

A Soft Systems Management Approach to Energy Management and Conservation for the Hotel Industry of Cyprus

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Abstract

The paper describes an attempt to tackle the problem of energy management and conservation of the Hotel Industry of the island of Cyprus utilising the Soft Systems Methodology. Hotel industry is one of the most dynamic industries of the island and contributes heavily towards its national income.

The paper describes all steps of the methodology applied that is: the development of the rich picture, the identification of issues for investigation, the development of conceptual models and the derivation of useful, feasible and culturally acceptable recommendations.

The paper concludes that Soft Systems Methodology is an excellent means for tackling complex problems involving human activity systems and that is certainly suitable for improving problematic situations in energy management and conservation.

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The Development of the Rich Picture

During the development of the rich picture the emphasis was placed on identifying elements of structure, process and climate. As the research progressed there were cases in which certain roles and attitudes of actors had to be modified.

The most important actors in the rich picture are listed below :

- (a) The Cyprus Tourism Organisation (C.T.O)
- (b) The Cyprus Hotel Owners Association
- (c) The Cyprus Hotel Manager Association
- (d) The Department of Energy
- (e) Architects
- (f) Tourists
- (g) Chief Engineers
- (h) Hotel Manager
- (i) Building and Engineering Contractors
- (j) The House of Representatives
- (q) The Electricity Authority of Cyprus

The main issues selected from the rich picture

The most important main issues selected (in no particular order) were the following:

- (a) Energy policy
- (b) Lack of awareness of energy conservation opportunities
- (c) Lack of education and training of persons involved in the design and operation of hotels at all levels.
- (d) Lack of clear line of authority and responsibility for the implementation of energy conservation measures.
- (e) Lack of progressiveness of the financial institutions in their loan policies.
- (f) Lack of energy data and information at all levels.
- (g) Communication problems within hotels and between various actors at all levels.
- (h) Energy management problems in the hotels themselves.
- (i) Parliament and Government conflicts about policy and special group interests.
- (j) Lack of motivation and incentives for the implementation of energy conservation measures.

Relevant Systems Related to the Major Issues

Some of the relevant systems that were developed in order to eliminate main issues were the following:

- (a) A system to form and promote policies on energy use and energy related investments.
- (b) An education system to inform and increase awareness on energy matters.
- (c) A system to establish a centre or a body that will be responsible for the efficient use of energy.
- (d) An information system for the collection, analysis and provision of regular and ad hoc information on energy matters to all parties concerned.

- (e) A system to promote new methods of financing for energy conservation investments.
- (f) An information system to inform relevant parties within a hotel on matters related to energy efficiency and provide a channel to ease communication difficulties.
- (g) A system to establish and facilitate links between isolated parties concerned with energy conservation.
- (h) A management system to plan and organise energy efficiency activities within a hotel.
- (i) A system to encourage energy conservation through the provision of incentives.
- (j) A system to support research and development in relevant technologies for the Cypriot Hotel Industry

The Primary task and the CATWOE mnemonic

The primary task of the research was defined as follows:

"To understand, manage and improve the energy use in the Hotel Industry of Cyprus".

After numerous iterations, the following root definition for the primary task relevant system was chosen: "A global and ongoing system to understand, manage and improve the energy use in the Hotel Industry of Cyprus for the benefit of the economy and the country".

The multiple levels of problem analysis required, were immediately apparent.

The "CATWOE" mnemonic (according to P. Checkland) for the primary task root definition was satisfied as follows:

C (customer): Individual hotels, the hotel industry of Cyprus and the economy of the island (3 different levels).

A (actors): All actors in the problem situation shown in the rich picture: Hotel managers, owners, engineers, guests (4 different levels).

T (transformation): Understand, manage and improve energy utilisation processes with a view to greater effectiveness and economy (at each major level) - The need met.

