Electricity Generation Inc. Company
Bangladesh Power Development Board
United States Energy Association

Maintenance Management System Project

Phase I

Project motivation

- EÜAŞ is a state owned company producing half amount of the electricity consumed in Turkey
- A strong and belated need for a systematic approach for bolstering maintenance operations (Breakdown, Periodic, Predictive and Rehabilitation)
- Frequently occurring equipment malfunctions and production losses, debilitating availability
- Insufficient and inefficient predictive maintenance technology use
- Challanges both in finding qualified staff and quantity
- Working Enviroment improvement needs
- Executive management’s endorsement verdict about MMS project

How did the project get started?

- A project working group was formed in a balanced matrix organization and Co-location technique.*

- A Quick Start: Project group studies focused on maintenance and project management

* Co-location [Technique]. An organizational placement strategy where the project team members are physically located close to one another in order to improve communication, working relationships, and productivity.PMBook Guide forth edition, page 429.

An “Organization “ is
a group of coordinated
specialized persons with a
common goal

Nurturing Project Management Approach

- Some of the project methods revised on eve of Phase I
- PMI 2000 which is a deep-seated approach was used in Phase I studies

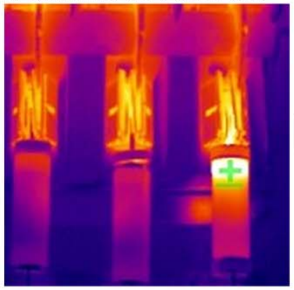
Project Management Institute

- Integration Management
- Scope Management
- Time Management
- Cost Management
- Quality Management
- Human Resoruce Management
- Communications Management
- Risk Management

