



The study of energy management in indoor pools of Kerman Province according to National Building Regulations

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ABSTRACT

Good consumption and energy management is very important for all of the governments. The purpose of this study was to investigate the energy management in indoor pools in Kerman province according to national buildings regulations [7]. The methodology of this research was descriptive and done by domain method. For data collection questionnaires set based on professors' ideas were used. Validity of the questionnaires was estimated by interview with professors and experts in physical education and sport facilities and mechanical engineers. Statically population of study included all of the indoor pools in Kerman province (N=27). For data analysis descriptive statistics was used. All of the choices in the check list were scored according to national buildings Regulations with regards to the reduced scores in each section. Furthermore the sum of scores was also estimated and the general energy management situation was determined [9].

The analysis of findings showed that national building Regulations were not completely applied in indoor pools in Kerman province. Information obtained from the data analyze is in indoor pools province, the average electricity consumption of lighting systems. The poor condition of the water and the gas consumption of fossil fuels is in poor condition. In general energy management in indoor pools in Kerman province is limited and theirs situation is not good.

Keywords: energy management, national building regulations, indoor pools

INTRODUCTION

In one hand our country is increasingly requiring the most potential sport facilities as well as a new and modern approach in social people's efficacy of the sport salons and pitches along with various targets such as providing healthy affairs, recovery of illnesses, fitness, and enriching the leisure times in this regard and in the other hand, this process has caused the increase of the population in sport locations such as swimming pools. Along this, the increase of apartment-living population and the occurrence of various diseases such as chronic backache, neck and ankle disabilities as well as the recommendations of many physiotherapists to use aqua-therapy approaches for its light weight issues in the recovery of these disorders, it has been made a great and high influential impact on people's participation at these kinds of sport and physical activities. One of these activities is subjected to the swimming pools; of course, the completion of the national training of swimming particularly in the cities for the third elementary school grades have been considered as the national plan especially at morning shifts for these students. The degree of the consuming energy can be increased by the pools; so, any thinking and necessary management should be carried out in this research [5]. Also, the most suitable geographical position of Iran in especial coordination of the sunlight during the day has been established as one of the best factors in applying this God's given gift; this issue conducts the most potential resources such as fossils and green gas productions to be applied doubly in this regard. In the recent years in addition to the officials and governmental systems such as the environmental department and other energy manufacturing companies and our country's energy as well as various symposiums, electronic products, establishing websites and weblogs have stepped different orientations in this relation; but, undoubtedly, the importance of the issues is not going to be negligible and any forgotten affairs should not be recoverable; although the sport issues and activities are being achieved traditionally in this century, but there have been fulfilled many different changes in this regard [3,8]. However, there has been long distance to the global steps and international standards [1]. Among this, a correct planning can be one of the most potential approaches in reaching to the target-based efficacy that the whole managers should be aware of the process suitably and they have to consider the whole regulations and criteria on these kinds of sport locations. At present, it is

necessary to apply the related experts using the latest technological and new scientific achievements and in the second step, it should be pay attention to the designing and constructing a new favorable location for these sport and physical activities; of course, these activities are the only part of the sport location management and the sport policy makers of the country should also define the related-based piece of the sport in the country potentially[3].The consumption of the energy is one of the most important challenges in today's world. Because the resources of the energy such as the gas and petroleum providers are going to be end up increasing the wastes of these energy along with high expenditures such as air pollution and various contaminations as well as the greenhouse effects [6]. today, the countries consuming the energy harshly try to make their own recoveries struggling to reduce the wastes of these consumptions for three decades; they have to follow the patterns and policies of the optimization of the consuming energy in this regard. It not only makes the reduction of the expenditures but also it prevents the destructive issues regarding to the environment; other effects of this optimization is subjected to the completion of Efficacy policies of the consumption[4]. Of course, the energy resources should not be considered as the consuming sources and it should be paid attention to the indirect impacts of these issues in other sections. The sport locations devoting about 40% of these resources should pay attention to this part as the country's building affairs; these are not considered out of the planning; these should also make a correct planning at their own pavements. This makes them to apply a suitable management of the energy conducting them to the increase of the efficacy at their affairs [9].

MATERIALS AND METHODS

The present study is of an applied one and due to its method is an applied-descriptive research.

Statistical community and statistical sample:

The statistical community of the research includes the whole covered pools that have been distributed around Kerman Province. The sampling method is the whole-counting method and the whole 27 pools have been considered in this study[9].

