# Environmental Benchmarking for Management of Energy and Water Use: A Study of SMEs in the Mediterranean Region

This article presents and discusses Internet-based environmental performance evaluation and benchmarking procedures and tools that help improve the competitiveness of small and medium-sized enterprises (SMEs) while promoting the rational use of energy and water resources.

The study discussed here monitored the environmental performance of a large number of SMEs in the dairy, textile, and hotel sectors in several countries around the Mediterranean Basin. The results reveal a significant potential for both energy and water savings. Substantial cost savings could also be achieved if an integrated water and energy management strategy is implemented.

***Improving competitiveness while promoting sustainability***

## Background: Impacts of Industrialization

Over the last century, economic growth has largely contributed to improved living standards and social development in most of the regions around the Mediterranean. Industrialization has been the major driving force behind the processes of social transformation and modernization. There are at least three pathways through which industrialization helps social development (United

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Nations Industrial Development Organization, 1998):

- contributing to economic growth, and thus creating the resources needed to fund social development programs;
- creating employment and generating income in other sectors (such as agriculture and services) through their linkages to industry; and
- promoting various aspects of social integration by encouraging modernization and by helping to integrate women into the production process.

However, industrial activities also result in localized environmental impacts (such as air or surface pollution) as well as global-scale impacts, such as ozone depletion and climate change. Overexploitation of energy resources for the sake of short-term economic prosperity, increasing pollution levels in water bodies, ecosystem degradation, and global warming are among the impacts that have made protection of environmental and natural resources a high priority.

**Sustainable development can facilitate long-term growth, enhance prosperity, and increase employment while also protecting the environment.**

## Sustainable Development

In the past two decades, sustainable industrial development has emerged as a core societal goal with powerful political and social dimensions. Sustainable development can facilitate long-term growth, enhance prosperity, and increase employment while also protecting the environment.

As the World Business Council for Sustainable Development states, "Pursuing a mission of sustainable development can make our firms more competitive, more resilient in shocks, nimbler in a fast changing world, more unified in purpose, more likely to attract and hold customers, and the best employees and more at ease with regulators, banks, insurers and financial markets" (World Business Council for Sustainable Development, 2001).

## Pressure on SMEs to Improve Environmental Performance

In view of the growing concerns about environmental impacts, industry is under increasing pressure from government agencies, international organizations, policymakers, and society at large. Enterprises are being forced to implement environmental protection practices and improve environmental performance. They also are increasingly being pressured to report the environmental impacts of their activities.

Like all business organizations, SMEs are being affected by the trend toward greater environmental accountability. In the past, the environmental behavior of these enterprises was mainly driven by the need for legal compliance. Today, however, it is widely recognized that SMEs can gain many potential benefits by behaving more consciously and proactively.

As J. Ladd Greeno and S. Noble Robinson (1992) have noted, "Demands on companies to measure, document and disclose information about environmental performance will become more invasive . . . [and] environmental performance will increasingly become a critical factor to scrutinize."

## Environmental Performance Measurement

Environmental performance measurement quantifies and tracks the relevant environmental aspects and impacts of enterprise activities.

Measuring environmental performance enables a level of transparency not previously possible in environmental reporting. It provides a powerful tool for evaluating whether businesses are doing the right things (effectiveness) in the right way (efficiency).

### *Environmental Performance Evaluation*

Environmental performance evaluation refers to the process of selecting environmental indicators and then measuring, analyzing, assessing, reporting, and communicating an organization's environmental performance against well-defined criteria (International Organization for Standardization, 1999).

Environmental performance indicators must exhibit specific characteristics, such as relevance, comparability, scientific soundness, reliability, and acceptability. They must be based on accessible data and must be understandable by everyone (Earth Council, 1997; Müller & Sturm, 2001).

Multiple initiatives of varying scope and perspective have sought to develop environmental performance measurement and reporting frameworks. Among the best-known organizations working in this area are the Global Reporting Initiative (2000), the United States National Academy of Engineering (1998), the World Business Council for Sustainable Development (2001), and the International Organization for Standardization (1999).

The various approaches have all largely converged on a set of environmental performance indicator schemes with the following characteristics:

- focus on a rather restricted set of generally applicable environmental indicators, complemented by a few sector- or company-specific indicators, and
- environmental indicators expressed as ratios of environmental variables (e.g., water or energy consumption or air emissions) to output (physical or financial) variables.

Given the multiple dimensions of environmental performance evaluation and assessment, the decision on whether (and how) to produce aggregated measures of environmental performance can become one of the most difficult issues. Comparisons of environmental performance can be further complicated by changes over time (in products or processes) that can affect the environmental indicators for individual industries.

Some have argued that environmental performance cannot be compared across organizations because companies differ so widely. The same argument could be made about company finances, however—yet the reporting of financial performance is a matter of routine. Distinctiveness should not stand in the way of comparisons between organizations, whether in terms of profitability, market value, or environmental performance (Berkhout et al., 2001).

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As information on environmental performance expands and becomes more consistent in quality and scope, it is possible to compare the performance of individual organizations against aggregated trends. Standardization of environmental information enables international comparisons and benchmarking of environmental performance.