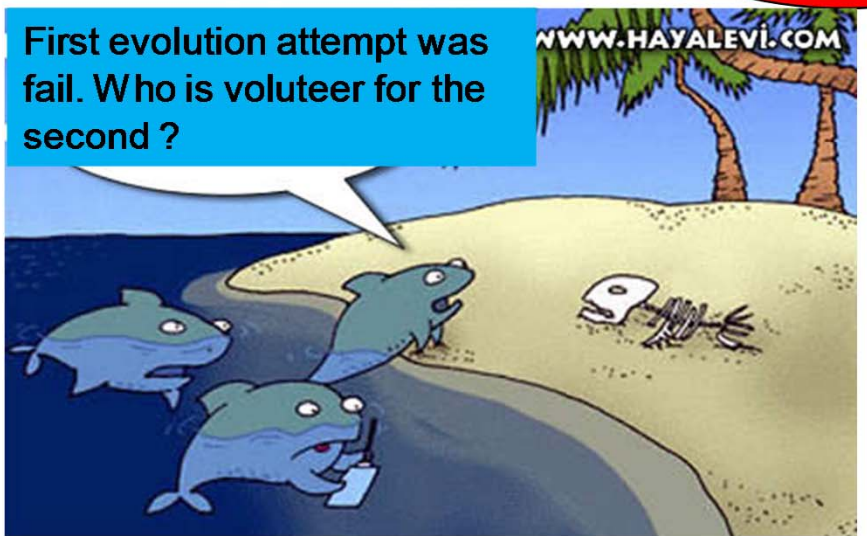
Evolution of Project Content

Computer Software

Predictive Maintenance

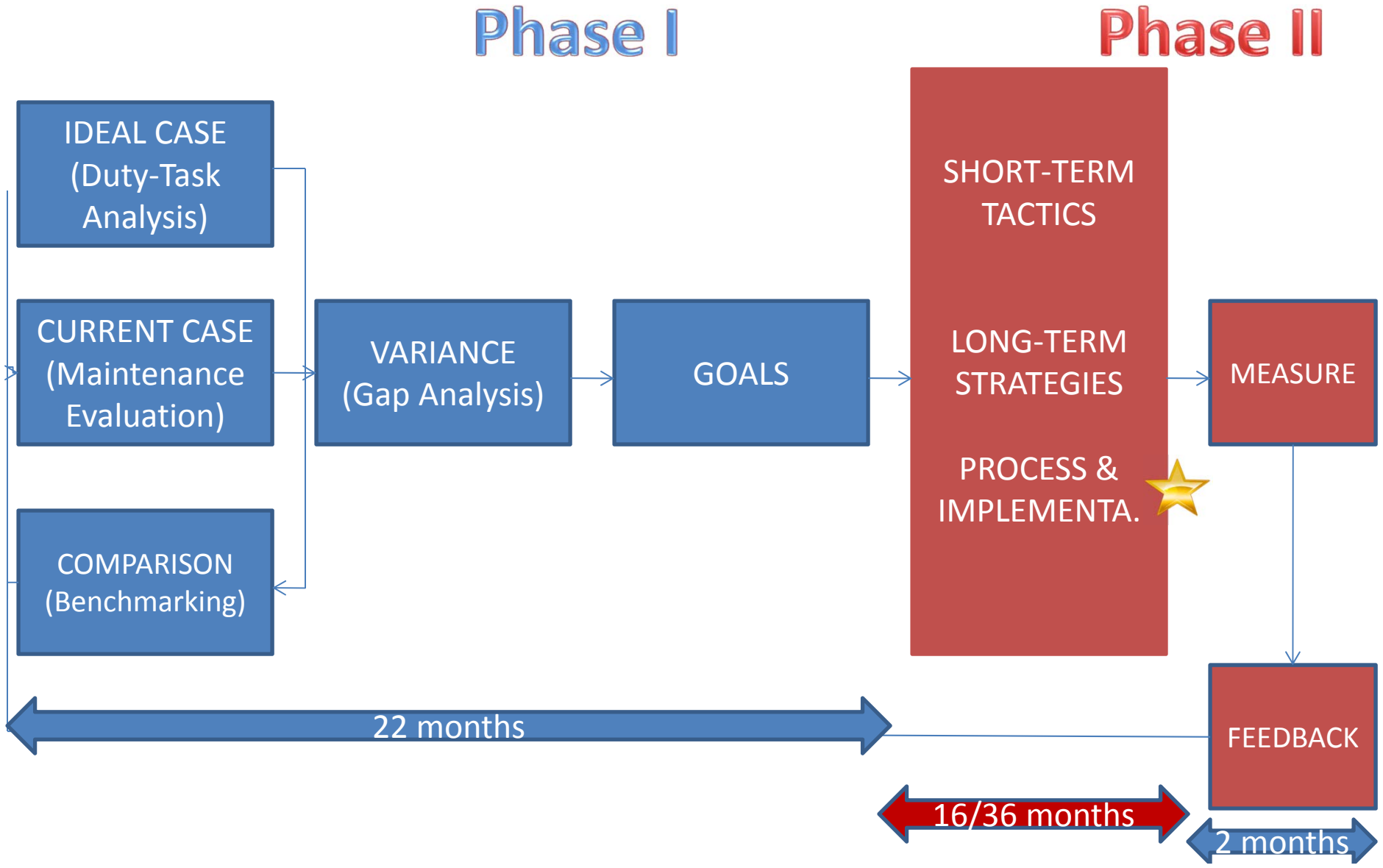


Maintenance Management System



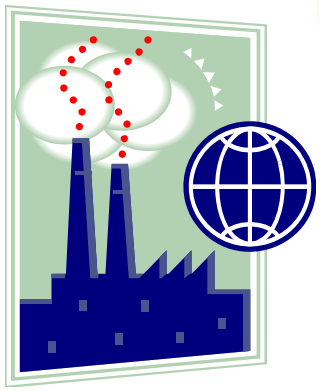
January 2007

Standart Business Improvement Process



Ideal (Duty Task Analysis)

- Internet
- Books and articles
- Personal contacts with retired and staunchly veteran staff
- Company presentations
- Private Sector Analysis



FIRMS AND COMPANIES

- **ABB**
- ALESTA TEKNOLOJİ
- ANEL ŞİRKETLER GRUBU
- ARTESİS
- BGS BİLİŞİM
- BİMSER
- BOĞAZİÇİ YAZILIM
- BOT ŞİRKETLER GRUBU
- **INSPARK**
- **MAPCON**
- **MITSUBISHI**
- **TETRA ENGINEERING**
- TEPUM SİGMA
- TOPAZ
- ZORLU

International Companies

Private Sector Analysis

Final Report

-BOOK-

Fundamental Approaches in Maintenance Management System

CHAPTERS

1- Introduction and Fundamental Concepts,
2- System Management,
3- Maintenance Management,
4- Maintenance Management Approaches,
5- Maintenance Management Approaches in Turkish Private Sector,
6- The Role of Computer in Maintenance Management,
7- Inventory, Stock and Procurement Management,
8- Human Resources and The Role of Training in MMS,
9- Conclusions.

