also possible to become familiar with

environmental standards reached hotels which have applied for EU Environmental Awards for the year 2005 over the literature [21].

The reason why so few accommodation services are applying to Eco-label Awards maybe interpreted as these standards being high and that more or less each country has its own local procedure which is relatively reasonable and easy to practice [3].

List of countries worldwide having separate Eco-label criteria: Austria, Canada, China, Croatia, Czech Republic, Denmark, EU, Finland, France, Germany, Iceland, India, Japan, Korea, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Singapore, Italy, Spain, Sweden, Taiwan, Thailand, United Kingdom, United States. Programs in Development: Brazil, Indonesia, Hong Kong [22]

EU Eco-label award applicant, Sunwing Resort Kallithea`s entry form to the European Product Award Contest clearly indicates getting its standards raised and to imply them inline with EU criteria takes time and it is a wise attitude to set minor targets on the path for reaching the Eco-label [21]. It is possible to come across 3 of Sunwing Chain Hotels named in newly Eco-label authorized hotels` list for the term end of 2005 and beginning of 2006 [23].

During Kallithea`s awarding process the first effort came in the form of a 50 step program for the protection of the environment that was later extended to 100steps for a better environment with the help of the Scandinavian Organization “The Natural Step”, since the hotel belongs to a Scandinavian chain of hotels [21].

After that, the above programs were replaced with the EU Eco-label criteria for tourist accommodation. The hotel is continuously awarded the European Blue Flag for the way it manages and maintains its coastal environment and beach. In addition to the above, Resort’s environmental initiatives are constantly reviewed and developed

so that company's resorts are always associated in the minds of guests with the best environmental practices [21].

For accommodation services which are willing to apply for Eco-Label award some suggestions are made over the literature:

a) Define your customer profile, nationality, age group, preferred vacation type, are they concerned and conscious of sound environmental practices?
b) Distinguish your hotel services, formulate them based on the European Eco-label`s scheme demands, either for the implementation of the mandatory criteria or for the optional ones. Therefore formulate strict procedures which better serve environmental operation.
c) Cooperate with schools, universities and hotels in order to promote the Eco-label scheme in the community by providing information and assistance based on experiences.
d) Employ local people and let them develop skills making them good professionals, thus securing their future careers.
e) Benefit the local population by hotel expenses to buy products and services produced locally.
f) Benefit the local population by letting guests spending on products and services produced locally [21].

1.6 Waste-to-Energy Plant Description

The flexible design for Waste-to-Energy plant lets it be compact, and suitable for large or small-scale operations. The system focuses on mechanical extraction of combustible materials from mixed solid waste originating from municipal, commercial, building & demolition, landfill and light industrial sources. The system is able to produce a better fuel from waste. Harmful and other contaminants not suitable for combustion are removed, such as: metals, batteries, plastics, electric components, stone, glass, soil etc. [16].

In addition, if the plant is equipped with means for material recovery, the volume that needs to be land filled is reduced to a minimum and can in some cases be avoided completely [24].

Municipal Solid Waste (MSW) to Refuse Derived Fuel (RDF) process is an important technique to densify biomass materials to increase the particle size and bulk density. The reasons for densification include; the reduction in transportation costs and easy storage and handling.

Syngas production is the process of converting biomass and solid waste into combustible gases (carbon monoxide, methane and hydrogen) that ideally contain all the energy originally present in the biomass feedstock [25]. It can be broadly defined as the thermochemical conversion of a solid carbon-based material (feedstock) into a combustible gaseous product (combustible gas) by the supply of a gas production agent (partial oxidation) under the application heat [26], Oxidation can be done either by using air or oxygen. If oxygen is used, the resulting gas (syngas) will have a higher calorific value.

The thermochemical conversion changes the chemical structure of the feedstock by means of high temperature. The agent introduced allows the feedstock to be quickly converted into gas by means of different heterogeneous reaction. The combustible gas contains CO_2, CO, H_2, CH_4, H_2O, N_2, and trace amounts of higher hydrocarbons, inert gases present in the gas production agent, various contaminants such as small char particles, ash and tars [27].

1.7 Life Cycle Assessment (LCA)

LCA is a process to evaluate the environmental burdens associated with a product, process or activity by identifying and quantifying energy and materials used

and wastes released to the environment; to assess the impact of those energy and material uses and releases to the environment; and to identify and evaluate opportunities to affect environmental improvements. The assessment includes the entire life cycle of the product, process or activity, encompassing extracting and processing raw materials, manufacturing, transportation and distribution, reuse, maintenance, recycle and final disposal [28]. The LCA methodology has four components: goal definition and scoping, life cycle inventory (LCI), impact assessment and improvement assessment [29].

The goal definition and scoping stage of LCA defines the purpose of the study, the excepted product of the study, the boundary conditions, and the assumptions [29]. The LCI quantifies the resource use, energy use and environmental releases associated with the system being evaluated [29].

Once the inputs and outputs of a system have been quantified by the LCI, impact assessment (IA), the third stage of LCA can be performed. IA consists of four stages: classification, characterization, normalization and weighting. Classification is the assignment of LCI inputs and outputs to impact groupings. For example, the use of fossil fuels may be assigned to the impact group ”depletion of finite resources”. It provides the answer for the question “What is the problem for this environmental exchange?”. Characterization is the process of developing conversion models to translate LCI and supplemental data to impact descriptors. For example; carbon dioxide and methane LCI outputs may be converted to units of global warming potential. The answer to “How big is the problem?” question is answered in this step. Normalization is where the different impact potentials and resource consumptions are related to a common reference in order to facilitate comparisons across impact categories. Weighting is the assignment of relative values or weights to different impacts, allowing integration across all impact categories and resource consumptions reflecting the relative importance they are assigned in this study in accordance with the goal [29, 30].

As per the improvement assessment; it is the desire to reduce burdens on the environment by altering a product or process which is often the driver for a given study along with the desire to benchmark a product against competitive products or to prove that one product is environmentally preferable to another [29].

LCA which is a decision support system, which cannot replace actual decision-making, does not provide eco-labeling criteria but simply provides a coherent basis from which policy makers take decisions [31]. LCA is internationally recognized and standardized via International Organization for Standardization (ISO) 14040 series [18].

LCA is used:

a. Help to develop long-term policies covering material use, resource conservation and reduction of environmental impacts and risks posed by materials and processes throughout the product life cycle and to guide for putting use restriction if necessary,
b. Evaluate resource effects associated with source reduction and alternative waste management techniques,
c. Provide public information about resource characteristics of products and materials,
d. Identify gaps in knowledge and research priorities,
e. Identification of the most important environmental aspects in the whole life cycle of the product, thus focusing on improvement efforts where the problems are largest and setting targets for improvement,
f. Marketing of products that are appraised as “environmentally friendly” or “green” through application of an Eco-Label or an environmental declaration, for which public and private bodies can differentiate among products for Eco-Labeling programs [30].

1.7.1 LCA and Energy Relation

Rising energy prices, shortages in non-renewable energy supply and political debates on the peaceful use of nuclear energy pushed long-term energy planning back to the top of the political agenda. At the same time, environmental impacts caused along the fuel cycle of classical and emerging energy technologies get more and more attention. This session is dedicated to LCA methodology development in view of long-term energy planning and technology assessment. SETAC announces that abstracts are invited that cover two or more of the following aspects: (1) the combination of LCA with energy modeling, (2) the combination of LCA with external cost assessments, (3) the adaptation of inventory data to long-term prospective LCAs, and (4) comprehensive assessments with special focus on trade-offs among such controversial issues like nuclear waste, climate change, and respiratory effects due to particulate matter [28].

1.8 GaBi4 LCA Software

The pressure to assess the environmental characteristics of products and processes has been more severe in Europe than elsewhere. This has led to a more urgent development of LCA approach, from which two major needs have become prominent, for data and for a practical and acceptable approach to impact assessment [29].

About 54 LCA tools are mentioned in the literature but just a few of them are suitable for complex product LCAs, for which the list includes GaBi tool as one of the strong tools with raw material and power generation data available.

The GaBi 4 software system is a tool to create life cycle balances. It provides support when managing large datasets and modeling product life cycles, which help to analyze and interpret the results. GaBi is different from other methods named in literature due to its analysis method which is expanded to include technical,

environmental and also socio-economical aspects. The system can be used as part of all modeling and analysis related to process chains [32]. GaBi 4 Extension database II covers 188 additional energy carrier data sets [33]. GaBi tool is highly functional, user-friendly software which offers post selling services [34].

2 SUSTAINABLE DESTINATION DEVELOPMENT FOR TOURISM IN BOZCAADA

2.1 General Information On Bozcaada

Figure 2.1 Bozcaada and mainland connections

The small island of Bozcaada is spread over 37.6 km^2 area at 39 50'- 39 47' and 025 57'-026 05' North – East, located on the Cruise Ships` Lines, and, because of its positioning (12 miles to the Çanakkale Strait) it differs from typical Mediterranean climate affected zones. Concerning water resources, apart from small rivers running only in winter time, there are no surface waters. On the other hand, both northern and southern winds play a dominant role in daily life as a source of renewable energy generation. Wind power is used for energy generation through 17 windmills with an annual production capacity of 37,177,530kWh which affects economic values, mainly agricultural, viniculture, fishery and tourist applications. Considering the environmental pollution control issues, there is neither the establishment of any kind

of municipal or industrial waste water treatment plant, nor any kind of landfill activity [14].

Based on the official census carried out in 2000, the island's population is 2,427. The population increases to 10,000 in the summer season as a result of incoming tourists. The estimated number for the total capacity of tourist accommodation places, summer house holder numbers, the number of guests staying at guesthouses, and the estimated number for daily visit tourists is helpful for calculating the summer population. The population for winter is based only on people staying in their winter houses on the island. Out of 1409 buildings, 64% and 36% are located in Cumhuriyet and Alaybey Districts with actual numbers of 914 and 495 respectively. However, 300 of these are vineyard houses and are located outside the residential area. Only 3% of vineyard houses are full during the winter season. Population volume in the Alaybey District is 1,110, and it is 1,317 in the Cumhuriyet District [14].

Figure 2.2 Bozcaada districts

Currently, there are no tools such as the Geographical Information System (GIS) application that are used for sustainable urban planning and control. In order to move towards delivering consistent results that match the needs of economies, local authorities and communities with those of business, both educational and informal conversational meetings are held on Bozcaada [14].

2.1.1 Tourism on Bozcaada

As per the controlled/uncontrolled sustainable tourism applications that are already getting started for Bozcaada, it has been observed that the local people are environmentally aware, they take care of cultural conservation, and they are willing to stop the increase in artificial tourist accommodation and improve the quality of the current hospitality service status on the island. Allowing tourism growth for Bozcaada while preventing the degradation of the environment can be realized through different methods, including, but not limited to, Integrated Coastal Zone Management (ICZM), sustainable agriculture, integrated waste management, and resource planning [14].

The tourism season on the island runs during the whole year excluding 3 months in winter. However, the peak and the most efficient part of the season is during July and August. As a result of local authority's efforts in terms of the right presentation of Bozcaada, there has been a serious increase in the number of visiting tourists during June and September as well. Activities are still being conducted in order to further increase the number of months the tourism season lasts as there is quite a long "low season" between September and June that is ineffective and requires the use of heating between October and April [14].

22 hotels and 44 pensions, with a total number of 1,602 beds, form the bed capacity on the island. In addition to this, guesthouses are also providing a wide portion of the hospitality service ot the island which results in a total bed capacity number of 2,500 [14].

In addition, there are a number of sub-tourism related activities which together form the total tourism industry for Bozcaada, and these are as indicated below [14].

1) Cultural tourism, which accounts for 10% of the total tourism on the island and consists of the Turkish –Greek Fellowship, Vineyard Festivals, Wine Tasting and Iliad Reading Days held on the island.
2) Eco tourism accounts for another 10% of the total island tourism. Fisheries are important resources for the local economy since the island is located on fish migration paths. The diving season is from May to October, and the waters around the island are crystal clear, with an average visibility of 50 meters.
3) Action plans on education on tourism at the university level, including its sustainability issues, were finalized at the end of summer 2006. This may be a very hopeful sign for the sustainability of tourism for which the related university department can be used as a medium for information dissemination.
4) Bozcaada is a very rich tourism destination for several sport activities, including bicycling, sailing, riding, and all these, along with others, account for 10% of the total island tourism. These activities are carried on via special events such as the Odysee Cannes Sailing Competition, the Bicycling Festival, etc.
5) 20% of tourists arriving on Bozcaada choose the destination for romance.
6) The rest, accounting for the highest proportion at 50%, is from family vacations. There are very limited health services in Bozcaada, which may be considered as a negative indicator for tourism destination selection by tourists.