### *Environmental Benchmarking*

The term "environmental benchmarking" often simply refers to comparing or ranking the environmental performance of different entities. For example, this is how the term is generally used by environmental nongovernmental organizations when they seek to compare air emissions or waste generation by different companies or countries.

However, benchmarking can also serve as a tool that helps guide improvements in environmental performance by identifying the gap between a company's actual performance and the level of performance that it seeks to achieve

(European Environmental Benchmarking Network, 2000). It should be noted in this context that, as Szekely, Vollman, and Ebbinghaus (1996) have stated, business and environmental performance are intricately linked. In sum, environmental benchmarking allows organizations to:

- identify their environmentally "weak" activities and processes;
- understand what practices are best for their specific activities;
- improve their production processes and environmental practices;
- design and implement environmentally effective policies; and
- realize competitive advantages in the global or regional markets.

## SME Study: Methodological Approach

The methodological approach presented in this article utilizes an Internet-based application for environmental performance evaluation and environmental benchmarking at small and medium-sized enterprises. The environmental assessment focuses specifically on SMEs' energy and water consumption. The methodology estimates how much SMEs can save in both resource consumption and expenditures through use of an integrated energy and water management strategy.

**The SMITE project primarily sought to establish a Web–based system for SMEs and a communication platform for all stakeholders pertaining to three important economic sectors in the Mediterranean area (textiles, food, and hotels).**

The methodology and tools were applied to SMEs in the dairy, textile, and hotel sectors located in nine countries[1] around the Mediterranean. This article presents data and results from the hotel sector. We offer an assessment of energy and water consumption, presenting our main conclusions in terms of quantities and costs.

### *SMITE Methodological Framework*

The environmental performance indicators used in this study were developed, and environmental benchmarking was carried out, through a research initiative known as SMITE (Improving Competitiveness of SMEs through IT-based Environmental Business Planning). The SMITE project was funded by the European Union under the Euro-Mediterranean Information Society (EUMEDIS) Initiative.

The goal of the SMITE project was to help SMEs improve their competitiveness—and, thus, their position in the market—by adopting prevailing environmental policies and practices, utilizing newly developed information technologies accessed through the Internet.

The SMITE project primarily sought to establish a Web–based system for SMEs and a communication platform for all stakeholders pertaining to three important economic sectors in the Mediterranean area (textiles, food, and hotels). SMITE's interactive, multimedia, and multilingual Web-based system:

- provides SMEs with up-to-date diagnostic tools for evaluating environmental performance (firms enter key operational data online and in return receive automatically generated self-assessment reports);
- provides information on environmental management practices, offers good examples and best available technologies, and proposes the most appropriate measures for improving environmental performance;
- allows firms to benchmark their environmental performance at the regional and international levels, and permits them to make rough estimates of the economic benefits they may

be able to derive from environmental performance improvement; and
- enhances networking activities among businesses, consultants, and other stakeholders.

SMITE adopted and further developed the general methodological approach of the European Union's Measuring the Environmental Performance of Industry (MEPI) project.[2] Under the MEPI approach, performance indicators are estimated on the basis of performance variables, which are divided into the categories of organizational (management and business) and environmental variables. Performance variables reflect data on performance provided by companies themselves. See **Exhibit 1**.

These variables are used for estimation of performance indicators, which are normalized measures of performance. In essence, performance indicators are simple ratios of two variables (Tyteca et al., 2002). The most common variables used as denominators for constructing performance indicators are:

- units of production for the sector (e.g., tons of product),
- total sales for the company,
- number of employees in the organization, and
- amount of value added (total value of sales minus total cost of materials purchased).

## *SMITE Approach*

### • *Environmental Performance Evaluation*

The SMITE approach uses a set of generic performance indicators, complemented by some sector-specific indicators. This approach has proven to yield a reliable representation of a company's environmental performance. It also reduces complexity while maintaining flexibility.

The SMITE approach is based on a restricted set of environmental indicators that are calculated for each individual enterprise for the current and previous periods of time. SMITE avoids multidimensional evaluation of environmental performance, instead presenting different performance indicators separately. The challenge was to produce simple environmental indicator figures that would allow users to compare the performance of individual industries at the regional and international levels.

**Exhibit 1. Organizational and Environmental Variables**

| | | |
|---|---|---|
| Organizational variables | Management variables | ISO registration<br>Number of noncompliance events<br>Environmental investment reported |
| | Business variables | Total sales<br>Profit<br>Number of employees<br>Raw material<br>Products |
| Environmental variables | Waste | Total solid waste<br>Recycled waste |
| | Air emissions | Carbon dioxide |
| | Wastewater emissions | Chemical oxygen demand (COD)<br>Biochemical oxygen demand (BOD) |
| | Water consumption | Total water consumption |
| | Energy consumption | Total energy input |

- ***Environmental Benchmarking***

Under the SMITE approach, environmental performance evaluation is followed by benchmarking. Enterprises are invited to compare their current performance to median values for the same set of indicators and the same business sector within their region or nation. Regional values for environmental indicators are produced and updated on the basis of data being input to SMITE.

**The opportunity bank serves as a guide for SMEs that are aiming to improve their environmental performance by means of cleaner technology.**

Environmental benchmarking is based on best available techniques (BAT) values, which represent state-of-the-art performance. BAT values, which are sector-specific, are derived from the relevant literature and case studies at the international level.