Current (Maintenance Evaluation)

Analyzing of EÜAŞ's Power Plants:

Atatürk Hydroelectric (2405 MW)
Berke Hydroelectric (510 MW)

Bursa Natural Gas Combined Cycle Power Plant (1432 MW)

Afşin Elbistan-A (1355 MW)
Soma (1034 MW)
Seyitömer (600 MW)
Kemerköy (630 MW)

Current (Workshops and Surveys)

- On 6-7 June 2007 a workshop is carried out in Ankara (46 staffs participated from our facilities).
- Several questionnaries and presentations performed
- Delphi method* is used to clarify the view of staff in maintenance originated problems.

*Delphi Technique [Technique]. An information gathering technique used as a way to reach a consensus of experts on a subject. Experts on the subject participate in this technique anonymously. A facilitator uses a questionnaire to solicit ideas about the important project points related to the subject. PMBook Guide forth edition, page 432.

Current (Survey Application)

Chapter	Scoring Weights	Answer Score	Rating Score
1- Personal information who is responsible from survey	**2.14**	**40%**	**60%**
2- General Information	**2.34**	**40%**	**60%**
3- Outage Information	**6.41**	**30%**	**70%**
4- System Management Information	**10.17**	**17%**	**83%**
5- Maintenance Management Information	**7.93**	**18%**	**82%**
6- Maintenance Planning and Coordination	**7.63**	**20%**	**80%**
7- Maintenance Data	**7.22**	**12%**	**88%**
8- Maintenance Organization	**7.32**	**10%**	**90%**
9- Corrective Maintenance and Archiving	**5.70**	**6%**	**94%**
10- Cost of Maintenance Information	**7.73**	**13%**	**87%**
11- Periodic and Predictive Maintenance Status	**8.95**	**16%**	**84%**
12-Equipments' Information for Periodic and Predictive Maintenance	**6.31**	**14%**	**86%**
13- Human Resources	**3.76**	**49%**	**51%**
14- Root Cause Analysis	**8.95**	**30%**	**70%**
15- Other Technical Issues	**7.43**	**30%**	**70%**

The survey was conducted to 16 Thermal Power Plants and 27 Hydro Power Plants.

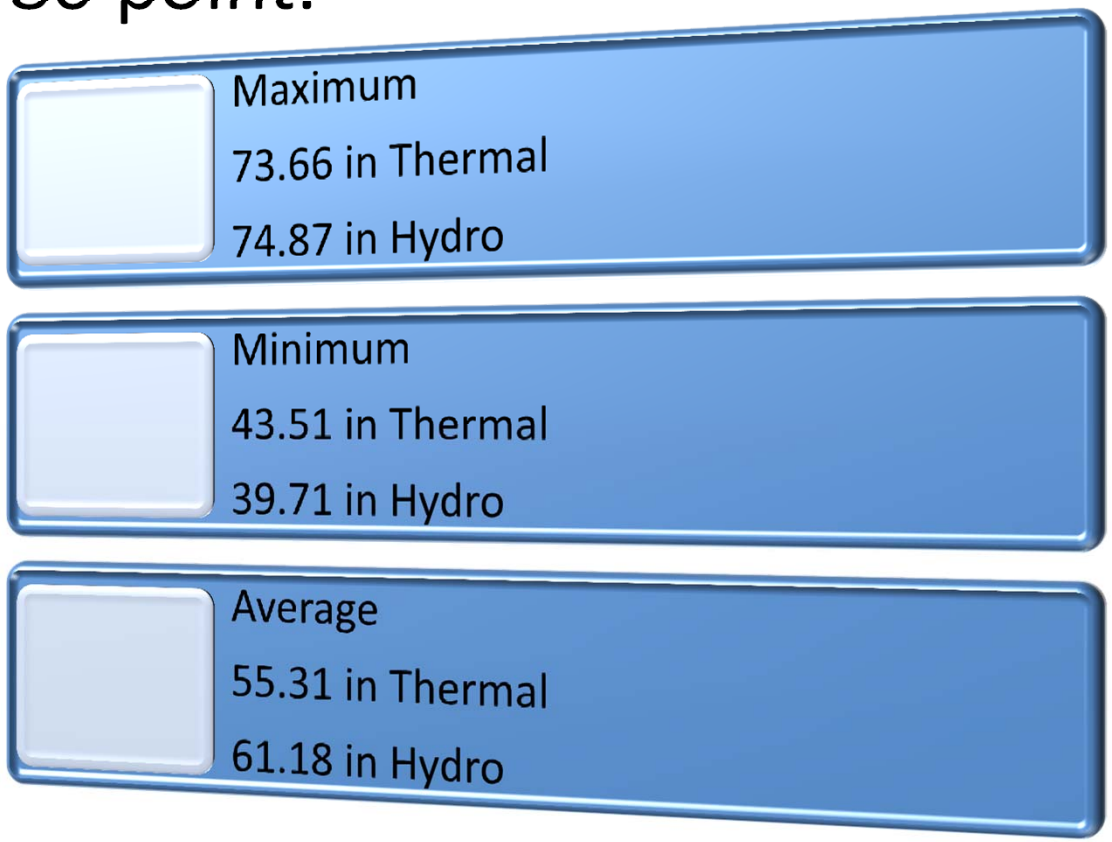
Minimum score that can be taken from survey is 20.40