2.1.2 Resource Management on Bozcaada

(i) Renewable Energy Resources

The renewable energy of 37,177,530kWh obtained from wind turbines with an operation efficiency of 40% [14] can provide for the needs of 12,000 people, which is equivalent to approximately 3,000 houses [35]. The amount produced is nearly 12 times greater than the actual energy need in Bozcaada. The excess energy is sold over an interconnected line from Bozcaada to Çanakkale, supplying 5% of the energy

consumption of the mainland. Unfortunately, the island is not getting direct use of the energy generated from the Wind Power Station. In accordance with the Energy Market Regulatory Authority (EPDK) regulation “Renewable Energy Resources Usage for Energy Generation Purposes No.5346, date: 10.05.2005” the, produced energy is first sold to the mainland via the interconnected system. The island population then buys the energy from The Turkish Electricity Distribution Incorporated Company (TEDAŞ). Therefore, there is no incentive in terms of benefit to the local authority since if there is a license to be provided, and then the producer company is going to benefit from it.

In addition to the above system, the use of existing solar panels on the island is very popular. Nearly 40% of buildings located on the island have solar panels, which work at a 40% efficiency level supplying 3,238,834.484kcal/day of energy. 563 houses benefit from solar energy on Bozcaada [14].

(ii) Water Supply

A potable water supply to the island is supplied at a rate of 30L/sec. through the Aegean underwater pipeline. In addition to this, there are two potable water wells on the island which provide 8L/sec. of water. As the existing water resources on the island are not sufficient to meet the annual need of 672,000m^3/year, water supplied from the mainland balances the total water consumption of the island. There is no necessity for water use for agriculture on the island.

For the time being, there exists no industrial or commercial waste water treatment plant (WWTP) at any level. However, an investment for a 10,000 people capacity WWTP will take place under the ownership of Bozcaada Municipality within a very short period. As WWTP on the island is one of the primary requirements of the Blue Flag award, these criteria must be met for the award application [14].

2.1.3 Other Sustainability Related Arguments

(i) Sustainable Agriculture on Bozcaada

With an economic contribution of 25%, grape cultivation has the priority in agricultural activities within the overall agricultural activity.

Agricultural activities in Bozcaada consist of agricultural crop production, olive groves, and vegetable and fruit plantations. Viniculture on Bozcaada is probably as old as the history of the island itself; on Bozcaada coins from the period B.C., the grape bunch can be clearly seen. The viniculture is spread over 5,002,500 bunches. The delicious “Cavus” type for eating, as well as the “Karasakiz” and “Vasilaki” for winemaking have made their way into the viniculture literature. Lately, varieties such as “Cabernet Sauvignon” and “Karalahna” have also been introduced to the island’s viniculture. Four factories are currently in operation for wine production purpose, and the excess grape production is sold outside Bozcaada’s boundaries [14].

Grapes for eating are sold on a retail basis in the internal market and marketed through the Istanbul Fruit and Vegetable Wholesale Market. The additional income to the economy from winemaking as a percentage of local agricultural products is approximately 50%. Only local food is served at restaurants on the island [14].

There is certificated organic agricultural activity on the island for which the contract was signed in 2006 with ECOCERT Accreditation Company. Organic agriculture in an area of 320hectares is undertaken. As a result, an identity, “Organic Island Bozcaada”, will be created for the island [14].

(ii) Transportation

Access to the destination is the priority item in decision making for tourism destination selection. Unfortunately, Bozcaada can be considered far from many national and international access points. Çanakkale national airport has been accessible since late 2006, but only through a limited number of connections from

Istanbul. Transportation to the island is primarily realized through ferries from the mainland which run with a 4-5 times/day frequency in the high season and a 3 times/day frequency in the low season [14].

There is no traffic registry mechanism on the island. Methods of transportation on the island are mainly taxis, bicycles, motorcycles and cars. There is no bio-fuel usage on the island [14].

2.1.4 Summary

The data collected over raised questions and governorship reports have been summarized in Table 2.1 which provides the General Overview of Bozcaada [14].

Table 2.1 General overview of Bozcaada from environmental dimension perspective

Information Related To	Year		Description
	Low Season	High Season	
Population	2,427 people	10,000 people	Tourist number added
Population Density	65 people/km^2	268 people/km^2	
Heating Necessity	14,090,000kcal		10,000kcal is calculated for one apartment [35].
Waste Generation	5,000kg/day	11,000kg/day	The yearly sum is 2,520,000kg
Solar Panels	1,182,174,586.66kcal		3,238,834.484kcal/day energy produced; with an assumption of 40% of the houses have solar panels. Copper blade and pumps, selective surface collectors are considered for the design [14, 16].
Waste From Agriculture	3,000,000kg		Input for compost
Waste From Wine Making	550,000kg		Used as fertilizer
Energy Generation	27,684,960 kWh	9,492,570 kWh	Wind farm is 40% efficient Energy sold to interconnected line is 37,177,530kWh / year
Energy Consumption	2,783,960 kWh	2,820,486 kWh	Energy bought from governmental body is 5,604,446kWh / year
Emissions From Agricultural Waste Burning	16,740,600kg		Value includes CO_2, NO_2, SO_2 [36, 37].
Water Consumption	1,400m^3/day	2,800 m^3/day	Grapevine houses use their own wells 672,000 m^3/year is the total water consumption

2.1.5 An Agenda For Action For Sustainability of Tourism in Bozcaada

While the total community bears the ultimate responsibility for this agenda, it is suggested that in practice the “destination management” organization should assume a leadership role in developing and catalyzing implementation [11]. Examples of the kind of activities involved in this process include:

a) Establishment of a destination management organization and its sub-categories such as the nature protection board, the sustainable tourism board, etc. [11]. For Bozcaada, the coordination unit may use the newly established social training facilities where existing infrastructure can be benefited.
b) Coordinating the development of a philosophy and vision for the island, and specifying the major goals of community\region with respect to sustainability in line with realizing the fair contribution to the implementation of the SD plan [6]. Islanders` participation in guidance of experts should be realized for decision making processes.
c) Identifying the specific action initiatives necessary to meet the tourism development objectives while respecting the social, physical, and cultural carrying capacity of the community/region in question [6].
d) Gaining agreement on the measures, in line with SD dimensions, to be used in monitoring the impact of tourism in the community/region. Observance of regulations guidelines and policies for the SD plan [6]. Fair contribution of islanders in already developed boards, and making sure of the proper operation of these units.
e) Gathering and disseminating information concerning the impact of tourism on the community/region. The carrying out of training programs by the destination management organization on a public participation role for implementation [6,11]. A “Tourism Vocational School” can be assigned the leading role for SD awareness raising on Bozcaada.
f) To support a sustainable tourism project, development and implication of a management model which includes evaluation systems and sustainability

indices to allow best practices to be identified, which in turn may be replicated [15]. As a prolongation of the current study, partnerships for EU fund raising are formulated [4].

g) Establish integral parts to the destination development plan, such as national/international environment and sustainability linked days and events (for example, ecological wine making, local products marketing strategies development, awareness raising days, etc.). [11].
h) Acceptance of responsibility for minimal self education with respect to the value of the host region and observance by visitors of terms and conditions of the host community's SD plan for tourism [6]. Distribution of Local Agenda 21 related brochures to incoming tourist potential, announcing the brand name of Bozcaada through the media [14].
i) Application to EU Business Awards for the Environment, Brussels [15].

2.2 SWOT Analysis for Bozcaada

The SWOT analysis is based on sustainable tourism application evaluation within the frame of subject destination depending on information obtained from various stakeholders on the island. For the classification of information three dimensions of SD (environmental, economical, social) have been considered [8, 38].

I. Environmental Dimension
II. Economical Dimension
III. Social Dimension

The contributions of the dimensions are expected to be in the following frame:

a) Environmental Dimension: Protection and conservation of natural sites which are rich in biodiversity, transfer or modification of technology and best practices of low environmental impact, the adoption of parameters of environmental protection such as norms and procedures related to waste management, septic tanks, and prohibiting the use of certain agrochemicals, resource conservation, environmental awareness, etc., in line with EU directives and decisions.

Compliance with these norms and procedures is ensured through contractual clauses for granting and maintaining credits.

b) Economical Dimension: The creation of direct and indirect employment, improvement in beneficiaries` incomes, increased society welfare, knowledge transfer from developed countries with experience in rural tourism to developing areas, technical help and follow-up, the granting of micro credits.

c) Social Dimension: Generating new employment alternatives for young people and other groups which are excluded from the labor market, improving the living standards of the beneficiary villages and groups, mirror impact on other groups involved in the activity, improvement in education and public health levels in beneficiary areas, training for new occupations, preserving the cultural heritage, and promoting the training of community leaders amongst other [15].

The information for the years 2005-2006 is based on [39]:

a) Strengthening the economy, quality of life and collaboration on the destination, within and out of its borders. (I-II)
b) The unique characteristics formed naturally of destination’s island status. (I)
c) The necessity to develop Networks and clusters between stakeholders on the destination to take action within and out of Island borders.(II-III)
d) Protecting, promoting and getting benefit in return from the rich natural, cultural and historical environment. (I-II-III)
e) Assuring conditions for SD with protection and rational management of the natural environment (soil, water, biodiversity, etc.) (I)
f) Forming balanced relations among the needs, wants, assets and focus points as to satisfy the locals and tourist. (III)
g) Encouraging cooperation between agencies charged with economic and physical planning and those that are charged with education and research.(II-III)

h) Maintaining natural resources at EU standard level, thus allowing their long-term maintenance or development. (I-II-III)
i) Developing a shared mentality on cross-border cooperation at the cultural, linguistic, economic, technical, administrative and geopolitical levels.(III)
j) Creating a pattern, a sample work and a guide for the similar destinations within national borders. (I-III)
k) Dealing with current instutional structures and public policies which hamper the destination development. (III)

The following tables present strengths, weaknesses along with opportunities and threats (SWOT analysis) of Bozcaada.

Table 2.2 SWOT [39]

FIELD	STRENGTHS	WEAKNESSES
Economy / Production Sector / Small and Medium Enterprises (SME)	Brandmaking over “Organic Farming” Good quality of local agricultural products	Lack of internal networks and clusters. Low level of technological equipment of enterprises. Lack of marketing strategies.
Spatial Development	Good soil and climate Advantageous properties as a result of Island status (Secure environment, surrounded by sea, etc.)	There is no master plan of the Island. Urban concentration – high degree of depopulation in winter season. Insufficient government funding and investments
Transport – Communications - Energy	Renewable energy is widely used on the Island, thru 1) solar panels 2) wind turbines	Lack of biomass energy usage. Low efficiency rate of solar panel applications.

Environment / Quality of Life	The whole Island is protected environmental zone. Therefore all construction works are monitored and binded to independent committee permissions. No irrigation water necessity for viniculture and other agricultural activities. Wide range of deep water varieties	Lack of Integrated Waste Management System. Lack of waste water treatment plant Lack of Blue Flag Sea traffic jam on the Dardannel Strait is organized and controlled at Bozcaada sea line. No endemic species are defined and monitored. Deficiencies in health services Very long cold season Lack of environmental awareness and green areas.
Culture – Tourism	Hospitality by each and every tourist contact point Rich Turkish – Greek cultural resources Rich historical background, attractive for different nations Potential for different tourism activities Extensive coastline	Uncontrolled tourist activity on the area, dense tourism in summer season only.
Human Resources	There is no unemployment	Qualified people have limited job opportunities on the Island, they move to mainland. Lack of research institutions and good higher educational institutions

FIELD	OPPORTUNITIES	THREATS
Economy / Production Sector / SME`s	People tend to migrate to Island from metropolitans of Turkey to establish their hobby companies. Strengthening cross-border investments and entrepreneurship especially for wine making processes Encouragement of cross-border cooperation between bodies charged with supporting SMEs, urban centers and development agencies. Increased external demand for organic agricultural products	People tend to migrate to Island from metropolitans of Turkey to establish their hobby companies. Low degree of cross-border cooperation
Spatial Development	EU expansion to the East Alternative agricultural activities provides with the opportunities to obtain higher value added and to relieve the economic burden of out migration	Depopulation of the Island in terms of manpower during winter season
Transport – Communications - Energy	Technology Transfer For: a) Biodiesel production from agricultural waste and its usage for vehicles on Bozcaada b) RDF generation from MSW for sustainable heat energy generation for heating purposes on the selected region of the destination. c) Fuel cells obtained from wind turbine energy applications for running inbound vehicles Brand making over “Target 100% Renewable Energy”	Lack of planning and monitoring systems and technologies of all actions Transport to the island from big cities is not easy especially for international tourists.

