



# ECO-SMART PROJECT

## INTELLECTUAL OUTPUT 1

Eco-Smart School Action Plan and Framework

IO1.2: Energy Action Plan



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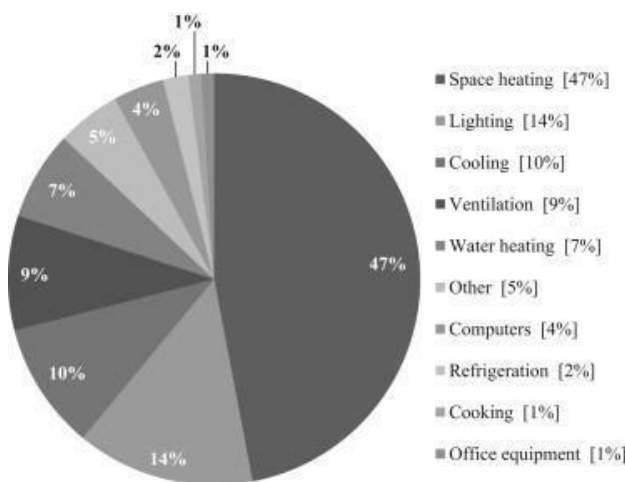
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## Introduction

The use of energy in our daily life has a major impact in several aspects of our life. On one hand, it brings comfort to our social activities and contributes to economic development. But on the other hand, energy is directly related to some issues the world must face: Pollution, climate change, resource depletion...

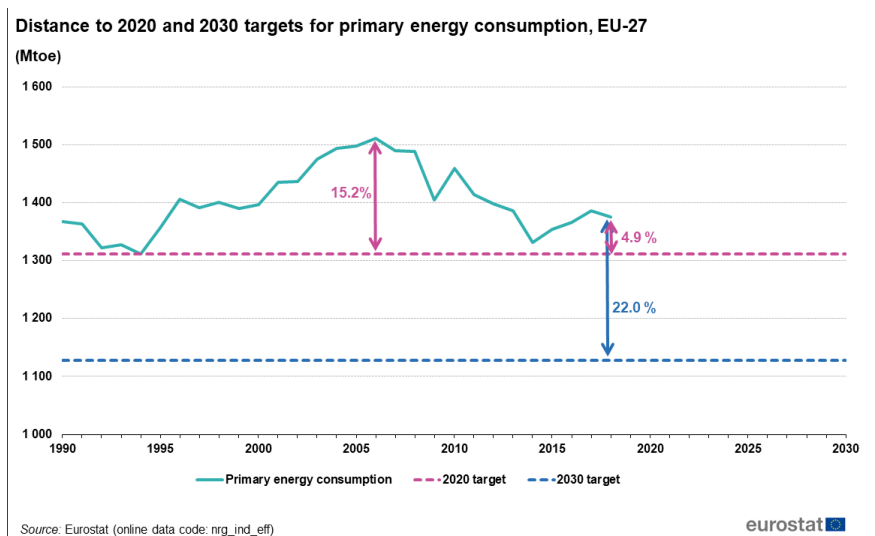
Most of the energy we use comes from fossil energy sources. Its use generates greenhouse gas emissions such as CO<sub>2</sub>, responsible for the increase of the planet's average temperature. The consequences of this temperature rise are critical and recent research and predictions foresee a worse future than was initially predicted in the most pessimist predictions.

Energy use of schools and public buildings in general reaches a high level. This situation gives a large potential for energy optimization.



Energy represents a big part of a school budget and a reduction of these expenses could lead for example to an increase of educational purposes expenses or investment into more eco-friendly equipment.

The Eco Smart project aims to take part in EU 2020 targets of 20% reduction of energy consumption by the year 2020. The target for 2030 will be at least 32,5% reduction. With that goal in mind, we need to increase the share of renewable energy and create an effective energy management plan to meet those objectives



## Goals of the Energy Action Plan

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Improvement of energy performance requires a clear organization and practices to be effective. A clear action plan highlights key energy saving and waste management opportunities that can be put into practice by schools. It also defines the actors and their specific roles. The energy action plan is useless if students, teachers, school administration and staff are not committed to apply it on the field.