W (weltanschauung): Cyprus is too dependent on foreign suppliers and at the mercy of oil price variations. However it has certain energy resources of its own (such as energy conservation) and the engineering skills to develop effective energy conservation devices and means (2 different levels, national and local).

O (Owner): Government Energy Department on behalf of all parties concerned and Hotel engineers charged with energy economy on behalf of the owners.

E (Environment): Attitudes, abilities, capability to invest in proposed measures, legislation, regulations.

The conceptual model of the primary task

This stage involved the development of the conceptual model based on the primary task. All relevant systems were included in this conceptual model. The first level of this conceptual model is shown in Figures.

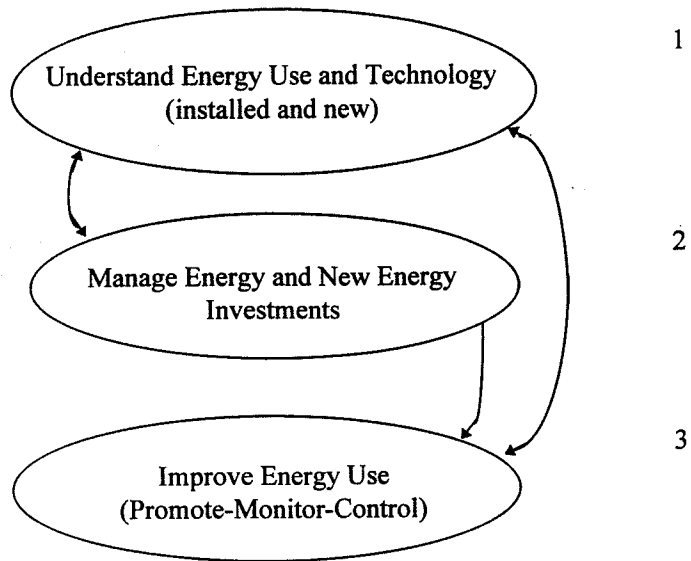


Figure 1: Primary task based conceptual model (Level 1)