Maximum score that can be taken from survey is 99.99

Ample Score for MMS was determined as 80.00

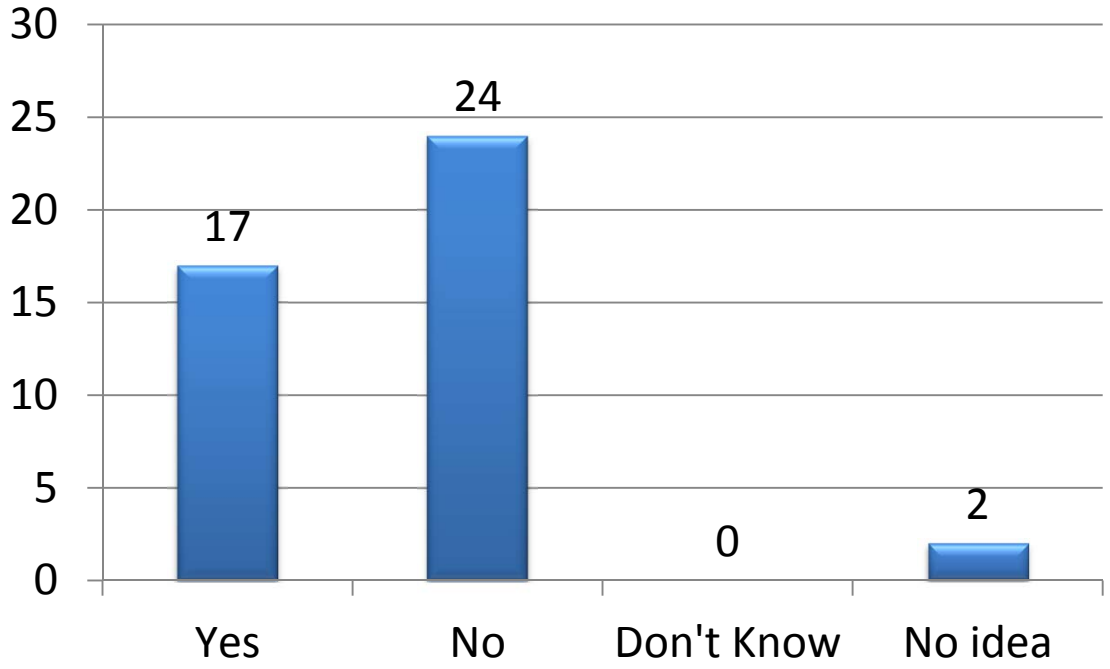
Result

None of the thermal power plants and hydro power plants could passed the acceptable limit of 80 point.