- ***Suggestions for Improvement***

Following environmental performance evaluation and benchmarking, the SMITE Web-based system suggests technical interventions and practical measures that could help the enterprise reduce its environmental burden and, consequently, improve its competitiveness through cost savings.

Recommendations are based on the user's present environmental performance (as recorded), which is evaluated in comparison to best practices and target values. For each indicator, the system refers the user to an "opportunity bank" containing suggestions on how to improve performance. The opportunity bank serves as a guide for SMEs that are aiming to improve their environmental performance by means of cleaner technology.

- ***Cost Evaluation and Savings Opportunities***

Finally, as the last step in the process, the SMITE Web-based system informs the enterprise about any excessive costs that may be related to its present level of environmental performance, and estimates the costs that can be avoided by applying BAT.

Cost-saving estimates are presented for each individual performance indicator, and then summed to represent the total potential costs that can be avoided.

## Applying Environmental Benchmarking to SMEs in the Mediterranean Region

### *Gathering Information from SMEs*

The SMITE methodology was applied to SMEs in the three targeted sectors. Representatives of the SMEs received training and were asked to provide their operational data for two consecutive periods.

The survey was based on a three-part structured questionnaire that sought information about each individual SME's business profile and environmental performance. Participants could complete the questionnaire online or submit it offline with the support of regional SMITE partners.

The first part of the questionnaire addressed basic information about the business in order to register the SME as part of the study. The information collected was related to firm profile, size, processes, and products. In the case of hotels, the survey registered several specific details about the establishments' characteristics and the services they provided.

The second part of the questionnaire sought to record environmental variables associated with the registered SMEs in order to assess their environmental performance and implied costs. **Exhibit 2** describes the types of information submitted by the SMEs.

The third and last part of the questionnaire investigated aspects of administrative operations that can have an impact on environmental performance. For this purpose, both qualitative and

**Exhibit 2. Data Collected for Evaluation of Environmental Performance**

| Category | Data Collected |
|---|---|
| Energy consumption | Forms of energy<br>Annual consumption<br>Cost of energy |
| Water consumption | Quality of water<br>Annual consumption<br>Cost of water |
| Raw materials consumption | Materials used<br>Annual consumption<br>Cost of raw materials |
| Production characteristics | Primary products<br>Annual production<br>Production cost or overnight guests |
| Solid waste production | Total waste produced<br>Hazardous waste<br>Recycled waste<br>Cost of disposal for each category |
| Wastewater | Produced volume of wastewater<br>Wastewater parameters<br>Cost of treatment/disposal |

quantitative information was collected from the SMEs. The survey focused on the following:

- environmental investments and cost savings;
- environmental training of personnel;
- reported environmental accidents and contingency plans; and
- information related to the SME's environmental policy and management.

All qualitative information was quantified with the aid of weighting factors.

Each record in the SMITE database contained data on the performance of an individual firm for a specific period. Each category of performance data was standardized to a particular unit of measurement, such as kilowatt-hours of electricity consumed per year or milligrams of chemical oxygen demand per liter of wastewater.

In total, 44 variables were calculated. They were classified as follows:

- environmental variables (such as energy consumption, water consumption, and chromium emissions) and
- administrative variables (such as environmental accidents and environmental cost savings).

Calculation of the environmental indicators was performed by normalizing all variables to a specific measure that was relevant to the particular sector, such as the annual production of dairy products (the dairy sector) or the total number of overnight guests (the hotel sector). **Exhibit 3** summarizes the performance indicators for each sector, which were calculated on the basis of the data and information collected.

Despite the efforts made, it was not always possible to obtain all the required data from each registered SME. As **Exhibit 4** indicates, the most frequently reported environmental variables were those related to energy and water consumption. This was most likely because the participating SMEs received utility bills reflecting their consumption of these resources, so the necessary information was readily available to them in most cases.

The response rate of SMEs generally reflected their sector's market size in each country. Tourism and its related activities are very important for the Mediterranean region. For this reason, the hotel sector was surveyed in 10 countries,[3] and the response rate from SMEs was significant.

The textile sector is declining in most parts of the region (with the exception of Turkey, Tunisia, and Egypt), and the response rate of SMEs in this sector was limited. Within the food sector, only the dairy and brewery subsectors were contacted; the latter yielded a very limited response rate, as there are few large brewery plants in operation.

The study discussed here focused primarily on the hotel sector, which showed the highest response rate. The sections that follow discuss the

**Exhibit 3. Performance Indicators by Sector**

| Performance Indicators | Hotel | Textile | Brewery | Dairy |
|---|---|---|---|---|
| Air Emissions | – | ✓ | ✓ | – |
| Chromium Emissions | – | ✓ | – | – |
| COD Emissions | – | ✓ | ✓ | ✓ |
| Energy Consumption | ✓ | ✓ | ✓ | ✓ |
| Water Consumption | ✓ | ✓ | ✓ | ✓ |
| Waste Production | ✓ | ✓ | – | – |
| Community Complaints | ✓ | ✓ | ✓ | ✓ |
| Environmental Accidents | ✓ | ✓ | ✓ | ✓ |
| Environmental Cost Savings | ✓ | ✓ | ✓ | ✓ |
| Environmental Investments | ✓ | ✓ | ✓ | ✓ |
| Environmental Training Costs | ✓ | ✓ | ✓ | ✓ |
| Environmental Training Hours | ✓ | ✓ | ✓ | ✓ |
| General Awareness of Environmental Issues | ✓ | ✓ | ✓ | ✓ |

