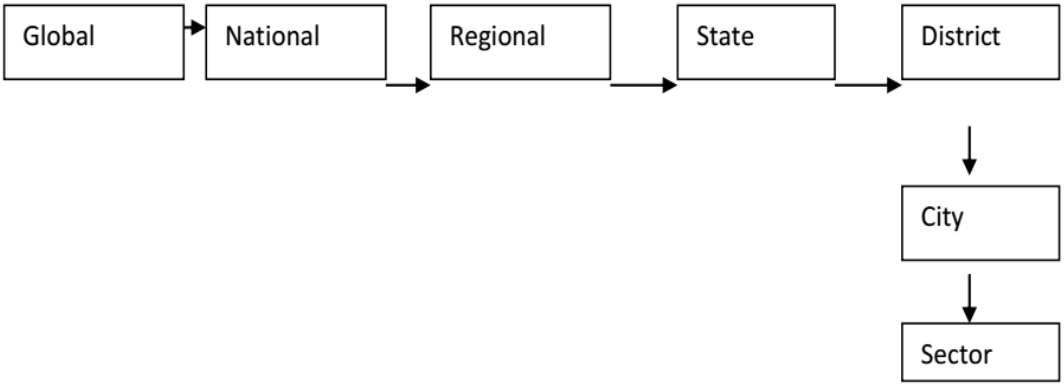
LECTURE 11

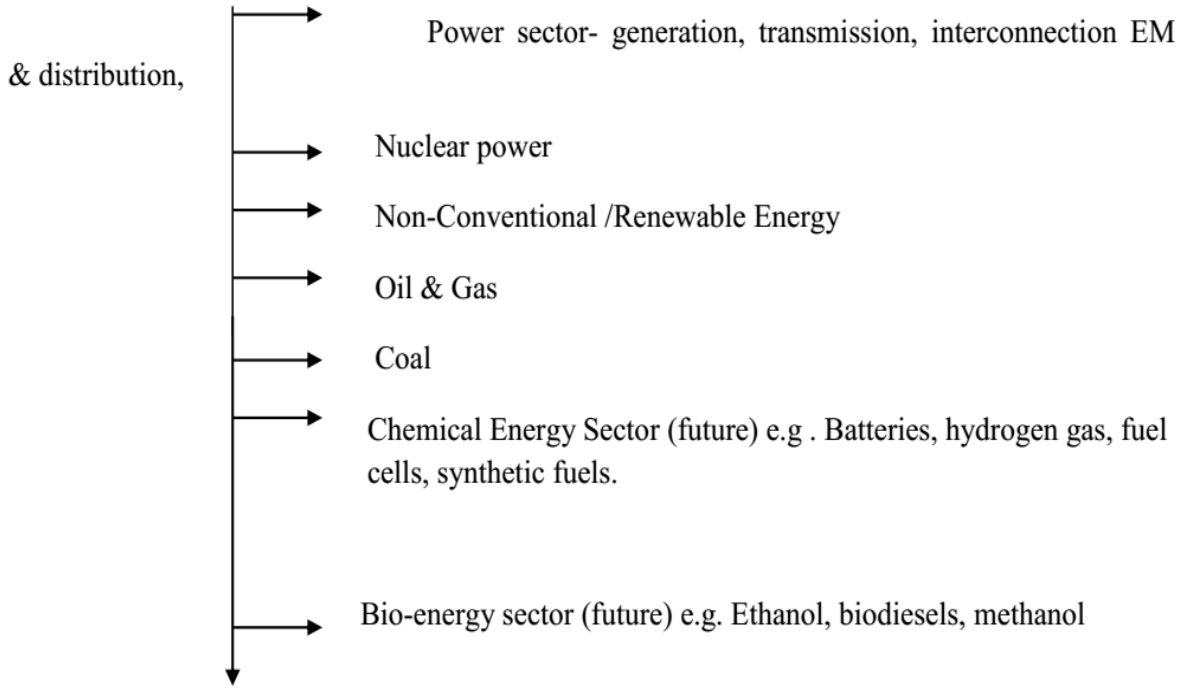
Note: Non-Commercial is the wood.