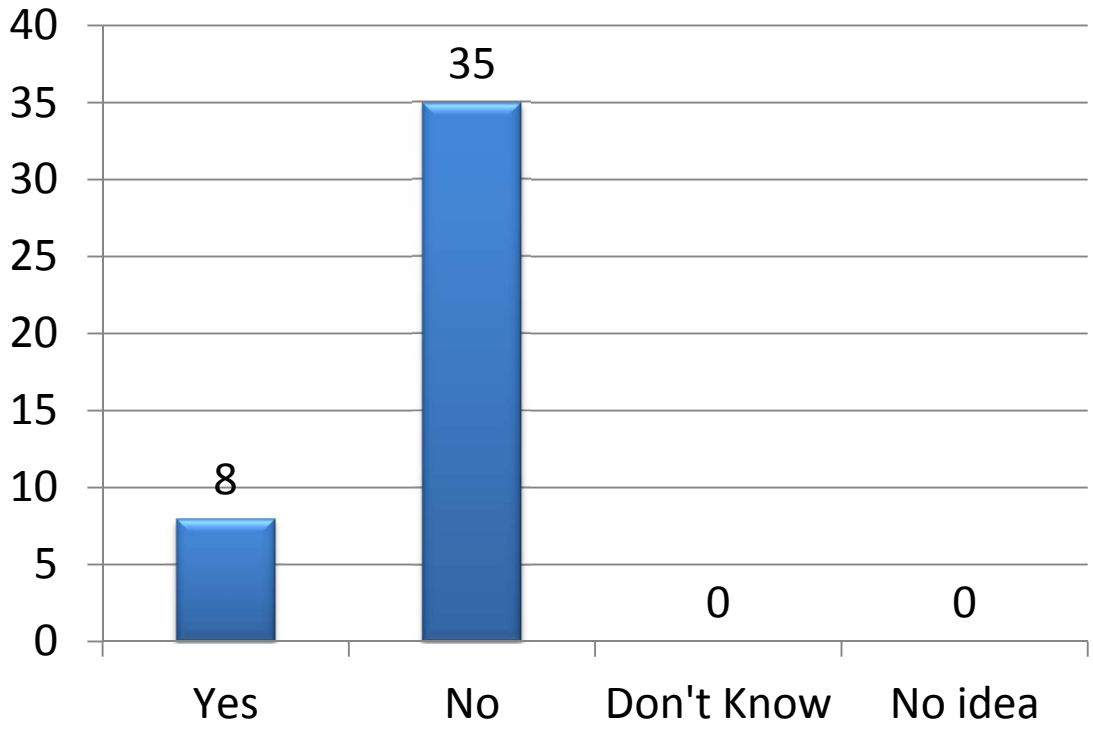
Sample Results

Question: Is there any predetermined measurable goal or target for maintenance?