Measuring tool: the questionnaire is consisted of two parts:

1. Introduction and general information of the pools such as : name, city, possession type, dimensions, facilities, treatment system, antibacterial materials and so on
2. Introduction and general information of the pools' manager such as : name and family name, age, education, having coaching certificate, being referee and life guard, check list including five sections and every section includes four sections: main (swimming pool) and Jacuzzi and baths and WCs, official section: management and acceptance and every section has 30 questions such as:
 - a. Cooling system
 - b. Warming system
 - c. Electricity and light
 - d. Water
 - e. Gas and fossil consumptions

Validity of the questionnaire:

The comments and viewpoints of the physical training and sport experts were asked in relation to determine the validity of the questionnaire; of course the comments of the sport engineering and swimming experts and specialists were also given in this regard[4].

Statistical method:

The descriptive statistics was used in order to organize, summary and rank the raw scores and describing the sample sizes such as adjusting the tales, percents and measuring the distribution indices. After measuring the score of the whole choices, the response of the energy management status was specified by using SPSS-18 software in the pools.

Table 2: study of distribution of pools by the separation of energy management degree (light and electricity)

Management of energy-electricity and light	Distribution	Percent
Very weak	0	0.00
Weak	5	18.5
Moderate	21	77.8
Good	0	0.00
Superior	1	3.7
Total	27	100

According to the analysis of the data in table 2, about 18.5% of the related pools were weak in relation to the energy management in the section of the light and energy, but about 77.8% were established at middle

rate and 3.7 had the superior level of these issues. The mean, deviation, minimum and maximum of the scores were as following, respectively: 49.8, 10.0, 34.0 and 83.3

Diagram 1: study of pools distribution by separation of the energy management degree (light and electricity)

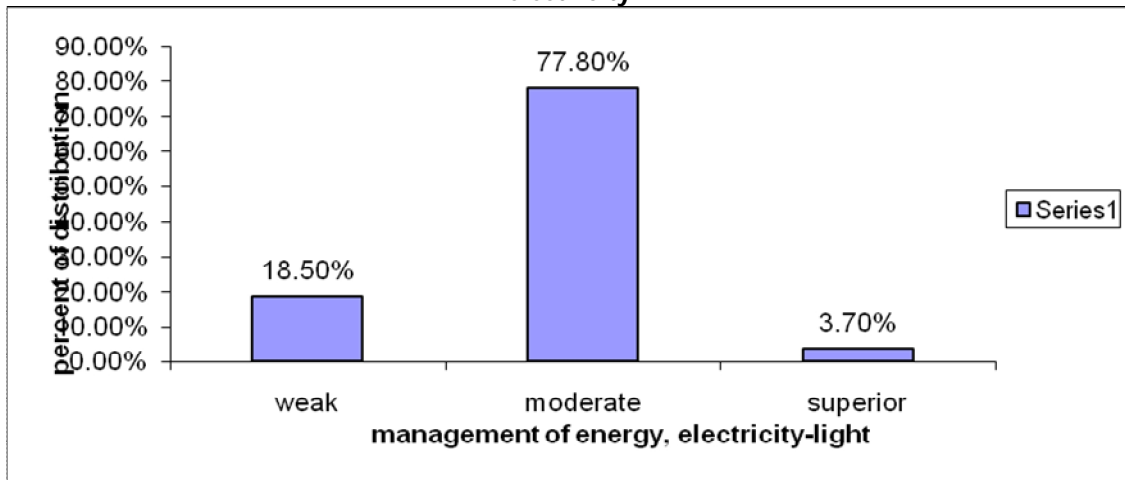


Table 3: study of pools distribution by separation of energy management degree (water)

Management of energy-electricity and light	Distribution	Percent
Very weak	5	18.5
Weak	22	81.5
Moderate	0	0.00
Good	0	0.00
Superior	0	0.00
Total	27	100

According to the analysis of the data in table 3, about 18.5% of the related pools were weak in relation to the water in the section of energy management, but about 81.5% were established at weaker rate. The mean, deviation, minimum and maximum of the scores were as following, respectively: 26.1, 7.9, 3.4 and 34.6

Diagram 2: study of distribution of pools by separation of energy management degree (water)

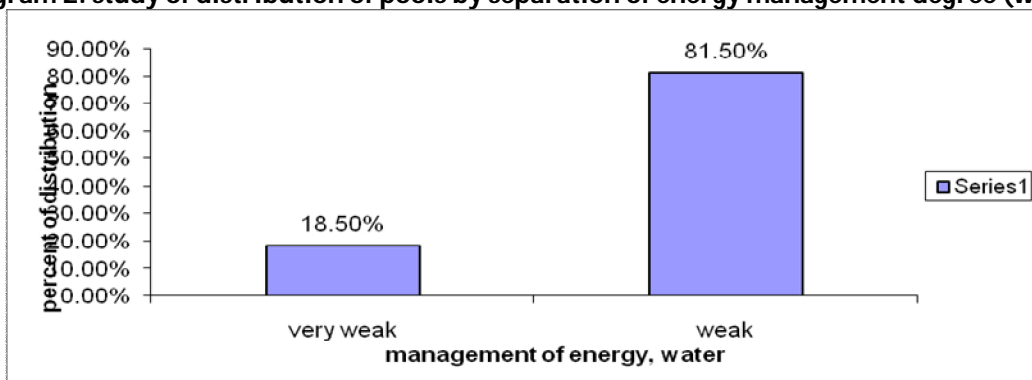


Table 4: study of pools distribution by separation of energy management degree (fossil and gas consumptions)