SCADA; - Supervisory control & Data Acquisition system

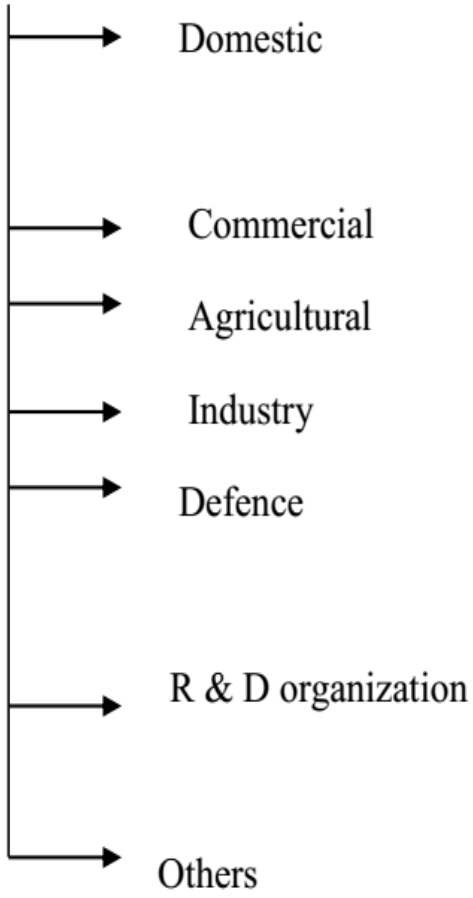
Energy Management EM:-



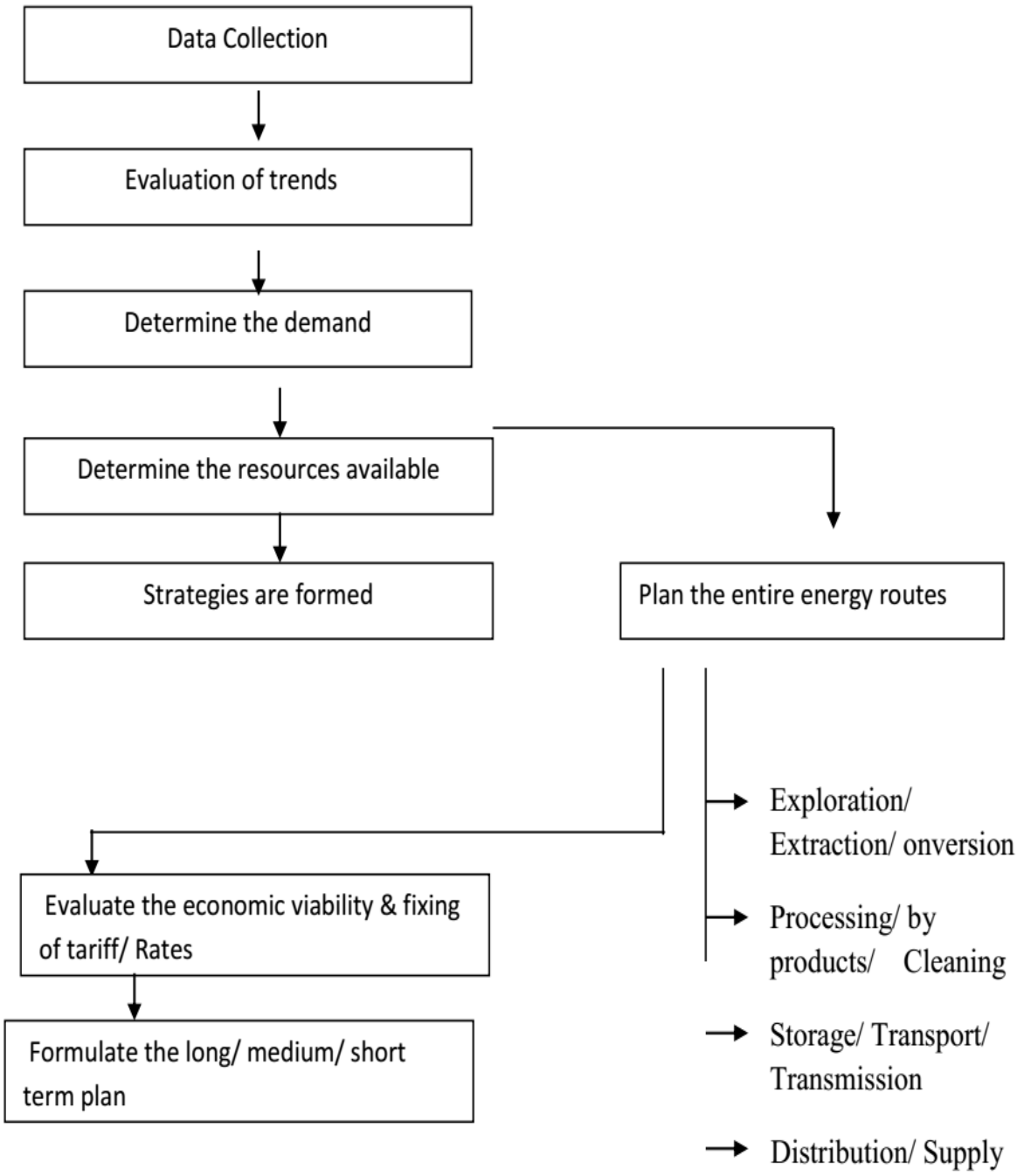
Supply side EM



Demand Side EM



Energy Planning for each Sector



Organization Structure

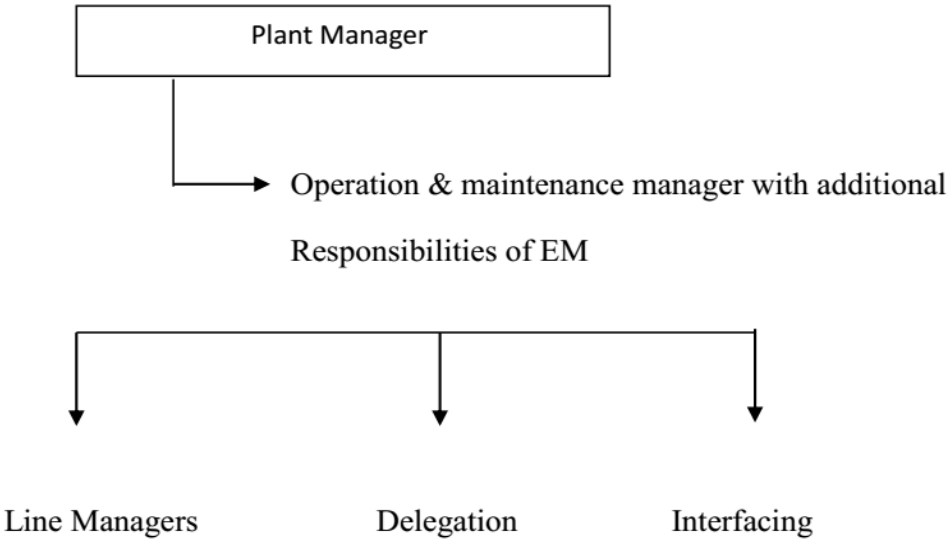
- Listing of essential activities
- Grouping of activities – whether it is related to space heating, power, fuel,
- Decision of responsibilities
- Interfacing between the groups

Organization

products)

- Non- energy (They just consume energy & produce
- Energy Intensive (which are using, as well as producing energy + products)

Non- Energy Organization Chart



Strategies Adopted by Indian Government for E.M

1 Apply Reforms to Energy & Power sectors, with de-control, privatization and the international help for raid growth.

2 Accelerate production and supply of energy though fast-track energy routes e.g. unbundling the potential in existing industries particularly those, which are generating their own power by improving plant load factor (PLF) and carrying out renovation and modernization; improve energy management system; accelerate fast- track liquid & gas fuel supply.

3 Increase the per capita energy consumption rural sector.

4 Improve efficiency and plant load factor (PLF) from the present 60% to 85% and reduce the transmission losses from 20-25% to 10-12%.

5 Encourage EC Measures and improve energy demand side management and recycling of the wastes.

6 Reduce the energy imports and achieve self-reliance in energy.

7 Encourage the use of non-conventional energies in industries and other sectors.

8 Encourage rural-electrification.

9 Encourage privatization in energy sector.

10 Reduce or minimize the pollution.

11 Encourage the forest development.

12 Encourage the conversion of Bio-waste to useful energy.

13 Encourage the R & D in energy sector for energy efficiency prospects and for finding alternatives for the future.

Terms:

Energy Management: EM: The EM is the practical science of techniques and dynamic processes of setting/objectives (task), planning, organizing, arranging materials/finance/human and other required resources, executing, supervising, monitoring, removing bottlenecks to achieve objectives and o set new objectives.

