# SCHEDULE “G”FORM OF energy management plan

**Energy Management Plan**

 ***<Template>***

Prepared by: Name of Employee

 Department

 Company Name

**TABLE OF CONTENTS**

PREFACE TO THE ENERGY MANAGEMENT PLAN TEMPLATE: 2

EXECUTIVE SUMMARY: 2

ENERGY PLAN INFORMATION: 4

BACKGROUND: 4

ENERGY MANAGEMENT POLICY & BEST PRACTICES: 4

ENERGY TEAM: 5

ENERGY BASELINE: 5

IDENTIFIED CONSERVATION CAPITAL PROJECTS: 7

OPERATIONAL SAVINGS AND EMPLOYEE AWARENESS PLAN: 8

ENERGY CONSERVATION TARGETS: 8

ACTION PLAN: 8

OPPORTUNITY IDENTIFICATION & ANALYSIS: 9

IMPLEMENTATION BUDGET 11

FOR FURTHER READING: 11

1. PREFACE TO THE ENERGY MANAGEMENT PLAN TEMPLATE:

Environmental concerns and the need to be globally competitive are providing a driving force for local industry to change the way energy use and energy costs are viewed. Rather than being an inevitable cost of doing business, energy is now considered to be a manageable input to the process, much like any raw material or other resource cost.

The first step in managing energy costs is creating an energy management plan. This document contains a template that lays out a logical format for capturing information critical to energy management planning. It formalizes the thought process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy use, energy targets that are likely to be achievable, and other associated activities that need to occur. While stand-alone energy management projects are satisfying to complete, the energy management plan provides the “big picture” view as an ongoing framework for optimizing overall energy use and achieving success.

Energy management planning is intended to be a process of “continuous improvement”. A closed-loop feedback approach is most effective in demonstrating results that will justify further investment in efficiency. The following diagram shows the circular steps that are recommended for adoption into the planning process:

**Plan:** Create the energy management plan ensuring budgets, resources, are timelines are established to meet the targets and objectives of the plan. Include tracking and monitoring processes within the plan to ensure effective reporting to management.

 **Do:** Execute the plan by deploying the resources and budgets, prepare status reports, and implement the communication strategy.

**Check:** Measure and monitor performance of projects and programs against the desired outcomes as planned and report to management. with recommendations for improvements and course corrections.

**Act:** Analyse the variances to the plan and their causes. Recommend improvements, course corrections, and modifications to the plan.

While OPA focuses on electrical energy efficiency, it is important that the scope of the plan includes all energy sources such as natural gas, coal, diesel, and biomass or other renewable fuels in order to have a complete understanding of opportunities for energy cost reduction and self-generation optimization.

1.
2. EXECUTIVE SUMMARY:

*<Provide an overview of the plan in a few paragraphs.>*

*<Ideas to include:*

1. *Specification of the energy plan targets and objectives over an appropriate planning time horizon.*
2. *The baseline energy usage and energy intensity of the plant compared to industry norms, energy flows of the facility energy use identifying major energy using equipment.*
3. *Top 3 to 5 high-potential energy conservation capital projects with estimated savings, incentives, capital costs and timelines.*
4. *A brief outline of medium term strategic energy management activities planned.*
5. *Communication strategy and employee awareness programs.*

*Include summary table(s) of relevant numbers for current energy performance, targets, projects etc.>*

1. ENERGY PLAN INFORMATION:
2. date of report
3. author
4. acknowledgement of key staff involved
5. facility name and location
6. BACKGROUND:

<Describe the plant operations and factors that affect energy use. Some ideas for inclusion here are:

1. *Business overview:*
	1. *description of business history and current structure (at parent and local level, ownership, etc.); and*
	2. *review of the industrial sector the business operates in with reference to the NAICS coding system and a summary of key business concerns facing the business and sector.*
2. *Process descriptions.*
3. *Physical location and access to resources.*
4. *List specifics of past conservation projects and successes.*
5. *Describe any existing metering/monitoring systems.*
6. *List past energy and feasibility studies.*
7. *Key challenges and constraints to achieving energy reduction goals (resources, capital, expertise, corporate commitment, data, etc.).*>
8. ENERGY MANAGEMENT POLICY & BEST PRACTICES:

<State your company’s energy policy here, if one currently exists. An example energy management policy would be:

“The XYZ Co. will endeavour to reduce energy consumption through all available means so that by 2014 our total energy usage will be 15% less (or, for each unit of material produced) than 2010”.