Environment / Quality of Life	Implementation of Local Agenda 21 covering: a) Supplying all aspects of the "Green Island" concept on the Island by integrating biomass minimization and energy recovery in a sustainable manner in addition to wind turbines and solar panels. b) Building up an Integrated Waste Management System c) Blue Flag application d) Endemic species definition, monitoring and protection mechanisms should be built up according to pre-written reports [40]. e) Establishment of sustainable tourism coordination unit for the Island f) Prevention of natural and technological disasters and establishment of joint system for monitoring and emergency action g) Environmental awareness raising program h) WWTP construction and operation.	Risk of pollution of transnational ecosystems Risk of infection by waste products
Culture – Tourism	Joint overseas marketing and promotion (Gökçeada – Bozcaada – Cunda and 3 selected Greek Islands) Development of various forms of tourism The number of visitors in low season may be increased with SD applications	Irrational development of tourism and pressures on land use Lack of awareness on hospitality industry

Human Resources	Opportunity to develop better cooperation between research institution, universities, industry and islanders, to work cooperatively to this end. Approval for Tourism Vocational School establishment on the Island. Wine academy establishment for setting trained employees' line. "Target 100% Renewable Energy" oriented energy academy establishment that can develop and organize educational courses for interested guests.	The workforce moves to large urban areas, depopulation of the Island in winter season.

2.3 General Objective Based on Destination Development

The model contains the aspects to be taken care of when it comes to destination development, and the combination of selected aspects provides guidance on which matters to take care of [11].

For the SD on Bozcaada, matching the model with the findings of the SWOT analysis created the path to be followed: resource and technology based innovation for identity creation of the destination in order to create brand name and marketing strategies. The aspects - resources, technology and innovation - will have the priority for which the related data is collected, information gathered and which will result in marketing strategies guiding the “Green Island” identity of Bozcaada, which is limited to “Target 100% Renewable Energy” for this thesis.

This study aims to bring an international based approach for understanding the “Green Island” identity. According to the study, a Green Island is a piece of land surrounded by seas which integrates environmental aspects together with economic and social dimensions of SD taking into account the input of the local public, the administrative bodies and visitors for the well-being of the destination. As each destination is unique, however, sub-clauses of the above-mentioned three dimensions (and as indicated in Figure 2.3) may be balanced in variations. However, they should also be structured to conform to predefined standards (such as Blue Flag, Eco-Label, WWTP, solid waste utilization, etc.)

The geographical status of Bozcaada gives it very limited opportunities for waste disposal. Currently; the solid waste is disposed of at the natural solid waste dumping area. However, given the length of time that the disposal area has already been in use, and the fact that there will not be an alternative landfill space available, instead of having to transport the garbage to the mainland or dumping it into sea in the future, the proposed Waste-to-Energy plant will provide an *in situ* solution.

2.3.1 Suggested Destination Development Model

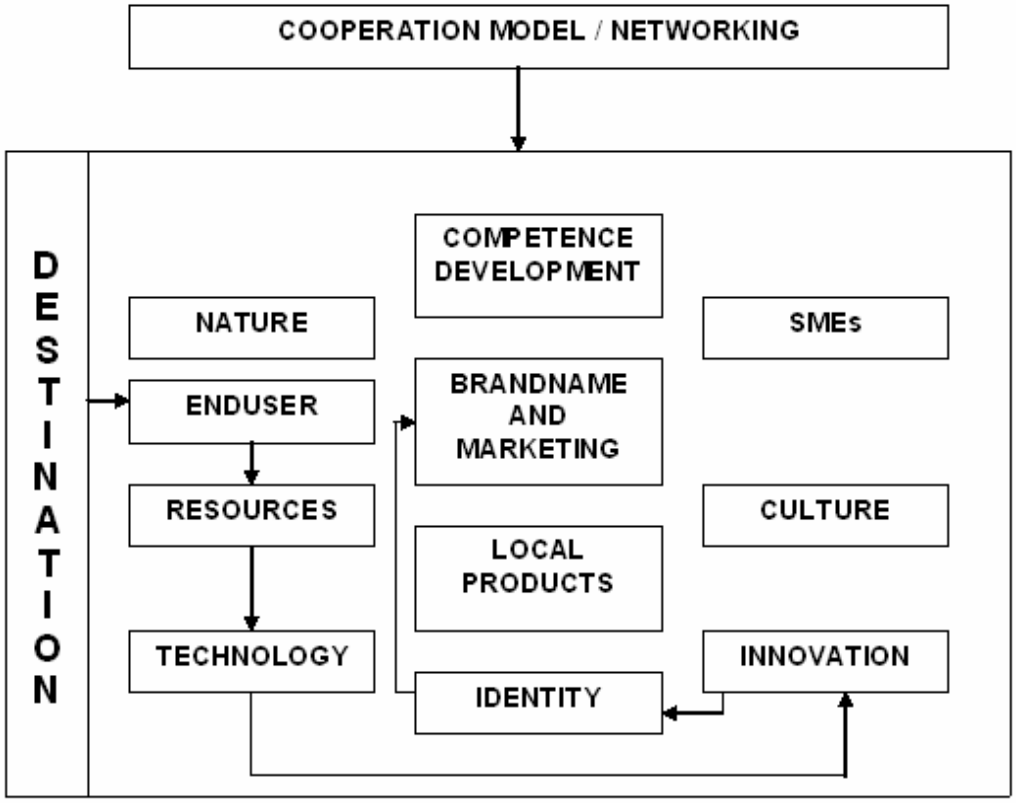

Figure 2.3 Destination development model

Selected sub clauses for the 3 focus points and their correlation for Bozcaada destination development are resources, technologies and end user.

a) **Resources:** Wind energy, Solar energy, Solid Waste Management and energy recovery, Hydropower
b) **Technologies** [41]: Wind Turbines, Solar Panels, Composting, Landfilling, Thermal Degradation Processes (incineration, gasification, pyrolysis), Land Spreading, Vitrification, Fixation / Cementation, Autoclaving/micro waving, Recycling, Illegal Dumping
c) **End User**: Islanders, Target Market (national, international tourists), Government, Private Entities

2.3.2 Solid Waste Utilization for “Target 100% Renewable Energy”

With reference to the example of Samsoe Island, Denmark and to the existing opportunities for Bozcaada as defined in the SWOT analysis, this thesis will be focusing on the “Target 100% Renewable Energy” concept [5].

Integrated solid waste management from the point of view of waste minimization is prioritized during the integration of sustainability issues with its three dimensions. Waste minimization through cleaner energy generation accomplished with gasification technology is recommended to the local authorities of the island. Sustainability issues are given priority; therefore, waste minimization will be realized for heating purposes , there will be cleaner energy generation through gasification process, selected from among the above indicated sub clauses of the three aspects for Bozcaada which is made on environmental dimension. For this purpose, the GaBi4 LCA Engineering Database Management System (DBMS) has been utilized for the LCA of the proposed Waste-to-Energy plant.

Taking into account the fluctuations in the generated solid waste quantity on the island due to seasonal variations, the tourism industry, and the lack of data recording, the collection of reliable, updated data representing the waste generation per capita has been quite problematic.

There exists the necessity for an integrated waste management strategy as municipal and industrial wastes have been dumped in a dumping area for eight years. However, wastes from wine production in the form of waste from vineyards and pomace from wine factories are burnt on site or used as fertilizers respectively. Concerning hazardous wastes, there is only the hidden hazardous waste to consider since there is no health service supplier or hazardous waste producing industry on the island. On the other hand, a source separation action plan for packaging waste is completed and will be implemented starting from 2007 [14].

2.3.3 Waste Generation and Resource Consumption in Tourist Accommodations

Considering the scope of the study, special emphasis has been given to the solid waste generation contribution of the tourist accommodation services. Recommendation of appropriate waste management strategies to minimize waste transferred to solid waste dumping sites via energy recovery is made.

In order to evaluate the general situation of tourist accommodation, three hotels from different areas have been selected. As the cultural and agricultural activities have been integrated into the living style of the Islanders, some of the hotels – for example, the Armagrandi and the Rengigul – are small hotels providing service for this purpose, whereas the Capraz provides sea and landscape facilities to visitors.

The unsorted MSW composition is believed to have a 50-65% humidity, and, as the solid material content, the organic matter forms 49,3%, ash and construction material form 12.8%, while recyclable material forms around 37.9% (paper, metals, glass, plastic, tire, textile) [16].

Table 2.3 Questionnaire results for hotels

Accommodation Service *	Occupancy Rate %		Waste Generation kg/capita/day		Energy Consumption kWh/day		Water Consumption m^3/capita/day		Heating Necessity Equivalent kg/day	
	Low Season	High Season	Low Season	High Season	Low Season	High Season	Low Season	High Season	RDF	MSW
Capraz	2	70.4	42	105.6	267	1,200	12	40.04	55.5	150
Rengigul	3	78	7.25	16	1.02	26.3	2.07	4.2	30	480
Armagrandi**	-	73	-	30.8	-	46.1	-	7,84	-	-

* Occupancy rates contain also permanent and temporary staff since they are producers and consumers of the indicated accommodation service.

** Armagrandi is newly established in summer 2006. Therefore low season data could not be gathered and included with other accommodation services in further calculations.

Related information for energy and waste generation are compiled in Table 2.4. Calculations have been based on the data gathered from the Bozcaada Governorship and small hotel questionnaires for waste generation and energy management which have been distributed over several months and for which certain percentages are clarified [14].

Considering sludge produced at the WWTP, as there has not been an establishment, no utilization necessity exists for the time being. The proposed RDF gasification plant is a modular system, and capacity can be increased in case of necessity. However, even if a WWTP is constructed and generated sludge is directed to the energy generation plant, there will be no need to increase the capacity of the Waste-To-Energy plant. The plant will be in operation the whole year, and more accommodations will benefit from the thermal energy [16].

Table 2.4 Waste - energy correlation on Bozcaada for 2005* [14]

Waste Generation & Resource Consumption / Categories	Generated Waste (kg/year)		Energy Consumption (kWh/year)	
	Low Season	High Season	Low Season	High Season
All Tourist Accommodation Services	323,736	37,800	2,762,228	2,800,000
Agricultural Activities	2,250	750	-	-
Others (Including Residential Areas and WWTP)	197,400,000	392,724,000	18,232	20,986
Total (Bozcaada)	1,200,000	1,320,000	2,783,960	2,820,486

3 SELECTED TOPICS FOR SUSTAINABILITY OF BOZCAADA

Figure 3.1 indicates sub-tourism activities and their effects on the three dimensions of SD for which focus areas are highlighted, and it has been created considering the current needs on the island in order to reach the Local Agenda 21 concept. It has been understood that Bozcaada lacks a master plan, which is the primary necessity for developing the Local Agenda 21[14].

In addition to the above, it has been observed that endangered species are not tracked. Islanders are aware of losses and are willing to cooperate in creating lists to track species and to follow up on progress. Biodiversity related projects can be realized. Also, the implementation of the Blue Flag criteria and presenting the island in that manner will give the right impression. Therefore, the investment for WWTP is necessary in order to strengthen the competitive advantage.

The ecological footprint of the destination can be calculated before and after Local Agenda 21 applications in order to evaluate short-medium-long run outputs [42]. The latter may contain the hospitality industry since a great portion of the island economy relies on the tourism industry, and the Eco-Label may be considered as an intermediary target.

In order to perform the necessary actions for reaching the environmental dimension of SD, solid waste minimization and its utilization for reaching the Target 100% Renewable Energy identity have also been considered. These two issues are crucial for environmental awareness raising and supporting the competitive advantage. Therefore a state-of-the-art Waste-to-Energy plant has been investigated.

