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Abstract

The concept of Sustainable Development cannot be ignored by one of world's biggest and fast growing industries - Tourism. To promote Sustainable Tourism, companies and facilities have to be environmentally aware and to preserve the main asset of the industry - the environment. Most of resorts in Eastern European former socialist countries have become a preferred destination for western tourists because of low prices. At the same time the levels of environmental degradation in those countries are so high, that there is an urgent need in improvements.

Present thesis is analysing the current performance of hotels and restaurants in the Bulgarian Black Sea resort Albena and suggests Cleaner Production measures that could help to improve their current performance and possibilities to apply for a recognition award. By using STELLA software different scenarios were simulated in terms of electricity and water consumption and waste management for an 11 year period and the results were compared with the standard requirements of chosen recognition schemes, in order to find the most feasible ones. The results of simulations show that in terms of electricity consumption good housekeeping is more efficient than change of equipment, while for water related issues is more efficient to change or improve the equipment. The waste management practice does not meet the EU standards, but after having implemented the new regulations, the resort will be able to meet those requirements. The current purchasing policy is not sufficient but the possibilities to have an environmentally sound purchasing policy are obvious.

It is expected that the recommended measures, if implemented, will help the company to meet the requirements of an International recognition scheme and by the end of 2001 Albena could apply for a certification.

Acronyms

⇒ **B & B** - Bed and Breakfast
⇒ **CP** - Cleaner Production
⇒ **EMS** - Environmental Management System
⇒ **EPI** - Environmental Performance Indicator
⇒ **IHEI -** International Hotels Environmental Initiative
⇒ **MoEW** - Ministry of Environment and Waters
⇒ **MPI** - Management Performance Indicator
⇒ **NPWMA** - National Programme for Waste Management Activities
⇒ **UNEP** - United Nations Environment Programme
⇒ **US EPA** - United States Environmental Protection Agency
⇒ **WCDE** - World Commission on Environment and Development
⇒ **WTTC** - World Travel and Tourism Council

CHAPTER I: INTRODUCTION

1.1. Background: Tourism and Sustainable Development

The tourism industry is considered as *"...one of the world's most important economic sectors and one of the most dynamic as well. ...it ranks alongside such sectors as construction and petrochemicals as one of the world's biggest industries"*[1]. Being a very complex system, tourism uses and provides products and services related to various other industries and services, such as: transport, food, construction, energy, water, etc. It affects the natural environment in terms of air emissions, solid waste and waste water disposal. On the other hand, tourism is such an industry, which uses the natural and/or cultural environment as one of its main attractions, hence its negative impact on the latter can be crucial. As the UNEP has noticed, *"There are (also) many examples where tourism's very capital, the natural and/or cultural environment, has deteriorated to a point at which it ceases to attract visitors. Often the damage is irreversible".* [2] The time has come when, because of environmental degradation and other similar problems, the consumers choose more protected and environmentally more secure tourist sites, which in many cases brings to a sensitive decrease in number of tourists, and consequently profit for some tourist centres and to their increase for others.
The very position of tourism in the economy and its interrelationship with other industries makes it both morally responsible and economically interested to have a leading role in the overall transition towards *sustainable development.*

Sustainable Development The World Commission on Environment and Development (WCED) defines Sustainable Development as a development that "… meets the needs of the present without compromising the ability of future generations to meet their own needs".[3]

Having in mind the level of environmental degradation in Eastern European former socialist countries, and the potential of those countries to provide tourism products at a relatively low price, the sustainable development issues acquire an increasing importance. Although the national environmental legislation, technical and financial possibilities vary from one country to the other, it is important to develop a comprehensive criteria which can be applicable for a maximum number of tourist resorts in Eastern European and/or former socialist countries. This becomes indispensable due to the increasing interest of western tourists for low price tourist resorts. So, for instance, in comparison with 1998 in 1999 there was a 31% increase in number of scandinavian tourists and for next year this number is going to be much higher (source of information: Sonya Stoicheva[4]).
Despite the environmental awareness of most western tourists, the main driving force for the choice of tourist resorts or hotels remains the low price[5].
In order to be able to provide a low price service and have profits, the resort must think about cost savings, especially in terms of electricity and water, because the prices of those resources are growing constantly.
Being a consumer and a service provider at the same time, the tourism industry relies - for its success - on many stakeholders. In order to provide a sustainable service, the industry must not only be environmentally conscious within itself, but must also use the services and products delivered by environmentally aware contractors. This can be possible to achieve only in close co-operation of all involved actors, that in one way or another are related to the tourism industry. To make sure that all actors have the same goal - sustainability - they must

[1] UNEP TIE Division Home Page, visited on June 29, 1999
[2] IHEI Home Page, visited on June 30, 1999
[3] WCED, *Our Common Future* in Nelissen et al., *Classics in Environmental Studies*, p.282
[4] See List of Interviewed Persons
[5] See Appendix I, Box 1

co-ordinate their activities, have economic incentives and at last, but not least, have the technical possibility to improve their environmental performance. Another important precondition is the appropriate environmental legislation (see Chapter IV - Solid Waste).

By implementing *Cleaner Production*[6] measures the resorts can reduce the negative impact on the environment and have cost savings. By communicating their environmental performance they can become more competitive. This is another important precondition for tourism development, that can not be ignored.
The knowledge of the research site is very important for making right suggestions, because each CP measure in different places can be implemented in different ways and to different extent.

1.2. Goals and Objectives

The objectives of this thesis are:
- to analyse the current environmental performance of the Bulgarian tourist resort Albena;
- to test different possibilities to improve the performance of the company's facilities in terms of electricity consumption, water use, waste management and environmentally friendly purchasing;
- to find most feasible CP measures (based on the knowledge of the research site and the results of tested measures); and
- to compare them with the requirements of chosen recognition schemes.

The goals of the research are to *find the set of most relevant CP measures*, and if they are implemented properly, *when will Albena be able to apply for a recognition scheme award*.

1.3. Scope and Limitations

Albena is a big complex of hotels, restaurants, sport and leisure centres, etc. (See subchapter 3.2.). Besides that, Albena is in a close relationship with such contractors as water and energy suppliers, food suppliers and others. On the other hand, some of the company's facilities are not playing such a crucial role as the others, hence the scope of the study has been narrowed down and only hotels and restaurants have been considered as most important fields that must be taken into consideration. At the same time, those facilities use different resources and materials, as well as generate air and noise emissions, solid waste and waste water etc. Some of these aspects are more relevant than the others. Therefore it was considered that the research will focus on electricity consumption, water use, solid waste generation and purchasing.
There are several limitations that have to be taken into consideration:
⇒ lack of time for collecting all relevant data and interviewing all key persons
⇒ the seasonal character of the facilities
⇒ lack of data for consumption of resources by hired facilities
⇒ lack of any real data about amounts and types of generated solid waste
⇒ lack of sufficient data about the performance during other high season months but June.

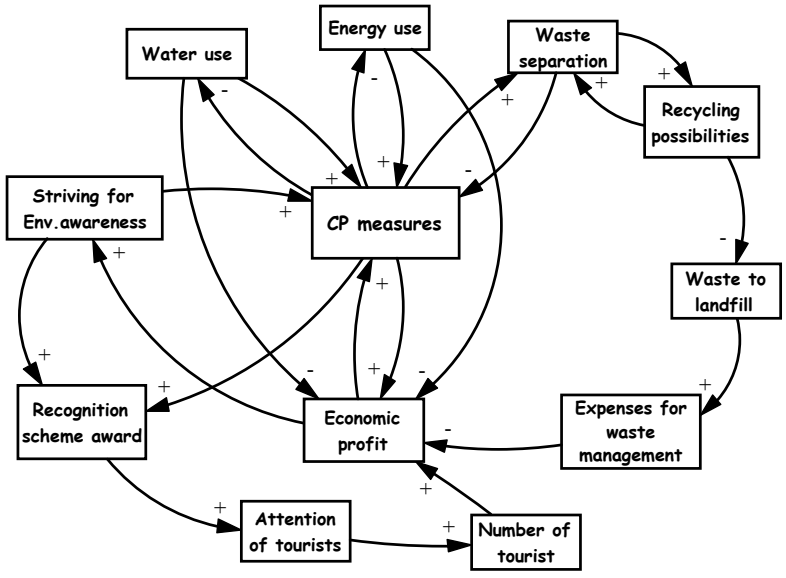
[6] More about Cleaner Production see Chapter II, subchapter 2.1.

1.4. Hypothesis

In order to be able to discuss the current performance of the resort and to suggest the future improvements and to what extent they could be implemented, it is important to have a holistic view over the *system*, which in this given case is called "Albena".

System A system is a perceived whole whose elements "hang together" because they continually affect each other over time and operate toward a common purpose.[7]

The resort itself represents a complicated system, which consists of many components, each of which is another subsystem and each change in any of those subsystems reflects the whole system. Therefore it is very important to know the relationship and/or interdependence of all parts of the whole to be able to react in time and in a right way. So, the actors of the system must be identified and the problem defined. Once we know how the system works, we can run scenarios to find the best way to solve the problem, making each of the actors to work in such a way that they approach our problem to its solution.
Based on the knowledge of the system and the effects of CP measures the following hypothesis was developed. Currently Albena has high levels of water and energy use. The more energy and water are used, the less profit will the company have. By implementing CP Measures those levels can be decreased. The CP measures include waste separation which will increase meanwhile creating possibilities for recycling. This means that less waste will be taken to the landfill and thus will be reduced the waste management costs. The increased profit will show that CP is about making profits and therefore the CP measures will be increased. On the other hand the economic profit will increase the company's striving for environmental awareness, which will create possibilities to get the ecolabel award. By communicating this fact the attention of tourists will be increased. The more tourists are interested in Albena, the more customers the company will have, hence, more profit will be generated.



How to read the CLD

If the cause and effect are both increasing or decreasing, then the feedback will be positive. While if the cause and the effect are "moving" in opposite directions, i.e. increase results in a decrease or vice versa, then the feedback will be negative

Figure 1. Causal loop diagram explaining the cause-effect relationship of CP measures

[7] Senge, Peter M. et al; The Fifth Discipline Fieldbook; p. 90

The cause - effect relationship is shown in Figure1. This is a reinforcing loop which will permanently increase the environmental awareness, make the company to implement new, more advanced CP measures which will create more profit. It could be said that economic profit is the driving force for CP improvements. If put in an order, the hypothesis is created on following steps:

⇒ implementation of CP measures;
⇒ reduction in energy and water use and waste generation;
⇒ better environmental performance
⇒ recognition scheme certification;
⇒ increase in number of tourists;
⇒ increase in economic profit.

As a result, Albena will improve its performance even more.

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CHAPTER II: CLEANER PRODUCTION AND RECOGNITION SCHEMES

2.1.The Cleaner Production Concept

According to UNEP,[8] Cleaner Production is *"the continuous application of an integrated preventive environmental strategy applied to processes, products, and services to increase overall efficiency and reduce risks to humans and the environment"*.
In his PhD thesis Rene van Berkel gives a 'working definition' of cleaner production, which seems to be applicable for the purpose of present research more than the previous definition. He says: *"Cleaner Production is the continuous improvement of industrial processes, products and services to reduce the use of natural resources, to prevent - at the source - the pollution of air, water and land and to reduce waste generation - at the source - in order to minimise risks to human population and the environment"*.[9]
The main idea of the CP concept is to shift from "end of pipe" solutions towards "source reduction". This concept is applicable for any industry or service, where exist an inflow of materials and resources (energy, water, etc.) and an outflow of discharges in any form (air emissions, wastewater, solid waste, noise).
One of most important tools in the toolbox of cleaner production is the concept of 'Pollution Prevention' which has different definitions in Europe and United States. Van Berkel refers to both of them to show the difference in the approaches. So, in European understanding pollution prevention is: *"avoiding or minimising the generation of waste and emissions ... through source reduction or on-site recycling"*, while the US EPA[10] defines pollution prevention as: *"the use of materials, processes, or practices that reduce or eliminate the creation of pollutants or wastes at the source. It includes practices that reduce the use of hazardous materials, energy, water or other resources and practices that protect natural resources through conservation or more efficient use"*. Although the idea is the same, the American definition is more detailed.
The "end of pipe" solutions are still important, especially if we bear in mind, that as long as there is an inflow, the outflow is unavoidable. Here comes the main idea of the concept: does the inflow correspond to our needs or it is more than we need in reality? If we take from the source as much as we need and not more, then the efficiency will be higher and we will not waste the resource, in whatever form it is. If we think in wider dimensions, we can see that, for instance, by using less electricity we reduce the emissions generated during its production or by using less water we reduce the amount of wastewater generated during our activities.

[8] UNEP TIE home page, Cleaner Production, visited on December 7, 1999
[9] Rene van Berkel, *Cleaner Production in Practice*; PhD Thesis; Amsterdam University, 1996
[10] See Acronymes

Cleaner Production puts the process of waste generation in one of the first places and implements alternative solutions in order to minimise the burden on the environment by reducing, where possible, its generation at the source rather than managing the generated waste.
To promote Cleaner Production, it is important to work in several directions simultaneously. This will mean, that CP can include a wide range of measures from implementation of resource - efficient technologies to such simple and easy - to - implement measures as good housekeeping.
The literature gives examples of implementation of different CP measures in different industries. So, for instance, in transport sector this could be a reduction of exhaust emissions by shifting to an alternative fuel or improvements in the engine might reduce noise pollution. In agriculture this could be by shifting from chemicals to natural fertilisers. In such industries, where the production uses packaging materials, the CP measures can include modifications in package design which might result in waste minimisation and resource efficiency. But as the topic of present research is not Cleaner Production by itself, we should rather discuss CP measures that are applicable for tourism industry.
Within the cleaner production concept tourism, as a rapidly developing industry, can both prevent the further overuse of resources in already existing facilities and apply the ideas of cleaner production concept during the reconstruction of old facilities and the construction of new ones. So, for instance, the installation of dual flash toilets can be implemented as resource efficiency measures to reduce water use, or the application of timers in common areas in hotels can help to reduce electricity consumption for lighting, hence energy use, in spaces where lighting is used for short time intervals.
Many recognition schemes in tourism industry include in their standard requirements resource efficiency and waste minimisation.

2.2. Recognition Schemes in Tourism Industry

Within the tourism context, a recognition scheme is to "… certify that specific efforts have been made to reduce environmental impacts. They thus disclose the real 'environmental identity' of products and services, offering 'environmentally-friendly' producers a competitive advantage"[11].
The application for a recognition or ecolabel award is a voluntary approach aiming to communicate the environmental performance of a hotel, restaurant, destination or a tourist company. At the same time this can become an incentive for further improvements.
Ecolabels help the tourists to make the right choice while deciding their holiday destination. As the tourists become more conscious in environmental matters, the ecolabel can play an advertising role for a tourism 'supplier' and become a driving force for its competitors to improve their environmental performance in order not to lose customers.
All recognition schemes have their criteria and in order to receive the award, the tourism company or facility has to meet the standards set by the given recognition scheme. This can not be achieved overnight and demands well planned and co-ordinated efforts of all involved parties. The criteria of a recognition scheme can be used as a guideline for improving the environmental performance of a facility or tourist company.
Amongst existing recognition schemes in Tourism Industry three were chosen to identify the main criteria which is most common for the accommodation and catering facilities.

[11] UNEP, Ecolabels in the Tourism Industry, 1998, p.5

2.2.1. The Green Globe 21

One of most internationally recognised and comprehensive recognition schemes in the tourism industry is the *WTTC*'s[12] Green Globe 21.