The energy management involves planning, directing, controlling the supply and consumption of energy to maximize the productivity and comforts and to minimize the energy costs, and to minimize the pollution, with consensus , judicious and effective use of energy.

3 steps of EM:

1. Energy Audit
2. Energy Conservation Measures (ECMs)
3. Waste recycling

Steps of Energy Management:

1. Strategies
2. Administrative actions
3. Policy
4. Organizational changes
5. Training and awareness program
6. Association of working personals
7. Energy Audit
8. Energy Conservation Measures
9. Evaluation of the present Energy Consumption
10. Implementation of ECMs.
11. Monitoring of EC efforts.

THE VALUE OF ENERGY MANAGEMENT

Business, industry and government organizations have all been under tremendous economic and environmental pressures in the last few years. Being economically competitive in the global marketplace and meeting increasing environmental standards to reduce air and water pollution have been the major driving factors in most of the recent operational cost and capital cost

investment decisions for all organizations. Energy management has been an important tool to help organizations meet these critical objectives for their short term survival and long-term success. The problems that organizations face from both their individual and national perspectives include:

• Meeting more stringent environmental quality standards, primarily related to reducing global warming and reducing acid rain.

Energy management helps improve environmental quality. For example, the primary culprit in global warming is carbon dioxide, CO2. Equation 1.1, a balanced chemistry equation involving the combustion of methane (natural gas is mostly methane), shows that 2.75 pounds of carbon dioxide is produced for every pound of methane combusted. Thus, energy management, by reducing the combustion of methane can dramatically reduce the amount of carbon dioxide in the atmosphere and help reduce global warming. Commercial and industrial energy use accounts for about 45 percent of the carbon dioxide released from the burning of fossil fuels, and about 70 percent of the sulfur dioxide emissions from stationary sources.

$$CH_4 + 2\ O_2 = CO_2 + 2\ H_2O$$

$$(12 + 4*1) + 2(2*16) = (12 + 2*16) + 2(2*1 + 16) \quad (1.1)$$

Thus, 16 pounds of methane produces 44 pounds of carbon dioxide; or 2.75 pounds of carbon dioxide is produced for each pound of methane burned. Energy management reduces the load on power plants as fewer kilowatt hours of electricity are needed. If a plant burns coal or fuel oil, then a significant amount of acid rain is produced from the sulphur dioxide emitted by the power plant. Acid rain problems then are reduced through energy management, as are NOx problems. Less energy consumption means less petroleum field development and subsequent on-site pollution.

Less energy consumption means less thermal pollution at power plants and less cooling water discharge. Reduced cooling requirements or more efficient satisfaction of those needs means less CFC usage and reduced ozone depletion in the stratosphere. The list could go on almost indefinitely, but the bottom line is that energy management helps improve environmental quality.

• Becoming—or continuing to be—economically competitive in the global marketplace, which requires reducing the cost of production or services, reducing industrial energy intensiveness, and meeting customer service needs for quality and delivery times.

Significant energy and dollar savings are available through energy management. Most facilities (manufacturing plants, schools, hospitals, office buildings, etc) can save according to the profile shown in Figure 1.1. Even more savings have been accomplished by some programs.

- Low cost activities first year or two: 5 to 15%
- Moderate cost, significant effort, three to five years: 15 to 30%
- Long-term potential, higher cost, more engineering: 30 to 50%

Figure 1.1 Typical Savings through Energy Management

Thus, large savings can be accomplished often with high returns on investments and rapid paybacks. Energy management can make the difference between profit and loss and can establish real competitive enhancements for most companies. Energy management in the form of implementing new energy efficiency technologies, new materials and new manufacturing processes and the use of new technologies in equipment and materials for business and industry is also helping companies improve their productivity and increase their product or service quality. Often, the energy savings is not the main driving factor when companies decide to purchase new equipment, use new processes, and use new high-tech materials. However, the combination of increased productivity, increased quality, reduced environmental emissions, and reduced energy costs provides a powerful incentive for companies and organizations to implement these new technologies.