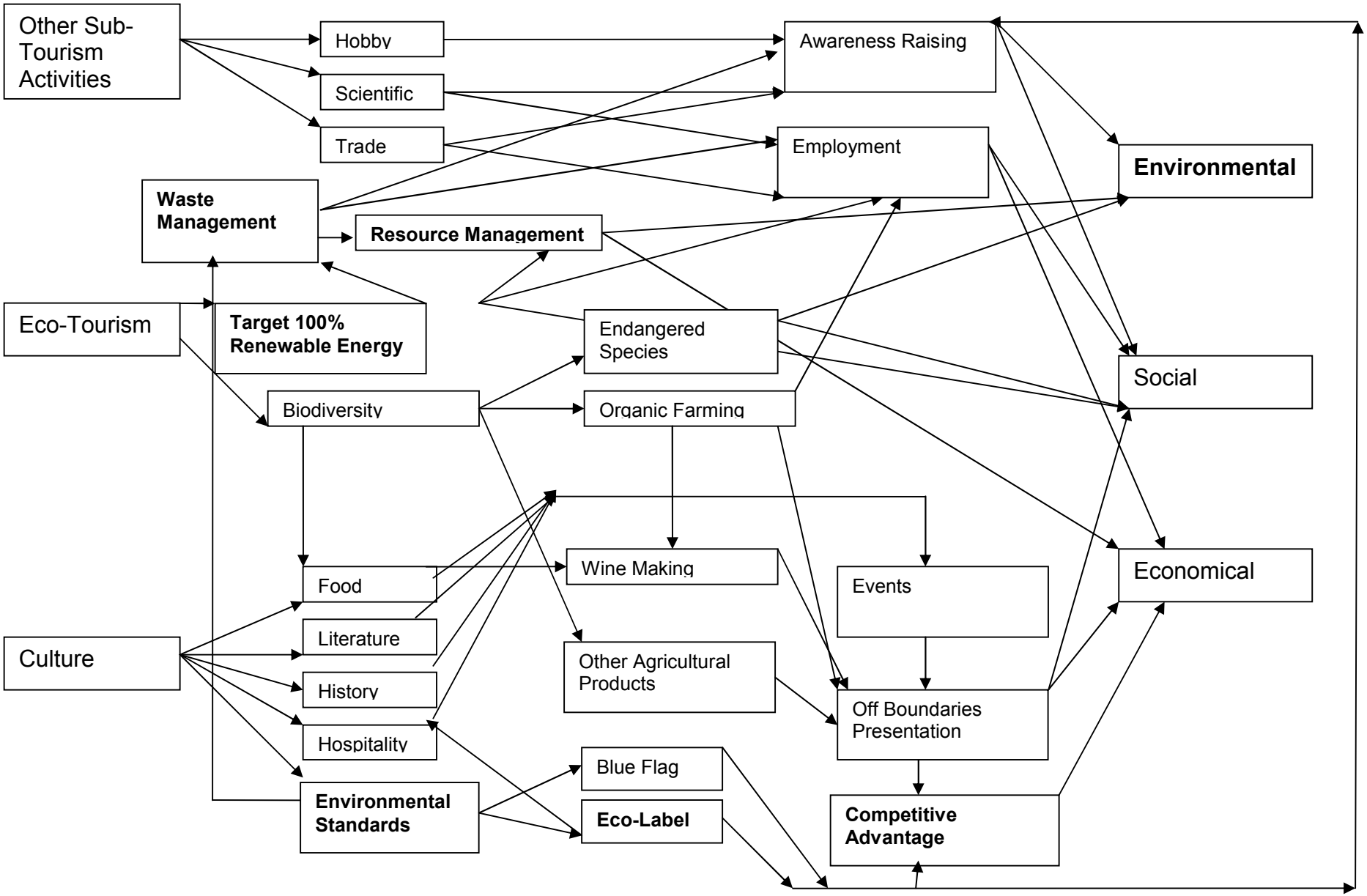

Figure 3.1 Sub-tourism activities and their effects on the three dimensions of SD

3.1 Waste Minimization Through Waste-To-Energy Plant

The importance of waste minimization is an important topic, especially for countries where pollution prevention is not common and source separation does not exist. The mixed waste with high humidity content is mainly dumped into landfills every day [16].

The proposed facility is a “no waste out system” which decreases the required land for landfill. It is an environmentally sound business application which is applicable to many public and private facilities such as municipality waste management facilities, agricultural farms, tourist accommodations (individual or centralized), industrial plants, etc. In addition to this, the system reduces air and water pollution, reduces greenhouse gas emissions, and avoids the use of other highly toxic fuel additives [16].

The energy conversion efficiency of the gasification system is relatively high. The Waste-to-Energy system turns no economic value waste into positive economic value. It supports rural employment, decreases dependence on oil, and it is in line with renewable energy certificate requirements [16].

3.1.1 Waste-to-Energy Plant LCA

Duration of Thermal Energy Necessity for heating up residential area and hot water supply purposes: 6 months
2,520 tons/waste/year = 14tons / waste / day

The Waste-to-energy plant is designed to work with briquetted MSW which is called RDF. One third of MSW consists of organic material which is used as composting material, one third is water, and the rest is the feedstock material for the gasifier. For RDF production, all packaging waste except for metals and glass are

considered within the input stream. Therefore, out of these 14 tons, 6 tons are briquettes. Based on the fact that the plant is going to operate 24 hours per day, it is possible to conclude the capacity calculation with 250kg/h capacity plant that should eventually be reached [16].

Carbon equivalent RDF and MSW for supplying the necessary thermal energy from gasification has been calculated over current fuel consumption where hotels and residential areas are using 14,090,000kcal coal/fuel oil for heating purposes [14]. The necessary heat equivalent feedstock quantity calculated for according to value obtained from hotels and fuel oil calorific value is 9,600kcal/kg. [43].

Table 3.1 MSW – RDF – Coal comparisons [16, 44, 45, 46]

Input	Calorific Value	Density
MSW (Uncompacted)	1,500kcal/kg	130kg/m^3
MSW (Compacted)	1,500kcal/kg	300kg/m^3
RDF (Briquetted)	4,000kcal/kg	600kg/m^3
Coal Lignite in Turkey	4,000kcal/kg	1,250 kg/m^3

The ultimate and proximate analysis for the RDF with a size of 20 - 100mm in diameter is given in Table 3.2. Since MSW is a complex feedstock, obtained values have been considered as for the Waste-to-Energy plant design parameters [16].

Table 3.2 Ultimate and proximate analysis of RDF (%Weight) [16]

Ultimate analysis	Humidity	Volatile Matter	Fixed Carbon	Ash	Gross Calorific Value (kcal / kg)
Briquette (MSW)	9.15	30.50	30.55	29.80	4.000
Proximate analysis	C	H	N	S	O (difference)
Briquette (MSW)	53.5	7.90	6.15	1.75	30.70

Briquetted materials are directly fed into the downdraft gasifier where they are thermally degraded in vacuum conditions at elevated temperatures of around 1000°C, [16]. The selected system is a “no waste out process”, and gasifier ash residues can be used to fertilize the ground (unless the feedstock is not agricultural waste), as concrete material, or disposed of in a sanitary landfill. Sometimes, solid residues can be used in industrial processes such as cement mills providing for a complete integration between gasification and industrial processes [26].

Table 3.3 indicates ash components from MSW Gasification [16].

Table 3.3 Ash analysis of RDF (% Weight) [16]

SiO_2	Al_2O_3	CaO	MgO	Fe_2O_3	Na_2O	K_2O
51.68	10.08	15.77	1.57	9.40	2.19	2.35

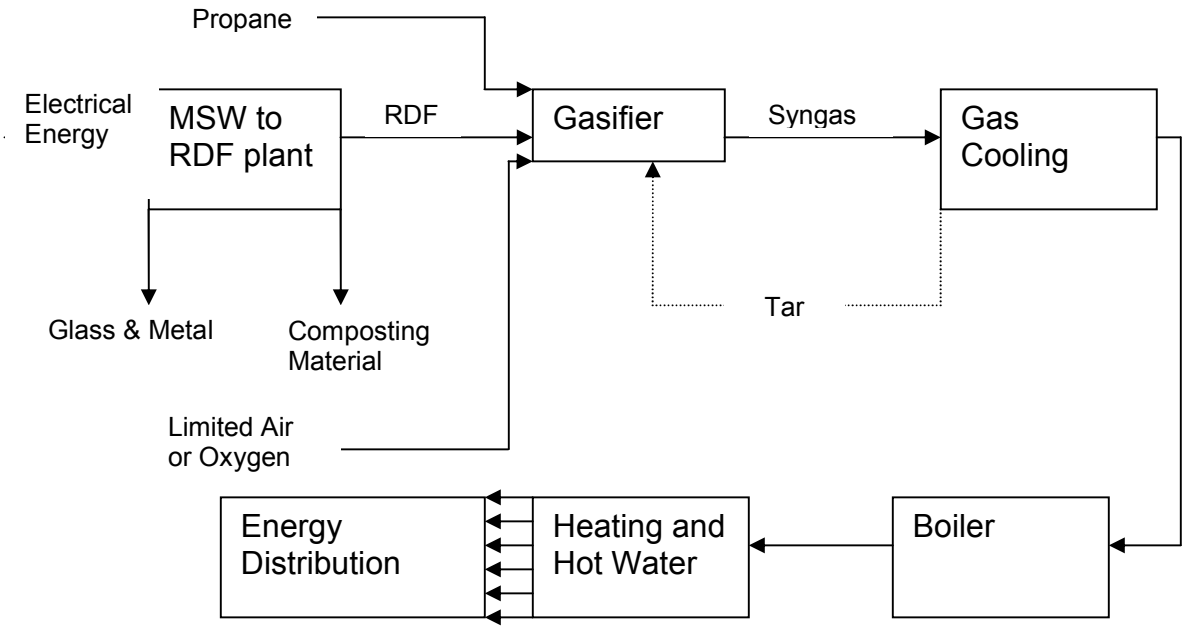

Figure 3.2 Process flow for Waste-to-Energy plant

3.1.2 Service Definition

Service Definition for the overall system:

250 kg/h Waste-to-Energy plant for 180days/ year for a period of 25 years is considered to be the basic service of the overall system. Maintenance necessity is 24 days/year, which may be added up on 180 operation days per year.

Winter is a 4 months long period on the Island. However; heating necessity is for 6 months. Therefore, the operation duration of the plant is calculating according to the heating energy necessity.

Service Definition for the internal process overall island:

Goal – Contribution to brand name creation “Target 100% Renewable Energy” by minimizing waste thru gasification for energy generation purposes.

Scope – Supplying 60% of the total heat energy required on the island consisting of existing solar panels with 40% rate and 20% coming from Waste-to-Energy plant.

Functional Unit -- Waste-to-Energy plant includes; MSW to RDF equipment chain, gasifier and gas cooling units and the boiler.

Obligatory properties of the Functional Unit

a) Quality properties:

I) Pretreatment and gasification stages resulting in by-product obtaining from the overall process
II) Special stainless steel quality for thermal degradation reactor and gas clean up units
III) Recycling of process wastewater from gas clean up

IV) CO_2 reduction

V) Resource conservation

VI) The proposed plant decreases methane by converting it into energy.

b) Quantity properties:

I) The removal of organic pollutants; easily degradable Chemical Oxygen Demand removal by 90%.

II) 250 kg/h MSW reduction for 25 years.

III) 63,000,000,000kg MSW reduction in 25 years. (except agricultural waste)

IV) 8,113,500,000kg compost production in 25 years.

V) 8,100,000kg ash production in 25 years.

VI) Being able to operate at 1000 -1200^{o}C.

VII) Total carbon reduction for the island in 25 years

VIII) With 558.41m^3/h → 1,060,979kcal/h energy generation

IX) 106 houses can benefit the thermal energy [35].

c) Duration: 24hours a day, 180 days in a year

The suggested Waste-to-Energy plant has a 25 years operational life span, where 50% of the life span will be inactive due to limited feedstock supply and the level of energy requirements on Bozcaada. The system consists of MSW-to-RDF preparation, gasification and energy generation stages where special, high temperature resistant construction materials are used. Produced energy from 250kg/h. feedstock is enough to heat 106 houses on Bozcaada.

Secondary services of Waste-to-Energy Plant (Scenario 1)

a) Energy production from syngas (H_2, O_2, N_2, CH_4, CO, CO_2, C_2H_6, C_3H_6)

b) MSW as compost, recycling material and/or energy recovery source.

c) Filling and recycled materials at the end of life cycle.

The technology serves as a medium for minimizing solid waste while transforming it into thermal energy as the primary product, whereas the by-products are tars, filling materials, compost and recycled materials at the end of the life cycle of the plant.

Product System Boundaries:

The study includes material manufacturing to disposal stage.
No cabling or automation devices are included.
No transportation issue is included.
No economical evaluation is made.
No social evaluation is made.

In accordance with the LCA understanding, parameters should be set prior to the assessment. For the selected system, material manufacturing, use of the Waste-to-Energy plant, and the disposal stage of the plant are included. Electronic devices, cabling, transportation lines, economical and social parameters are also excluded from the parameters.

Figure 3.3 contains the summarized information for the LCA inventory phase of the proposed Waste–to-Energy plant, where used materials are grouped and the related flows are indicated. 80% of base materials` goes to the MSW-to-RDF Plant and the rest is equally shared among the rest of the plant.

Data from the inventory table has been processed in GaBi and results obtained for a 25 year period of time. The plastic content in the plant has been considered as the input material to the Waste-To-energy plant together with MSW. According to GaBi results, the plant will produce 34,117,191kg of CO_2 from MSW, 2,324kg of CO_2 from plastic thermal degradation, and 62,532kg of CO_2 from propane supply and firing in the 25 year period.