Otherwise, strive to use this plan to generate management acceptance of the importance of energy planning and create a formal energy policy. State a target timeline here for energy policy creation.>

Does the company:

* have broad awareness of the benefits of energy efficiency
* collect and utilise information to manage energy use
* integrate energy management into their overall management structure
* provide leadership on energy management through dedicated staff and a committed energy efficiency policy
* have an energy management plan for the short and long terms
* have a procurement policy that favours energy efficient equipment and materials
1. ENERGY TEAM:

<State here if there is an existing energy manager for the company and/or plant. If not, name an overall plant energy champion or one for each major section of the plant. Tabulate all individuals that have an impact on energy use and potential energy projects, identifying whether it is their basic job function or if they are co-champions for this effort (i.e. Dan in purchasing will need to be included in planning conservation projects, Rick in engineering is very interested in contributing to energy conservation projects and is a future energy champion).>

*<List all personnel with Knowledge and experience in energy management from operations, maintenance, engineering, etc.>*

<The importance of having a senior executive as a regular participant and sponsor of the energy team is highly recommended. This ensures that the executive management team is well informed of ongoing projects and progress toward energy management goals. If this person is or becomes an energy champion, the energy team is well on its way to achieving great success.>

**The Energy Team at XYZ Co.**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Name*** | ***Position*** | ***Energy Champion?*** | ***Percent of Time on Energy Team*** |
| Jane Doe | Energy Manager | Yes | 80% |
| Name 2 | VP – Production | Yes | 5% |
| Name 3 | Buyer | No | 5% |
| Name 4 | Foreman – Production | No | 5% |
| Name 5 | Engineering Team Leader | No | 10% |
| Name 6 | Engineer | No | 20% |

1. ENERGY BASELINE:

<This section requires some basic data gathering and thought about the best way to show how and where energy is used in the plant. The more detail that is presented in this section, the easier it will be to demonstrate success of the plan.>

Fuel source usage breakdown can be shown in a table such as this:

|  |  |  |  |
| --- | --- | --- | --- |
| ***Fuel, Resource, Productivity*** | ***Total Annual Consumption/Production*** | ***Total Annual Cost/value*** | ***Percentage of Total Plant Energy Cost/production units*** |
| *Electricity* |  |  |  |
| *Natural Gas* |  |  |  |
| *Fuel Oil* |  |  |  |
| *Other fuel* |  |  |  |
| *Water* |  |  |  |
| *Units of Production #1* |  |  |  |
| *Units of Production #2* |  |  |  |

<It is best to slice the energy pie for each fuel source in as many ways as possible that are meaningful to you in order to identify the best approach to improving energy intensity. Two example tables are shown below to illustrate different ways to show the breakdown of electrical energy consumption. Other energy disaggregation methods may be more applicable to your specific situation.>

<It is important to identify the uncertainty associated with this activity and link back to energy information references listed in the Background section above.>

<It may be necessary to construct a table that shows the annual energy use profile by month if the plant operations vary greatly over the course of a year.>

One way of showing electrical energy use breakdown by system type:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Types of End-Uses*** | ***Number of Machines*** | ***MWh/yr*** | ***Operating Peak MW*** | ***% of Total*** | ***Uncertainty +/-%*** | ***Source of Energy Information*** |
| *Fans* |  |  |  |  |  |  |
| *Pumps* |  |  |  |  |  |  |
| *Compressed Air* |  |  |  |  |  |  |
| *Material Handling* |  |  |  |  |  |  |
| *Heating* |  |  |  |  |  |  |
| *Lighting* |  |  |  |  |  |  |
| *Process Equipment* |  |  |  |  |  |  |
| *Other* |  |  |  |  |  |  |
| ***Total:*** |  |  |  |  |  |  |

Another way of showing electrical energy use breakdown by process:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Unit Process*** | ***MWh/yr*** | ***Operating Peak MW*** | ***% of Total*** | ***Uncertainty +/-%*** | ***Source of Energy Information*** |
| *Saw Mill* |  |  |  |  |  |
| *Planer Mill* |  |  |  |  |  |
| *Lumber Drying* |  |  |  |  |  |
| *Plywood Mill* |  |  |  |  |  |
| *Chipper Mill* |  |  |  |  |  |
| *Offices* |  |  |  |  |  |
| ***Total:*** |  |  |  |  |  |

*<Now pick a meaningful measure of plant throughput, or process throughput, and calculate energy intensity per unit of throughput by dividing total annual energy use of each fuel source by throughput. This will be the most important number for tracking and reporting energy management success to your executives. If possible, calculate energy intensity for 5 or more past years and show the trend.>*

*<Research typical energy intensity for your industry and compare to your findings.>*

1. IDENTIFIED CONSERVATION CAPITAL PROJECTS:

*<Create a table of known opportunities for energy savings projects involving capital investment. List the systems with identified savings along with their energy consumption, potential for savings, and next steps to achieving the savings. State the source of information for the energy savings potential. Use a separate table for each energy source.>*