**Exhibit 4. Completeness of Indicator Sets: Environmental Performance**

| Environmental Performance Indicators | Hotel | Textile | Brewery | Dairy | Total |
|---|---|---|---|---|---|
| Air emissions | – | 66.7% | 75.0% | – | 67.6% |
| Chromium emissions | – | 0.0% | – | – | 0.0% |
| COD emissions | – | 26.7% | 25.0% | 33.3% | 29.7% |
| Energy consumption | 93.0% | 73.3% | 100.0% | 80.0% | 85.1% |
| Water consumption | 93.0% | 73.3% | 100.0% | 80.0% | 85.1% |
| Waste production | 66.7% | 33.3% | – | – | 55.2% |

environmental performance of the hotel sector, with a focus on energy and water consumption.

### *Environmental Performance of the Hotel Sector in the Mediterranean Basin*

The study involved 94 registered enterprises in the hotel sector, located in 10 countries around the Mediterranean region. Of these, 80 provided data relating to their individual consumption of energy and water.

Evaluation of these data is reflected in **Exhibits 5** and **6**. On these exhibits, the solid line indicates the average behavior of all the SMEs, which corresponds to the regional benchmarking value. Average behavior is expressed as the statistical median of all individual performances. The dashed line indicates the consumption rate that corresponds to "best practices."

For the hotel sector, the BAT value for energy consumption is 0.104 gigajoule (GJ) per overnight guest. The BAT value for water consumption is 0.611 cubic meters ($m^3$) per overnight guest (International Hotels Environment Initiative, 1993).

Many SMEs that participated in the SMITE initiative had already undertaken a series of energy- and water-saving measures that resulted in substantial improvements to their energy and water consumption. However, there was still a significant potential for savings among enterprises located all across the Mediterranean region.

The study also estimated hotels' energy and water consumption patterns at the national level (see **Exhibit 7**). Minimizing the gap between national and regional consumption averages would result in substantial savings for the economies of the Mediterranean region, and could yield significant financial benefits to individual enterprises as well.

Best practices in energy and water consumption in the hotel sector correspond to patterns recorded