Green Globe 21 is the only independently verified world wide certification scheme for Travel & Tourism.[13] As any ecolabel scheme, it has established a list of criteria, that the applicants have to satisfy to qualify for the ecolabel. The objectives of a criteria are designed to lead a participant to a higher level of performance.[14]

The Green Globe minimum standard requirements include such key issues as:

⇒ waste minimisation, reuse and recycling;
⇒ energy efficiency, conservation and management;
⇒ management of freshwater resources; and
⇒ environmentally-sensitive purchasing policy.[15]

2.2.2. The Nordic Swan for accommodation services

The promoter of this recognition scheme is the Nordic Council of Ministers for Consumer Affairs. It targets mainly the Nordic countries. .

The criteria developing work for this recognition scheme has been started in February 1998 by the Swedish Standards Institution. The main areas for the criteria of this scheme are:

⇒ energy;
⇒ waste;
⇒ transport;
⇒ water;
⇒ inventory and decoration;
⇒ raw material and consumable supplies;
⇒ washing and cleaning.

2.2.3. The Green Key

This recognition scheme is promoted by the Hotel, Restaurant and Tourist Association (HORESTA), Danish Outdoor Council and Danish Tourist Information Managers.

The main areas for the criteria include:

⇒ guest and staff information;
⇒ water;
⇒ waste;
⇒ energy;
⇒ in- and outdoor environment; and
⇒ washing and cleaning.

The present research has focused on four main areas that in one way or another, are common for all three of mentioned recognition schemes:

- ♦ energy;
- ♦ water;
- ♦ waste; and
- ♦ purchasing (this includes washing and cleaning, all kinds of raw material and inventory supply etc.)

The selection of those aspects is also supported by the CP audit realised by the IIIEE[16].

CHAPTER III: METHODOLOGY

[12] See Acronyms
[13] Green Globe 21 Home Page; visited on October 29, 1999
[14] Ecolabels in the Tourism Industry; p.15
[15] Ecolabels in the Tourism Industry; p.18
[16] See Bibliography

3.1. Methods Used in the Research

The research has used several methods to gain a background knowledge, collect data, evaluate it, test and analyse the results.

- **Literature review**

A literature review was carried out to gain the background information about tourism and environmental issues; the CP concept and its applicability for tourism; different recognition schemes in tourism industry. By going through different case studies an attempt was done to understand how the industry affects the environment and what is their interdependence, as well as how the CP measures can affect the environmental performance of tourist resorts and facilities. Furthermore the effects of recognition schemes on tourism industry in different aspects (environmental, economic, social, etc.) was studied.

- **Data collection**

For collecting all necessary data several sources were used: the Audit report of the Audit for Cleaner Production, carried out by the audit team of IIIEE in Albena in April 1998 gave the basic knowledge about environmental issues in the company and about the performance of the facilities one year ago, as well as about the recommendations that the audit team had made.
The next step was to go to Albena and to interview different stakeholders such as its employees, managers of hotels, persons responsible for the technical maintenance of buildings, waste management personnel and tour operators. Questionnaires have been distributed to a number of tourists in order to find out their attitude for environmental issues.[17]
A part of the data related to electricity consumption, water use and the number of overnight stays was provided by the management of the company.
After having analysed and evaluated all the available data it was found out that some relevant information was missing. This gap was fulfilled by the data found from other, similar facilities, but as the data available from other facilities is very scarce, sometimes this data comes from a completely different geographical, economic and technological backgrounds and it is important to remember about the possible approximation.

- **Modelling**

By using the available data, three computer models have been built - by using the STELLA software - in order to analyse the environmental performance of Albena in terms of electricity consumption, water use and waste management. Moreover, different scenarios have been tested to find the most applicable and effective set of feasible CP measures. It is very important to bear in mind that the models are conceptual and the mathematical values of outcomes are not relevant. They aim to show the trends of implementing different CP measures and not exact values.
Based on the results of this study, recommendations have been given for changes in the infrastructure of the facilities and for the management of the company, which will help Albena to improve its environmental performance and, hopefully, to apply for a recognition scheme certification.

3.2. The Research Site - Albena

Albena is situated in the northern part of the Bulgarian Black Sea coast, at a 30km. distance from the city of Varna. Because of its favourable climate, clean beach, abundance of hotels, camp-sites and different leisure facilities, Albena has become a preferred holiday destination not only for local tourists, but also for many foreigners.

[17] As only 3 of 50 questionnaires were answered, they were not considered as relevant and for this reason no data from the questionnaires is used in the research.

The owner of the site is Albena AD, a shareholders company with an executive director. The company includes 40 hotels (13 of which have been totally renovated)[18], five villa parks, and a campsite. Except that there are various food and beverage facilities.
Being situated at a certain distance from any residential unit and having a centralised management gives to Albena a unique possibility to be independent of such municipal services as waste management, transport, etc. The company has its own waste management department and transport division, it is the owner of all facilities, a part of which are hired by tenant firms during the active season. In some cases the centralised management brings to certain difficulties for the management of small facilities and taking individual decisions and responsibilities, but this will be discussed later (see Ch. VIII, Recommendations).
Since 1993 Albena is an associate member of the world-wide Blue Flag Movement. The company is the first Bulgarian tourist complex which applied for enlisting in the Catalogue of the ecologically clean resorts.[19] The Blue Flag is a recognition scheme which concerns mainly the beach.

3.3. System Boundaries

As it was mentioned before, three computer models were built to analyse the effects of CP measures on the electricity consumption, water use and waste management.
In the first two models (electricity and water) were included average amounts of electricity and water used by 24 hotels, and 17 restaurants. The measurement units are consequently kW/h and litres per month.
The facilities are divided into old and renovated ones and as renovated are considered only the facilities that have been renovated during the last three years.
The energy issues relate only to electricity consumption.
The computer simulations were run for an 11 year period from 1999 to 2010. Alternatively, in some cases the time units were months (44 months = 11 years[20]).
The possible growth in number of tourists during the simulated period, as well as the increase in consumption of resources due to this possible growth have been left out of the models.
In the waste management model were included all main types of waste generated by a facility, as well as all possible ways of waste management. Out of its scope was left only the possible waste incineration. This model does not refer to any group or type of facility. It includes the whole complex Albena, which, as it was assumed, generates one unit of solid waste.
The number of overnights and the amount of electricity and water used are not growing during the simulated period, which means that it is assumed 0 growth in number of tourists. It seems important to mention that the amount of consumed electricity and the amount of water used are represented in the models as stocks, which means that they are accumulating during the simulated period.
More detailed and specific assumptions will be mentioned further, for each particular model.

[18] Source: Albena AD
[19] Albena home page, visited on June 20, 1999
[20] See Scope and Limitations

CHAPTER IV: ENERGY

4.1. Problem Definition

Electricity in Albena is supplied to users from a substation to 22 traffic posts and further - directly to the users. Each of them has a metering device which makes easy the monitoring of electricity consumption. Due to increasing price of electricity on the national level and driven by the understanding of resource use issues, in Albena exists a policy of energy saving measures as well as a procedure of inspecting the proper use of energy by the tenants of hired restaurants, bars and other facilities, in order to check the accordance of the electricity used in reality and the amount of electricity paid for. (The share of hotels and restaurants in the overall electricity consumption is shown in Figure 2.) Another important incentive for energy savings is the fact, that in Bulgaria one of main sources of electricity is the brown coal or lignite, which is known as one of most polluting sources of electricity. By improving the amount of energy used, it can be assumed that Albena makes serious improvements in pollution prevention.

As it was mentioned before, Albena has 40 hotels. 13 of them have undergone the renovation, which means that electric installations and devices have been changed. Those renovated hotels and restaurants claim to have done significant improvements in energy consumption. Is that true and how far have they gone in their improvements? Another important question that seeks a comprehensive answer is: what kind of improvements should be done in seasonal hotels? Are those improvements cost effective? So, for instance, in his interview Vladimir Yovchev mentioned the price and the durability of fluorescent bulbs, questioning the cost effectiveness of this investment[21]. The success stories from other hotels show, that this measure can be very efficient. One of Sheraton Hotels in Hawaii has reduced electricity costs by 26,000$ by replacing bulbs with fluorescent fixtures in the public areas.[22] We can't ignore the fact that the hotel mentioned in this reference is not seasonal and obviously is bigger than the hotels in Albena, but at least the example gives some idea about how sensitive can be the profit if a simple measure is applied.

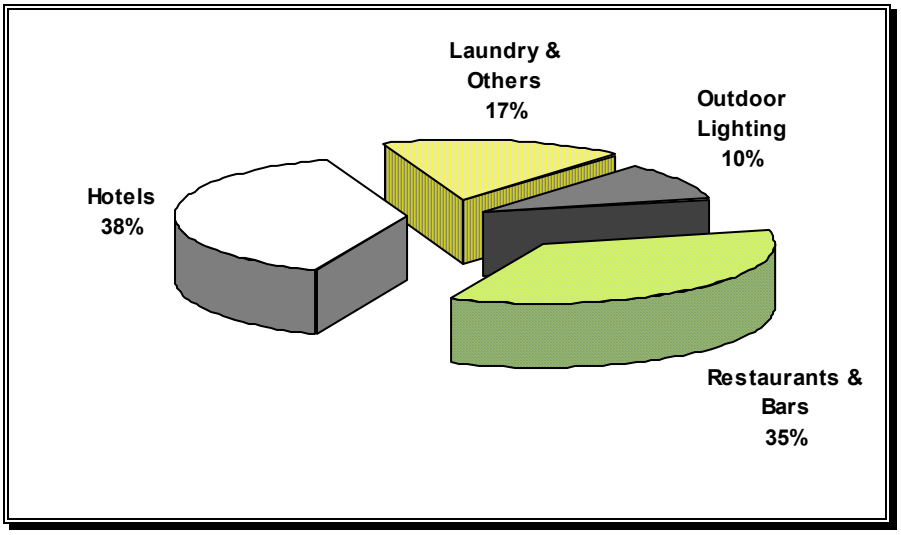

Fig. 2. The share of hotels and restaurants in electricity consumption (modified from: IIIEE, Audit for CP, 1998, p. E3)

[21] See Appendix I, Box 2
[22] Environmental Management for Hotels, SS3.11, p.57

The purpose of present chapter is to compare the amount of electricity used by the selected facility during the same month in 1998 and 1999, to analyse the effects of improvements that have been done and to suggest a set of measures that could bring Albena closer to the application for the recognition scheme award.

4.2. Hotels and Energy Issues

The energy issues related to the hotels can be divided in two groups:

◊ for renovated hotels, and

◊ for old hotels.

The renovated hotels

As the renovation process is a gradual one and it has been started since 1991, it is not reasonable to consider all those hotels as renovated, because the performance of the first renovated hotels differs from those that have been renovated recently and have implemented more advanced technologies. Therefore, in this research as to renovated will be referred to only those hotels, that have been renovated during the last two years, so it can be possible to calculate the effects of the renovation. Those hotels have already applied some relevant improvements that have drastically changed their performance. This is mainly due to installation of new, more efficient equipment. So, for instance some of the renovated hotels have a key switch system programmed in the key cards. By inserting the card in the lock the guest switches on the electricity supply for the guest room. When the guest wants to leave the room, by taking the card out of the lock, he automatically turns the electricity supply off. This is a very efficient measure, because the practice shows that very often the guests leave the room for several hours forgetting to turn the lights or the air condition off. A simple calculation based on the electricity consumption during one overnight stay[23] in hotel Gergana, before and after renovation shows about 22%[24] decrease in electricity consumption for June 1999 compared to June 1998 (respectively 5.786 and 7,383kWh/overnight)[25]. Of course, there have been done other improvements too and this number cannot be used to show the effect of only one CP measure. In two of renovated hotels (Moura and Slavouna), the boilers have been changed before the summer season of 1999 and currently they are using fossil fuel (diesel) for water heating purposes. This is a very interesting case, because if we believe the general manager of those hotels[26], then they have reached a certain level of energy efficiency and use less electricity than before. But if we analyse the data provided by the company, it turns out that hotel Moura, which was renovated in 1998 and has installed the new boiler in 1999 has consumed more electricity in 1999 than in 1998. And Slavouna, which has been renovated before the 1999 season and has installed the new boiler during the renovation, has reached about 27,5% decrease in electricity consumption during the same period. So, how can we find out which part of these savings is due to the renovation in general and which - due to the new boiler in particular?

Assuming that the energy savings in Slavouna are due to the new boiler, the key card system and other CP measures applied during the renovation and by comparing the 27,5% reduction with the results obtained at Gergana we can conclude that the introduction of new water heating system has resulted in about 5,5% of electricity savings per overnight.

Summer months are the most active season for Albena. Most of the hotels are functioning three or four months per year. The weather at this period is rather warm and even hot, which

[23] in case of Albena the energy and water consumption is calculated per overnight stay because very often the double rooms are occupied by three people with an extra bed - parents and a kid - and the calculation based on the number of announced number of beds available in the hotel would not be correct

[24] Here and further all the numbers about resources consumed by facilities and numbers of overnights are provided by the technical department of Albena AD. The calculations are done by the author, based on these numbers

[25] See Appendix E

[26] See Appendix I, Box 3

eliminates the necessity of space heating systems in most hotels. For this reason, while analysing the energy use issues, space heating is not considered as relevant. Instead, an immense quantity of water is heated and mainly using electric power. It is assumed that the guests are taking at least two showers per day. It has been found that the most warm water consuming time of the day are in the morning from 8 to 9.30 AM before the breakfast and between 5 and 7 PM, when the guests come back from the beach and take a shower to get ready for the dinner. The rest of the day guests don't use warm water as much as during those hours. Many hotels, as the hotels Kaliakra and Dobrotitsa for instance, manage to heat enough water by using the cheap tariffs for both peak periods. Another important observation is, that as the weather is warm, there is no need of very hot water, which means that the water doesn't need to be more than 60 degrees centigrade as in winter. There are three different tariffs of electricity, depending on the hours. The most expensive is the electricity used from 8 to 12 AM and the most cheap is at night. The hotels are using this tariff to warm tap water for morning use and after about 10-11 AM the boilers are switched off (interview with Yovka Ivanova)[27]. This makes a certain percentage of electricity cost savings. This measure is applicable for both renovated and old hotels and can be considered as a result of good management practice.

As **the old hotels** have been constructed several decades ago, the electric devices are not of a very good quality, they are not efficient and brake downs are very often. The management doesn't want to invest in new, more efficient equipment, because it has to be a part of the overall design during the renovation. As a reference data to compare the effects of improvements, the average electricity use of old, not renovated hotels has been taken, based on the data related to 11 hotels. Although in 1999 were introduced more strict instructions for energy saving measures further mentioned as order #901[28] (the company did not provide the full text of this document considering it as a document for internal use), the average energy use is only about 5,4% per overnight less than last year. However, this fact cannot give a precise view of the hotels' performance, because it also depends on the fluctuations in the weather.

The energy consumption of hotel Varshava has been examined for a special reason. In June 1999 the electricity consumption per one overnight stay has been 33,684 kWh[29] while in 1998 it was only 7,932kWh/overnight. This means that having more than 10 times less overnights, in June 1999 has been consumed about 1,5 times more energy than in June 1998. This example shows that even if the hotel is not 100% occupied, almost all electric devices have to work as in case of full occupancy. It is obvious that if the hotel had a more flexible network of distribution for, let's say, each part of the building, it would help to avoid this kind of energy overuse.