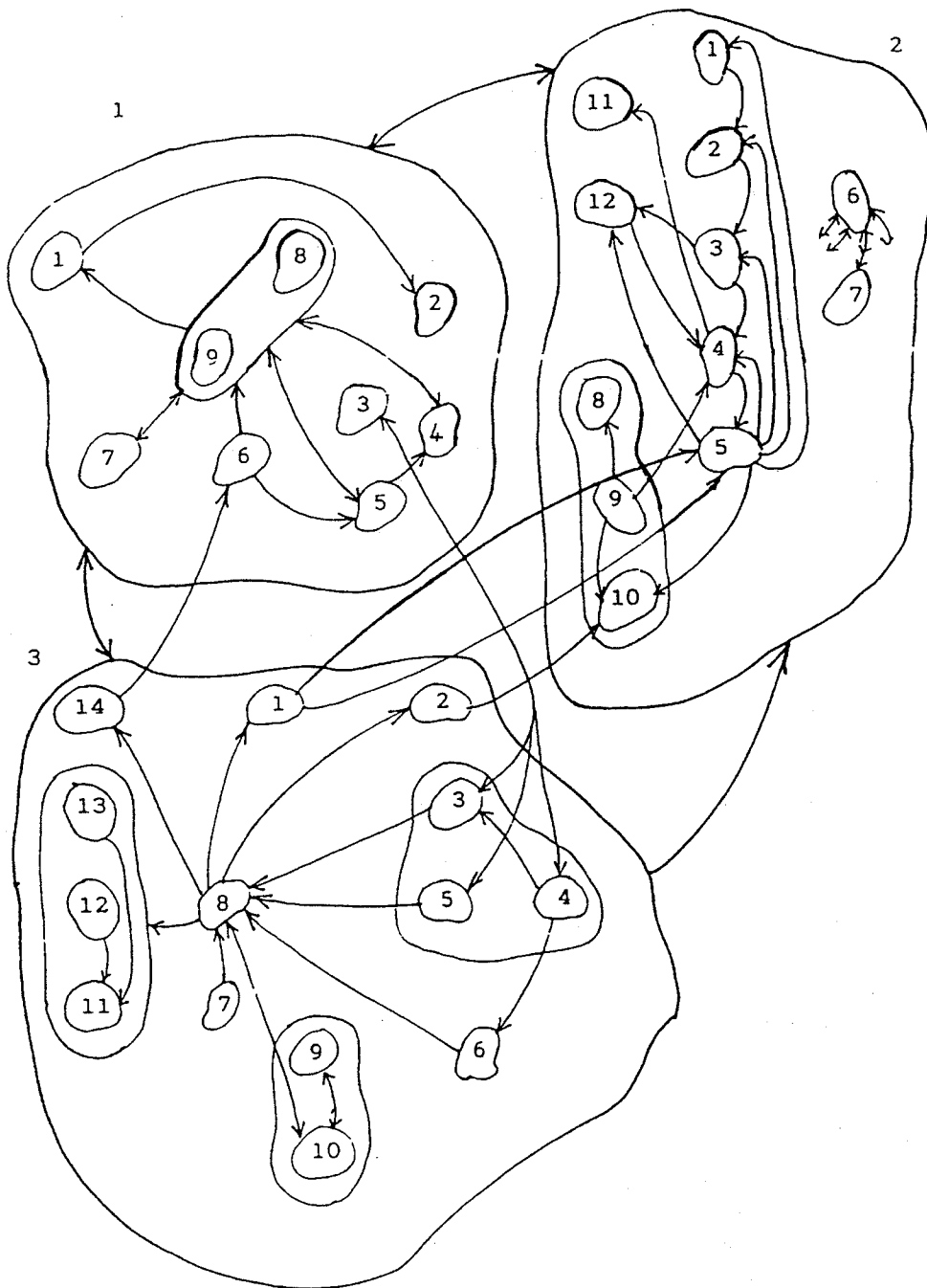
The various activities shown in figure 2 are listed below:

1. UNDERSTAND ENERGY USE AND TECHNOLOGY

1. Train
2. Increase Awareness
3. Analyse Information
4. Distribute Information
5. Gather Information
6. R & D
7. Provide Information
8. Aggregate information on energy use
9. Develop data base

2. MANAGE ENERGY USE AND TECHNOLOGY

1. Measure energy use
2. Record energy use
3. Analyse energy use
4. Monitor energy use and new investments
5. Follow guidelines and legislation
6. Communication with relevant people
7. Motivate people
8. Evaluate various technologies
9. Introduce optimum energy "mixes"
10. Invest in new technology
11. Control energy use
12. Set targets



3. IMPROVE ENERGY USE

1. Introduce guidelines for measuring, targeting and monitoring
2. Provide incentives for energy conservation
3. Monitor international developments on energy use and cost
4. Monitor energy use in industry and economy
5. Monitor energy cost in hotel industry
6. Evaluate benefits for industry and economy
7. Consider/monitor other benefits
8. Propose system changes
9. Establish responsibilities for energy conservation
10. Form policies on energy conservation and use
11. Introduce legislation and regulations
12. Propose legislation to control practising of related professions
13. Propose and canvas legislation and regulations related to energy use
14. Encourage R & D of relevant technology

The comparison stage

The final conceptual model was set aside the real situation (as presented in the rich picture) in order to identify differences and similarities between the activities of the model and the real problem situation. Based on the results of the comparison stage the research proceeded to the next stage. This stage involved focusing on recommendations.

Furthermore, an additional stage defined as "guidelines for recommendations" was also included for each and every case. This stage was considered necessary in order to provide practical guidelines for the persons that would attempt to implement these recommendations.