**Exhibit 5. Energy Consumption in the Hotel Sector Around the Mediterranean**

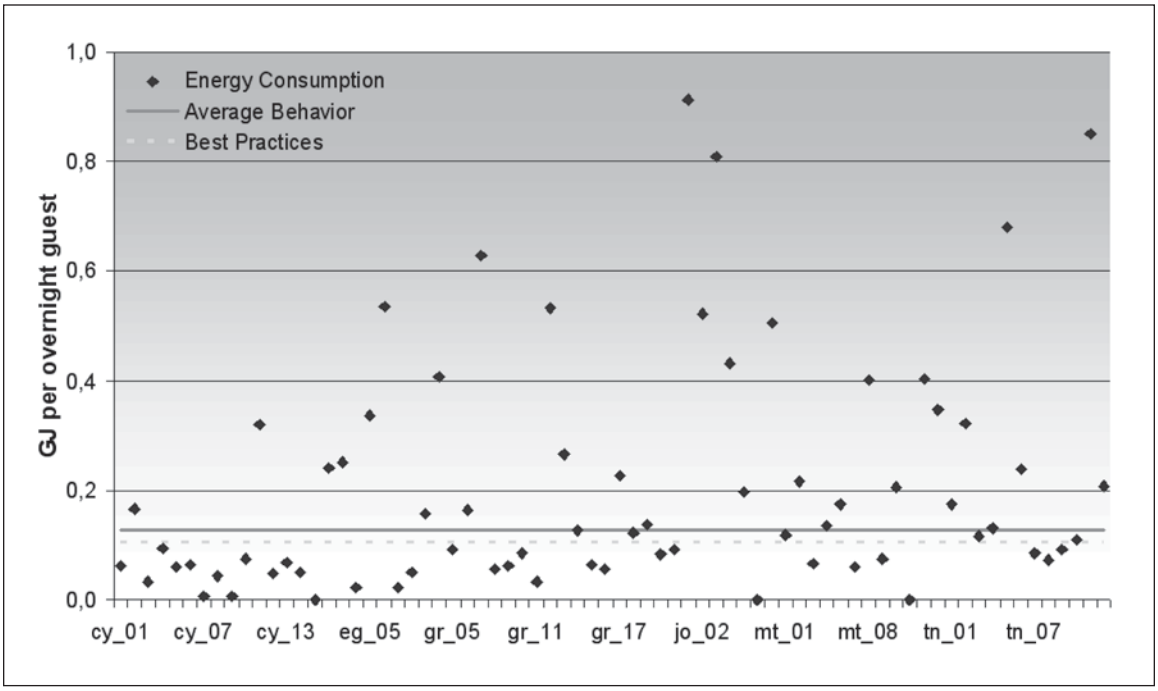
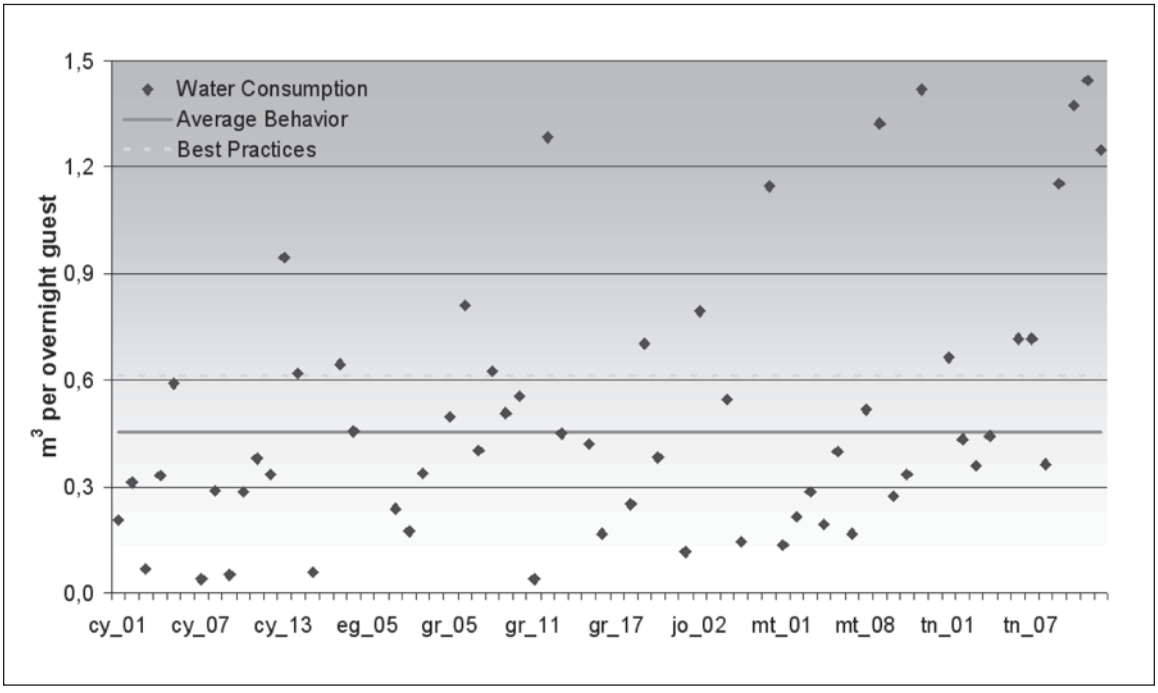
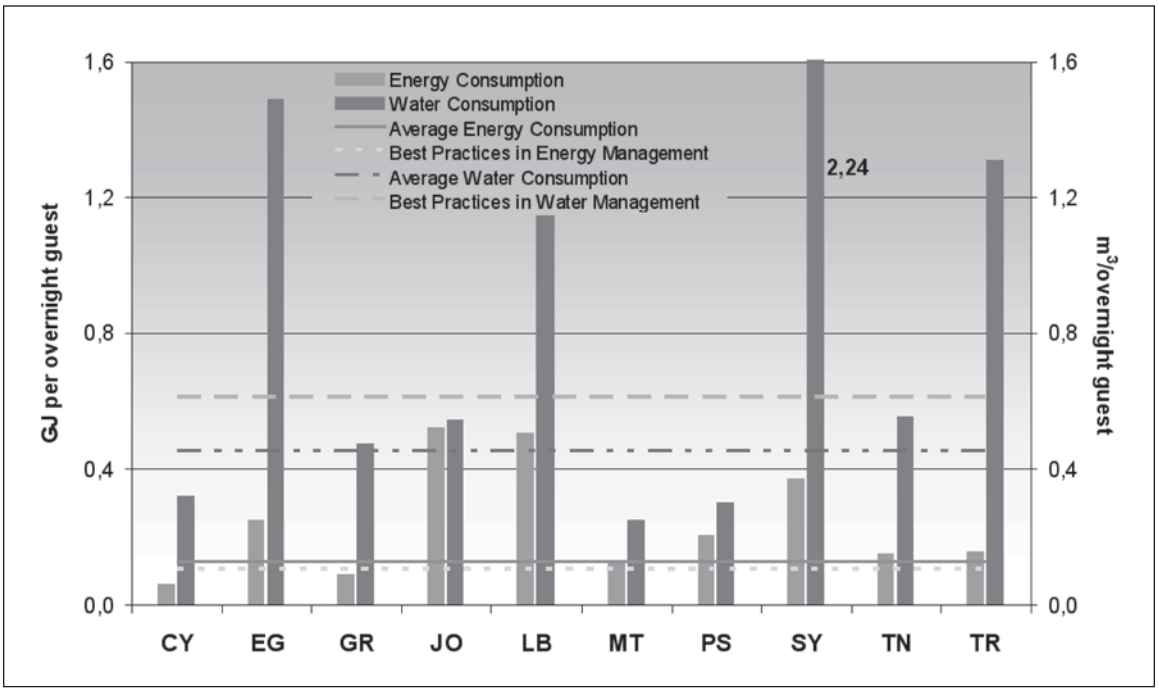



**Exhibit 6. Water Consumption in the Hotel Sector Around the Mediterranean**




at large hotels (those with more than 150 rooms), which also tend to have additional amenities and recreational facilities, such as swimming pools, gardens, and restaurants. For this reason, direct comparison with the establishments in the study sample was not always feasible since some of the SMEs surveyed are simple "bed and breakfast" establishments, in which both energy and water needs are

**Exhibit 7. Consumption Patterns: Energy and Water Consumption in the Mediterranean Hotel Sector, at the National Level**




substantially lower. This partly explains the inversion observed in Exhibit 7, where the average water consumption of all the hotels included in the survey is lower than the level of performance that corresponds to "best practices."