Based on the performance of renovated hotels it was assumed that the renovation itself will lead to an average decrease in electricity consumption by about 20%. The good housekeeping policy can reduce the electricity consumption by about 7,5% (an average number was calculated by using the 5,4% reduction performed by old hotels and the 10% achievable standard pointed by Hotel Nikko[30].

[27] See List of Interviewed Persons
[28] See Appendix I, Box 4
[29] See Appendix E
[30] Hotel Nikko Home Page; visited on September 10, 1999

4.3. Restaurants and Energy Issues

The main consumers of electricity in this sector are the stoves, refrigerators and dishwashers. There is also a certain amount of electricity used for lighting. Some of the restaurants, especially the renovated ones, have changed most of the lighting devices and use fluorescent bulbs or tubes. A part of old restaurants have also done those changes, but not all of them. It could be estimated that about the half of old restaurants use energy efficient bulbs and the other half will change them gradually, despite the renovation deadline. The assumed rate of this changes due to increasing price of electricity can be, say 20% each year, which will mean that in 2,5 years all restaurants will use fluorescent bulbs.

Another important issue is the absence of possibilities to use natural gas for cooking purposes. As most of the buildings in Albena have been constructed several decades ago (when electricity was extremely cheep due to the centrally planned socialist economic system), there are no facilities for the storage of gas cylinders. In order to bring the buildings into accordance with the requirements of fire services, investments are needed, which, again have to be calculated carefully, due to the seasonal character of a major part of catering facilities. Even though, my raw estimation is that the costs of electricity used for cooking purposes have to be much higher than the costs of a certain modification in the construction. Usually the pay back period of such investments is short and it will accrue after the investment has been paid off. There are serious preconditions to solve this problem but, as usual, the process of thinking and calculating the pros and cons is too long[31].

Usually, the routine in the kitchens is, that the plates of the stove are kept switched on much before they are used (to heat them) and afterwards, they are kept on a stand by regime, to keep them warm in case if they can be needed. This is a huge amount of energy used 'for nothing' and usually it is used during the peak hours and consequently, paid at a high price. The natural gas is much more effective, because it will eliminate those two reasons. Besides, it is environmentally more friendly and less polluting, than the brown coal used at the power plants.

If the natural gas pipeline comes one day to Albena, it will have very good results in terms of energy efficiency, because except the kitchen, gas can be used for water heating purposes too. The success stories about other hotels and restaurants in different countries show that according to the calculations if the electricity supplied by the power station is used for water heating, almost 40% of the original energy is lost, while if gas is burned directly to obtain hot water, then in the worst case scenario the loss will be no more than 10%.[32]

The refrigerators are another important consumer of electricity and if maintained properly, they should use much less electricity than now. As it was noticed during the CP audit[33], the doors are not closed properly and there is no control of the temperature, so the optimal temperature is not obtained. This results in an overuse of electricity for cooling.

Usually during the renovation all installations are changed and replaced by more efficient ones. Therefore it is assumed that the fact of renovation itself brings to an average of almost 10% reduction in energy consumption.

This could include both, new equipment (refrigerators, dishwashers) and more flexible and efficient installations. The shift to diesel fuel for water heating purposes will have the same effect as for hotels and therefore the same benchmark (5,5%) can be used both for hotels and restaurants (See above, 4.2. Hotels and Energy Issues).

As a feasible target for year-on-year reduction of energy consumption is 5%[34], which should include no/low cost improvements and proper maintenance practice.

Another important change towards reduced electricity consumption could be the use of solar energy.

[31] See Appendix I, Box 5
[32] INSULA Home Page; visited on October 2, 1999
[33] Audit for Cleaner Production, p.F6
[34] Environmental Action Pack for Hotels, p.34

4.4. Solar Energy: Is it relevant for Albena?

The geographical location and the abundance of sunny days throughout the year give to Albena the possibility to use solar energy. This could bring to very sensitive benefits both in environmental and economic terms. Surprisingly this source of energy is not seen by the management as an alternative for reducing the energy costs. It has been mentioned by the audit team that a reportedly run project has found the solar energy use inefficient for Albena[35].

Currently there is only one hotel in Albena (Hotel Compass), which has a solar collector. The solar energy is used for domestic water heating. As Vladimir Yovchev mentioned, it is used during the peak hours, to reduce the electricity consumption. However, the comparison of electricity consumption per overnight stay in this hotel showed no difference between this specific hotel and other, 'ordinary' hotels. If in another three star hotel, let's say in Kaliakra in June 1999 this number was 4,856 kWh/overnight, in Compass it was 4,757 kWh/overnight[36]. So, the difference is almost unnoticeable and it could be said that the solar collector was not used at all or was used so irregularly and few times that it didn't give any effects.

There are propositions for such installations for hotels Tervel, Kaliakra, Dobrotitsa, but no one knows for sure whether they will be installed. As showed the interview with Vladimir Yovchev, the Technical University-Sofia has been doing a research to find the most optimal size and capacity for each hotel and according to this data will be done a calculation of costs and pay back periods. For instance, the collector at hotel Compass has been installed in 1997 and has a 8 to 10 years pay back period[37]. Again, everything is related to the seasonal character of the resort. And then, who can guarantee that the installations will be used effectively and without often brake downs? It seems very important to organise educational courses for those, who will maintain those installations, because this is something new and hardly could be found people who have been maintaining this type of installations before and have enough experience.

4.5. STELLA - Based Analysis of Electricity Consumption

A model was built by using the STELLA software in order to analyse the current performance of hotels and restaurants and to see how and to what extent can the suggested improvements affect the electricity consumption. As it was mentioned above, the old and renovated facilities have different equipment and their performance is also different. For this reason the average electricity consumption was calculated for old and renovated hotels and restaurants (see Appendix E).

Assumptions and data used in the model

- the average amount of electricity consumed by old/renovated hotels was divided by the average number of overnights in the corresponding group of hotels and then multiplied by 30, to find the average consumption per month
- according to the Home Page of Hotel Nikko in Hong Kong, electricity consumption for lighting is typically 30% of total[38]
- by using the data provided in the CP Audit Report it was calculated that for restaurants in Albena lighting is approximately 4% of overall electricity consumption[39]
- a year-on-year reduction of energy consumption due to good M & M (management and maintenance) is about 5% [40]

[35] Audit for Cleaner Production, p.E8
[36] See Appendix E
[37] Source: Albena AD
[38] Hotel Nikko Web Page; visited on September 15, 1999
[39] Audit for Cleaner Production; Subreport "Hotels and Restaurants"; p.F6 and Appendix F2; p.F11

- the replacement of conventional bulbs by fluorescent tubes gives approximately a 75% reduction in electricity used for lighting[41]
- the half of old facilities have changed their lighting devices, and the other half will do it gradually
- as most of facilities are seasonal, it was assumed that in average they work 4 months per year and in the model 4 months are estimated to be equal to one year
- it is assumed that not all tourists use the services of the restaurants and not three times a day, therefore it was estimated that only 70% of the tourists eat at the restaurants and for this reason the average electricity consumption was calculated according to the following equation: total el. by old/renovated restaurants/ 70% of total number of overnights
- it is estimated that the two renovated hotels (of total 8) that have shifted to diesel fuel for water heating purposes constitute 25% of the overall electricity used by renovated hotels
- it is estimated that the restaurants in those hotels also use diesel fuel for water heating, and their share in the overall electricity consumed by renovated restaurants (of total 6) will be about 33%
- if the boiler for water heating use diesel instead of electricity, then the energy savings will be almost 5,5%
- usually during the renovation all installations are changed and replaced by more efficient ones, therefore it is assumed that the fact of renovation itself brings to an average of 10% reduction in energy consumption.

As most of the data used in the model are assumptions or data taken from other facilities, the mathematical values of the outcomes cannot be used as precise data. The model should be considered as a conceptual one, which aims to show the trends in the electricity consumption while implementing different CP measures.
The first scenario was run without introducing any CP measures, in order to have a 'starting point' for further reductions.

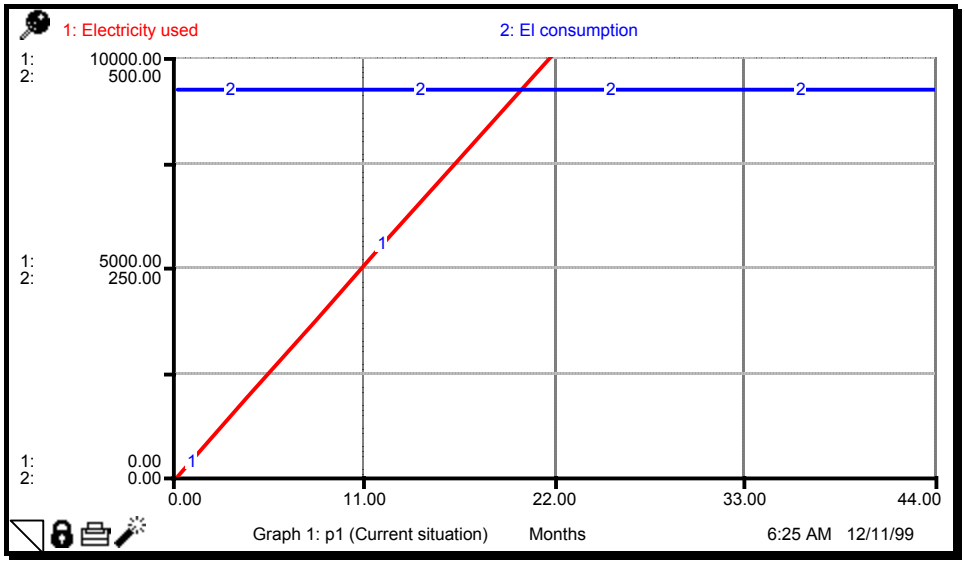

Fig.3 The results of the first scenario, where no CP measures are implemented. The amount of electricity consumed per month stays constant, which causes a constant accumulation of electricity used through the simulated period of 44 months (11 years)

As we can see on Figure 3, the curve for the amount of electricity used goes up quite rapidly. This is due to the fact that this input is represented in the model as a stock, hence the year-on-

[40] Environmental Action Pack for Hotels, p.34
[41] Source: Audit for Cleaner Production; Appendix F2; p. F11

year consumption accumulates. Although the electricity consumption stays constant (430 kWh/month), the amount of used electricity achieves the 10000 kWh barrier much before achieving the time barrier of the simulation (44 months).
After having introduced the good management and maintenance practice the model was run for a second time. Usually when the targets for reducing the consumption are set, the aim is to achieve a benchmark, which is considered as a fair or good performance. The benchmarks found in the literature show that if a hotel consumes less than 65kWh/m^2/year, then this is considered as a good performance[42] (as there was no precise data about the surface of each discussed facility, it was found impossible to use this kind of benchmarks in the modelling). So, for instance, if the benchmark in our case was to reduce electricity consumption by 50% during a ten year period, this could mean that the Good M & M practice in Albena works pretty well, because during the simulated period of 44 months (11 years), a more than 48% decrease in the amount of electricity used by all the facilities was achieved.
However, other CP measures have been considered to be possible to implement. A simulation of the third scenario, where such measures as replacement of conventional bulbs by fluorescent ones, shift to a diesel boiler and overall renovation are introduced, brings to a reduction of electricity consumption, but the efficiency of these measures is not as high as in the previous scenario (see Figure 4). The reason for such small difference is that although the shift to fluorescent lamps has a rate of 75%, this change affects only 30% of the half of electricity consumed by old hotels and only 4% of the half of electricity consumed by old restaurants[43]. More important are the renovation and especially the shift to diesel boiler because those changes have higher rate and affect bigger share of the overall amount of electricity consumed by both old and renovated facilities[44].

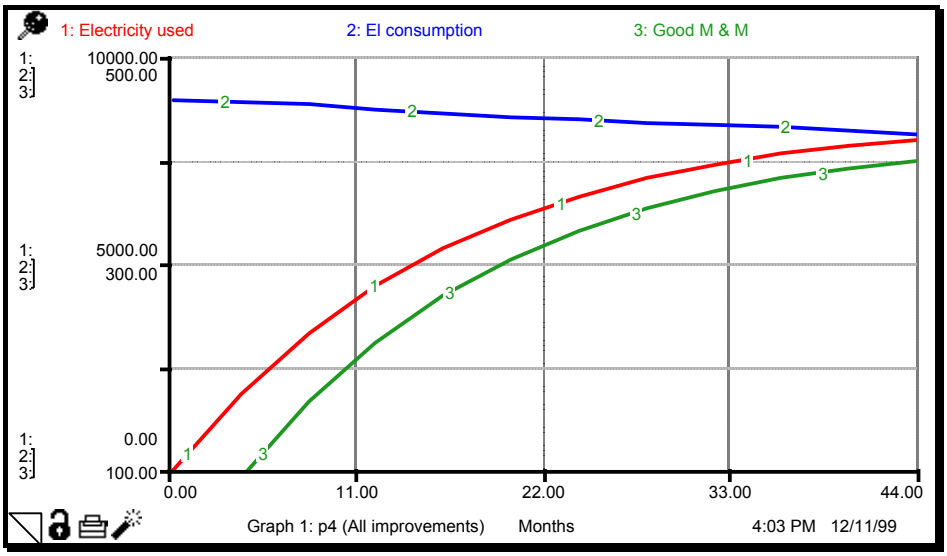

Fig.4. Possible performance if all suggested measures are implemented. Curve 1 doesn't grow as fast as before, curve 2 shows the effects of equipment improvements and curve 3 accumulates the electricity saved by implementing good housekeeping.

We can see that the curve 1, which was going up in Figure 3, accumulating the amount of used electricity, now has slowed down and due to the introduced CP measures does not grow as fast as before. The curve 3 shows the amount of electricity saved by implementing good M & M and as this is a year-on-year improvement, this curve also shows an accumulative effect.

[42] Environmental Action Pack for Hotels, p. 32
[43] See assumptions and data used in the model, p. 17 - 18
[44] See Appendix B

As it was mentioned above, if the benchmark had been introduced, then at the point when the curves had achieved that value, should not change their direction anymore and should keep moving in the same direction as at the moment when they achieve the benchmarked value. As benchmarking is out of the scope of this research, we can only predict, but not test our estimations.
At last, another simulation was run to show the comparative analysis of all previous scenarios. The results of this simulation are shown in Figure 5. This scenario was simulated to show only one output - the electricity used and how each of CP measures affects this output. The curve 1 represents the current performance. Curve 2 - good M & M, curve 3 (which is too close to current performance) - the amount of electricity used after introducing new equipment, and at last the curve 4 represents the amount of electricity used after implementing all possible measures together.