Management of energy-electricity and light	Distribution	Percent
Very weak	4	14.5
Weak	19	70.4
Moderate	4	14.8
Good	0	0.00
Superior	0	0.00
Total	27	100

According to the analysis of the data in table 4, about 14.8% of the related pools were weak in relation to the fossil consumption, but about 70.4% were established at weaker rate and 14.8 had moderate level of these issues. The mean, deviation, minimum and maximum of the scores were as following, respectively: 28.0, 11.8, 0.0 and 58.7

Diagram 3: study of distribution of pools by separation of energy management degree (fossil and gas consumption)

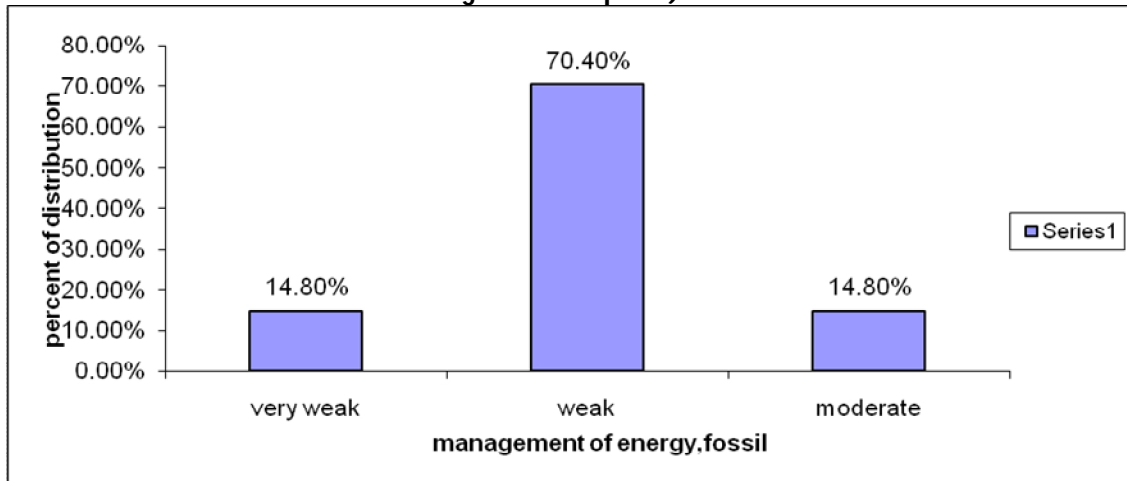
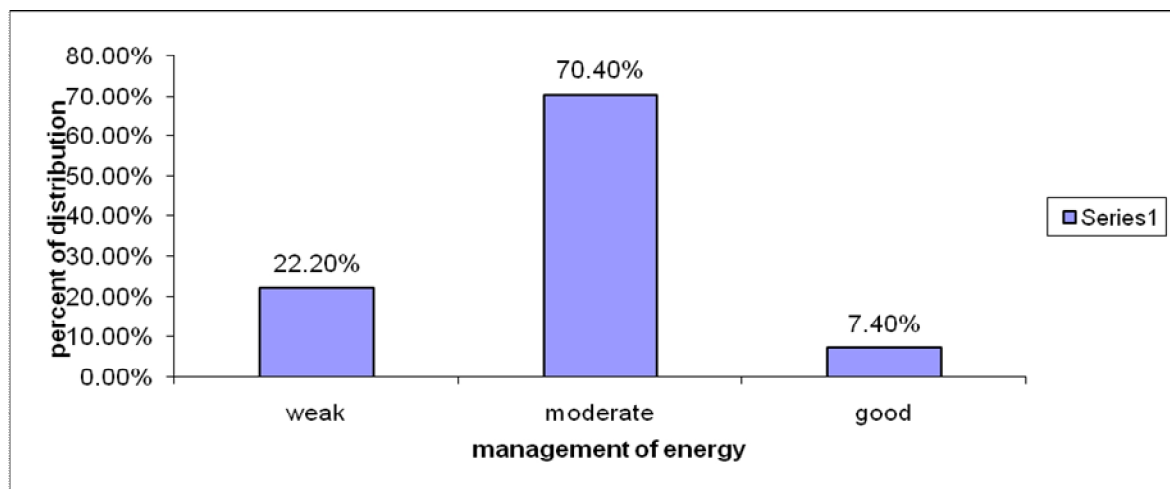