Developing Recommendations

Following the comparison phase of the Soft Systems Methodology detailed recommendations were developed for each major category shown below. The five major categories with the relevant subcategories for which recommendations were derived are the following:

A. CHANGES IN POLICY

1. Energy pricing policy
2. Energy conservation policies
3. Infrastructure policy (see D below also)
4. Codes, regulations and standards
5. Establishment of an Energy Conservation and Management Fund (ECMF)
6. Introduction of R & D to establish cases for systemic change
7. Introduction of legislation for the practising of the engineering profession

B. CHANGES IN ATTITUDE

1. Increase and promote awareness for energy conservation
2. Promotion of good communication
3. Provision of incentives

C. CHANGES IN ATTITUDE

1. Introduction of workable management information systems
2. Introduction of performance review and target setting techniques
3. Application of quantitative design modelling approaches
4. Remodeling of existing technology
5. Adoption of new technologies and energy conservation measures

D. CHANGES IN STRUCTURE

1. Establish Centre for collecting and disseminating information
2. Establish Training Body for the needs of the Hotel Sector

E. EDUCATION AND TRAINING NEEDS

1. Training of the Staff of the Energy Unit
2. Training of architects and engineers
3. Training of hotel staff at all levels
4. Training of energy consultants

Conclusions:

The research investigated the problem of energy management and conservation in the hotel sector of Cyprus; one of the most important and most dynamic sectors of the island's economy. The methodology of the Soft Systems Approach was considered as the most appropriate method for tackling the complexities involved in the problem situation. This was extended by the utilization of interactive simulation modelling in cogeneration supply and stochastic demand situations.

(1) It has been demonstrated that the adoption of a systemic approach for tackling complex problems is well suited for problems of energy management and conservation.

The use of the Soft Systems methodology approach employed in this research proved to be an excellent means of both understanding the problem situation of the Hotel Industry of Cyprus and proposing feasible and desirable changes for its improvement. No hesitation should therefore exist in applying the methodology for the investigation of the energy problems of other micro sectors of the economy.

(2) Existing problems in the energy situation investigated are systemic by nature. As a result there is always a need for systems interactive models for preparing feasible economic solutions. The reduction of current energy consumption level of the hotel sector by 10-20% through the applications of the systems work is both possible and realistic.

(3a) There is a real need for changing the attitude of all "actors" of the system towards the issue of energy management and conservation.

(3b) The detailed investigation of the research points to the fact that there is a pressing need for introducing a new energy management infrastructure at National level and below. This includes both changes in the overall Government system responsible for energy, and the hotel industry itself.

(4) There is a need to modify existing energy policies and adopting new more efficient policies and strategies. This conclusion concerns energy policies and strategies at the macro economic level, the hotel industry level and even at the level of individual hotels and the managerial staff.

(5a) There is a need for further investigation of the energy supply and demand patterns of the Hotel industry of Cyprus in order to arrive to accurate cost effective proposals for optimum energy supply mixes in individual hotels or small clusters of hotels.

(5b) Considerable energy savings can be realised by modifying user habits and hotel energy demand patterns (reducing energy consumption and peak electricity demand) through improved utilisation and management of installed technology, There is also good scope for energy conservation through both remodelling existing technology and introducing new energy efficient technology. The sequence of progression of these stages is also important to achieving maximal benefits.

(6) There is an immediate need for the provision of training and education of all human actors involved in the problem situation. This fact has been well demonstrated from the analysis of the questionnaires of the major "actors" of the hotel industry (chief engineers, hotel managers) and from the discussions held with hotel staff, architects, engineers, hotel owners and energy consultants.

(7) A general sampling of the energy demand of the economy, necessitated by the systemic nature of the research, proved the presence of inappropriate energy management practices and planning in several representative industries. This fact underlines the need of undertaking systemic investigations of all other energy consuming sectors prior to major energy planning decisions (such as the construction of a new power plant). It is believed that there is good scope of energy conservation in other sectors, of a magnitude comparable to that of the hotel sector examined.

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