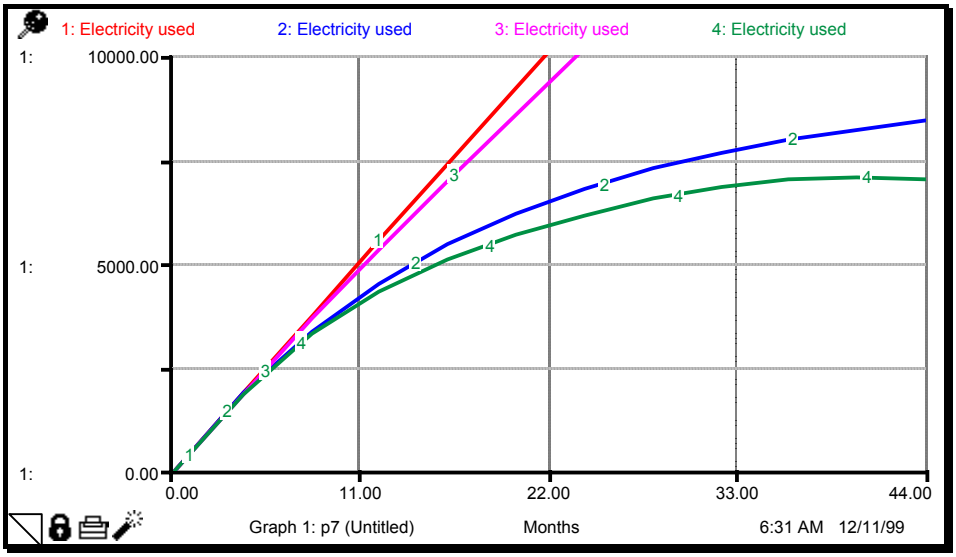

Fig.5. Comparative analysis effects of all four scenarios on the amount of electricity consumed during the simulated period. The difference between curves 1 & 2 shows the effects of good housekeeping, between 1 & 3 - the effects of changes in the equipment and between 1 & 4 - all improvements implemented together.

On the graph can be seen that the difference between the curves 1 and 2 is much bigger than between 1 and 3. This is due to the fact, that the changes in the equipment affect a very small share of the overall amount of electricity consumed, while the good housekeeping is a year - on - year improvement which, is accumulating during the simulated period (see above,the analysis of scenario 2).
As the restaurants use more than twice as much electricity as the hotels, it seems more relevant to implement the improvements in restaurants, especially in the old ones, because even by good M & M and lighting improvements the total amount of electricity consumed by restaurants could be reduced sensitively. If we add the shift to diesel boiler, which affects not only the old facilities, but the renovated ones as well, then the effects of changes become even more obvious.

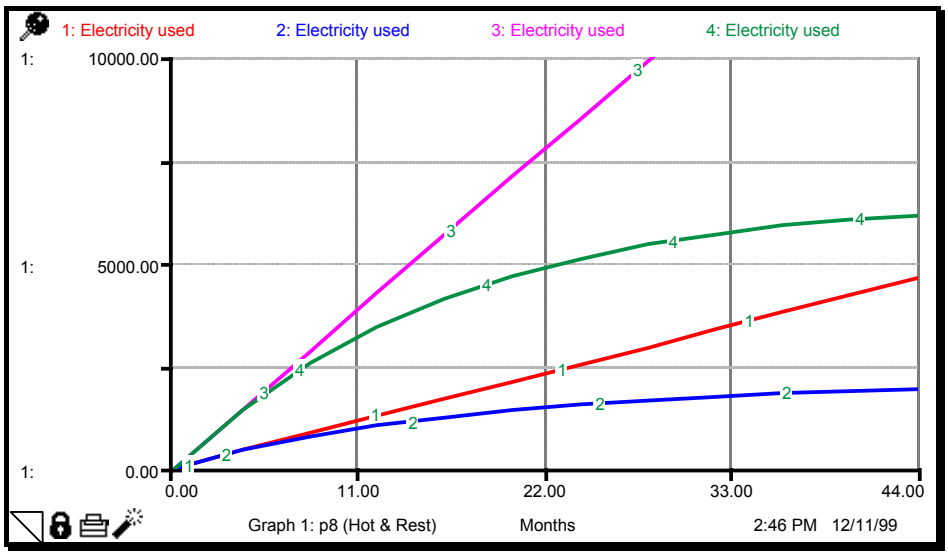

Fig.6. Comparative study of electricity used by hotels (1 & 2) and restaurants (3 & 4) before (1 & 3) and after (2 & 4) the improvements.

To illustrate this statement, the model was run both for hotels (1 & 2) and restaurants (3 & 4) before (1 & 3) and after (2 & 4) improvements (see Figure 6). The focus was on the electricity used.

We can see that the performance of restaurants before implementing the improvements was much worse than of hotels, but after implementing the measures the reduction in electricity consumed by restaurants has reduced more than for hotels. This is due to the difference in amounts of initially consumed electricity.

Thus by using the possibilities of the STELLA software were found the most relevant CP measures that could be suggested as important ones not only for Albena, but for any tourist resort or facility, which seeks possibilities to reduce electricity costs and to reduce the energy use, in order to move towards sustainability, with or without doing serious investments.

CHAPTER V: WATER AND WASTEWATER

5.1. Problem Definition

Hotels and restaurants in Albena, as in any other tourist resort, use huge amounts of water. Very often this precious natural resource is overused because of bad management, leakage in the utilities, low quality of devices, etc. In this chapter will be discussed the actual performance of facilities in terms of water use and possibilities to reduce its consumption, which, consequently, will lead to reduced waste water generation, thus reducing the load on the environment. As there is a gradual increase in water price, this can also help the company to meet the needs of its customers without a sensitive increase in water cost.

The questions to be answered will include:

1. how is managed water in hotels and restaurants currently?
2. what has been achieved by better resource management?
3. what can be the further steps?
4. how can the proposed measures affect the overall water use and waste water generation?

5.2. Hotels: Are They Water Efficient?

In their striving to reduce water use, the hotels must not forget the major aim of any facility within the hospitality sector: to satisfy the needs of customers without affecting their choice of destination or facility and to create maximum comfort for the guests. This means that such measures must be chosen, which will meet both the needs of guests and the performance improvement policy and targets set by the management of the facility.

As for electricity, for measuring the water consumption of each hotel, there are meters installed at the entering point of each hotel. The data provided by the management of Albena shows that in comparison with 1998, in 1999 the hotels have better performance. This could be explained by the order #901 of the executive manager of the complex and its implementation[45]. The full text of this document was not provided for references, because, as it was explained by the officials in Albena, it is for internal use only.

Further will be given some examples of how the hotels improve their water management and what is the difference between the old and renovated hotels.

In the **old hotels**, such as Bratislava and Dobrudja the water used per overnight stay has decreased dramatically since the order has come into force. So, for instance, in June 1999 those hotels have used respectively about 47,5 and 39% less water per overnight compared to June 1998. This is only or at least mainly due to better management and maintenance.

One of most common CP measures to reduce the water consumption is to install water efficient shower heads. As it was explained by Vladimir Yovchev, in case of Albena it seems to be a problem to apply the common water efficient ones due to the mineral composition of tap water in Albena, which is rich in minerals and salts, which litter the holes of the shower head[46].

There is another possibility to solve this problem: to install softeners at the entrance point of each facility. This seeks an investment, but is quite affordable. By installing softeners, actually are being solved most problems related to littering of pipes and all other installations, including the boilers and also, it can sensitively decrease the water consumption[47].

The **renovated hotels** already have such improvements as water efficient shower heads and softeners, but this does not seem enough. Instead of installing dual flow toilets, which are very expensive and hence, are not cost effective, the management in Albena has solved this problem in a simple way, which does not give the same result as in case of mentioned toilets, but anyway, the water consumption is decreased. The level of water in the toilets is adjusted manually.

A comparison of water consumption per overnight stay in the hotels shows that the old hotels unexpectedly have even better performance than the renovated ones. So, for instance, the average efficiency of renovated hotels in June 1999 is more than 30% while the old hotels have performed about 45% average efficiency in comparison with June 1998. The average water consumption per overnight in June 1999 was 0,181m^3/overnight[48], which means that it has decreased by almost 40%. It is obvious, that such a decrease cannot be expected every year. This is the result of the implementation of order #901, but it can be assumed that if the management keeps on the good practice and continues the improvements where possible, a 10% decrease can be expected as a result of good housekeeping policy.[49]

Possible improvements for better performance of old hotels could include such measures as adjustment of toilet flush (average of 6-7 litres/flush) and installation of aerators on bathroom taps, which could reduce water flow to 5-6 litres/minute. Those measures could result in additional 30% reduction in water consumption.[50]

[45] See Appendix I, Box 4
[46] See Appendix I, Box 6
[47] See Appendix I, Box 7
[48] See Appendix G
[49] Hotel Nikko Web Page; visited on October 1, 1999
[50] Eco-efficiency and Cleaner Production Home Page; visited on September 30, 1999

The goal for improvements in water consumption should be 0,1m^3/overnight[51], which seems to be achievable for Albena if all the suggested measures are implemented.

5.3. Restaurants and Water-Related Issues

To be able to discuss the issues related to water used by restaurants it is important to remember one of mentioned limitation: the big number of hired restaurants[52], which are practically out of control of Albena AD in terms of management and maintenance. The managers of those facilities are not very willing to give any interviews or to provide any information for a research. They hire the facility for the season and try to generate as much profit as possible. The details used for the present research about running a restaurant are obtained from the general managers of hotel complex Dobrudja and the complex Neckerman, who have a holistic view of the state of art in those facilities. However, the company has provided the data related to the water consumption of those facilities and the research is based on that data.
The restaurants use water for drinking, cooking, dishwashers etc. The performance of 17 restaurants has been analysed and compared for June 1998 vs. June 1999. The total amount of water used by those restaurants in June 1998 and in June 1999 has been respectively 12750 and 6600m^3. This means that after implementing the water saving measures set by the order #901 the water consumption has decreased by about 48%[53]. However, this is a gross number. Although this is a rather impressing result, it is important to do some assumptions and to take into consideration some details in order to obtain a more precise data.

5.3.1. Details to be considered

- ***is the facility renovated during last year, recently or it is not renovated at all ?***
  if it has been renovated during the last year, then the results of new and more efficient equipment are combined with the saving measures. In case of recent renovation it will mean that in 1998 they already had better equipment, but the management was not as effective as this year. And at last, if the restaurant is not renovated yet, the equipment might be inefficient and old, but the saving measures can give some good results, which in the future, after the renovation, will bring to even better performance.
- ***where is the restaurant situated ?***
  some hotels are situated far from the centre of Albena and the beach. Very often the guests don't go back to their hotel during the whole day and use the services of restaurants other than those of their hotels.
- ***was the weather warm enough in June?***
  If the weather is not warm then many outdoor restaurants do not function in June due to lack of customers, so if the restaurant has consumed very small amount of water that could mean that it has not been functioning and the comparison can not be correct.
- ***the seasonal character of the facility.***
  if the facility is seasonal, then the equipment renovation is not always at the most efficient level, because the cost efficiency issues in this case are much more relevant.

At the same time, these are details which must be taken into consideration while setting the targets for seasonal facilities and a certain flexibility must be accepted from one year to another.
The discussion of particular cases within this thesis is relevant just for giving an idea about the CP measures that can be considered as important and feasible ones. For instance Gergana Restaurant, which was renovated for the season of 1999, has performed about 23% efficiency

[51] A Guide to Innovative Technology for Sustainable Tourism; p.8
[52] See 1.4., Scope and Limitations
[53] See Appendix H

compared to last year for water consumption, so that it can be considered as a result of both renovation and better management. For this reason the average water consumption and the efficiency has been calculated to find the trend and limits of water saving measures.

5.3.2. Assumptions

- As Albena does not have local population and as some of the hotels are situated at a big distance from the beach and the centre so that the guests prefer to stay out of the hotel and have lunch and diner in restaurants other than the hotel's, ***the total number of overnights can be taken as a total number of guests using the services of restaurants.*** This way of calculating the customers could be accepted because of a lack of any statistics about the number of customers visiting the catering facilities.
- It can be also assumed that ***not all the guests are eating at the restaurants every day and three times a day.*** (While choosing the hotel very often the guests use the *B&B*[54] option). Many of them are using the services of small snack bars and for this reason it was assumed that ***about 70% of visitors are using the services of the restaurants.***

Dividing the total amount of water consumed by all restaurants by 70% of total number of overnights during one month, was found the average amount of water used by restaurants per overnight.
The calculations show that in June 1999 in average for each guest per overnight stay the restaurants have been using about 38% less water than in June 1998. However, June is not a typically "high season" month and the performance of facilities during this month is not as distinctive as, for instance in July or August. Unfortunately, no information was provided for those months, therefore the calculations are based on the data for June 1999 and have a certain percentage of approximation.

5.4. Wastewater

The wastewater in Albena is treated at the wastewater treatment plant of the resort and after appropriate treatment is discharged into the sea, at about 40-50 m from the sea shore. The water quality is not in the scope of present research, therefore only quantitative data will be discussed.
As there was no data provided about the volume of pumped water, the comparison is done between the volumes of water used (paid) and treated at the wastewater plant. In June 1998 and 1999 the amount of water used by the facilities in Albena was respectively 119190 m^3 and 84710 m^3 (Source: Technical division of Albena AD). According to the data provided by the chief of Albena Wastewater Treatment Plant Valcho Karadjov[55] during a phone interview, the amount of water treated at the plant during the same months was respectively 188990 m^3 and 130600 m^3. The difference is obvious, but anyway, it cannot be discussed as a relevant information, because many facilities, like for instance the central laundry, are not included in the list of users provided by the company for the purpose of present research, which means that there is no information available about one of important users. Another reason for having such a big difference between the volumes is because of the fact, that in 1999 in June the weather was cold and many hotels did not function. All the above mentioned facts make the analysis of wastewater related issues difficult and even impossible.

5.5. Analysing the Present and Predicting the Future

While building the STELLA model the following assumptions and calculation were done:

[54] See Acronyms
[55] See List of Interviewed Persons

- the average water consumption per overnight was multiplied by 30 to find the amount of water consumed per month
- as most of reference sources do not mention if the reduction is per month or per year, it was assumed that they are on a year basis and therefore the rate of improvements was divided by 12 to find the reduction rate per month
- as for electricity consumption, the water consumed by restaurants has been divided by 70% of overnights to find the average water consumption per day and multiplied by 30 - to find the consumption per month
- the Good Management and Maintenance are considered to result in about 10 % reduction in the amount of water used[56]
- it is estimated that if the toilet flash is adjusted and aerators are installed on bathroom taps, this will result in an average reduction of water consumption by about 30%[57]
- as in case of electricity, 4 months in the model are estimated to be equal to one year
- it is estimated that the share of toilets in the overall amount of water consumed by a hotel is about 30%[58]

The model was run by simulating different scenarios in order to look at the current performance and to find how each improvement affects the overall amount of used water.
The simulation of current performance was run without any improvements. It shows that the consumption is stable and it is 10 831 litres per month. As in case of electricity, the water used is represented as a stock, therefore it accumulates the whole amount of water used during the simulated period (44 months = 11 years). The amount of water used is growing at a constant rate of 12,300 litres/month.
The second scenario includes easy to implement and low/non cost measures that are suggested as improvements at a good M & M rate. The simulation shows that the amount of water used, if there is a good M & M practice, by the end of the simulated period will be reduced by about 14%.
A third scenario was run by introducing only measures that aim to reduce the water consumption by making changes in the equipment but the good M & M was excluded to see how does this improvement affect the overall water use. Another information that was looked for is, which of those scenarios gives better results. The numeric expression of this simulation which is used only to find the trends, shows that the amount of water used has decreased by more than 42%, compared with the scenario when they might keep on the current practice. This means that the reduction measures are more efficient than the good M & M, but having in mind that they seek pretty serious investments, this cannot be as easy to implement as just the good housekeeping practice.
At last, all the possible improvements were introduced and the model was run for one more time. The results of this scenario are shown in Figure 7.