3.1.3 Inventory Analysis and Environmental Assessment Via GaBi Tool

Table 3.4 LCA inventory table

	MATERIALS	WEIGHT	
		1 year	25 years
RESOURCES AND MANUFACTURING	Sand	-	136,000 Kg
	Stone Granule	-	360,010 Kg
	Cement	-	61,000 Kg
	Cast Iron	-	1,552.5 Kg
	Steel	-	35,777.5 Kg
	Stainless Steel	-	7,483 Kg
	Copper	-	1,350 Kg
	Aluminum	-	30 Kg
	Plastic	-	913 Kg
	Brass	-	70 Kg
USE	Input- RDF	250	27,000,000 Kg
	Input – Electrical Energy	367,200,000 kcal	9,180,000,000kcal
	Input - O_2	340 Kg	36,720,000 Kg
	Input – Propane	0.17 Kg	18,360 Kg
	Output - Ash	82.5 Kg	8,100,000 Kg
	Output - Fertilizer	751.25 Kg	8,113,500,000 Kg
	Output – Tar	7.5 Kg	225,000 Kg
	Output – Thermal Energy	837,615kcal	90,462,420,000kcal
	Output – Syngas	558.41 Kg	60,308,280 Kg
DISPOSAL	Filling Material	-	501,309 Kg
	Cast Iron	-	1,215 Kg
	Steel	-	32,199.75 Kg
	Stainless Steel	-	6,734.7 Kg
	Copper	-	1,215 Kg
	Aluminum	-	27 Kg
	Plastic	-	821.7 Kg
	Brass	-	63 Kg

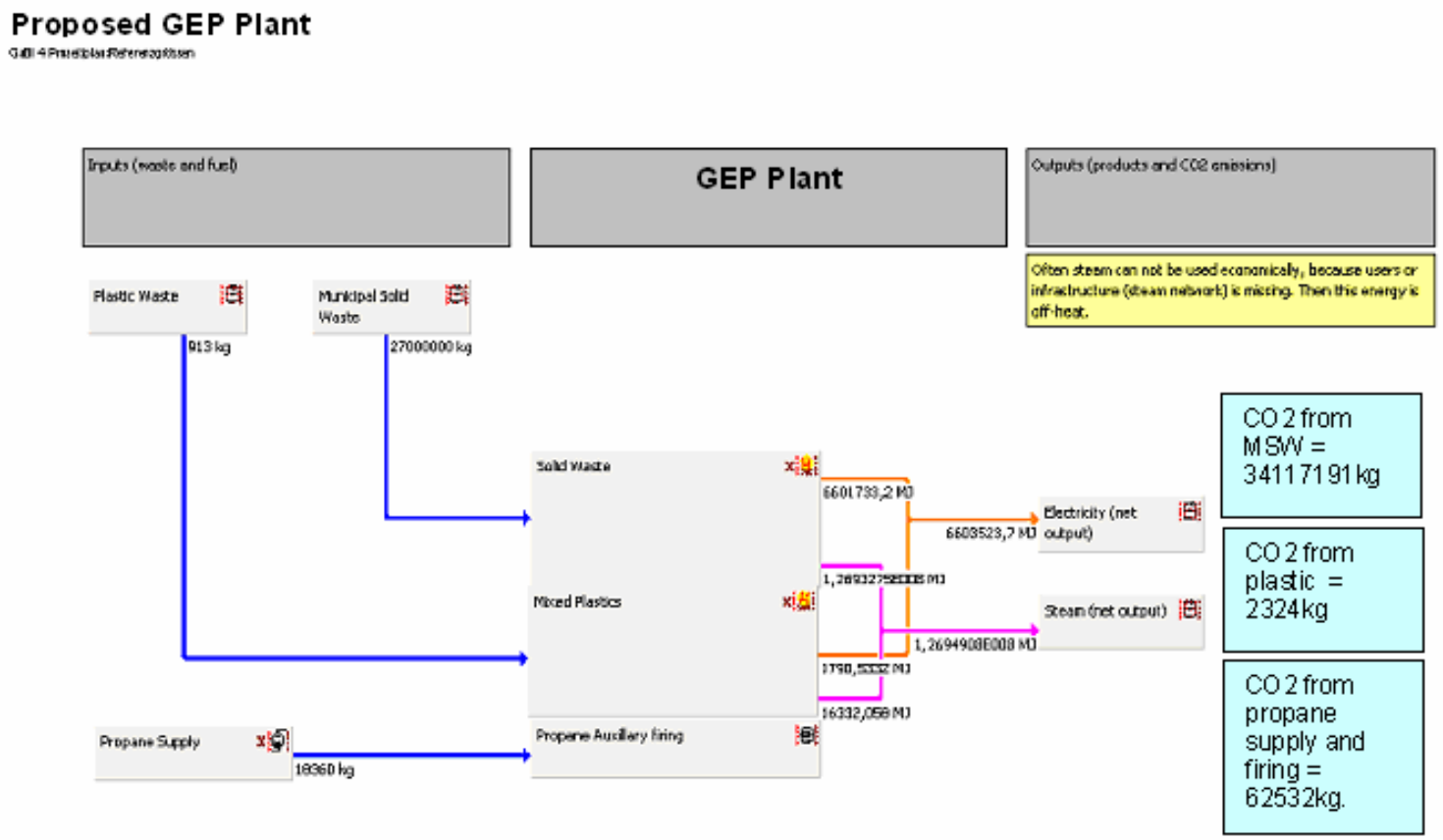

Figure 3.4 GaBi tool screenshot for LCA of the Waste-to-Energy plant [33]

3.2 Eco-Labeling of Selected Accommodation Services in Bozcaada as an Environmentally Sound Business Application

Based on literature review clause 1.2, progress for SD in tourism, between progress policy items, bullet `f`, Eco-labeling has been chosen as an intermediary target. In the case of the Bozcaada selected tourist accommodations evaluation, only mandatory criteria have been considered.

Statistical surveys have shown that 51% of European tourists prefer environmental friendly hotels and accommodation, while 82% are seeking a clean environment [21]. Although Bozcaada islanders and hotel owners are willing to perform environmentally friendly hospitality services, efforts remain in an unorganized fashion. To benefit, already set criteria would fit into clause c on page 4 for good progress of the SD, and for additional tourist attraction as a result of environmental concern.

3.2.1 Criteria for Bozcaada Accommodation Services Product Group

An in-depth study of the waste management system and related contribution on Bozcaada tourism sustainability has brought environmental data availability on the accommodation services product group side. These data have been collected in line with EU Eco-labeling Directive sub-clauses, via the prepared questionnaire. (See appendix 2)

The case for Bozcaada is one of the first tourist accommodation services Eco-labeling attempts in Turkey, and it is important to define the criteria in the best possible way to realize the format. Therefore, the Italian Tourist Accommodation Product Group Eco-label “Legambiente Turismo” has been set as the minor target for the destination.

The Italian Tourist Accommodation Product Group Eco-label “Legambiente Turismo”, since 1997, when the certification system “recommended eco-friendly hotels” was first launched in the bathing resort of Riccione, Legambiente Turismo’s scheme has been steadily growing. In 2004, 192 hotels and 46 other accommodation businesses (totaling over 45,000 beds), 42 bathing establishments and 20 camping sites along the coasts, mountains and cities-of-art in Italy were awarded Legambiente Turismo’s eco-label with its well-known Green Swan logo. Its criteria include a better use of water and energy resources, reduced waste production, good local cuisine and breakfast, a choice of organic ingredients, tips to help visitors become acquainted with the local culture and natural environment, and cycle hire [47].

Although renewable energy is produced on Bozcaada, local dwellings can not benefit from the situation directly, as is indicated in Table 2.1, and the individual attempts for renewable energy usage are very limited. As per the source separation of waste, Eco-Label may create a platform awareness rising and correct application [14, 2].

The LCA study covered belongs to the Waste-to-Energy plant although the Eco-Label criteria have been evaluated for tourist accommodation services. The reason is due to the Eco-Label criteria not being present for such plants. Therefore the tourist accommodation product group has been evaluated for feedstock material supplying representative tourist accommodation services.

Table 3.5 consists of comparable information from Bozcaada selected hotels to the Eco-labeling criteria for tourist accommodation services product group of Italy and EU. The environmental status of the Armagrandi (A), the Rengigul (R), and the Capraz (C) have been compared according to the answers provided to questionnaire. (See Appendix 2)

Table 3.5 Comparable information from Bozcaada selected hotels to Eco-labeling criteria for tourist accommodation services product group of Italy and EU

Mandatory Ecological Criteria	EU [19]	Italy [9]	C		R		A	
			EU	I	EU	I	EU	I
Energy Saving	Energy efficiency light bulbs >60% within the first year of application	Placement of indicative notes for clients, telling to make the laundry only when there is necessity	(√)	(√)	(√)	(√)	(√)	(-)
	At least 22% of electricity coming from renewable energy sources	Inserting at least one low energy consuming light bulb in each room.	(-)	(√)	(-)	(√)	(-)	(-)
	At least 22% of electricity used for heating rooms and sanitary hot water coming from renewable energy sources	For energy saving purposes, inserting Technologies in 70% of public areas.	(√)	(√)	(-)	(-)	(√)	(-)
	No oil with S content >0.2% and no coal as an energy sources	For internal notes and photocopy purposes use recycled paper	(-)	(-)	(-)	(-)	(-)	(-)
	Boiler efficiency >90% as measured according to Directive 92/42/EEC	-	(-)	(-)	(-)	(-)	(-)	(-)
	Air conditioning system with Class B efficiency according to Directive 2002/31/EC	-	(√)	(-)	(-)	(-)	(-)	(-)
	Appropriate window insulation	-	(√)	(-)	(√)	(-)	(√)	(-)
	Sauna with time control	-	(-)	(-)	(-)	(-)	(-)	(-)
Water Saving	Water flow from tap shower <12L/minute	Creating knowledge on water saving at the clients ‘ end	(-)	(-)	(√)	(√)	(-)	(-)
	No more than 5 urinals flushing at the same time	Integrating % 100 water saving devices in both room and shower taps	(-)	(-)	(√)	(-)	(-)	(-)
	Towels and sheets changed once or twice a week or on request	Usage of mechanical or natural products (microfibre, vapor, etc) as detergents	(-)	(-)	(-)	(√)	(-)	(-)

	Water plants and garden after sunset or before high sun	-	(√) (-)	(√) (-)	(√) (-)
	Waste water has to be treated	-	(-) (-)	(-) (-)	(-) (-)
	Follow local waste water plan and water protection plan	-	(-) (-)	(-) (-)	(-) (-)
	Limit amount of disinfectants used	-	(√) (-)	(√) (-)	(√) (-)
	Choice of low environmental impact water source	-	(-) (-)	(√) (-)	(-) (-)
	Staff training for disinfectant and detergent usage	-	(√) (-)	(√) (-)	(√) (-)
General Management	No-smoking section in common areas	-	(-) (-)	(√) (-)	(√) (-)
	Good maintenance and servicing of equipment		(√) (-)	(√) (-)	(√) (-)
	Environmental policy statement and precise action program		(√) (-)	(-) (-)	(-) (-)
	Staff training for application of environmental measures and awareness raising		(√) (-)	(-) (-)	(-) (-)
	Active information to guests on environmental policy, objectives and actions		(√) (-)	(√) (-)	(√) (-)
	Data collection (energy and water consumption, chemicals use and waste production)		(√) (-)	(-) (-)	(√) (-)
	Good maintenance and servicing of boilers		(√) (-)	(-) (-)	(√) (-)

Waste Reduction	Facilitate waste separation by guests	In order to provide support service sector realize source separation (glass, paper, plastics , metals, humid , material)	(-) (√)	(√) (√)	(-) (-)
	Staff separates hazardous waste as defined in Decision 2000/532/EC	Placement of source separation containers at strategically locations to facilitate the usage by customers.	(√) (√)	(-) (√)	(-) (-)
	Waste sorted, separated and transported to appropriate site	Placement of used batteries containers	(√) (√)	(√) (-)	(-) (-)
	No use of disposable products (soap, shampoo, shower caps, etc.)	Eliminating monodose breakfast goods	(√) (-)	(-) (√)	(-) (-)
	-	Eliminating monodose hygienic materials	(-) (-)	(-) (√)	(-) (-)
	-	Usage of ecological hygienic paper	(-) (-)	(-) (-)	(-) (-)
	-	Serving water bottled in glass	(-) (-)	(-) (√)	(-) (-)
	-	Eliminating drinks in plastic bottles	(-) (-)	(-) (√)	(-) (-)
	-	Preference applied for selection of concentrated detergents and refilled utilization	(-) (-)	(-) (√)	(-) (-)
Information To Guests	Switch off air conditioning/heating when windows are open (when no automatic switch off is in place)	Show and distribute environmental policy materials to the clients	(√) (√)	(-) (-)	(-) (-)
	Switch off lights when leaving the room (when no automatic switch off is in place)	Communicate with guests the own environmental procedures thru brochures.	(√) (√)	(-) (√)	(-) (-)
	Information on how to save water in bathroom and toilets	-	(-) (-)	(√) (-)	(-) (-)
	Use waste bin for appropriate waste in toilets	-	(√) (-)	(√) (-)	(√) (-)
	Inform staff on any leaks	-	(√) (-)	(√) (-)	(√) (-)

	Information on local public transport	-	(√) (-)	(√) (-)	(√) (-)
Information on the Eco-label	Measures taken to save energy and water and to reduce waste	-	(√) (-)	(-) (-)	(-) (-)
	General environmental improvement		(√) (-)	(√) (-)	(√) (-)
Food Products	-	Opening an ecological food products corner, indicating them by a label	(-) (√)	(-) (√)	(-) (√)
		Offering wine made through biological agriculture	(-) (√)	(-) (√)	(-) (√)
		Do not use products containing generically modified organisms	(-) (√)	(-) (√)	(-) (√)
Gastronomy	-	Offer a traditional dish everyday, by indicating it on the menu	(-) (√)	(-) (√)	(-) (√)
		Signal everyday a typical local product in between other nutritive	(-) (√)	(-) (√)	(-) (√)
Transport	-	Setting up shuttle services and informing guests on schedules	(-) (√)	(-) (-)	(-) (√)
		Selling public transportation tickets	(-) (-)	(-) (√)	(-) (-)
Moving Around	-	Putting bicycling services for free for the utilization of at least eight rooms	(-) (√)	(-) (-)	(-) (-)
		Share information on cycling roads	(-) (√)	(-) (√)	(-) (√)
Noise	-	Asking to keep cellular phone, rings at a low volume at the restaurant	(-) (-)	(-) (√)	(-) (√)
		Respect noise making hours set by the ministry	(-) (√)	(-) (√)	(-) (√)

Cultural and Environmental Events	-	Announce cultural and environmental events on the area thru the reference materials	(-) (√)	(-) (√)	(-) (√)
		Evaluate cultural and environmental events on the area thru reference materials	(-) (√)	(-) (√)	(-) (√)
		Create a lecture corner to guarantee the disponibility of scientific publications	(-) (-)	(-) (√)	(-) (√)

(-) Not Applicable

(√) Applicable

When evaluating accommodation services, 4 levels of presenting the product have been taken into consideration: 1) Resource → 2) Production → 3) Service → 4) Experience

The path describes the utilization of the current resources on hand for creating the product group which, in the required time frame, is turned into a service by adding value to standard offers and then into experiences when there is the direct communication with guests [38].