Table 5: study of pools distribution by separation of energy management degree (general)

Management of energy-electricity and light	Distribution	Percent
Very weak	0	0.00
Weak	6	22.2
Moderate	19	70.4
Good	2	7.4
Superior	0	0.00
Total	27	100

According to the analysis of the data in table 5, about 22.2% of the related pools were weak in relation to the energy management, but about 70.4% were established at moderate rate and 7.4% had superior level of these issues. The mean, deviation, minimum and maximum of the scores were as following, respectively: 47.2, 7.5, 33.8 and 62.1

Diagram 4: study of distribution of pools by separation of energy management degree (general)



DISCUSSION AND CONCLUSION

In relation to the light system, the worst system, the control system as the handy system has been applied that it should be applied timer intellectual system according to article 19; these results are coincident with

the research results of [1,3,5] In relation to the windows and buildings' doors in covered pools of Kerman Province, the single-sided glasses with steel frames without sealing were applied. According to Article 19, it should be used two-sided windows with sealed frames; these results are coincident with the findings of [7,5] In relation to the optimization of the water consumption of covered pools of Kerman Province, it is specified that the most traditional common equipments were used in water piping facilitations. According to the instructions of the power ministry, the low-consumption flash tanks, baths and water taps were applied and alarming lights should be installed for the whole dwellers. Today, the taps and sensory baths and low-consumption flash tanks as well as bath tubes should be economically installed in this regard. It should be mentioned that the low consumption of the water can reduce the energy wastes; then, by the application of the reducing instruments of the water, it can prevent a considerable degree of the energy consumption in this case. The obtained results of the present study are coincident with [2,5]. In relation to the energy planning and repairmen section, it is specified that the covered pool managers of Kerman Province do not register and record the degree of energy consumption; and there is no reporting system for the repairing issues and they do not have energy label equipments over their the instruments. However, it is a regulation issue of the Article 19 of the national regulation. In relation to the application of the clean energies particularly the application of the solar energy of the covered pools of Kerman Province does not use this cheap energy resource. The results of the research are coincident with the findings of [4]. Also, in relation to the discussion of energy planning, a one person is responsible for the repair issues with expertise certificate that this kind of person does not exist in Kerman Province swimming pools. The results of the research are coincident with the results of [9]. One of the sections of the energy planning is subjected to the services of the energy equipments of the covered pools that this happens only in the time of technical troubleshooting section. The obtained results are coincident with the findings of [10]. Generally, based on the obtained results from the analysis, the electricity system is very weak in Kerman Province swimming pools and it also is weak in water supply section as well as the fossil consumption section, too. According to the obtained results, the rehabilitation systems can be substituted of these traditional ones potentially. Based on the increase and decrease of the energy consumption and the related reports and their registers and records, it should be prepared a counter for measuring the degree of the energy consumption separately. These managerial affairs should be completed along with a correct planning for the application of potential energy to be able to increase their efficacy in this regard.

REFERENCES

1. Paknezhad Soodabeh Yazdi, A.R. (2009). the correction of public and governmental buildings electrical energy consumption pattern of the country, 7th national conference of the energy
2. Fooladi, A., Mojtehdzadeh, F. (2001). the reduction of warming and cooling and energy consumption of sophisticated buildings along with sealing, Iranian energy efficacy (SABA), ministry of power, Tehran
3. Keikhani, T. (2009). energy rehabilitation in buildings, 7th national energy conference.
4. Mirza Hosseini, M. (2011). The study of energy management status in saloons and covered locations of Kerman Province, college of physical training and sport sciences, Kerman Shahid Bahonar University
5. A collection of legal and optimized approaches of energy consumption in the country; the department of Iranian energy efficacy (SABA), ministry of power
6. Darwish, M., & Tsave Anna, A. (2008). Energy Performance Regulations and Methodologies of Energy Saving in Office Buildings in Southern Europe, A Thesis submitted for the degree of Master of Philosophy, Brunel University.
7. Elaine, M. (2005). Energy -saving and access systems in community sports facilities. Sports colt and www.sportscotland.org.uk.
8. Konstantin, K., Brandl, G., Luncy, L., Kanzian, R. (2009). energy management for Austria, austria energy agency, austria.
9. Kuzgunkaya, E., Yildirim, N. (2010). Pre-Feasibility Study of a Swimming Pool Complex for a University Campus, Proceedings World Geothermal Congress, Bali, Indonesia
10. McMahon, J., Whitehead Camilla Dunham, J., Biermayer P. (2006). Saving Water Saves Energy, Energy Efficiency In Domestic Appliances And Lighting, th International Conference EEDAL, European Commission.
11. Sport e². (2010). intelligent management system to integrate and control energy generation, consumption and exchange for European sport and recreation Buildings.