[56] Eco-Efficiency and Cleaner Production Home Page; visited on June 28, 1999
[57] Hotel Kurrojang Web Page; visited on July 10, 1999
[58] Guide to Innovative Technology for Sustainable Tourism; p.8

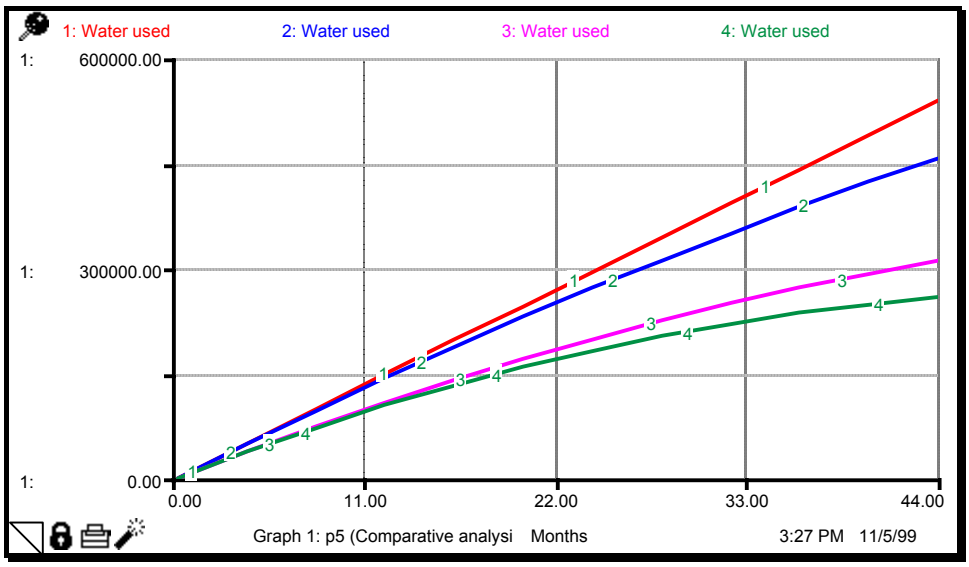

Fig.7 Comparative analysis of the effects of each improvement: 1- Current performance; 2 - Good M & M; 3 - Reduced consumption; 4 - All possible improvements

The curves show the changes in only one output - the water used - by implementing no, one or both CP measures. It can be noticed that this graph looks very much like the one with electricity consumption. The main difference is that if in the previous model better results were obtained by implementing good housekeeping practice, in water related issues it is much more efficient to make changes in the equipment, although the good housekeeping should not be neglected. As it was mentioned before, a good performance means to achieve the benchmark of 100 litres of water consumption per overnight, so if at a certain point this result is obtained, further improvements would not be relevant anymore and only good housekeeping should be enough, unless the requirements set by the management or other institutions are changed. This way of simulation is very useful, because the changes are very obvious and without going into numbers conclusions can be done and decisions can be taken by the management of the company.

CHAPTER VI: SOLID WASTE

Solid waste management problems are of major importance for Bulgaria in general and for the Black Sea region in particular. The state of environment in this region is directly affecting the tourism development. This fact makes the region attractive for foreign investors[59] and can become an incentive for further improvements. On the other hand, the Ministry of Environment and Waters of Bulgaria has developed a National Programme for Waste Management Activities (NPWMA). The fulfilment of this programme will approach Bulgaria to the norms of European Union for waste management.[60]

6.1. The Current Waste Management Practice

One of first impressions that one can get during the visit to Albena is, that it is very clean, green and well maintained. This is due to the abundance and good maintenance of green areas

[59] Dax, Paul; p.6
[60] NPWMA, Sofia 1999; p.2

and the waste management policy that the resort is practising and which, according not only to the officials in the company, but also to many tourists, is very efficient[61].
The practice in other resorts is, that they have a contract with the municipal waste management company, which takes care of the solid waste. Albena has its own division for waste management. Being a rather big complex separated from any residential unit and having a centralised management gives to Albena the possibility not to be related to the municipal company. In her interview the chief of the division Elena Saraidarova was explaining what are the advantages for Albena to have its own waste management unit.[62]
The division of waste management has special vehicles for cleaning the beach, cleaning the streets and for waste collection. Every morning, since 6.15 AM until late in the evening the vehicles and the personnel are taking care of the solid waste generated by 40 hotels, 27 restaurants, a huge number of other leisure facilities and the customers of all those facilities. The collected waste is taken to the Balchik municipal landfill which is situated at about 10 km from Albena.
In other words, the complex is clean and that is the most important. No one is interested in such issues as how quick is growing the landfill, what is the composition of the waste taken to the landfill and how it can be reduced and recycled. However, according to the waste management infrastructure existing in the country, this is a very efficient way of keeping the resort clean. To be able to change the situation, a whole infrastructure must be created not only in Albena, but on national level, in order to manage the solid waste in a proper way.

6.2. Waste Separation: Is It Feasible ?

There have been some efforts to introduce waste separation practice in hotels and restaurants. Three of the hotels claim to have separated waste collection[63], but how does it work?
Actually the real waste separation starts and ends up at the entrance of those three hotels, because as it was found out during the interviews, Albena does not have any contracts with other firms, who might take care of the separated recyclables. Those three hotels are part of the Spanish chain Iberotel, and as waste separation is mentioned in their environmental policy, they have introduced it in their three hotels in Albena. In reality it is a visual waste separation. The vehicles of waste management division do not collect/empty those containers in different places, because they are not adapted for separate collection.
The waste management division cannot introduce separated waste collection right away, because they don't have the appropriate equipment and vehicles.[64]
In 1998 there was an attempt of separated waste collection. Albena had a contract with a recycling firm, which was sending its trucks three times per week to take the separated recyclables. The contract was not renovated in 1999 due to different reasons. Some officials in Albena said that it was not profitable, the others have completely different reasons. As Yovka Ivanova mentioned during her interview, there is no appropriate infrustructure for the disposal of separated recyclables in the facilities. The areas defined for waste collection are so small, that it is difficult to have all different types of waste in that small place and to manage it in a proper way[65]. And then, another big problem is the small carriages that the maids use. They cannot have several plastic bags for waste collection on the small carriage, plus the laundry bags, plus the cleaning inventory, detergents etc. Not all facilities have elevators, especially in two-star seasonal hotels and for the maids it is very difficult to carry all these bags downstairs and then to the waste collection area.
Although there is no functioning infrastructure for waste separation, in the National Programme for Waste Management Activities, as one of priorities to promote recycling is the

[61] See Appendix I, Box 8
[62] See Appendix I, Box 9
[63] See Appendix I, Box 10
[64] See Appendix I, Box 11
[65] See Appendix I, Box 12

introduction of schemes for separated waste disposal[66]. So, if this becomes a priority issue on the national level, the initiatives on local or industry level would be welcome. If Albena starts to create its local scheme and infrastructure for waste separation, it will help the company to be integrated in the new system much easier than other companies. The fact that they have been trying to have waste separation means that there are possibilities for the personnel to get used to it easily.
In case of Albena it is very important to consider the tourists and their attitude for waste separation issues. During the interviews with tour operators it was found that most of the guests will do it without any major problem.
The western tourists are used to it in their home countries and as Terje Dahl mentioned during his interview, they are even surprised why in Albena they don't separate the waste.
For the Eastern European tourists coming from such countries, where waste separation is not introduced yet, it is going to be a little bit difficult at the beginning, but they can get used to it and even use the knowledge of how to do it later, in their home countries[67].
According to the Action Plan of the NPWMA, the system for separated waste collection will be introduced in 2001[68].

6.3. Recycling

Currently there are several companies that recycle secondary raw materials (plastics, paper and cardboard, metals and glass). The problem is, that because of lack of appropriate technologies there are no possibilities for sorting and pre-processing of collected waste.
For plastics, for instance, this problem results in such a situation, that despite the increase in consumption of plastics by different industries, it is not cost effective to find, transport and dispose plastic waste for recycling. That is why in many cases it is much cheaper to import plastic waste from abroad (even including transportation costs).[69]
The situation is a little different for paper/cardboard. The recycling of those raw materials is on a more developed stage, because the collection is more organised. Besides that, paper and cardboard are handled much easier. A few years ago in the country started to function the branch Chamber "Phoenix Resource" , which co-ordinates the activities of more than 100 firms which collect, transport, treat and processes secondary resources[70].

6.4. Waste Reduction

It is very difficult to find appropriate data about the quantity and brake down of solid waste generated in Albena because there is no practice to measure the solid waste neither by type nor by weight/quantity. An approximate calculation has been done based on the data provided as a typical brake down of waste generated by a hotel.[71] The brake down and quantities of solid waste are shown in Figure 8. Although the Figure gives some idea about the types and quantities of solid waste, this information is, as all three models in this thesis, a conceptual one, just for showing the trends and not precise numeric values.

[66] NPWMA, Chapter II, Section 2.2.2., § 8, p.40
[67] See Appendix I, Box 13
[68] NPWMA, Action Plan; p.7; §28. MoEW, Sofia, 1999
[69] NPWMA, Appendix 1, Table 8., pp. 63 - 64
[70] "Waste", Issue No.5 of the series "Let's Take Care of the Environment - All Together"; MoEW, Sofia
[71] Environmental Action Pack for Hotels; p.37

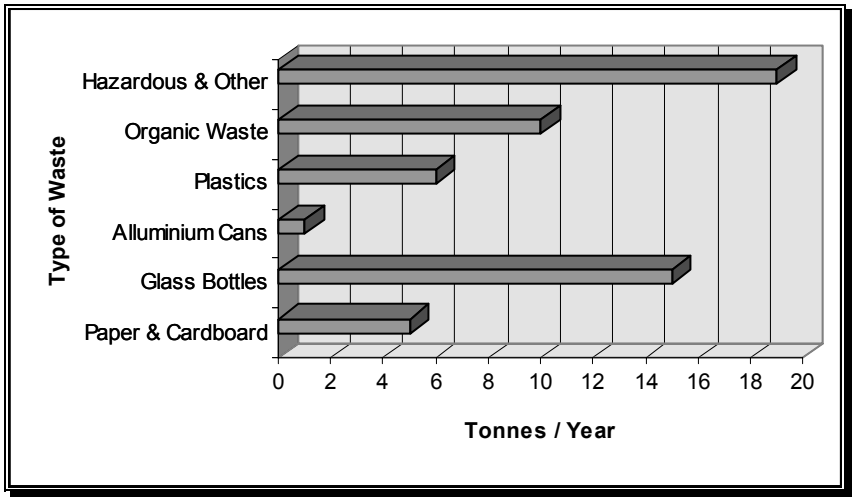

Fig.8 Typical brake down of Solid Waste generated by a hotel (the total quantity is 56 tonnes/year)

There is another category of waste generated in Albena, that is not pointed in the chart above as a separate category of solid waste. As there is a renovation process in the facilities, huge amounts of construction/demolition waste are generated, which is taken to a construction waste landfill. It could be assumed that this waste is included in "Hazardous and Other".
Currently the waste reduction issues in Albena are applied mainly via purchasing policy, which is centrally determined for all facilities. The jams, honey etc. are purchased in big glass jars, which are refillable and the butter is packaged in plastic bags. The beverages purchased by restaurants are mostly in refillable bottles.
About other feasible possibilities to reduce the solid waste bulk see *6.5. Preconditions, Limitations and Solutions.*

6.5. Preconditions, Limitations and Solutions

There are different possibilities to reduce the total amount of solid waste generated in Albena, as well as to create recycling and reuse possibilities, thus implementing the "three R" practice[72].

Possibilities for waste Reduction, Reuse and Recycling

Waste Reduction: In the central office special containers could be introduced for collecting wasted office paper. As the office waste paper separation is included in the NPWMA, Albena can introduce it straightaway and thus demonstrate its readiness to implement the improvements. Another possibility to reduce the bulk of wasted paper could be the shift towards the computers. Instead of printing each memo or other current information, the possibilities of e-mail and data collection in the data base of the functioning network could be used better.
The soft drinks and beer , if purchased in refillable bottles only, will reduce the amount of aluminium generated as waste. The same goes also for plastic bottles.
Reuse: The old towels and sheets could be used for cleaning purposes. Old sheets can be transformed into laundry bags and replace the former paper or plastic ones. This can reduce the cleaning inventory expenses and reduce the amount of generated solid waste.
The organic waste, which is mainly generated by restaurants in form of food residues can be collected separately and given to farmers as food for pigs. This measure could reduce sensitively the bulk of solid waste, create certain economic profit from the sales or

[72] The three "R" practice suggests to **R**educe, **R**euse and **R**ecycle the solid waste

alternatively, an agreement could be achieved between Albena and the farm to get agricultural products in exchange for the food for pigs.

Recycling: This is the most difficult-to-implement measure, because certain space, inventory and hence, funds are needed. However, there are some possibilities to make this process happen easier and with minimum expenses.

Paper and cardboard are currently the most recyclable part of solid waste, because there is a created and well functioning infrastructure for these resources. When the renovation of a facility is completed, the cardboard packages of the new inventory are sold for recycling, thus making both economic and environmental profits.

For other types of recyclables the following limitations and solutions are considered:

- lack of space in hotels and restaurants for separated waste disposal (see Appendix I, Box 12).
- lack of special containers for separated waste collection.
- Lack of special vehicles. It could be pointed in the contract with the recycling firms that their trucks are going to collect the separated recyclables. This could reduce the workload for the waste management department and reduce the transportation costs.
- lack of knowledge and incentives for the staff to implement waste separation.

Currently the company does not pay anything for the waste taken to the landfill. After the implementation of the NPWMA there will be a taxation system for the amounts of waste. If the company implements the "RRR" concept, it will not pay the high taxes as in case of generating as much waste as now.

The main findings of this subchapter are shown in Table 1.

Type of Waste	Source	% of total	Of it: Recycled	Re-used	Landfilled
Paper & Cardboard	Office, facilities, renovation	8,9	70	20	10
Glass bottles	Restaurants & hotels	26,8	20	75	5
Aluminium cans	Restaurants & hotels	1,8	58	20 (replaced by refillable bottles)	22
Plastic bottles & packaging	All Facilities	10,7	60	25 (replaced by refillables)	15
Organic (food residues)	Restaurants	17,9	35 (composted)	20 (food for pigs)	45
Hazardous & other	All Facilities	33,9	15	2 (incl. Sheets & towels)	83

Table 1. Type, source & share of recyclable/reusable solid waste[73]

6.6. Results of Computer Simulations

As it was pointed above, solid waste management is going to be changed and a whole infrastructure is going to be created on the national level (see p.27). This, of course, will change the situation, but if Albena starts to implement at least some of the main principles of this policy right away, then the company can be one step ahead its competitors and later it will be much easier for Albena to shift towards a full scale waste management. According to the

[73] The share of recycled, reused and landfilled solid waste are the author's estimations

NPWMA, in the year 2000 will be introduced the separated collection of plastic packaging and in 2001 - recycling of PET bottles. In the year 2000 will also be introduced separated collection of paper in governmental organisations. In 2001 will be introduced the taxation tariffs for packaging waste. In general, the whole infrastructure will be created and functioning until 2002, including composting and incineration installations[74].