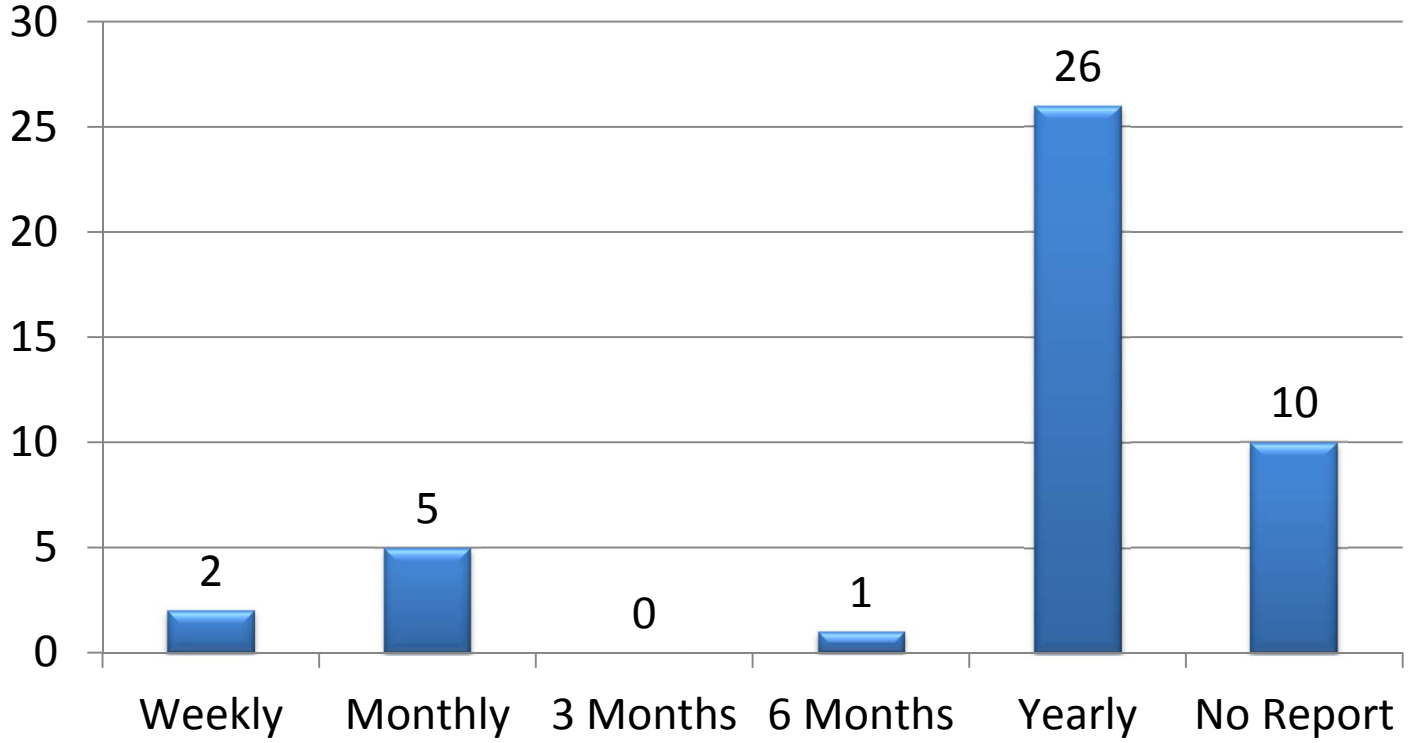
Sample Results

Question: Do you use a software to organize your maintenance activities?



