

Department of Civil Engineering, IIT Madras

Prof.M.S.Mathews
Chairman, Project Evaluation Committee

17.4.2007

Dear Colleagues and Students,

Sub: Format for B.Tech Project report and other requirements

Please find enclosed the standard format for preparation of B.Tech project report. The students are required to strictly follow the procedure specified in the document enclosed herewith. The project report, which does not adhere to this specification, will attract reduction in marks as decided by the committee. The overall requirements are as follows:

Font : Times New Roman Font Size : 12 Line spacing: Double
Left Margin : 30 mm (~1.25") Right Margin : 25 mm (1")

Number of copies of project report

Students with single Guide	5 copies (Guide, Common examiner, Divisional representative, External examiner, student copy)
Students with two guides	6 copies

Schedule for submission and viva-voce

Last Date for submission of Project (at HoD's Office)	9 th May 2007 4.30 p.m.
Last date for conduct of Viva-Voce	18 th May 2007
Departmental Schedule for conduct of Viva-Voce (Schedule for each Division will be announced shortly)	14 th -18 th May 2007
Students who have to work more on their Project Last date for submitting request to for extension of project submission date. Such students have to forward their requests, stating the reasons to Deputy Registrar (Academic) recommended by the guide through HoD. Copies of these letters may be given to HoL and Chairman (Prof. M.S.M)	20 th April 2007
Last date for Submission of project report with formal approval	30 th June 2007
Fees to be paid by the student seeking extension for submitting project work	Rs.1,500
Presentation time allotted to each student	20 minutes
Question and answer session for each student	10 minutes

Note: Students are requested to load their presentation before the start of the viva. Ensure that power point presentations are clear and free from unnecessary animations.

Sincerely

M.S.Mathews

**ENERGY RESOURCE ALLOCATION TO URBAN HOUSEHOLDS:
AN INTEGRATED GOAL PROGRAMMING – AHP MODEL**

A Project report submitted in partial fulfillment of the requirements for the award of the

degree of

Bachelor of Technology in Civil Engineering

By

Name of the Student



**BUILDING TECHNOLOGY AND CONSTRUCTION MANAGEMENT DIVISION
DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY MADRAS**

MAY 2007

CERTIFICATE

I (name of the student) hereby solemnly affirm that the project report entitled <Project Title, bold font>, being submitted by me in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Civil Engineering, to the Indian Institute of Technology Madras, is a record of bonafide work carried out by me under the guidance of <Guide's name(s)>. The work reported in this report in full or in part has not been submitted to any University or Institute for the award of any degree or diploma.

Place :

<Signature of student>

Date:

<Signature of guide>

<Signature of Head of the Department>

<Name and Designation <bold>>

<Name and Designation <bold>>

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GLOSSARY

The following are some of the commonly used terms in this report:

- Biogas Electricity** This refers to the electricity generated by feeding biogas in a dual - fuel mode.
- Criterion** This refers to the yardstick on which the performances of different alternatives are evaluated.
- Combination** When an energy resource is employed for satisfying the demands of a specific energy end-use, it becomes a combination. For example, coal-cooking is a combination. Such combinations form the decision alternatives in this thesis.

CHAPTER 1

ENERGY POLICY ISSUES, MODELS AND METHODOLOGIES

1.1 GENERAL

The indispensable role of energy in national development has been aptly demonstrated, in the last two decades, by the rapid rise in energy prices, the effects of energy shortages and disruptions, and the resultant problem in trade balance and reduced economic growth (Commoner, 1974). The energy sector is capital intensive accounting for about 30% of the Union budget in India (Economics Survey, 1992). Being the largest service sector, any policy changes made in it such as price changes, investment pattern, research and development etc., affect the entire economy. Energy has exclusive linkages with other sector of the economy and hence it should not be viewed in isolation but as a subsystem of the overall energy-economic-environment system (Sonnenblum, 1978); Odum and Odum, 1981). Energy has been recognized as a factor of production similar to land, labour and capital (Grivoyannis, 1983). Often, energy recovery and conversion processes account for a significant portion of environmental problems such as air and water pollution, land use, and generation of solid wastes. Planning and policy specification in the energy sector should reflect these linkage to serve national objectives. Energy policy should also consider economic, environmental and societal issues such as equity, poverty, energy conservation, long term availability of resources, technological excellence employment generation, self reliance, environmental protection, etc. (Cohen, 1978; Maillet, 1987).

In addition, energy can play role in solving problem peculiar to developing economics such as India's, viz. the rural-urban dichotomy, balanced economic development, foreign exchange requirements and other (Reuter and Voss 1990).

1.2 ENERGY POLICY- THE MAIN ISSUES

“Public policy analysis can be defined as an effort aimed at obtaining and synthesizing pertinent information in order to evaluate the police alternatives and determine the ‘best’ policy’.