Data and assumptions used in the model

- The STELLA model is based on the data used in Figure 8 and Table 1. The numbers are valid for a hotel with restaurant.
- As there is no information available about the quantities of waste generated in Albena, it was assumed that the whole amount is 1.
- The time unit used in the model is the year and not the month as in previous models, but as it was stated before, 1 year is equal to 4 months and further calculations can be based on this assumption.
- The starting point for recycling is considered the year determined by the NPWMA as deadline for introduction of recycling for the given type of waste.
- As it was mentioned above, paper recycling exists now, but by introducing separated paper collection in offices the rate of paper recycling will be increased drastically and by introducing separated waste collection in general, will increase this trend even more.
- The organic waste is considered that can be reused or given to farmers right now, but the composting is introduced later.
- As there are certain capacities for recycling of different kinds of metals, it is assumed that since the introduction of waste separation in 2001[75] aluminium cans can be recycled at a certain rate, which will increase gradually[76]

Dates defined by the NPWAM for waste management improvements

- paper - 2000 (separated collection in offices)
- plastic bottles' recycling - 2001
- glass recycling - 2001
- hazardous waste - 2001 (it is estimated that the disassembling of cars and the reconstruction and modernisation of recycling installations for batteries[77] can be considered as a starting point for hazardous waste recycling)
- composting - 2002

Four different scenarios were tested to compare the performance in terms of waste management. First the model was run as "Current situation", where it is assumed that all the waste generated by Albena is taken to the landfill. In this scenario no improvements are included, except the paper recycling at a rate of 5%, which has such a small share in the overall bulk, that it doesn't make any sensitive changes in the pattern.

It is obvious that if Albena keeps on the current practice of waste management, the landfill will grow too rapidly, although Albena is not the only user of Balchik landfill. We have to bear in mind that a taxation is going to be introduced for waste management, which means that if Albena keeps on current practice, the company is going to have rather high waste management costs.

According to the second scenario only waste reduction and reuse were introduced, i.e. measures that don't need big investments or a special infrastructure. The non/low cost measures include:

⇒ reduction of aluminium and plastic waste by replacing the beverage containers by refillable glass bottles

[74] NPWMA, Chapter III, Action Plan, pp. 7-11
[75] NPWMA, Action Plan; p.7; § 28
[76] See Appendix D.
[77] NPWMA, Action Plan; p. 9; § 40

⇒ reduction of paper waste, especially in the offices
⇒ reuse of organic waste by providing food for pigs
⇒ reuse of hazardous and other waste (this includes the reuse of old towels and sheets)

All reduction and reuse rates are in accordance with the data included in Table 1.
There is a decrease in waste generation (by about 10%), which results in a decrease in the amount of waste taken to the landfill.
The third scenario includes all recycling possibilities, but excludes reduction and reuse improvements.
The model was run once more, after having introduced all improvements, that have been proposed in this chapter.
Since recycling was introduced, the curve for waste taken to landfill has moved more than in the second scenario. This fact shows how important it is to have the possibility to introduce recycling.
And for one more time the model was run, where a comparative analysis was done to show the changes in a more clear and obvious way (see Figure 9).

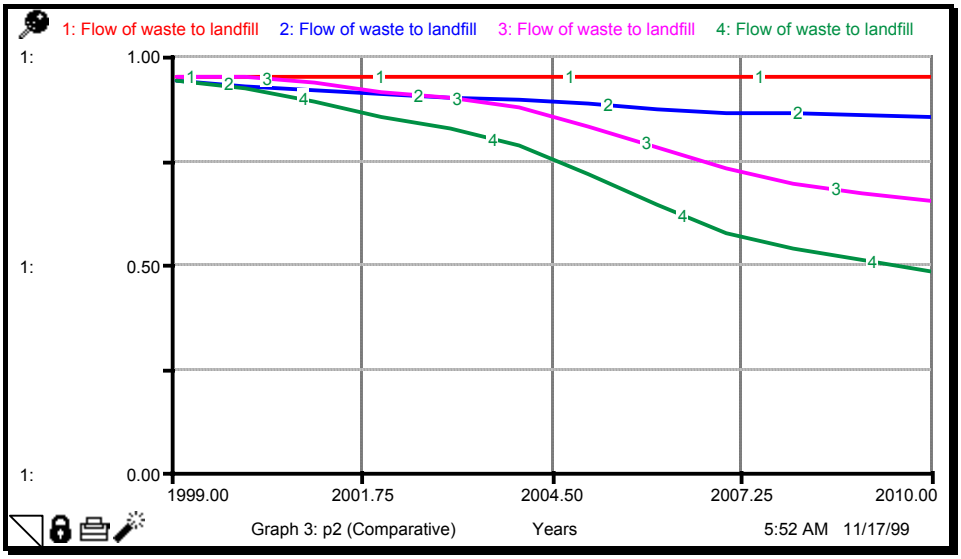

Fig.9. Comparative analysis of all tested scenarios. Flow of waste taken to the landfill if scenarios are implemented (1 - current, 2 - reuse/reduce, 3 - recycle/compost and 4 - all possible improvements)

In this scenario the accent was on the flow of waste taken to the landfill. The graph shows how after introducing each improvement, the flow of waste taken to the landfill is decreasing more and more. It can be seen that recycling and composting give much better results than reduction of waste generation and reuse. Anyway, they cannot be ignored, especially in Albena and especially now, when this is the most feasible possibility to reduce the amount of waste taken to the landfill. Although the boundaries of the system don't allow us to see what will happen after 2010, in this case it doesn't seem very important, because the aim of the model was just to see the trends of waste management possibilities during the next 11 years. Based on the results of simulations can be concluded that by introducing all possible measures, the waste flow going to the landfill can be reduced by about 50%. This is a rather impressing finding, but as it was mentioned before, it can be achieved only after making some important changes in waste management infrastructure not only in Albena, but also on national level.

CHAPTER VII: PURCHASING

The fourth criteria defined by recognition schemes as one of most important ones toward sustainable development of a tourist resort or facility is the appropriate purchasing policy. This is the criteria which to some extent puts together the issues discussed in previous three chapters. It could be said that the success of previously discussed issues partly depend on this one. Let's find the link between all of them.
To have a purchasing policy means to follow strict guidelines about the quality, packaging, efficiency and other characteristics of the purchased materials, inventory, equipment, etc.

In terms of quality to have an environmentally friendly purchasing policy means to use only such materials, that don't have any negative impact on the environment or human health. During the interviews it was found out that there is a purchasing policy for detergents. The hotels in Albena use only detergents produced either by Johnson & Johnson, or by Henkel. They are both well known marks and meet all international standards.

In terms of energy and water consumption to have an environmentally sensitive purchasing policy means to consider the energy and water efficiency while choosing the equipment and to purchase the ones that best meet the requirements of the standards set by the company and its environmental policy.
During the interviews it was found out that there is no purchasing policy in terms of energy efficiency while choosing dishwashers and/or refrigerators.[78] In many cases the consumption of electricity is not considered and as a matter of fact, even recently purchased dishwashers consume significant amounts of electricity and water.

In terms of waste management the most important is to purchase goods in recyclable or biodegradable packages, to avoid buying food, soap etc. in individual packages. This will help to reduce the waste generation and to recycle the generated one.[79]
The interviews showed that in purchasing matters the management in Albena last year was not as conscious as this year. Hopefully a comparison will be done, and right conclusions will help the company to keep implementing this practice.

CHAPTER VIII : DISCUSSION

Now, when a holistic view of the state of art is achieved, it becomes possible to discuss the situation and to give some recommendations that might help the management of the company to improve the environmental performance.
The present research showed that in comparison with 1998, in 1999 Albena has done remarkable improvements in terms of energy consumption, water use and purchasing. This is the result of the order #901 and is achieved mainly by good housekeeping. Although efforts are put to improve the environmental performance of the resort, Albena has the possibility to perform even better. This opinion is mainly based on the results of simulated scenarios, which showed that:

- In terms of energy consumption changes can be done that will improve the current performance. Those include non/low cost and high cost improvements. If the company keeps this practice at a rate of 5% reduction per year, then the electricity used in 2010 will be by about 48% less than if Albena continues to perform as currently. This could be the most affordable and most efficient improvement, because it doesn't require any high cost investments. The replacement of conventional lighting devices by more efficient fluorescent ones can be another possibility to improve the performance at a relatively low cost. As high cost but rather efficient improvements could be considered the key card system, the diesel boiler and the purchasing policy in terms of more efficient equipment.

[78] See Appendix I, Box 14
[79] See Appendix I, Box 15

If purchasing new equipment is not too relevant for seasonal hotels, it can be very important for the restaurants. We have to remember that restaurants consume much more electricity than hotels. This could mean that the payback period for this equipment will not be too long, while the savings will be much more sensitive than for seasonal hotels.

◊ If in energy issues the good M & M gives better results than the changes in consumption by introducing new equipment, in water related issues the relatively high cost measures were found more efficient. So, for instance, if the good M & M results in about 14% reduction by the year 2010 compared with the current practice scenario, the high cost improvements' application, for the same period can result in more than 40% reduction. Although the economic calculations are out of the scope of present study, it is obvious that the cost savings could be very sensitive and worthwhile.

◊ In terms of waste management very serious changes have to be done. The present practice is not sustainable and has to be improved. As a first step towards sustainable waste management, the waste generation should be reduced by implementing the measures simulated in second scenario. So, if currently about 95% of assumed amount of waste generated in Albena is taken to the landfill, according to second scenario only about 86% will go to the landfill, while the third scenario (recycling and composting without reduction and reuse) will reduce this number up to 60%. It is important to keep in mind that a taxation is going to be introduced for waste management, which means that if there is less waste taken to the landfill, than the company will have reduced the burden on the natural environment and will have reduced the waste management costs.

CHAPTER IX: CONCLUSIONS

The top management of Albena is committed to improve the environmental performance of the company. Based on the recommendations given by the audit team of IIIEE, in 1999 was introduced an order of the executive manager giving directives for efficient use of natural resources and a more conscious purchasing policy. The implementation of those directives resulted in a sensitive decrease in energy consumption and water use. A certain decrease in waste generation was also achieved because of the purchasing policy, but as there are no mechanisms for monitoring the waste generation, no data has been available.

However, based on the simulations of suggested CP measures, the following conclusions were done:

⇒ currently the performance of Albena is much better than last year;

⇒ although improvements have been done, there is a possibility to achieve even better results by implementing the measures tested and suggested by present research;

⇒ without reducing the consumption a remarkable decrease in the amount of electricity used by all facilities can be achieved;

⇒ if all measures suggested by present research are implemented, in 2010 the amount of water used by Albena will be by about 52% less than if the company keeps on current practice.

⇒ the non/low cost measures result in approximately 10% decrease in waste generation. After having introduced all improvements, that have been proposed for waste management, the flow of waste taken to the landfill at the end of the simulated period can be reduced by more than 46%.

⇒ if the new waste management programme and the CP measures are implemented, by the year 2001, when waste separation will be officially introduced, Albena could fulfil the minimum standard requirements and could apply for an international recognition award.

In all 4 areas discussed in this thesis, can be done improvements, which will improve the performance of the company and will help to develop in a sustainable way.

CHAPTER X: RECOMMENDATIONS

Albena has the possibility to become a tourist resort which develops in a sustainable way. For this purpose some changes should be done which, the author believes, will help the company to become one of preferred Eastern European resorts for western tourists.
The recommended changes should include both changes in the management and infrastructure.

Management
The company has all the preconditions for developing an EMS. The results of the CP audit and of present research could be used to define the objectives and targets of the EMS. In fact, the aspects where improvements can be done are already identified. The results of computer simulations could be used to develop EPIs which Albena will obviously need to monitor the performance and to keep track of them. The EMS could also include the training of the personnel for CP measures. The training programme should include environmental awareness, good housekeeping and waste separation. This could take place during the introductive educational courses at the beginning of each season.
Other, more detailed and professional training could be organised for the managers of facilities in winter (out of peak season).
An internal award scheme can be introduced within the company for the facilities, in order to create incentives for application of the knowledge gained during the training.
In each facility a person should be assigned to monitor the performance of the facility in terms of resource efficiency and cost savings. A part of saved funds could be used as awards for best performers.
As it was mentioned before, the management in Albena is very centralised. In some cases it is considered as something positive, because the decisions taken by the general management are implemented by all facilities and the results are more sensitive, but in some cases, when it comes to small facilities, no individual decision can be taken. This fact makes impossible the creative thinking for managers of those facilities. Sometimes they might come up with a solution which could be good for one or two facilities, but as it is not easy to implement individual decisions, they don't put any efforts to make things happen. It would be much more efficient and creative to encourage such individuals and to communicate their initiatives to other facilities.
The performance and good practice of the facilities should be communicated both internally and externally, thus creating an incentive for other facilities and competitors to improve their own performance. The external communication could help the environmentally aware customers to choose Albena as a preferred destination. For this reason the information could be put in the Internet, in the company's home page.

What is an EMS ?
In order to be able to implement all the improvements that have been discussed and tested in previous chapters, Albena needs a tool for appropriate management of the company's environmental issues. As most applicable tool seems to be the development of an EMS.

> *"An EMS provides order and consistency for organisations to address environmental concerns through the allocation of resources, assignment of responsibilities and ongoing evaluation of practices, procedures and processes."*[80]

By following all steps of the EMS framework, we can see how and in what order can the changes be implemented, monitored and improved. The steps to be taken include:

- **Initial Review**

This has been partly fulfilled by the CP audit and present research.

[80] Swedish Standards Institution; "Environmental Management Systems - General guidelines on principles, systems and supporting techniques", p. 20

- **Plan**

This step will include:

1. development of an *Environmental Policy*
2. identification of *Environmental Aspects* (within this research Management, Energy, Water, Waste and Purchasing have been identified as most significant aspects)
3. defining *Objectives and Targets* (for Albena the objective could be the reduction of water and energy use and reduction of waste generation, and the targets might be set in form of benchmarks for the performance)

- **Do**

This consists of:

1. *structuring the action and defining the responsibilities* (to be successful in implementing the EMS, the commitment of the employees at all levels is crucial, as well as having responsible attitude for the appropriate functioning of the facility or the company in general)
2. *training of the personnel* (how to implement CP measures, what are the benefits, how can environmental awareness, good housekeeping and waste separation affect the overall performance of the facility).
3. *communication* (to inform all interested parties about the company's commitment and in some cases, if requested, about the environmental impacts of the company's activities)
4. *control and document* (people, other than the responsibles for implementing the improvements, must be assigned to control the performance in a way that corresponds to the requirements of the EMS)
5. *emergency preparedness* (an action plan must be identified for emergency cases such as brake downs of the equipment, unexpected shortage of water or electricity supply etc.)

- **Check**

At this stage the most important steps are:

1. *monitoring and measurement* (the performance must be measured in order to compare it with previous results and see if there is any improvement)
2. *EPIs* might be needed to be able to monitor the performance
3. *audits* (this must be done on a periodic basis to find out if the system functions the way it was planned, if the measures have been implemented properly or some changes in the EMS are needed)

- **Improve**

At this step the main action will be to review the findings of audits, to re-identify the targets and objectives, if needed or if the objectives have been achieved.

The implementation of an EMS is a continual process, which should never stop, because once the targets are achieved, new ones should be set according to new laws, technologies, requirements etc. The EMS is a very helpful tool for an organisation or company on its way towards sustainability. It might be very useful to have the idea of an EMS in mind while discussing the current situation and giving recommendations for future improvements of the Environmental performance of Albena.