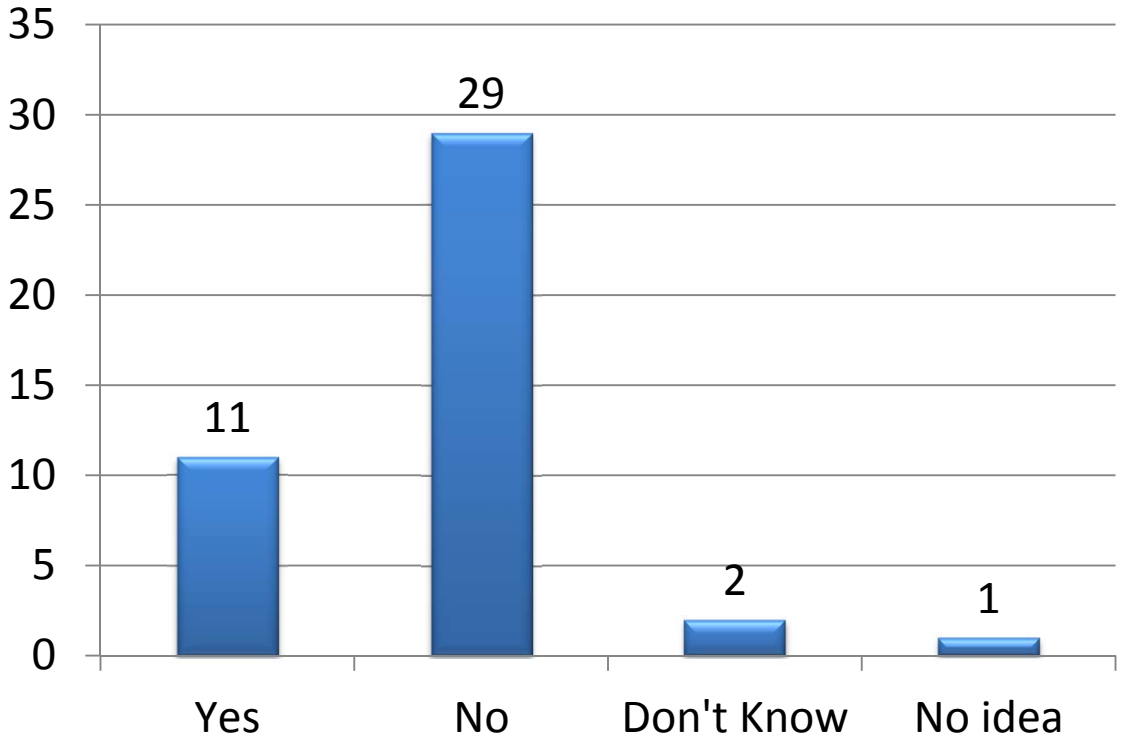
Sample Results

Question: How often do you report maintenance peformance results to EÜAŞ's executive management?



Sample Results

Question: Are you writing labor durations and costs on the work order forms?



Final Report
Current Case Analysis Report

Gap Analysis Survey

We conducted another special survey, Gap Analysis Survey, to the participants of workshop that was carried out on 5-6th of June 2011. We offered 12 options for solution of maintenance problems.

1. CMMS
2. Increasing number and quality of trainings for engineers and technicians
3. Salary application with respect to responsibility and risk
4. Automation in power plants
5. Independent predictive maintenance teams.