### *Potential for Resource and Cost Savings*

The potential for energy and water savings among hotels was investigated with the help of two scenarios. In both, potential savings were calculated for each individual hotel, as well as for all 80 hotels in the study sample. The first scenario was based on the average behavior of all the enterprises studied, while the second was based on best practices in energy and water management.

As shown in **Exhibits 8** and **9**, hotels in the study region can achieve energy savings of up to 44.5 percent and water savings of up to 36.6 per-

**Exhibit 8. Potential for Energy Savings**

| | | Average Behavior Scenario | | Best Practices Scenario | |
|---|---|---|---|---|---|
| Country | Consumption (GJ/year) | Margin (%) | Consumption (GJ/year) | Margin (%) | Consumption (GJ/year) |
| Cyprus | 187,252 | – | 187,252 | – | 187,252 |
| Egypt | 1,327,207 | 49.5 | 670,886 | 58.6 | 549,387 |
| Greece | 84,551 | – | 84,551 | – | 84,551 |
| Jordan | 51,579 | 75.7 | 12,529 | 80.1 | 10,260 |
| Lebanon | 1,314,933 | 74.9 | 329,955 | 79.5 | 270,199 |
| Malta | 87,959 | 0.4 | 87,614 | 18.4 | 71,747 |
| Palestine | 1,257,107 | 38 | 778,881 | 49.3 | 637,824 |
| Syria | 67,118 | 66.1 | 22,772 | 72.2 | 18,648 |
| Tunisia | 309,086 | 16.7 | 257,384 | 31.8 | 210,771 |
| Turkey | 5,739,307 | 20.4 | 4,569,856 | 34.8 | 3,742,244 |
| | 10,426,101 | 32.8 | 7,001,680 | 44.5 | 5,782,884 |

**Exhibit 9. Potential for Water Savings**

| Country | Consumption ($m^3$/year) | Average Behavior Scenario Margin (%) | Average Behavior Scenario Consumption ($m^3$/year) | Best Practices Scenario Margin (%) | Best Practices Scenario Consumption ($m^3$/year) |
|---|---|---|---|---|---|
| Cyprus | 845,299 | – | 845,299 | – | 845,299 |
| Egypt | 488,380 | 69.6 | 148,570 | 59,0 | 200,389 |
| Greece | 526,606 | 4.4 | 503,289 | – | 526,606 |
| Jordan | 95,682 | 17 | 79,464 | – | 95,682 |
| Lebanon | 140,200 | 60.5 | 55,362 | 46.7 | 74,671 |
| Malta | 162,859 | – | 162,859 | – | 162,859 |
| Palestine | 16,817 | – | 16,817 | – | 16,817 |
| Syria | 410,400 | 79.8 | 82,873 | 72.8 | 111,778 |
| Tunisia | 752,205 | 18.3 | 614,401 | – | 752,205 |
| Turkey | 1,134,331 | 65.5 | 391,805 | 53.4 | 528,461 |
| | 4,572,779 | 36.6 | 2,900,738 | 27.5 | 3,314,767 |

cent if they make the necessary technical modifications and changes to their management practices.

Based on cost data provided by a majority of the hotels participating in the survey, an average specific cost for energy and water was calculated (at the national level). The overall weighted average energy cost was estimated at € 3.05/GJ, and the weighted average water cost at € 0.87/$m^3$. Using the results of the analysis previously described, the potential cost savings for "average behavior" and "best practices" scenarios were estimated.

**Exhibits 10** and **11** present the annual cost of energy and water for the countries involved in the survey and show the potential savings. The total potential cost savings for the first scenario is estimated at € 15.7 million, and the value for the second scenario is € 20.4 million. It should be noted that the energy and water savings potential (and the corresponding cost