Infrastructure

Currently the hotels and restaurants in Albena are undergoing a renovation process. As the number of hotels is big, every year can be renovated not more than 3 or 4 hotels, it is likely that this process will be permanent, because when the first spin of renovation is over, the time will come to start a new spin. This can create possibilities to apply new, more efficient equipment and technologies in the facilities. The renovation process gives to the management of the company a unique possibility to make radical changes in the buildings and not only to change the devices, the furniture etc. but also to change the infrastructure of water and energy supply, to make it more rational and environmentally friendly. This can have several positive effects :

- reduce the consumption of natural resources and consequently create economic benefits by installing timers for lighting devices in the corridors, sensored sinks for common bathrooms;
- allow to make modifications in the design of those buildings, making possible such changes as storage of gas cylinders and separated recyclables, wider corridors so that the maids could use bigger carriages;
- have an efficiency - oriented and environmentally friendly purchasing policy driven by such characteristics as:

1. durability of the inventory;
2. easy maintenance;
3. recyclability;
4. low price;
5. minimum impact on the environment;
6. minimum health effects for guests;[81]

- control the electricity and water supply for smaller number of devices by creating more flexible networks of distribution;
- create possibilities for separated waste collection by building bigger places for waste disposal. To make it less expensive one common area could be assigned for two or three hotels, if they are situated close to each other. It is also important to make sure that the vehicles and the cleaning personnel have easy access to those places.

Introduce waste separation by adding new waste containers. There are two options to solve this problem: a) to purchase appropriate modifications of containers, or b) to come to an agreement with a firm that uses recycled plastics as raw material and ask them to produce garbage containers as an exchange for the plastic waste provided by Albena to this firm. This could be a very good solution, because as waste separation is going to be a national policy, hundreds of thousands new containers will be needed and actually Albena could become the initiator of a new production.

The author hopes that the findings and recommendations of present research will help Albena to improve its environmental performance, at the same time initiating a competition within other Black Sea resorts in Eastern European former socialist countries. This could rise the awareness in the region and in long term perspective could improve the ecological situation of the whole region.

[81] IHEI Purchasing guidelines; # 2; 1998, London (a supplement to "Green Hotelier" magazine)

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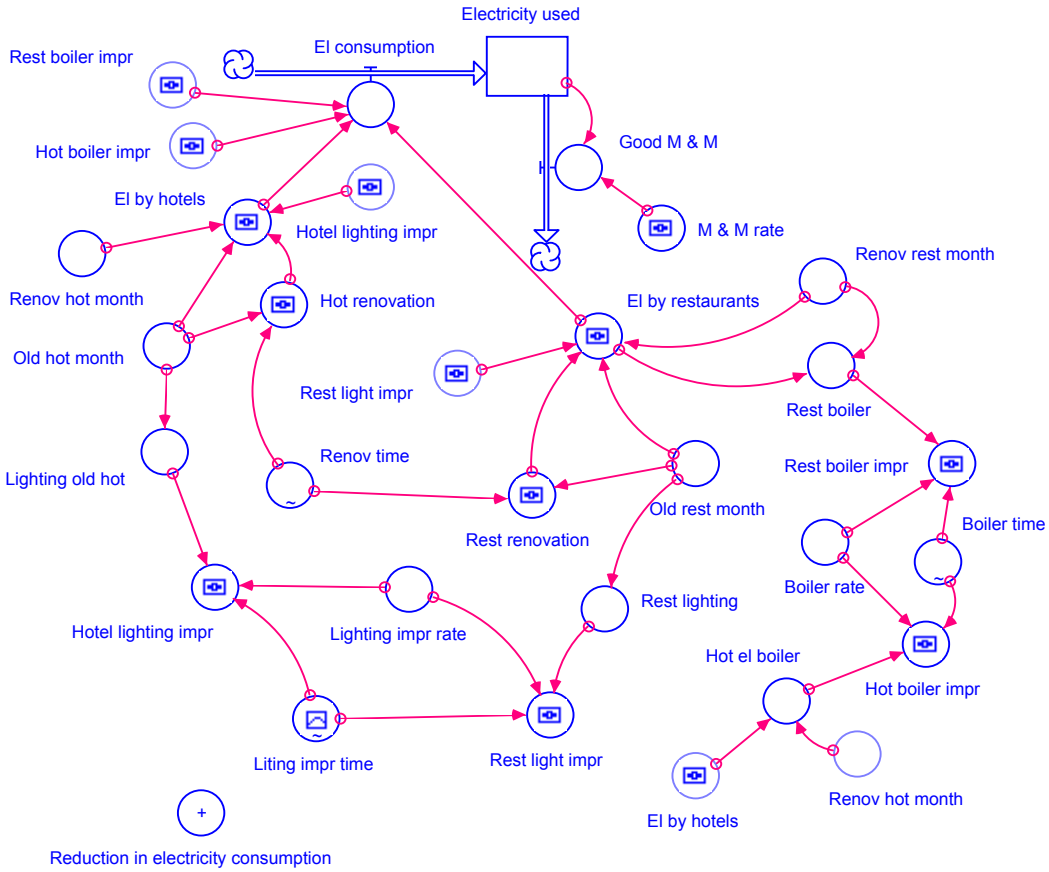
APPENDICES

Appendix A
LIST OF INTERVIEWED PERSONS

Name	Duties	Phone	Date of Interview
Dahl, Terje	Area Manager, Scandinavian Leisure Group	+359 5722 62299	August 10, 1999
Dimitrov, Dragomir	Manager, Hotels Dept. Albena	+ 359 5722 62947	August 10, 1999
Ivanova, Yovka	Hotel Manager, Albena	+ 359 5722 62952	August 20, 1999
Karadjov, Valcho	Chief of Wastewater Treatment Station	+359 5722 66430	August 19, 1999
Saraidarova, Elena	Chief of Hygienic Dept., Albena	+ 359 5722 62720	August 12, 1999
Shishkova, Angelika	Official Representative of Albena for Lithuania, Fiji Travel	+370 231 03 00	August 12,1999
Stoicheva, Sonia	Sales Manager, Albena	+359 5722 62406	August 9, 1999
Tsvetanova, Tanya	Hotel Manager, Albena	+359 5722 62153	August 9, 1999
Yovchev, Vladimir	Chief of Maintenance Dept., Albena	+359 5722 62476	August 9, 1999

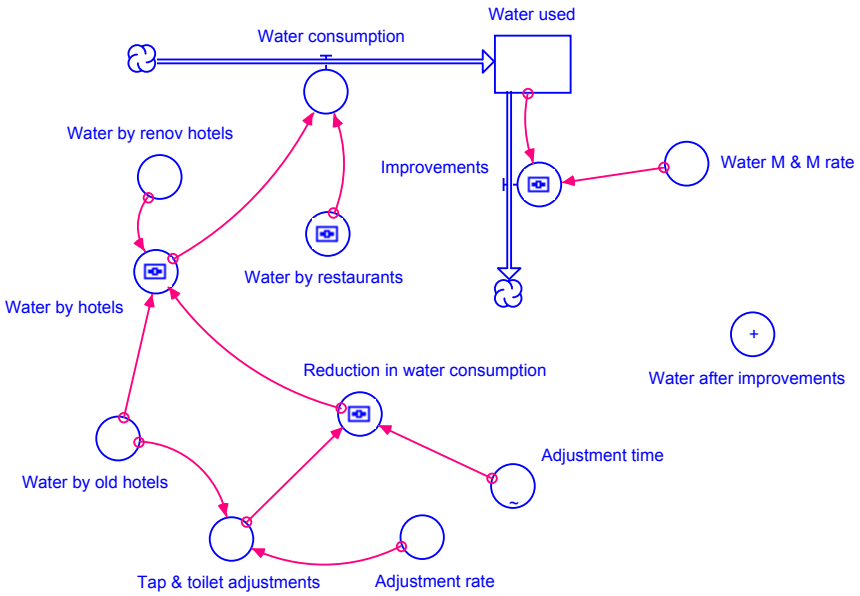
Appendix B
STELLA MODEL FOR ELECTRICITY CONSUMPTION



Equations used in the model for electricity consumption

Electricity_used(t) = Electricity_used(t - dt) + (El_consumption - Good_M_&_M) * dt
INIT Electricity_used = 0{kWh}
INFLOWS:
El_consumption = (El_by_hotels-Hot_boiler_impr)+(El_by_restaurants-Rest_boiler_impr)
OUTFLOWS:
Good_M_&_M = Electricity_used*M_&_M_rate
Boiler_rate = 0.055
El_by_hotels = (Old_hot_month+Renov_hot_month)-(Hot_renovation+Hotel_lighting_impr)
El_by_restaurants = (Old_rest_month+Renov_rest_month)-(Rest_renovation+Rest_light_impr)
Hotel_lighting_impr = Lighting_impr_rate*Lighting_old_hot*Liting_impr_time
Hot_boiler_impr = Boiler_rate*Hot_el_boiler*Boiler_time
Hot_el_boiler = El_by_hotels-Renov_hot_month*0.25
Hot_renovation = Old_hot_month*Renov_time*0.1
Lighting_impr_rate = 0.75
Lighting_old_hot = (Old_hot_month/2)*.3
M_&_M_rate = 0.05
Old_hot_month = 0.187*30{kWh}
Old_rest_month = 5.2*30{kWh}
Reduction_in_electricity_consumption = El_consumption- + Good_M_&_M
Renov_hot_month = 3.328*30{kWh}
Renov_rest_month = 6.7*30{kWh}
Rest_boiler = El_by_restaurants-Renov_rest_month*0.33
Rest_boiler_impr = Boiler_rate*Rest_boiler*Boiler_time
Rest_lighting = (Old_rest_month/2)*0.04
Rest_light_impr = Lighting_impr_rate*Rest_lighting*Liting_impr_time
Rest_renovation = Old_rest_month*Renov_time*0.1
Boiler_time = GRAPH(TIME)
(0.00, 0.045), (4.40, 0.145), (8.80, 0.225), (13.2, 0.46), (17.6, 0.63), (22.0, 0.725), (26.4, 0.76), (30.8, 0.815), (35.2, 0.875), (39.6, 0.92), (44.0, 1.00)
Liting_impr_time = GRAPH(TIME)
(0.00, 0.00), (4.00, 0.085), (8.00, 0.135), (12.0, 0.165), (16.0, 0.22), (20.0, 0.27), (24.0, 0.355), (28.0, 0.435), (32.0, 0.605), (36.0, 0.7), (40.0, 0.855), (44.0, 1.00)
Renov_time = GRAPH(TIME)
(0.00, 0.095), (4.40, 0.14), (8.80, 0.17), (13.2, 0.205), (17.6, 0.265), (22.0, 0.365), (26.4, 0.435), (30.8, 0.525), (35.2, 0.575), (39.6, 0.705), (44.0, 0.805)

Appendix C
STELLA MODEL FOR WATER USE



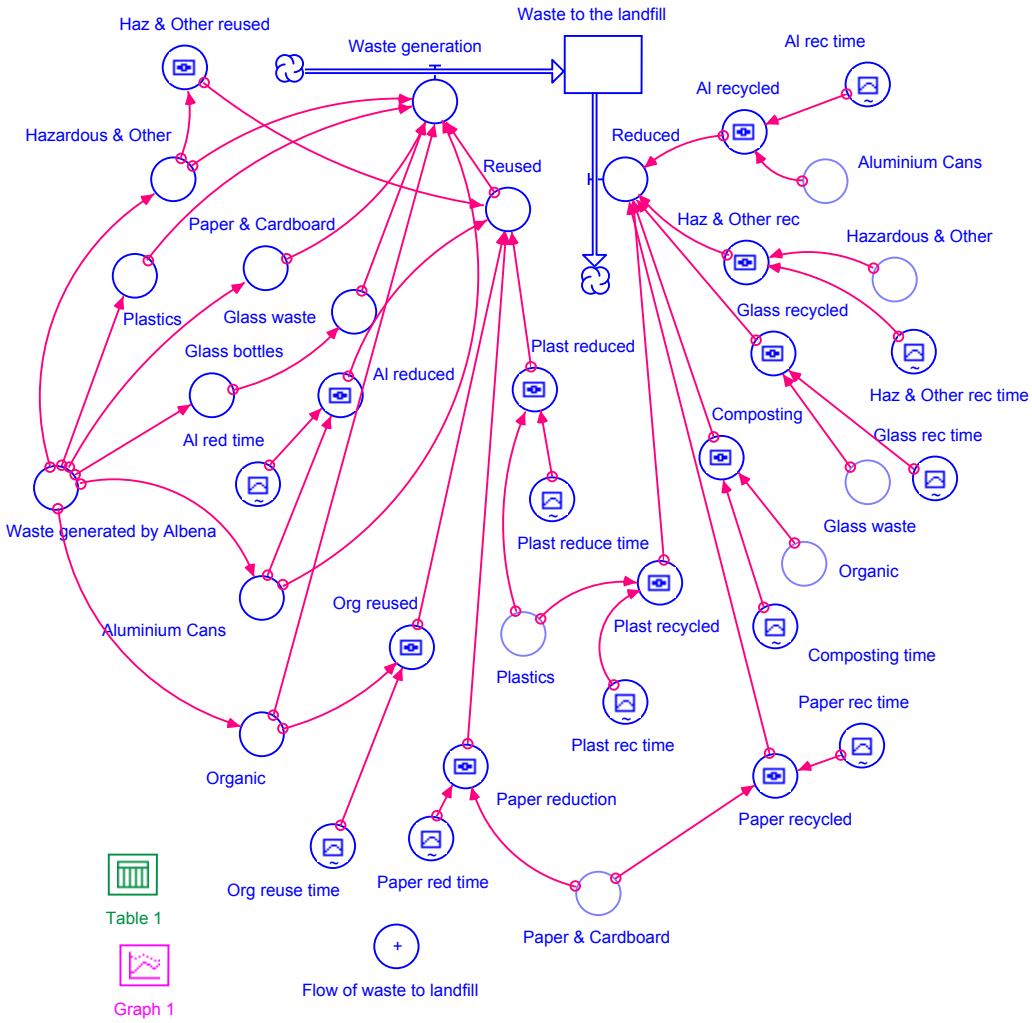
Equations used in the model

Water_used(t) = Water_used(t - dt) + (Water_consumption - Improvements) * dt

INIT Water_used = 0

INFLOWS:
Water_consumption = Water_by_hotels+Water_by_restaurants
OUTFLOWS:
Improvements = Water_used*Water_M_&_M_rate
Adjustment_rate = 0.3/12
Reduction_in_water_consumption = Tap_&_toilet_adjustments*Adjustment_time
Tap_&_toilet_adjustments = Adjustment_rate*Water_by_old_hotels
Water_after_improvements = Water_consumption- + Improvements
Water_by_hotels = (Water_by_old_hotels+Water_by_renov_hotels)-
Reduction_in_water_consumption
Water_by_old_hotels = 196*30{liter/month}
Water_by_renov_hotels = 165*30{liter/month}
Water_by_restaurants = 49*30{liter/month}
Water_M_&_M_rate = 0.1/12
Adjustment_time = GRAPH(TIME)
(0.00, 20.0), (6.00, 25.0), (12.0, 28.5), (18.0, 32.5), (24.0, 38.0), (30.0, 43.5), (36.0, 49.0), (42.0, 53.5), (48.0, 57.0), (54.0, 61.5), (60.0, 65.5)