The actions listed on the plan are a good opportunity to complete the school curriculum regarding energy use, renewable energy sources, climate change, waste management and the impact that an energy literate person can have on such subjects in and outside the school. How he/she can influence at a larger scale a change in the practice and behaviour around him which is a key point to have a bigger impact. Concrete and practical activities on the field will offer to the students a realistic ground to experiment and take action to reach the energy efficiency goals.

The benefits of energy efficiency plan are numerous:

- Reduce environmental impacts by decreasing energy consumptions, using more sustainable sources of energy and therefore reduction of greenhouse gas emission and other environmental impacts.
- Reduce energy costs
- Develop a true waste management plan to reduce waste production and the impact of its treatment.
- Improve learning and work conditions in the school (temperature, air quality, lighting...)
- Enhance energy awareness of students, parents, educational community and beyond.

Often, energy efficiency plans are related to high technical skills, expertise and significant financial resources. But, by following the steps listed below, we will see that we can reach a substantial decrease of the energy use in schools and in all buildings in general.

The Energy Action Plan is a comprehensive plan which clearly defines technical and management requirements, behaviors of the involved actors. It also lists the main action to be taken by the Energy Teams to be constructed in the school to achieve the goal of energy savings and waste management procedures.

## Overview of the 7 steps action plan

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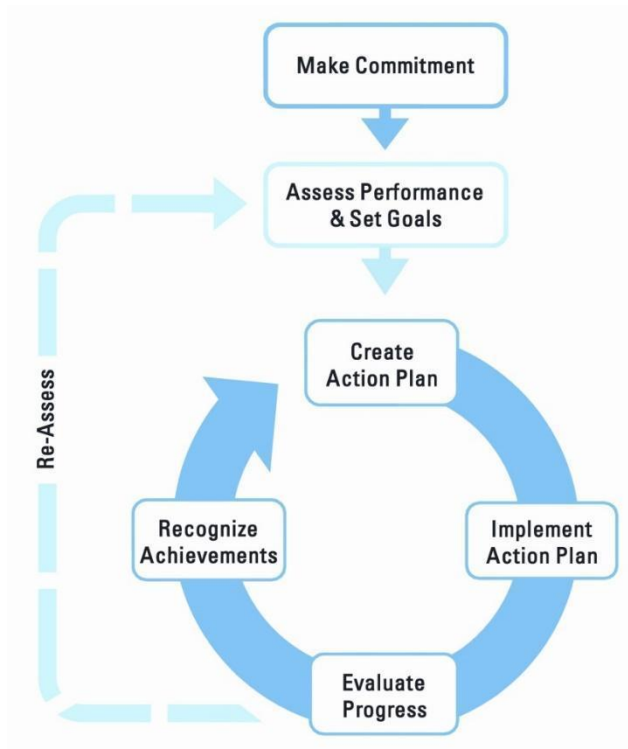


Figure 3 - Energy Star guideline for energy management

- STEP 1: Make Commitment
- STEP 2: Assess Performance
- STEP 3: Set Goals
- STEP 4: Create Action Plan
- STEP 5: Implement Action Plan
- STEP 6: Evaluate Progress
- STEP 7: Recognize Achievements

## STEP 1: Make commitment

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### What?

Schools' regular assessments of energy performance and their continuous efforts are not the only contributors to energy management and performance efficiency. Commitment making plays also an essential role for successful energy management - no matter the size of school. Commitment, by Kanter's (1974) definition, is the process through which people become willing to give their loyalty and energy to a particular social system; thus, a high level of attachment to an organization. Making commitment consists of the very first step to design an efficient energy management program. Schools make a commitment to allocate staff and time to achieve continuous improvement.

### Why?

In this essence, everyone in the school has a role to play in working towards its energy action goals. Hence, an inclusive approach brings together a variety of skills, knowledge and perspectives to approach the topic from a truly holistic viewpoint and builds commitment with all participants involved to maintaining and empowering energy management over time. Also, by having everyone participate, a chance to acquire knowledge and develop skills such as critical thinking, consensus-building, and empathy needed for creating a more sustainable society is provided. Thus, teachers and students, general staff and parents can be equally engaged and active that results in inspiring them to own such energy management programs and their future and also leading them from an attitude of apathy to one of passion.