As a result of answers to questionnaires and personal experience through visits to the accommodations, it is possible to evaluate individual situations according to the Eco-label criteria for both Italy and the EU:

Capraz: Has conscious attitudes towards energy and waste management. However, water management needs to be revised. Substitutes for detergents and chemicals should be considered. Periodical staff training on environmental awareness raising is a positive sign for building up running environmental systems. Organic farming and offering organic local dishes is a point of attraction. Customers are also served with “Capraz” labeled organic wines produced from grapes from Capraz vineyards.

Rengigul: Has developed its environmental services within the capacity of the island. The entity uses the offered potential by the local authority and is willing to cooperate in further action. Within the existing circumstances, R is trying to promote local products and activities, cooperating with other clusters as defined in Figure 1.1. In addition to this, accommodation services product is more than a product in the case of R, where clients have a great chance to hear much of the destination. Local staff are employed and they are having their knowledge raised in terms of environmental awareness.

Armagrandi: Even though it was established in early summer 2006, the owners are experienced in hotel management. The idea behind the establishment is that it has its own character by inviting guests to an old wine factory which is now the hotel itself. The staff has good understanding and familiarity with the local people, and the destination and is trying to create new business opportunities for them such as pomace usage for heating purposes at the hotel. The infrastructure is ready for the process, and the feedstock can easily be obtained from islanders.

Summer 2006 was their first season and it is a fact that environmental concerns are a second priority. However, these concerns are now known and the position will soon be improved. Moroever, the situation is considered even better since there is a greater chance for the application of the suggested data.

3.2.2 Necessary Investments by Selected Hotels

Based on findings of Table 3.3 necessary investments for raising environmental criteria at the selected tourist accommodation services have been defined. As a result of actions to be taken an entity can realize medium term profits. The implementation of all above mentioned initiatives and activities is possible to be followed by other enterprises without major financial investments since they are all paying back. As a result they guarantee their viability and their business continuation.

a) Eco-labeled accommodation seeking customers will give a stable monthly occupancy.
b) The cost for energy and water will reduce despite price increases X€/room/day [21].

Table 3.6 Necessary investments by selected hotels [21]	C	R	A
Installation of an energy saving system that recovers the heat produced and uses it to heat the water by the air condition chillers.	√	√	√
Installation of heat recovery system in the main kitchen's dishwasher, where the steam from the drying section is used to heat up the water from the dishwashing section.	√	-	√
Installation of Building Management System (BMS) for central control and monitoring of all technical installations and machinery, such as air conditioning systems, chillers, boilers, heaters, pumps, watering, lighting and by doing so managing to save energy and reduce energy peaks of the installation. Moreover by controlling the pumps and the watering system (during night time) saving of hot water is possible. The utilization of measurements and the control methods as well as the periodic programmed maintenance will help reducing operational costs and the saving of natural resources.	√	√	√
With the replacement of all window panels of single glazing with double glazing the thermal and acoustic insulation is realized.	-	-	-
Replace light bulbs with energy saving ones.	-	-	√
Installation of aerators in all taps and showers in order to reduce the water flow.	√	√	√
Installation of ionization system in pools as well as automatic dozing machines to control ph & cl in order to reduce the use of chemicals.	-	-	√
Installation of key card systems in rooms for the control of lighting and air conditioning when they are not occupied.	√	√	√
Installation of a limit switch at the balcony doors to stop the air conditioning when doors are opened.	√	-	√
Investment in human resources is needed for coordinating and managing all environmental actions	-	-	√
Composting toilets allow for the composting of waste in toilet structure itself and to not require water for flushing. Integration of mechanical aerator and insulation mechanism is also necessary. [48]	√	√	√

(-) Not Necessary

(√) Necessary

CONCLUSION AND RECOMMENDATIONS

The performed study includes sustainable tourism destination management efforts for Bozcaada Island in Turkey, where the environment is selected as the priority concern. It is envisaged as leading to the management of all resources in such a way that economic, social and aesthetic needs can be fulfilled, while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems [49]. The study covers the LCA of a solid waste utilization plant as a renewable energy source processor along with Eco-Label practices for feedstock suppliers (tourist accommodation services) to the Waste-to-Energy plant for the selected destination. Practical guidelines covering sustainable tourism development (destination approach) are created whereby related stakeholders can find their roles for participating in the implementation stage.

Site related data has been gathered from Bozcaada District Governorship reports and tourist accommodation services via field studies carried out during the period May 2005-September 2006. The findings indicate that 2,520,000kg/year MSW, 1,182,174,586.66kcal of thermal energy from solar panels, and 37,177,530kWh/year of energy is generated, while 5,604,446kWh/year of the electrical energy is consumed on Bozcaada. Waste generating and energy consuming stakeholders, in addition to the ones named in thesis, are “production and other tourism industries” which cover boats, ports, production facilities, eco-tourism and are not investigated in this thesis. The data gathered for the success of thesis was collected and put together for interpretation in a difficult manner due to lack of data recording system.

The technical data and design parameters for the appropriate Waste-to-Energy plant have been generously supplied by GEP Green Energy Production Technologies Ltd. Co. (GEP). According to the LCA of the GEP Waste-to-Energy plant, the system reduces 63,000,000kg of MSW while producing 8,113,500,000kg of compost, and 8,100,000kg of ash over 25 years. 106 houses can benefit from thermal energy output

equivalent to 1,060,979kcal/h obtained from the MSW generated on the island. The GaBi4 software calculated the CO_2 production as 34,187,047kg over 25 years where the feedstock materials are RDF; plastics generated at the end of plant life span and total propane for start-up are included.

The volunteer study is believed to be one of the first applications in the sustainable tourism development (destination approach) in Turkey due to the combination of many new understandings that are brought together. Such a framework consists of the integration of worldwide patents applicant GEP plant along with its LCA study where design parameters are also defined but kept as company know-how. In addition to that, most EU tourist accommodations are far from being Eco-Label applicants and certain Bozcaada accommodations representing guesthouses, holiday villages and small hotels have been chosen for volunteer guidance and they are aware of the necessary investments. EU Business Awards for the Environment create a reliable platform to present the current status. Therefore, it is strongly believed that in case of realization of suggestions indicated in this thesis, Bozcaada may be a powerful candidate in the competition, which will again bring it a primary position.

Most of the topics which are not covered in this study can be further evaluated and are subject to different projects by considering the needs for sub-tourism activities and their relations on the three dimensions of SD.

The study aimed at fulfilling the “Target 100% Renewable Energy” identity for Bozcaada. Current sources available are only enough to reach 60% of the goal. The remaining 40% can be evaluated in further studies which may contain fuel cell usage through the energy obtained from windmills, bio-fuel usage for transportation matters, energy crops cultivation for producing additional feedstock for the suggested Waste-to-Energy plant.

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APPENDICES

APPENDIX 1 QUESTIONNAIRE FILLED OUT BY BOZCAADA GOVERNORSHIP

1. Ada Hakkında Genel Bilgi

1.1 Son yapılan nüfus sayımının resmi sonuçları nedir?

1.2 Yaz ve Kış sezonu kaç gün sürmektedir?

1.3 Yaz ve Kış sezonunda nüfusta değişiklikler oluyor mu, oluyorsa değerleri belirtiniz.

1.4 Yaz ve kış sezonundaki nüfus değişikliğini saptama yöntemi nedir? (Ör. Vapur bilet satışı)

1.5 Turizm sezonu kaç gün sürmektedir?

1.6 Bölgelere ait nüfus ve bina yoğunlukları nedir?

1.7 Konaklama tesislerinin toplam yatak kapasitesi nedir?

2. Alttaki turizm dalları ada turizminin yüzde olarak ne kadarını oluşturmaktadır?

2.1 Kültür Turizmi(varsa diğer lütfen belirtiniz)

- Türk-Yunan Dostluk Festivali
- Bağ Bozumu Festivali

2.2 Eko turizm

2.3 Sağlık Turizmi

2.4 Eğitim Turizmi

2.5 Spor Turizmi

- bisiklet,
- yelken,
- dalış,
- balıkçılık,
- binicilik
- diğer

2.6 Alış-veriş Turizmi

2.7 Romantizm Turizmi

2.8 Aile Turizmi

2.9 Diğer (varsa belirtiniz)

3. Su ve Kaynaklar Yönetimine dair istatistiksel veri

3.1 Enerji Yönetimi

3.1.1 Rüzgar türbinleri 10.2MW / 17*600 kW / Rotor 44 m çaplı DEMİRER / Enercon, kaç hanenin enerji ihtiyacına cevap vermektedir?

3.1.2 Adada kurulu güneş panellerinin ve nedir?

Toplam kurulu güç:

Adet:

Kaç hanenin enerji ihtiyacına cevap verdiği:

3.1.3 Yenilenebilir enerji kullanımından ötürü yararlanılan teşvikler var mıdır? Varsa hangileridir belirtiniz.

3.2 Su Yönetimi

İçmesuyu

3.2.1 İçme Suyu Temini: 30lt./saniye Ege sualtı borularla aktarım haricinde varsa diğer kaynak belirtiniz.

3.2.2 Mevcut kaynaklar adanın su ihtiyacını karşılamaya yeterli midir?

Evet ☐ Hayır ☐

3.2.3 Mevsimlere göre su kullanım miktarını belirtiniz.

Yaz

Kış

Atıksu

3.2.4 Adada atıksu arıtma tesisinin mevcut olmadığı bilinmektedir. Yapılması düşünülen tesisin kapasitesi ne kadar olacaktır?

3.2.5 Bu tesisten oluşacak arıtma tesis çamuru bertarafı ne şekilde sağlanacaktır?

3.2.6 Fabrikaların bağımsız arıtma tesisleri var mı?

Evet ☐ Hayır ☐

Cevap EVET ise toplam kapasite ve adetlerini belirtiniz?

3.2.7 Tatil köylerinin kendi arıtma sistemleri var mı?

Evet ☐ Hayır ☐

Cevap EVET ise toplam kapasite ve adetlerini belirtiniz?

3.2.8 Tarım ve hayvancılık bölgelerinin mevcut bireysel arıtmaları var mı?

Evet ☐ Hayır ☐

Cevap EVET ise toplam kapasite ve adetlerini belirtiniz?