**Exhibit 10. Annual Energy Cost for the Reference Scenario and the Alternative Scenarios**

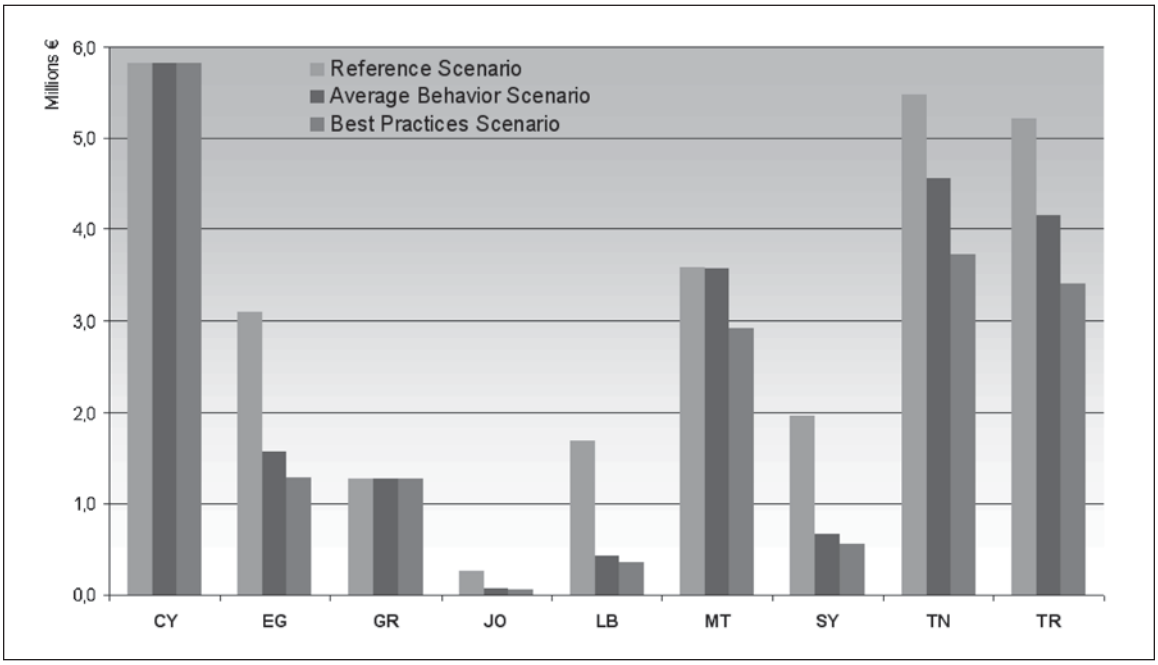
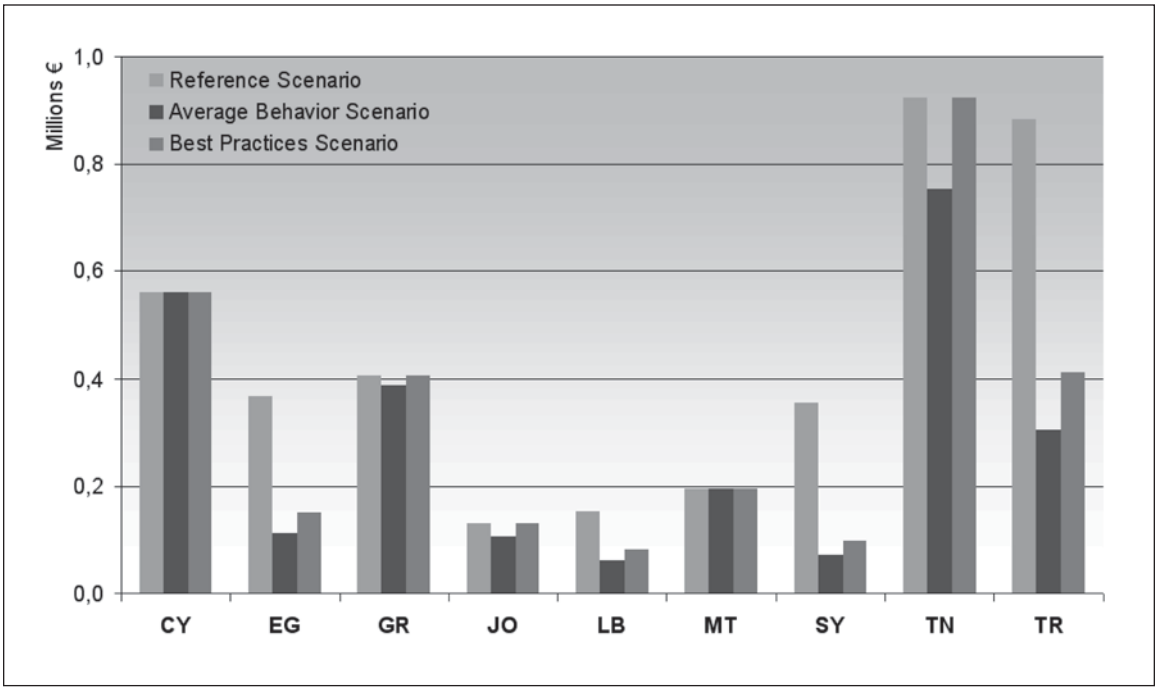


**Exhibit 11. Annual Water Cost for the Reference Scenario and the Alternative Scenarios**




savings) vary widely among the countries of the region.

Finally, total costs for energy and water consumption were estimated for the entire sector. **Exhibit 12** shows cost comparisons for current consumption patterns (as depicted by the Web-based tools) compared to the average behavior for selected countries in the Mediterranean region.

Considerable cost-saving possibilities exist for hotels in every country with the exception of Cyprus. The potential annual savings range from thousands of euros (in the case of Greece) to approximately 25 million euros (in Tunisia).