**Electricity Savings Capital Projects:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***System Name*** | ***Annual Energy Consumption*** | ***Operating Peak MW*** | ***Conservation Measure*** | ***Estimated Savings*** | ***Estimated Operating Peak MW Reduction*** | ***Source of Information*** | ***Date of Information*** |
| *Big Fan #1* | *40,000 MWh* |  | *VFD* | *5,000 MWh* |  | *Consultant Study* | *Oct. 2009* |
| *Air Compressor* | *20,000 MWh* |  | *Replace comp.* | *2,000 MWh* |  | *Internal Study* |  *Jan. 2010* |
| *Melter #1* | *90,000 MWh* |  | *Heat recovery* | *10,000 MWh* |  | *Rough Estimate* | *Mar. 2010* |

*<List all known opportunities in the table above even if they are presently considered to be uneconomical or otherwise not currently feasible.>*

1. OPERATIONAL SAVINGS AND EMPLOYEE AWARENESS PLAN:

*<Opportunities to improve energy intensity and competitiveness through operational and employee awareness programs should not be overlooked. The OPA does not provide incentives for these conservation activities, but an energy management plan would not be complete without addressing these opportunities.>*

*<Operational savings are typically achieved through non-capital improvements to control systems. Optimizing the operation of a system from an energy perspective can often produce significant and measurable savings while maintaining or improving the system reliability and throughput.>*

*<Employee awareness programs identify and target everyday actions that employees can be encouraged to do, with the intent that the actions become second nature in order for the savings to persist well past the initial push for awareness. This type of activity dovetails well with operational savings. System operators will often have ideas for optimizing their system and eliminating wasteful idling or other unnecessary run time, but need the environment to encourage the development of these opportunities.>*

*<Investigate and document opportunities here for operational and employee awareness savings.>*

1. ENERGY CONSERVATION TARGETS:

*<Using the potential energy savings identified for each fuel source in the previous sections, set annual conservation targets for five years. Include stretch targets in high/medium/low scenarios for estimated savings>.*

**ELECTRICITY SAVINGS TARGETS:**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Year*** | ***Savings High (MWh)*** | ***Savings Medium (MWh)*** | ***Savings Low (MWh)*** |
| *1* |  |  |  |
| *2* |  |  |  |
| *3* |  |  |  |
| *4* |  |  |  |
| *5* |  |  |  |

<Schedule time annually to update this plan and extend the conservation target for another year. This will produce a rolling 5 year target that when compared to results achieved, should continue to justify investment in conservation for years to come.>

1. ACTION PLAN:

<Turn the targets in the previous section into actionable tasks by tabulating projects, timelines, and accountabilities. The attached spreadsheet can be used as an action plan template for prioritization, tracking, and reporting.>

<Identify any barriers to the implementation of each capital project and think about what strategies could eliminate the barriers. Provide an assessment of the ease of implementing each identified project.>

<In addition to identified capital projects, list the approach and strategies to identify further conservation opportunities that may exist including those relating to:

* *behavioural;*
* *organisational;*
* *maintenance; and*
* *other.>*

<Resolve to bring the energy project team together on a regular basis to systematically work through approval and implementation of the action plan.>

1. OPPORTUNITY IDENTIFICATION & ANALYSIS:

<Potential projects identified by the Energy Manager/Key Account Manager in conducting a general energy assessment of a facility. >

**Project Economics, Benefits & Risks for Identified Projects:**

| Conservation Measure | Feasibility Study Complete? | Estimated Energy Savings (MWh) | Estimated Operating Peak MW reduction | Estimated Cost ($) | Available Incentives ($) | Project Payback (years) | Productivity, quality, or yield savings | Ease of implementation (easy, medium, hard) | Risk  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VFD on BF#1 | Yes | 5,000 MWh |  | 1,000,000 | 625,000 | 1 |  |  |  |
| Replace Air Compressor | Yes | 2,000 MWh |  | 800,000 | 460,000 | 2.3 |  |  |  |
| Heat Recovery on Melter #1 | No | 10,000 MWh |  | 5,000,000 | 2,300,000 | 3.6 |  |  |  |
| Total: | N/A | 17.00 GWh |  | 6.80 M | 3.385 M | 2.0 |  |  |  |

1. IMPLEMENTATION BUDGET

<This budget should include the cost of the Energy Manager, running the Energy Management team, projects, employee awareness and outreach activities, etc.>

1. FOR FURTHER READING:

There has been substantial work on the subject of energy management planning. For further more detailed reference, the ANSI MSE (management system for energy) is an excellent resource that can be found at <http://www.mse2000.net/>.

NRCan offers the comprehensive “Energy Efficiency Planning and Management Guide” available at <http://oee.nrcan.gc.ca/publications/infosource/pub/cipec/efficiency/index.cfm?attr=24>.

The International Standards Organization (ISO) is working on a draft energy management standard (ISO 50001) that will address energy management planning and should be available around the end of 2010 <http://www.iso.org>.

