technical bulletin

Municipal Technical Advisory Service
Institute for Public Service, The University of Tennessee
In cooperation with the Tennessee Municipal League

September 23, 1975

SUGGESTED OUTLINE FOR AN ENERGY CONSERVATION PROGRAM

The following outline, taken from the National Bureau of Standards' Energy Conservation Program Guide for Industry and Commerce (NBS Handbook 115, U. S. Government Printing Office, 1974), seems to be readily adaptable for municipal governments, and is reproduced as a means of possibly assisting Tennessee cities in formulating energy conservation programs.

I. TOP MANAGEMENT COMMITMENT
   A. Inform line supervisors of:
      1. The economic reasons for the need to conserve energy
      2. Their responsibility for implementing energy saving actions in the areas of their accountability
   B. Establish a committee having the responsibility for formulating and conducting an energy conservation program and consisting of:
      1. Representatives from each department in the plant
      2. A coordinator appointed by and reporting to management
      Note: In smaller organizations, the manager and his staff may conduct energy conservation activities as part of their management duties.
   C. Provide the committee with guidelines as to what is expected of them:
      1. Plan and participate in energy-saving surveys
      2. Develop uniform record keeping, reporting, and energy accounting
      3. Research and develop ideas on ways to save energy
      4. Communicate these ideas and suggestions
      5. Suggest tough, but achievable, goals for energy saving
      6. Develop ideas and plans for enlisting employee support and participation
      7. Plan and conduct a continuing program of activities to stimulate interest in energy conservation efforts
   D. Set goals in energy saving:
      1. A preliminary goal at the start of the program
      2. Later, a revised goal based on savings potential estimated from results of surveys
   E. Employ external assistance in surveying the plant and making recommendations, if necessary
   F. Communicate periodically to employees regarding management's emphasis on energy conservation action and report on progress

(over)

II. SURVEY ENERGY USES AND LOSSES

A. Conduct first survey aimed at identifying energy wastes that can be corrected by maintenance or operations actions, for example:
   1. Leaks of steam and other utilities
   2. Furnace burners out of adjustment
   3. Repair or addition of insulation required
   4. Equipment running when not needed

B. Survey to determine where additional instruments for measurement of energy flow are needed and whether there is economic justification for the cost of their installation

C. Develop an energy balance on each process to define in detail:
   1. Energy input as raw materials and utilities
   2. Energy consumed in waste disposal
   3. Energy credit for by-products
   4. Net energy charged to the main product
   5. Energy dissipated or wasted

   Note: Energy equivalents will need to be developed for all raw materials, fuels, and utilities, such as electric power, steam, etc., in order that all energy can be expressed on the common basis of Btu units.

D. Analyze all process energy balances in depth:
   1. Can waste heat be recovered to generate steam or to heat water or a raw material?
   2. Can a process step be eliminated or modified in some way to reduce energy use?
   3. Can an alternate raw material with lower energy content be used?
   4. Is there a way to improve yield?
   5. Is there justification for:
      a. Replacing old equipment with new equipment requiring less energy?
      b. Replacing an obsolete, inefficient process plant with a whole new and different process using less energy?

E. Conduct weekend and night surveys periodically

F. Plan surveys on specific systems and equipment, such as:
   1. Steam system
   2. Compressed air system
   3. Electric motors
   4. Natural gas lines
   5. Heating and air conditioning system

III. IMPLEMENT ENERGY CONSERVATION ACTIONS

A. Correct energy waste identified in the first survey by taking in the necessary maintenance or operation actions

B. List all energy conservation projects evolving from energy balance analyses, surveys, etc. Evaluate and select projects for implementation:
   1. Calculate annual energy savings for each project
   2. Project future energy costs and calculate annual dollar savings
   3. Estimate project capital or expense cost
   4. Evaluate investment merit of projects using measures, such as return on investment, etc.
   5. Assign priorities to projects based on investment merit
   6. Select conservation projects for implementation and request capital authorization
   7. Implement authorized projects

C. Review design of all capital projects, such as new plants, expansions, buildings, etc., to assure that efficient utilization of energy is incorporated in the design.

   Note: Include consideration of energy availability in new equipment and plant decisions.

IV. DEVELOP CONTINUING ENERGY CONSERVATION EFFORTS

A. Measure results:

1. Chart energy use per unit of production by department
2. Chart energy use per unit of production for the whole plant

Note: The procedure for calculating energy consumption per unit of product is presented in "How to Profit by Conserving Energy."

3. Monitor and analyze charts of Btu per unit of product, taking into consideration effect of complicating variables, such as outdoor ambient air temperature, level of production rate, product mix, etc.
   a. Compare Btu/product unit with past performance and theoretical Btu/product unit
   b. Observe the impact of energy-saving actions and project implementation on decreasing the Btu/unit of product
   c. Investigate, identify, and correct the cause for increases that may occur in Btu unit of product, if feasible

B. Continue energy conservation committee activities

1. Hold periodic meetings
2. Each committee member is the communication link between the committee and the department supervisors represented
3. Periodically update energy-saving project lists
4. Plan and participate in energy-saving surveys
5. Communicate energy conservation techniques
6. Plan and conduct a continuing program of activities and communication to keep up interest in energy conservation
7. Develop cooperation with community organizations in promoting energy conservation

C. Involve employees

1. Service on energy conservation committee
2. Energy conservation training course
3. Handbook on energy conservation
4. Suggestion awards plan
5. Recognition for energy-saving achievements
6. Technical talks on lighting, insulation, steam traps, and other subjects
7. "savEnergy" posters, decals, stickers
8. Publicity in plant news, bulletins
9. Publicity in public news media
10. Letters on conservation to homes
11. Talks to local organizations

D. Evaluate program

1. Review progress in energy saving
2. Evaluate original goals
3. Consider program modifications
4. Revise goals, as necessary