Appendix D
STELLA MODEL FOR WASTE MANAGEMENT



Equations used in the model for waste management

Waste_to_the_landfill(t) = Waste_to_the_landfill(t - dt) + (Waste_generation - Reduced) * dt
INIT Waste_to_the_landfill = 0
INFLOWS:
Waste_generation =
(Aluminium_Cans+Glass_waste+Hazardous_&_Other+Organic+Paper_&_Cardboard+Plastics)-Reused
OUTFLOWS:
Reduced = Composting+Glass_recycled+Haz_&_Other_rec+Paper_recycled+Plast_recycled+Al_recycled
Aluminium_Cans = 0.018*Waste_generated_by_Albena
Al_recycled = Aluminium_Cans*Al_rec_time
Al_reduced = Aluminium_Cans*Al_red_time
Composting = Organic*Composting_time
Flow_of_waste_to_landfill = Waste_generation- Reduced
Glass_bottles = 0.268*Waste_generated_by_Albena
Glass_recycled = Glass_waste*Glass_rec_time
Glass_waste = Glass_bottles*0.25
Hazardous_&_Other = 0.339*Waste_generated_by_Albena
Haz_&_Other_rec = Hazardous_&_Other*Haz_&_Other_rec_time
Haz_&_Other_reused = Hazardous_&_Other*0.02
Organic = 0.179*Waste_generated_by_Albena
Org_reused = Organic*Org_reuse_time
Paper_&_Cardboard = 0.089*Waste_generated_by_Albena
Paper_recycled = Paper_&_Cardboard*Paper_rec_time
Paper_reduction = Paper_&_Cardboard*Paper_red_time
Plastics = 0.107*Waste_generated_by_Albena
Plast_recycled = Plastics*Plast_rec_time
Plast_reduced = Plastics*Plast_reduce_time
Reused = Al_reduced+Haz_&_Other_reused+Org_reused+Paper_reduction+Plast_reduced
Waste_generated_by_Albena = 1.2
Al_rec_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.00), (2001, 0.02), (2002, 0.1), (2003, 0.225), (2004, 0.34), (2005, 0.505), (2006, 0.58), (2007, 0.58), (2008, 0.58), (2009, 0.58), (2010, 0.58)
Al_red_time = GRAPH(TIME)
(1999, 0.005), (2000, 0.035), (2001, 0.07), (2002, 0.105), (2003, 0.115), (2004, 0.145), (2005, 0.155), (2006, 0.18), (2007, 0.2), (2008, 0.2), (2009, 0.2), (2010, 0.2)
Composting_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.00), (2001, 0.00), (2002, 0.04), (2003, 0.05), (2004, 0.065), (2005, 0.135), (2006, 0.235), (2007, 0.305), (2008, 0.315), (2009, 0.35), (2010, 0.35)
Glass_rec_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.00), (2001, 0.02), (2002, 0.07), (2003, 0.135), (2004, 0.295), (2005, 0.415), (2006, 0.58), (2007, 0.835), (2008, 0.94), (2009, 0.95), (2010, 0.95)
Haz_&_Other_rec_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.00), (2001, 0.02), (2002, 0.035), (2003, 0.04), (2004, 0.045), (2005, 0.08), (2006, 0.1), (2007, 0.115), (2008, 0.15), (2009, 0.15), (2010, 0.15)
Org_reuse_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.03), (2001, 0.04), (2002, 0.055), (2003, 0.08), (2004, 0.09), (2005, 0.11), (2006, 0.155), (2007, 0.2), (2008, 0.2), (2009, 0.2), (2010, 0.2)
Paper_rec_time = GRAPH(TIME)
(1999, 0.05), (2000, 0.095), (2001, 0.155), (2002, 0.225), (2003, 0.295), (2004, 0.4), (2005, 0.5), (2006, 0.6), (2007, 0.655), (2008, 0.665), (2009, 0.7), (2010, 0.7)
Paper_red_time = GRAPH(time)
(1999, 0.00), (2000, 0.005), (2001, 0.015), (2002, 0.02), (2003, 0.02), (2004, 0.025), (2005, 0.035), (2006, 0.035), (2007, 0.045), (2008, 0.05), (2009, 0.06), (2010, 0.1)
Plast_rec_time = GRAPH(TIME)
(1999, 0.00), (2000, 0.00), (2001, 0.035), (2002, 0.04), (2003, 0.05), (2004, 0.07), (2005, 0.125), (2006, 0.17), (2007, 0.245), (2008, 0.33), (2009, 0.435), (2010, 0.595)
Plast_reduce_time = GRAPH(TIME)
(1999, 0.02), (2000, 0.06), (2001, 0.105), (2002, 0.135), (2003, 0.16), (2004, 0.165), (2005, 0.2), (2006, 0.215), (2007, 0.22), (2008, 0.225), (2009, 0.235), (2010, 0.25)

Appendix E
ELECTRICITY CONSUMPTION BY HOTELS

Old hotels	June 98 (kWh)	ovrn. in June 98	kWh/ov.	June 99 (kWh)	ovrn. in June 99	kWh/ov.	Efficiency (%)
Dobrudja	65000	13673	4.754	80140	10607	7.555	- 58.9
Dobrotitsa	38000	7289	5.213	32600	7586	4.297	17.6
Kaliakra	48000	11655	4.118	64280	13237	4.856	- 17.9
Bratislava	26060	9121	2.857	31620	9538	3.315	- 16.0
Varshava	38120	7564	5.040	24320	722	33.684	- 568.4
Praga	38000	9535	3.985	40600	9632	4.215	- 5.8
Compass	23600	4116	5.734	33600	7587	4.429	22.8
Balik	15000	3097	4.843	500	1160	0.431	91.1
Dorostor	30170	5998	5.030	1000	5914	0.169	96.6
Karvouna	20600	4389	4.694	1100	3838	0.287	93.9
Tervel	23120	5141	4.497	1200	5804	0.207	95.4
Camelia	20000	2325	8.602	500	2588	0.193	97.8
Kaliopa	18000	3170	5.678	500	4992	0.100	98.2
Panorama	26920	6519	4.129	800	5519	0.145	96.5
Orhideja	27760	7146	3.885	700	7590	0.092	97.6
Ralitsa	30800	6198	4.969	400	1430	0.280	94.4
Total old hotels	489150	55978	8.738	313860	837196	0.375	35.8
Average old hotels	30572	3499	8.738	19616	104649	0.187	35.8
30% of av.old hotels	9172			5885		0.056	
Effects of fl. lamps	2293			1471			
Difference in lighting	6879			4414			
Av. with fl. lamps	23693		6.772	15203		0.145	22.5
Renovated hotels							
Gergana	92000	12461	7.383	89200	15414	5.787	21.6
Moura	24600	3606	6.822	60000	8293	7.235	- 6.1
Slavouna	49040	5631	8.709	44620	7063	6.317	27.5
Nona	37280	8714	4.278	43940	9973	4.406	- 3.0
Droujba	25400	5334	4.762	2300	5476	0.420	91.2
Orlov	25200	8282	3.043	1480	6645	0.223	92.7
Boryana	30200	7352	4.108	1100	10153	0.108	97.4
Elitsa	28640	7860	3.644	1000	9738	0.103	97.2
Total renov. hotels	312360	50958	6.130	242160	72755	3.328	22.5
Average ren. hotels	39045	6370	6.130	30270	9094	3.328	22.5
Total all hotels	978300	106936	4.574	627720	909951	0.689	270.7
Average all hotels	40762.5	4455.66	0.191	26155	37915	0.689	

Appendix F

ELECTRICITY CONSUMPTION BY RESTAURANTS

Old restaurants	June 98 (kWh)	June 99 (kWh)
Dobrudja	72000	100020
Bratislava	50300	55120
Dobrotitsa	47600	50480
Kaliakra	13000	65600
Compass	25800	28160
Karvouna	40440	30000
Dorostor	15640	26834
Orkhidea	48920	44120
Tervel	15620	11880
Ralitsa	10470	2845
Panorama	17920	17480
Renovated restaurants		
Gergana	30240	87560
Boryana	25580	38000
Ellitsa	25060	41980
Nona	25920	32920
Slavouna	25600	41000
Orlov	54600	57240
Total all restaurants	544710	731239
Total cons. by old rest.	357710	432539
Average consumption by old rest.	32519	39322
Overnights in old hotels		119474
70% of overnight in old hotels		83632
Assumed kWh/overnight in old		5,2
Total cons. by renov rest.	187000	298700
Average cons. by renov.rest.	31167	49783
Overnights in renov. hotels		63889
70% of overnights in renov. hotels		447232
Assumed kWh/overnight in renov.		6.7
Lighting in old rest.	107313	129761
Fluor.lighting effects	277225	335218

Appendix G

WATER USED BY THE HOTELS[82]

Old hotels	June 98 (m^3)	number of overnights	m^3/ovrn. June 98	June 99 (m^3)	number of overnights	m3/ovrn. June 99
Dobrudja	12500	13673	0.914	6000	10607	0.566
Dobrotitsa	2500	7289	0.343	1240	7586	0.163
Kaliakra	2300	11655	0.197	1620	13237	0.122
Bratislava	2000	9121	0.219	1100	9538	0.115
Varshava	2100	7564	0.278	110	722	0.152
Praga	1700	9535	0.178	1100	9632	0.114
Compass	1500	4116	0.364	1150	7587	0.152
Balik	1700	3097	0.549	500	1160	0.431
Dorostor	1500	5998	0.250	1000	5914	0.169
Karvouna	1900	4389	0.433	1100	3838	0.287
Tervel	2000	5141	0.389	1200	5804	0.207
Kamelia	1500	2325	0.645	500	2588	0.193
Kaliopa	1600	3170	0.505	500	4992	0.100
Panorama	1500	6519	0.230	800	5519	0.145
Orchidea	1300	7146	0.182	700	7590	0.092
Ralitsa	1500	6198	0.242	400	1430	0.280
Renovated hotels						
Gergana	2600	12461	0.209	1500	15414	0.097
Droujba	1700	5334	0.319	2300	5476	0.420
Orlov	1800	8282	0.217	1480	6645	0.223
Boryana	1700	7352	0.231	1100	10153	0.108
Elitsa	1400	7860	0.178	1000	9738	0.103
Moura	1300	3606	0.361	2000	8293	0.241
Slavouna	1900	5631	0.337	1400	7063	0.198
Nona	1700	8714	0.195	1600	9973	0.160
Total	53200	166176	0.320	31400	170499	0.184
Total by renov. hotels	12300	50958	0.241	10900	66110	0.165
Total by old hotels	40900	115218	0.355	20500	104389	0.196
Average by renov. hot.	2050	6370	0.322	1363	8264	0.165
Average by old hotels	2556	7201	0.355	1281	6524	0.196

[82] Source: Albena AD

Appendix H
WATER USED BY RESTAURANTS

Old restaurants	June 1998 (m^3)	June 1999 (m^3)
Dobrudja	1100	700
Bratislava	800	620
Dobrotitsa	850	330
Compass	700	300
Kaliakra	950	680
Karvouna	650	250
Dorostor	700	320
Orkhideia	850	500
Ralitsa	500	50
Panorama	500	120
Tervel	800	250
Renovated restaurants		
Boryana	600	130
Gergana	1000	770
Nona	800	580
Slavouna	600	150
Orlov	700	540
Elitsa	650	310
Total by renovated rest.	4350	2480
Total by old restaurants	8400	4120
Total restaurants	12750	6600
Total overnights	231283	193662
70% of overnights	161898	135563
Average water/ovrnt	0.079	0.049

Appendix I
CITATIONS FROM INTERVIEWS

Box 1.
"When the tourists are at home, in Scandinavia, they think about environmental issues. When they come here, maybe they see things that they could have done it another way, then sometimes they write about it in the questionnaires. When they choose the hotel from home I don't think they think about… . I think the choice is focused on the price." Interview with Terje Dahl

Box 2.
"I have to admit that there is a program for replacement of conventional incandescent bulbs by energy-efficient ones. According to our calculations, this must be done first of all in the hotels that function all the year round. Because if the pay back period of such a lamp is longer than its life cycle, then, … You understand, don't you?" Interview with Vladimir Yovchev

Box 3.
"… The good thing is that Moura and Slavouna now have a boiler which does not use electricity but diesel, which is much more efficient, while Gergana is using electricity."
Interview with Tanya Tsvetanova

Box 4.
"…since the order of the executive manager came into force, there is an order 901, there is an abrupt change in the efficient use of those resources." Interview with Vladimir Yovchev

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Box 5.
"Besides that, in long term perspective, there are ongoing preliminary discussions about an eventual gasification of the complex, which is something very normal for western countries. There everything is gasificated. This, also, is something more ecological. That is categorical".
Interview with Vladimir Yovchev

Box 6.
"As I told you, the water in Albena is rich in mineral salts and that's why it is more reasonable to install shower heads with less holes but of normal size than the same number of holes but of smaller size. Otherwise the holes will be littered very soon." Interview with Vladimir Yovchev

Box 7.

"My idea is, during the reconstruction, to mount softening installations at the entrance of each facility, as obligatory. It will decrease significantly the water consumption. Because the water is hard here. ... They are not related with who knows, what investment. Let's say they can cost about 10 to 12.000 DEM, let it be 15, and will be paid back in two years" Interview with Dragomir Dimitrov

Box 8.

"I haven't travelled very much. It's for the first time that I come to Bulgaria. In comparison with other resorts where I've been, it's for the first time that I see how the beach is cleaned every day. Every evening we see the cars which clean the beach and every morning the streets are washed. I know that they wash the streets in Germany, but here I saw it for the first time."

Interview with Angelika Shishkova

Box 9.

"To be related to a municipal company by a contract, it means that they will have a strict schedule: let's say from 8 o'clock in the morning and till the end of working hours and that's it. They are not interested in anything else. Here people and trucks must be available non-stop. Otherwise the complex will not be this clean." Interview with Elena Saraidarova

Box 10.

"In our three hotels we have separated waste collection. The containers are situated at the entrance of the hotels, next to Balta[83], there are 4 containers: plastics, glass, other waste and paper. The guests really do that, the separated collection and every morning the trucks come and take care of it. It is centralised for whole Albena." Interview with Tanya Tsvetanova

Box 11.

"It is possible to have separated waste collection, but we will have difficulties. I mean, our vehicles are not adapted for it. They are very good, new, with a press, they can collect big quantities of garbage, but they are not for separated waste." Interview with Elena Saraidarova

Box 12.

"Most of hotels don't have suitable waste collection areas. ... most of hotels have difficulties for ..., collecting and transporting the waste. Last year we were putting the separated waste in one corner and after that, when the other waste was carried in, the next day it was (a mess). When the personnel from the recycling company came, they couldn't reach the bags with separated waste, the other truck comes, it takes all the bags without looking if it is plastics or... " Interview with Yovka Ivanova

Box 13.

"I think that if there is separated waste collection here, our tourists will follow the rules, because when they go abroad they always try to show themselves from the best side. And then, when they go back home, they will apply it at home too." Interview with Angelika Shishkova

[83] A preserved area next to Albena

Box 14.
"Last year we bought a dishwasher for Dobrudja, the same was bought for Gergana too, which, turned out to consume incredible amounts of energy and water. This year we bought a Haubert(???). Haubert, that is a well known producer of kitchen equipment. Those are relatively quicker and more efficient than the tunnel-type dishwashers, because tunnel dishwashers were then bought for Dobrudja and Gergana and it turned out that they are for very big restaurants, where there is a steady stream of customers and the racks have to follow each other. We don't have such a stream of dishes to supply the whole tunnel by racks. Interview with Yovka Ivanova

Box 15.
"The hotel cannot have its own policy. The deliveries are centralised. What we do this year, is that we don't buy packaged (for individual use) *butter, jam, etc. for two reasons: first because they are more expensive than the big packages and second, from the ecological point of view, to generate less plastic waste."* Interview with Yovka Ivanova