Sulama Suyu

3.2.9 Mevsimlere göre kullanım miktarını belirtiniz.

Yaz

Kış

3.3 Katı Atık Yönetimi

3.3.1 Yerleşimde toplanan aylık evsel katık miktarı nedir?

Yaz

Kış

3.3.2 Katı atık ile ilgili madde grubu analizi yapıldı ise sonuçlarını yazınız. (organik madde, kül ve toplam geri kazanılabilir maddelerin yüzdesini mevsimlere göre belirtiniz)

Malzeme	Madde Grup Analizi, %		
	Genel	Yaz	Kış
Kağıt			
Karton			
Renkli Cam			
Renksiz Cam			
Pet			
Poşet			
Plastik			
Çuval			
Demir			
Aliminyum			

Diğer Metal			
Org. Mad.			
Çocuk Bezi			
Odun			
Elk. Alet			
Pil-Akü			
Tekstil			
Diğer Yanan			
Kül			
İnert Malzeme			
Toplam	100,00	100,00	100,00

3.3.3 Yerleşimde bulunan sokak toplayıcısı ve hurdacı varsa, taraflarca toplanan atık miktarı / ay lütfen belirtiniz.

3.3.4 Ambalaj atıkları toplama ve ayrıştırma lisansına tabi olunuyor mu?

Evet ☐ Hayır ☐

3.3.5 Karışık toplanan atıkların geri kazanım yüzdelerini belirtiniz.

Malzeme	%	Geri kazanılan yüzdesi
Kağıt		
Karton		
Renkli Cam		
Renksiz Cam		
Pet		
Poşet		
Plastik		
Çuval		

Demir		
Aliminyum		
Diğer Metal		
Toplam		

3.3.6 Mevcut depolama sahası hakkında bilgi veriniz

Toplam depolama alanı:

Kaç yıldır faaliyette olduğu:

Depolama tipi: Vahşi ☐ Düzenli ☐

Sızıntı suyu toplama ve arıtması mevcut mu: Evet ☐ Hayır ☐

3.3.7 Bölgede oluşan tıbbi ve tehlikeli atıklara dair alttaki bilgileri doldurunuz.

Miktar:

Uygulanan İşlem:

3.3.8 Katı atıkları toplama işine dair alttaki bilgileri doldurunuz.

Görevli:

Toplama arabası:

Toplam sefer sayısı:

1 seferde kat edilen mesafe:

4. Sürdürülebilir Tarım

4.1 Hangi alanlarda tarım faaliyetleri mevcuttur?

4.2 Oransal olarak ada ekonomisinde tarımsal faaliyetlerin oranı nedir?

4.3 Organik Tarım toplam faaliyetlerin % kaçını oluşturmaktadır?

4.4 Yerel tarım ürünleri nelerdir?

4.5 Yerel tarım ürünlerinin iç ve dış pazara satış gerçekleşiyor mu?

4.6 Yerel tarım ürünlerinin ekonomiye katkısı % kaçtır?

4.7 Oluşan tarım, bağ, park ve bahçe atık / artıklarının miktar, özellik ve ne yapıldıkları?

4.8 Bölgede bulunan kümeslerden ne kadar atık oluşuyor?

5. Turizm Potansiyeli Yükseltme ve Ada Tanıtım Aktiviteleri Hakkında Detaylı Bilgi

5.1 Atölye çalışmaları kapsamı ve ne sıklıkta yapıldığı

5.2 Fuar katılımları varsa takip edilen fuarlar nelerdir ve bunlara kaç senedir katılım vardır?

5.3 Ada broşür, kitapçık ve tanıtım katalogları

5.4 Ada halkına özgü sanat ve el işlerinin tanıtımı ne şekilde yapılmaktadır?

5.5 Ada halkına özgü yerel gıdaların tanıtımı ne şekilde yapılmaktador?

5.6 Diğer (varsa belirtiniz)

6. Ulaşım ve Turizm hakkında detaylı bilgi veriniz.

6.1 Yaz ve kış feribot sefer sayısı

6.2 Adada kayıtlı toplam araç sayısı

6.3 Ada içi ulaşım yollarının neler olduğu

6.4 Biyodizel kullanımının yaygınlığının ne oranda olduğu bilgisi.

6.5 Biyodizel eldesi için uygulanan yöntem nedir?

7. Sürdürülebilir şehir planlaması ve gözlemlenmesi için kullanılan sistemler varsa belirtiniz. (Ör. GIS kullanımı)

8. Halk ve Yönetim Sinerji Oluşturulması için Gerçekleştirilen Faaliyetler Varsa Belirtiniz.

APPENDIX 2 QUESTIONNAIRE FILLED OUT BY ACCOMMODATION SERVICES

İşletmenin çevre dostu konaklama merkezi olup pazarlama stratejilerinde çevre öncelikli konuların vurghulanabilmesi için çalışmamız kapsamında alttaki bilgilere ihtiyacımız söz konusudur. Cevaplanacak anket ve işletme genel tanıtım bilgileri doğrultusunda çevre öncelikli bir çalışma oluşturmak mümkün olacaktır.

Otel genel tanıtımı için ihtiyaç duyulan bilgiler:

a. İşletmenin tarihçesi:
b. İşletmenin konumu:
c. Sunulan servisler:
d. Personel sayısı: Daimi personel sayısı:
   Sezonluk personel sayısı:
e. Yatak kapasitesi:
f. Oda sayısı:
g. Tuvalet sayısı:
h. İşletme kapalı alan m2:
i. İşletme açık alan m2:
j. İşletmeye ait görseller:
k. Mevsimlere göre yaklaşık rakamları alttaki tabloda belirtiniz.

	Misafir	Geceleme
İlkbahar		
Yaz		
Sonbahar		
Kış		

ENERJİ

1. İşletmede hangi çeşit enerji kaynağı kullanılmaktadır?
2. Eğer tüketilen enerjinin tamamı veya bir kısmı yenilenebilir kaynaklardan (rüzgar, güneş, biyokütle, kanalizyon çamuru, vb.) sağlanıyorsa bunların yüzdesi nedir?

3. Yenilenebilir kaynaklardan sağlanabilecek en yüksek enerji değeri nedir?
4. Enerji kaynağının tabiatını belirten deklarasyon veya sözleşme mevcut mu?
5. Isınma için kullanılan enerjinin tabiatı nedir?
6. Isınma için kullanılan enerjinin miktarı nedir?
7. Havalandırma sisteminin kurulum ve bakımı için alınan teknik desteğin tanımı?
8. İklim özelliklerine uygun ses ve ısı yalıtımı ne şekilde sağlanmaktadır?
9. Müşterileri yönlendirecek şekilde , kullanılmadığı durumlarda
    a. ısıtma
    b. havalandırma
    c. aydınlatmanın

kapatılmasına yönelik hatırlatma mesajı mevcut mudur?

10. Ampullerin verimine göre enerji sınıflandırmasının beyan edilmesi gerekmektedir. Ampullerin gücü genellikle kaç Watt`dır? Florasan ampullerin kullanım oranı nedir?
11. Enerji tüketiminin otomatik kontrolü için merkezi dijital sistem mevcut mudur?

mevcuttur

SU

12. Duş ve musluklardan akan suyun 12lt/dk.`yı geçmemesine dikkat edilmelidir. Bu çerçevede sayaç kontrolü uygulanmalıdır. Konaklama tesisinde böyle bir uygulamaya geçilmesi gerekmekte ve geçmişe dönük 3 ay için de bu çalışma gerçekleştirilmelidir.
13. Konaklama alanının su tüketiminde tasarrufa gidilmesi için hangi yöntemler izlenmektedir?
14. Müşteriler su tasarrufu konusunda bilgilendirilmekte midir?
15. Müşteriler tuvaletteki çöp kutularını gerektirdiği şekilde kullanmakta mıdır?
16. Müşteriler tarafından su hatlarında bir kaçak tespit edildiği durumlarda işletme yetkilileri ne şekilde bilgilendirilmektedir?
17. Havlu ve yatak takımlarının değişimi hakkında müşterilerin bilgilendirilmesi ne şekilde olmaktadır?
18. Havlu ve yatak takımları hangi sıklıkta değiştirilmektedir?
19. Bahçe ve bitki sulamada kullanılan metot nedir?

20. Bahçe ve bitki sulama ne sıklıkta gerçekleşmektedir?
21. Atıksu arıtma planı mevcut mudur?
22. İşletmede oluşan atıksu nereye drene edilmektedir?

DETERJAN VE DEZENFEKTAN KULLANIMI

23. İşletmede dezenfektan
    a. nerde :
    b. ne zaman .:
    c. ne miktarda kullanılmaktadır?:
24. Deterjan ve dezenfektan paketlerinde belirtilen kullanım oranlarına uygun hareket etmek konusunda personele eğitim verilmekte midir? Detaylandırınız.
25. Tuvalet temizlenmesi konusunda personelin temizlik beyanı için doldurması gereken tablo uygulaması var mıdır? Varsa lütfen tabloyu paylaşınız.

ATIK YÖNETİMİ

26. Müşteriler atık ayrıştırmanın ne şekilde yapılması konusunda bilgilendirilmekte midir?
27. İzlenen atık ayrıştırma yöntemi hakkında bilgi veriniz.
28. Ayrıştırılan atıkların belediye / ilgili kuruluş tarafından toplama aşamasında nasıl bir organizasyon mevcuttur?
29. İşetme tarafından ayrıştırılmış atıkların miktarları ve madde grupları hakkında bilgi veriniz.
30. Turist konaklama servisleri tarafından oluşan tehlikeli atıkların (toner, mürekkep, pil, ecza malları, soğutucu ekipmanlar) tanımı nedir?
31. Tehlikeli atıklar ne şekilde ayrıştırılmakta, toplanmakta ve bertaraf edilmektedir?
32. Yerel yönetim tarafından kabul edilen farklı atık kategorileri nelerdir? Eğer böyle bir uygulama yoksa işletme bu uygulamalardan haberdar olduğunu ve bunların uygulamaya geçmesi için destek olacağını yerel yönetime beyan edebilir.
33. Turist konaklama alanında hangi tek kullanımlık ürünlerin kullanıldığının beyanatı. (şampuan, sabun, bone, bardak, tabak, galoş, vb.)

DİĞER SERVİSLER

34. Turist konaklama alanında sigara içilen bölme var mı?
35. Müşterilere toplu taşımacılık imkanlarının gösterildiği bir bilgilendirme var mı?

GENEL YÖNETİM

36. Hangi çevresel yönetim sistemi mevcuttur?
37. İşletmenin çevresel uygulama prensipleri varsa bir kopyasının iletilmesi.
38. İşletmenin çevresel uygulama prensiplerinin harekete geçiş programı.
39. İşletmenin çevresel uygulama prensiplerinin uygulanması için misafirlerden katkı sağlayabilmek için prosedürler nelerdir?
40. Personelin çevre eğitim programının detayları nelerdir?
41. Hangi personel ne zaman ve ne sıklıkta eğitim almaktadır?
42. Müşterilerin çevresel uygulamalar hakkında bilgilendirilmesi (resepsiyonda bilgi sağlanması vb.) için uygulanan yöntem nedir?

Madde 41-42-43-44 için her gelen fatura ile veriler toplanmalıdır ve gecebaşına kapalı alana gore tüketim hesaplanmalıdır.

43. Son 3 aydaki toplam enerji tüketim maliyeti (kWh) nedir?
44. Son 3 aydaki toplam elektrik tüketimi (kWh) nedir?
45. Son 3 aydaki toplam ısıtma için kullanılan enerji (kWh) miktarı nedir?
46. Son 3 aydaki toplam su tüketimi (litre) nedir?

Madde 45-46 için her gelen fatura ile veriler toplanmalıdır ve gece başına kapalı alana göre tüketim hesaplanmalıdır.

47. Son 6 aydaki toplam kimyasal tüketim maliyeti (kuru madde gr) nedir?
48. Son 6 aydaki toplam üretilen atık miktarı (ayrıştırılmamış atığın litre ve kg olarak hesaplanması) nedir?

APPENDIX 3 LIST OF ALL ECO-LABELLED HOTELS IN EU

	NAME	Short description	Email/internet	Address	Phone/Fax
AUSTRIA	HOTEL FLORIAN	Healthy, organic and non smoking hotel in the Tyrolean Alps.	www.hotel-florian.at office@hotel-florian.at	Bichlachweg 258, 6370 Reith bei Kitzbühel	tel: +43 5356 65242, fax: +43 5356 65242-4
	BIOLANDHAUS ARCHE	Hotel in Carinthia with heart, focus on health and personal touch.	www.bio.arche.hotel.at bio.arche@hotel.at	Vollwertweg 1a, 9372 St. Oswald-Eberstein/ Carinthia	tel: +43 4264 8120, fax: +43 4264 8120-20
	HOTEL IM WALD „HAMMERSCHMIEDE"	Best for recreational activities amidst a romantic scenery in Salzburger Land.	info@hammerschmiede.at www.hammerschmiede.at	Acharting 22, 5102 Anthering bei Salzburg	tel: +43 6223 2503, fax: +43 6223 2503-77
	VIVA-HOTEL	The centre for modern Mayr-medicine at the „Wörthersee" in Carinthia.	office@viva-mayr.com www.viva-mayr.com	Seepromenade 11 9082 Maria Wörth	tel: +43 4273 3117 fax +43 4273 3117-150
CYPRUS	SUNWING HOTEL (SANDY BAY RESORT)	Relax on the beautiful island Cyprus between cypresses and palms.	louis.misseris@sunwing.net	75 Nisi Av. P.O. Box 30150 5340 Ayia Napa	tel: +357 23841000 fax: +357 23841008
DENMARK	SKYTTEHUSET KOLDBY KRO	Comfortable inn in an old restored farm, tap room, stylish bedrooms.	skyttehuset@pedersen.dk www.sydthy.dk	Algade 65, DK-7752, Snedsted	tel: +45 97 93 66 39