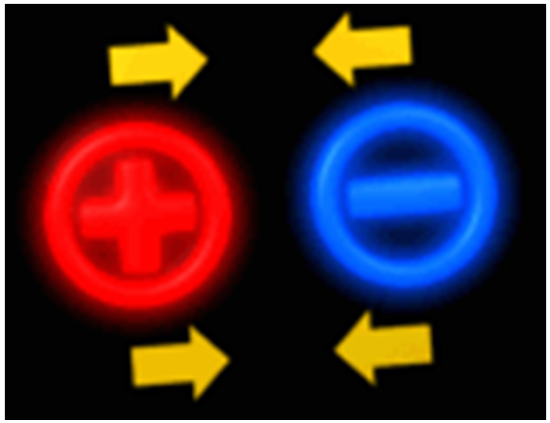
Gap Analysis

- Ideal Case

We know what is ideal after ideal analysis case

- Current Case

We know what “we are” after current analysis case



Gap analysis

Now we could compare these two to determine our gaps…

Gap Analysis

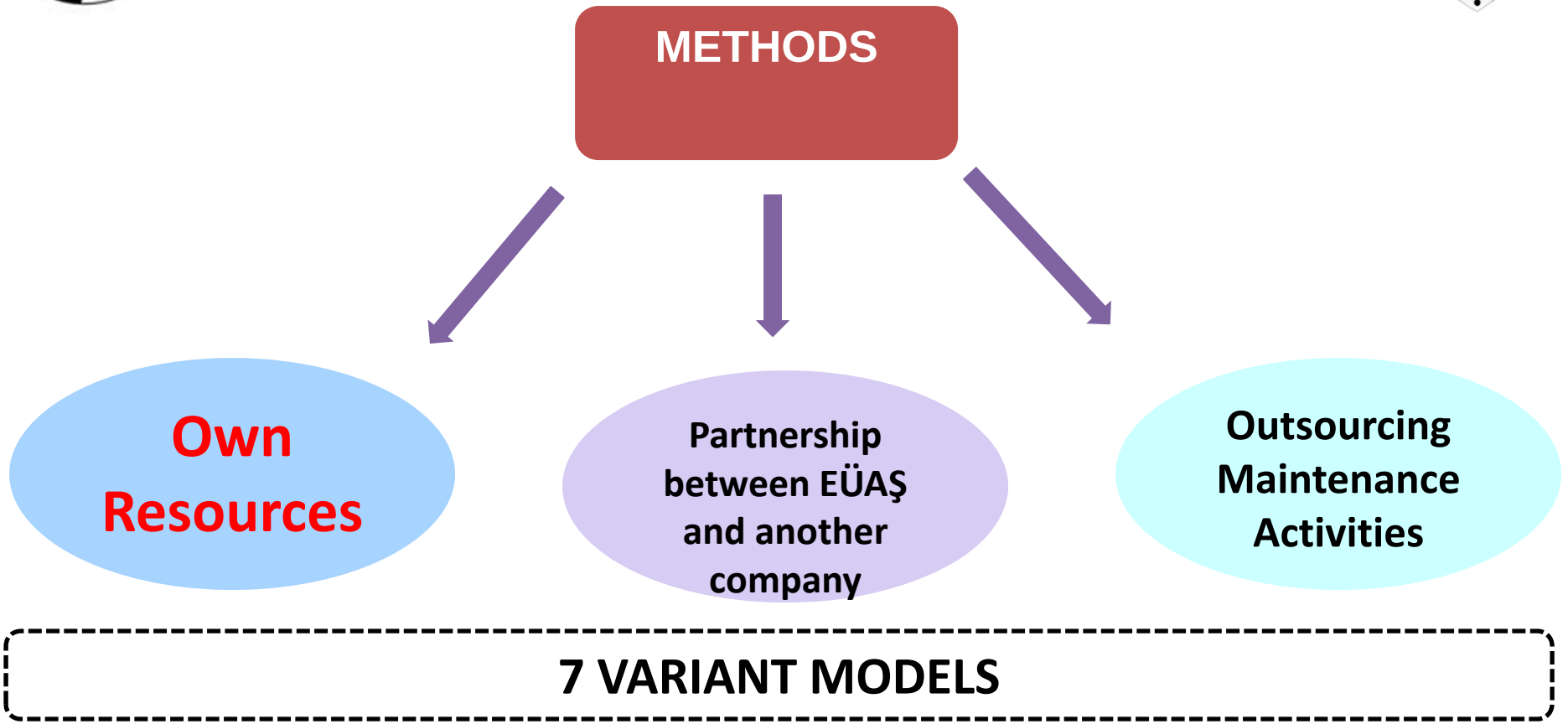
- 8 Main Headings
  - ❑System Management
  - ❑Maintenance Inventory
  - ❑Maintenance Aprroach
  - ❑Maintenance Data
  - ❑Preventive &Predictive Maintenance
  - ❑Computerized MMS
  - ❑Storerooms & Proc.
  - ❑Human Resource and Training

- Each coded & categorized
  - ❑A01…….A17
  - ❑B01…….B17
  - ❑C01…….C09
  - ❑D01…….D11
  - ❑E01…….E17
  - ❑F01…….F05
  - ❑G01…….G08
  - ❑H01…….H17

Importance
Hardness Level
Time Requir.
Consultancy
Budgeting
Pilot Study
Related Depart.
Problem Solution

= Total of 101 gaps

HOW TO ELIMINATE THESE GAPS?



7 VARIANT MODELS

PROBLEM SOLUTION MODELS

- Operating and Maintenance Outsourcing
- Full Maintenance Service Outsourcing
- EÜAŞ-Company X Partnership Full Service Outs.
- EÜAŞ Centralized Maintenance
- EÜAŞ Local Maintenance
- Machinery and Equipment Based Maintenance
- Work Breakdown Based Maintenance

MODEL ANALYSIS

Each model examined with respect to

- Definition,
- Advantage and disadvantges,
- Legal Analysis,
- Financial Analysis,
- Technical Analysis,
- Social and Political Analysis,
- Risk Analysis,
- Activation Plans,
- Organization Chart,
- Conclusion and Evaluation

Strategy Document

- It is a document which aims to eliminate 101 gaps for a perfect maintenance management.
- Consists of
  - Maintenance Main Policy
  - 6 high pirority strategies
  - 2 general strategies
- Full maintenance service outsourcing in 3 lignite fired thermal power (pilot study) plants

Pilot Study Thermal Power Plants

Seyitömer TPP	Tunçbilek TPP	Orhaneli TPP
600 MW	365 MW	210 MW
4 Units	5 Units	1 Unit
1973-1989	1956	1992

Consultancy Service from Havelsan

- Signed on 14 November 2008 between EÜAŞ and HAVELSAN
- Contract Period: **16 months**
- Pilot study power plants: **Seyitömer, Tunçbilek and Orhaneli TPPs**
- Service covers: **human resource management, process management and documentation, Maintenance Software, Training Curriculum , Full service outsourcing technical specificiations**

Next Presentation:

Second Phase of the Project

Teşekkür Ederiz