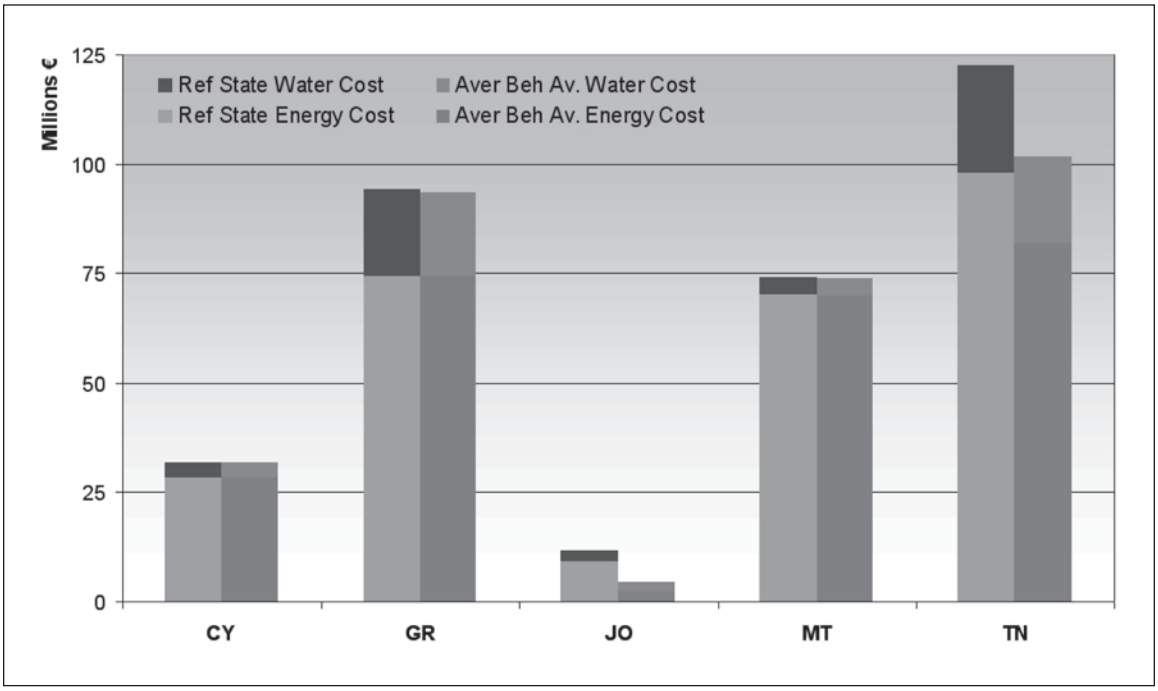
## Conclusion

This article has investigated the use of environmental performance evaluation and benchmarking, highlighting their benefits for both environmental protection and business competitiveness. Environmental benchmarking allows organizations to identify their environmentally "weak" activities and processes, understand the best practices for those activities, and design and implement environmentally effective policies and production processes.

In the case of SMEs specifically, it is widely recognized that smaller and medium-sized enterprises can gain competitive advantages in the global or regional markets by behaving more consciously and proactively toward the environment.

The study described here involved a research project funded by the European Union—the SMITE project, carried out under the EUMEDIS Initiative—that developed environmental performance measurement and benchmarking methodologies, along with a corresponding set of tools. These methodologies and tools were applied to SMEs in the dairy, textile, and hotel sectors operating in the countries of the Mediterranean Basin. The goal of the project was to help SMEs improve their competitiveness (and thereby their position in the market) by encouraging them to adopt prevailing environmental policies and practices, utilizing newly developed information technologies through the Internet.

**Exhibit 12. Total Potential Cost at the National Level Compared to the Reference State**




Tourism is one of the major sources of income for all the countries around the Mediterranean. New tourist facilities, as well as new types of tourism, are constantly being developed. The environmental impacts of tourism activities continue to be very significant, however.

The study discussed here focused on energy and water consumption by SMEs in the hotel sector. The study estimated the SMEs' potential for resource conservation and cost savings through implementation of an integrated energy and water management strategy.

Water consumption can have a major environmental impact because of the increasing scarcity of water in all regions of the Mediterranean, especially coastal resort areas. Additionally, with the exception of Egypt and Algeria (which was not included in the SMITE project), the entire region depends on oil and natural gas imports to meet its energy needs. As a consequence, any feasible savings in water and energy consumption will promote the prosperity of the Mediterranean countries, and any measure leading to better management of these resources will greatly benefit the national economies of the region.

The results obtained from this study prove that SMEs in the region's tourism sector can realize significant potential benefits from better management of both energy and water resources. Environmental performance improvement, combined with large cost savings, can increase the competitiveness of SMEs considerably, while also contributing substantially to sustainable development at a regional level.

## Acknowledgment

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## Notes

1. Tunisia, Egypt, Syria, Lebanon, Jordan, Palestine, Turkey, Malta, and Cyprus.

2. The objective of MEPI (which was funded by the European Commission) was to develop a framework for standardized environmental performance indicators that could be applied across firms in all sectors. This framework aimed

to give a reliable, complete, transparent, and verifiable measure of a firm's environmental performance.

3. In addition to the nine countries mentioned previously, SMITE methodology and tools were also applied to the hotel sector in Greece during the same period. Data obtained from Greek enterprises are included in the results presented here.

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