1.2.1 Survey Articles

One of the earliest surveys on energy policy models was carried out by Searl (1973). A number of survey articles have been published since then by Hogan(1975), Shaprio (1975), Chapman (1976), Hoffman and Wood (1976), and others.

1.2.1.1 Analysis of data obtained in literature

It is the responsibility of those managing the process to find and crimate the common cause to bring about an improvement in process (Table 2.1). Lack of understanding of these concepts by management will lead to misinterpretation of the patterns of variation. Some of the losses resulting from misinterpretation are (Notan and Provost,1990):

- blaming people for problems beyond their control,
- spending money for new equipment when they are not needed,
- wasting time looking for explanations of a perceived trend when nothing has changed, and
- taking other actions which it would have been better to do nothing.

Table 2.1 Responsibility for Variation (Adapted from Francis and Gerwels, 1989)

Type of variation	Frequency	Characteristic	Action Needed	Responsibility
Common cause	High (>90%)	Fault of the system	Fundamental system change	Management
Special cause	Low (<10%)	Traceable to an assignable cause	Find the source and take preventive action	Local work force

When a process has only common cause affecting the outcomes, it is called a stable process and is said to be in a state of statistical control. A stable process does not necessarily mean that the product produced or service provided is meeting specifications or is satisfactory. It only means that the cause system for variation remains constant over time and the outcome is predictable. In an unstable process the magnitude of variation from one period to the next is unpredictable. Some of the advantages of a stable process are (Deming, 1986):

1. The process has an identity: its performance is predictable. It has a measurable and communicable capability.
2. Costs are predictable.
3. Productivity is at a maximum and costs at a minimum under the present system.
4. The effects of changes in the system can be measured with greater speed and reliability. Without statistical control it is difficult to measure the effect of a change in the system.
5. The soundest way to cut inspection is through getting the process into control (Burr, 1976).

Shewart developed the control chart as a tool to separate special causes from common causes. It consists of three statistically based lines: the centerline (CL), an upper control limit (UCL), and a lower control limit (LCL). Test set up for sorptivity measurement is presented in Figure 2.1.

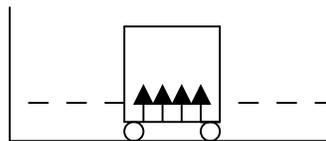


Fig. 2.1 Test set up for sorptivity measurement

Data for the sample statistic (or quality characteristic) is divided into subgroups. The subgroup should be selected in a way that makes each subgroup as homogenous as possible and gives the

maximum opportunity for variation from one subgroup to another. Often, especially for variables control charts, the sub grouping is based on the order in which the product is produced.

In general, 3-sigma limits are used for the UCL and LCL. As a general model, the 3-sigma limits can be expressed as (Grant and Leavenworth, 1988)

$$UCL_y = E(y) + 3 \sigma_v \quad (2.1)$$

$$CL_y = E(y) \quad (2.2)$$

$$LCL_y = E(y) - 3 \sigma_v \quad (2.3)$$

REFERENCES (Extracted from Author Guide - ASCE)

To cite sources in the text, use the author-date method; list the last names of the authors, then the year. The formats are as follows: one author—(Smith 2004); two authors—(Smith and Jones 2004); three or more authors—(Smith et al. 2004).

Prepare a reference section listing all references alphabetically by last name of the first author. For anonymous reports and standards, alphabetize by the issuing institution. Double-space the reference section. Below are samples of properly formatted and complete references:

Book

1. Feld, J., and Carper, K. (1997). *Construction failure*, 2nd Ed., Wiley, New York.

Journal paper

2. King, S., and Delatte, N. J. (2004). "Collapse of 2000 Commonwealth Avenue: Punching shear case study." *Journal of Performance of Constructed Facilities*, ASCE, 18(1), 54-61.

Conference and Symposia paper

3. Fwa, T. F., Liu, S. B., Teng, K. J. (2004). "Airport pavement condition rating and maintenance-needs assessment using fuzzy logic." *Proc., Airport Pavements: Challenges and New Technologies*, ASCE, Reston, Va., 29-38.

Web Pages and On-line Material:

4. Burka, L. P. (2002). "A hypertext history of multi-user dimensions." *MUD history*, <<http://www.ccs.neu.edu>> (Dec. 5, 2003).

Unpublished Material: Unpublished material is not included in the references. It may be cited in the text in the following forms: (John Smith, personal communication, May 16, 1999) or (Jones et al., unpublished manuscript, 2002). As an exception to the rule, articles that are accepted for publication may be included in the references as follows: Gibson, W. (2003). "Cyberspace: The postmodern frontier." *J. Comp. in Fiction*, in press.