DENMARK	AALBORG SØMANDSHJEM	Comfortable family hotel close to Tivoliland.	info@hotel-aalborg.com www.hotel-aalborg.com	Østerbro 27, DK-9000, Aalborg	tel: +45 98 12 19 00, fax: +45 98 11 76 97
	FERIECENTER V/ KARUP Å	Holiday resort in Midtjyl -land with many recrea- tional activities .	karup-aa@mail.dk www.karup-aa.dk	Nygård, Koldkurvej 13, Hagebro, DK-7470 Karup	tel: +45 97 45 21 07, fax: +45 97 45 29 07
	STIHOLT HOTEL	Small hotel with 10 bedrooms.	bo.christensen@stiholt.dk www.tcss.dk	Trafikcenter Saeby Syd 1 DK-9300 Saeby	tel: +45 96 89 66 69 fax: +45 96 89 6667
	FERIECENTER SLETTESTRAND	Surrounded by unique preserved areas, good accessibility for disabled guests.	fc@slettestrand.dk www.slettestrand.dk	Slettestrandvej 142-144, DK-9690, Fjerritslev	tel: +45 98 21 70 44, fax: +45 98 21 75 44
GERMANY	KING'S HOTEL FIRST CLASS ****	Sumptuous luxurious city hotel in Munich.	1stclass@kingshotels.de www.kingshotels.de	Dachauer Strasse 13, 80335 München	tel: + 49 89 55 18 70, fax: +49 89 55 18 73 00
	KING'S HOTEL CENTER ***	Luxurious hotel with noise reduction system in the city of Munich.	center@kingshotels.de www.kingshotels.de	Marsstrasse 15, 80335 Munich	tel: +49 89 51 55 30, fax: +49 89 51 55 33 00
GREECE	SUNWING RESORT KALLITHEA	Family resort hotel focus- ing mainly to children.	ion.gonos@sunwing.net www.ving.se	P.O. Box 207 Kallithea Avenue km 5, 851 00, Rhodes	tel: +30 22410 88100, fax: +30 22410 63487
	SUNGARDEN RHODES	Top hotel in the region of Rhodes.	ion.gonos@sunwing.net www.ving.se	P.O. Box 207 Kallithea Avenue km 5 851 00 Rhodes	tel: +30 22410 88100 fax: +30 22410 63487

HUNGARY	KOLPING HOTEL	4 star hotel and spa resort in the Balatony-area.	sos.eva@kolping.hotel.hu www.kolping.hotel.hu	Sos Eva Fő u. 120. 8394 Alsópáhok	tel: +36-30-620-7696 fax: +36-83 344-142
ITALY	AGRITURISMO CASCINA MARTINA	Typical stone-built farmstead situated in a hilly area about 460m above sea level.	cascinamartina@yahoo.it www.cascinamartina.net	Località Martina III n.12 , 12063 Dogliani (CUNEO)	+39 0173 721239
	AGRITURISMO CASCINA VILLA	Relaxing holidays for families with B&B accommodation.	info@cascinavilla.it www.cascinavilla.it	Cascina Villa di Maggiora - Via Santa Caterina n°24 - 14030 - Rocca D'arazzo	tel:+39 0141408456
	AZIENDA IL DUCHESCO	Breathe in the fragance of the Maremma natural park.	info@ilduchesco.it, www.ilduchesco.it	Via Provinciale 59 29, 58010, Alberese (Grosseto)	tel: +39 564 407 323, fax: +39 564 407 323
	B&B BRICCO DEL GENERALE	The Bricco del Generale is situated on the top of a hill at only a few Km from Asti city.	briccodelgenerale@tiscali.it www.briccodelgenerale.it	Via Santa Caterina, 21a 14030 – Rocca D'Arazzo (Asti)	tel/fax 0141408343
	B&B CASCINA LA GIOIA	The B&B Cascina la Gioia is located in an old restored farmstead on 18 hectares of farm land.	info@cascinalagioia.it www.cascinalagioia.it	CASCINA LA GIOIA Via Cascina La Gioia, 48 - 14030 REFRANCORE (AT)	+39 0141 670918 +39 0141 670918
	B&B BAGLIO CASE COLOMBA	The B&B is an old rural farm „baglio". A typical late 19th century Trapanese structure.	info@casecolomba.com www.casecolomba.com	Via Toselli n.183, - 91012 Buseto Palizzolo - TP	tel:: +39 0923/852729
	B&B IL BOSCO DELLE TERRECOTTE	Besides enjoying the beauty and peace of vineyards and woods its is also possible to undertake a course in ceramics.	segreteria@ilboscodelleterrecotte; www.ilboscodelleterrecotte.it	Via Vigne di Spagna, 18 – 12032 Barge - CN	tel: +39 0175343671 fax: +39 0175343671
	CASA PER FERIE CONTE ROSSO	The Conte Rosso holiday home is located in the historic centre of the medieval town of Avigliana.	comuneavigliana@cert.legalmail.it www.comune.avigliana.to.it	Piazza Conte Rosso, 7 Avigliana - TO	tel:: +39 011/97 69 111 fax: +39 011/97 69 109

ITALY	HOTEL JOLIE	Its is a small family run B&B hotel with a young and friendly atmosphere.	info@hoteljolie.it www.hoteljolie.it	Viale Ma scagni 6/C - 47838 Riccione - RN	tel:: +39 0541 647800 fax: +39 0541 648184
	HOTEL DIANA	Located very close to the wonderful testimony of the Byzantine history.	info@hoteldiana.ra.it www.hoteldiana.ra.it	Via Girolamo Rossi, 47 – 48100 Ravenna - RA	tel:: +39 0544 39164 fax +39 0544 30001
	HOTEL GLIS	This new construction is designed to meet the needs of the most selective clientele.	info@hotelglis.it www.hotelglis.it	C.so Lombardia, 42 – 10099 San Mauro Torinese - TO	tel:: +39 011 2740151 fax +39 011 2740375
	HOTEL BEL SOGNO	Your free time can be spent between the coffee shop, gaming rooms and restaurants.	info@hotelbelsogno.com www.hotelbelsogno.com	Via Modena, 11 - 47900 Rimini - RN	tel:: +39 0541-372354 fax: +39 0541-375014
	HOTEL SOLE	Bright and comfortable atmosphere. Care and courtesy are the best ingredients of this hotel.	hotelsole@ hotelsole.com www.hotelsole.com	Via Dante 82 - 47838 Riccione - RN	tel:: +39 0541 692800 fax: +39 0541 693030
	HOTEL IL MULINO	It is the ideal place for gourmets, sportsmen, horse lovers and for those who love to feel free.	mulinomattie@libero.it www.mulinomatie.it	Via Giordani 52 – 10050 Mattie - TO	tel: +39 012238132 fax: +39 012238132
	HOTEL VILLA ARGENTINA	The starting point for pleasant walks and other pathways in an unconta-minated environment.	villaargentina@libero.it www.hotelvillaargentina.com	Via A. De Gasperi n.170 - 19017 Riomag-giore - SP	tel:: +39 0187920213 fax: +39 0187760531
	RIFUGIO L'ARBERGH LOCANDA DEL PARCO	The Locanda del Parco is located in an old shepherds village at the edge of the Bosco di Faggi.	info@palanfre.it www.palanfre.it	Località Palanfré - 12019 Vernante - CN	tel:: + 39 335 6596266
	RIFUGIO ALPINO DANIELE ARLAUD	Located inside the Natural Park of Gran Bosco di Salbertrand it offers an unique opportunity to be in contact with nature.	info@rifugioarlaud.it www.rifugioarlaud.it	Via Roma n.28 - 10050 Salbertrand - TO	tel:: +39 0335 401624 fax: +39 011 8396082

ITALY	RIFUGIO ALPINO TOESCA	A mountain refuge situated at 1710m above sea level in Val di Susa in the Regional Park of Orsiera Rocciavrè.	rifugio.toesca@libero.it www.rifugiotoesca.com	Pian del Roc, Comune di Bussoleno, Val di Susa - TO	tel:: +39 0122 49.526
	RIFUGIO LOCANDA DEL SORRISO	Located in the Natural Park of Alpi Marittime, this mountain refuge is a stopover on the Grande Traversata delle Alpi (GTA)-crossing of the Alps.	parcalma@tin.it www.parcoalpimarittime.it	Fraz. Trinità-12010 Entracque - CN	tel:: +39 0171 978809 fax: +39 0171 978921
	VILLAGGIO MEDIA UNIVERSITÀ	Designed with bio-architectural techniques, using materials and technologies for water and energy saving.	environment@torino2006.it www.torino2006.org	Lungo Dora Siena angolo via Ricasoli - 10100 Torino - TO	tel:: +39 01111 68000 fax: +39 01111 68503
NETHERLANDS	GROEPS-ACCOMMODATIE DOEKSEN	Group accommodations situated at the beautiful sites of Terschelling.	info@doeksen-groepsaccommodatie.nl www.doeksen-groepsaccommodatie.nl	Oosterend 49, 8897 HX, Terschelling	tel: +31 (0) 562 448878, fax: +31 (0) 562-448784
	LANDAL TWENHAARSVELD	Bungalows amidst impressive scenery, paradise for children.	info@landal.nl www.landal-online.nl/twenhaarsveld.html	Landuwerweg 17 7451 SP Holten	tel: +31-548 36 1458 fax: +31-0548 36 25 35
	NH LEEUWENHORST CONFERENCE HOTEL	Close to Noordwijk beach, surrounded by the famous tulip fields.	nhleeuwenhorst@nh-hotels.com www.nh-hotels.com	Langelaan 3, 2211 XT, Noordwijkerhout	tel: +31.252.378888 fax: +31.252.378890
	GRAND HOTEL OPDUIN ****	Charming, near the beach and dunes of the Dutch island of Texel.	info@opduin.nl www.opduin.nl	Ruyslaan 22, 1796 AD, De Koog-Texel	tel: +31 222 317445 fax: +31 222 317777
	TULIP INN BRINKHOTEL-ZUIDLAREN	Perfect place to discover culture and nature.	niels@tibrinkhotel.nl www.hethotel.nl	Brink o.z. 6, 9470 AC Zuidlaren	tel: +31 (0) 50 409 12 61, fax: +31 (0) 50 409 60 11
	SCANDIC SANADOME NIJMEGEN	On the edge of the old town's rural estate, Jonkerbos, right in the middle of town, but yet still in the country it is an exceptional location.	ronny.bouckeart@scandic-hotels.com www.sanadome.nl	Scandic Sanadome Nijmegen Weg door Jonkerbos 90 6532 SZ Nijmegen	tel: +31 024-3597405 fax: +31 024-3597264

NORWAY	AALBORG SØMANDSHJEM	Child friendly family hotel with 54 modernized rooms.	info@hotel-aalborg.com www.hotel-aalborg.com	Hotel Aalborg Sø-mandshjem Østerbro 27 9000 Aalborg	tel: +47 98 12 19 00 fax: +47 98 11 76 97
	GÅLÅ HØGFJELLSHOTELL OG HYTTER	Perfect venue for memo-rable holidays, weddings, anniversaries or business.	www.gala.no hotel@gala.no	N - 2646 Gålå i Gudbrandsdalen	tel: +47 6129 7600, fax: +47 6129 7601
	PARK HOTELL, ALTA	Homely high standard hotel near Finnmark's open countryside.	post@parkhotell.no www.parkhotell.no	Markedsgata 6 Alta Sentrum, PB 1058, 9503, ALTA	tel: +47 78 45 74 00, fax: +47 78 45 74 01
PORTUGAL	HOTEL JARDIM ATLANTICO	Clean air, healthy food, unique landscape near the Natural Park.	monicaheras@ jardimatlantico.com www.jardimatlantico.com	Lombo da Rocha, Prazeres, P-9370-605, Calheta, Madeira	tel: +351 291 820 220, fax: +351 291 820 221
SPAIN	MAS FUSELLES	Family hotel near the sea and the mountains.	ecoturisme@masfuselles.com www.masfuselles.com	Mas Fuselles, s/n, 17844, Cornella del Terri	tel: +34 972 594 841, fax: +34 972 840 950
	SUNWING RESORT ARGUINEGUIN	Family resort hotel in Gran Canaria.	tomas.massanet@ sunwing.net www.mytravel.se	Carretera General del Sur, km 68.2, 35120 Arguineguin	tel: +34 928 735 701, fax: +34 928 735 612
	SUNWING RESORT BOUGANVILLA	Enjoy your holidays in this beautiful hotel at „Posei-don Bar" with a gorgeous view of Medelhavet.	anders.glemne@sunwing.net www.sunwing.net	CRRT. Costa de los pinos S/N 07559 Cala Bona-Son Servera-Mallorca	tel: +34 971 814 009 fax: +34 971 813 743
SWITZERL.	HOTEL BOLDERN	Evangelic seminarhotel equipped to fulfill highest managers' needs.	hotel@boldern.ch www.boldern.ch	Boldernstrasse 83 8708 Männedorf	tel: +41 44 921 71 11 fax: +41 44 921 71 10