### How?

To establish effective energy programs, participating schools need to proceed to the following actions as needed:

#### Form a Dedicated Team

##### **Appoint an Energy Coordinator**

Appointing an Energy Coordinator is essential. Key responsibilities include communicating with the school principal, creating and coordinating the Energy and Management teams, resolving conflicts, securing sufficient resources to implement the Action Plan and helping the participants in general. In each team specific roles will also be assigned (organizer, creativity, communication).

##### **Establish the Eco Smart Energy Team (ESET)**

Creating an energy team helps to integrate energy management. Everyone in the classroom has a role to play in working towards energy management goals. Sharing roles and responsibilities is important to be effective throughout the process.

The role of ESET is to *discuss* the overall project, proposing any ideas that may arise to the ESMT. The students will be responsible for *tracking* the progress regarding the timetable of the project, as well as its results. Those can be incorporated in a lesson context, i.e., they can be presented in the classroom by the Energy Team and then be explained by a teacher. ESET will also create presentations for each step of the project that will later be presented to the rest of the school. ESET can either create a “green” newspaper or write in the existing school paper regularly. In either case, the newspaper can contain information about the project in general, energy saving tips, worldwide green news and best practices and even educational games, i.e., quizzes.

### **Establish the Eco Smart Management Team (ESMT)**

For an energy efficiency program to be carefully crafted, the identification of a qualified and experienced personnel team is needed. Moreover, the combination of individuals interested in the project with their diverse backgrounds, can offer overall broader support.

The role of ESMT is to *coordinate* the development, implementation, and revision of the school’s energy management activities in consultation with all other school’s stakeholders, and ensure integration of best practices. This involves several meetings at the beginning of the school year to plan the projects and actions, as well as meetings throughout the school year to assess the progress and to adjust the plan as necessary. Besides, the team is charged for *measuring and tracking* energy performance and for *communicating* with the principal, teachers, students and other stakeholders. In addition to the development of the energy policy, the team can also be involved with the upgrading and designing of energy-efficient buildings, in the stage when the performance targets are set, in order to identify information needs and share knowledge of each building system to achieve optimal integration. ESET can be established with the support of the principal and fellow teachers. ESMT should include *all the different groups* in and outside the school that might have a stake in the school’s energy management initiatives. This is important to have access to different skills, knowledge and viewpoints in the team.

When setting up the teams, please consider the following:

1. Include student representatives with diverse backgrounds and from different age groups. Don’t forget to explain the extent to which students will (or will not) hold decision-making power. This will help avoid feelings of disappointment that might arise when students see that not all of their ideas are put into practice.
2. Seek representatives from all parts of the adult school community: managers, teachers, administrators, support staff and families.

#### Teachers:

- work with the energy team to communicate the action plan to all departments of the school.

- Urging everyone in the school community to take part in energy-related school initiatives.
- Reinforcing expectations for energy-friendly behaviour by celebrating actions such as turning off the lights when not in use.

Administrators:

- Championing school's vision and values for energy action.

Support staff:

- Helping to spread messages about the school's achievements and lessons learned related to energy action.
- Presenting school's values related to energy action when greeting visitors.

Families:

- Volunteering in school-led energy management campaigns.
3. Invite individuals and organizations in the local community that might be affected by the school's projects and that might provide technical expertise and other support for future initiatives. These might include environmental organizations, school neighbours, local businesses, and local government representatives.
  4. Ensure equal participation and leadership by girls and boys, women and men.
  5. Members, if possible, of the energy action team should be elected rather than designated so that they can speak and act on behalf of the group they are representing and mobilize them.

### Institute an Energy Policy

For the success and effectiveness of the Action Plan an Energy Policy needs to be established. This formalizes school principal's support and emphasizes the school's commitment to energy efficiency for students, teachers, the community and other stakeholders. It is recommended the school principal to officially issue the policy and communicate it clearly and understandably to all the stakeholders of high interest and encourage them to get involved. In that, the policy needs to be tailored to the school's culture and also key people should be included throughout its development to ensure their perceptions and thoughts about Energy Management.

The aim of the Energy Policy is to assure that the school can meet its energy needs in a manner that is adequate, reliable, secure and sustainable, assures affordability and improves the organization's economic performance, as well as to identify and evaluate on an ongoing basis its energy needs in accordance with principles of cost reduction, usage efficiency, load management alternatives, purchasing practices, renewable resources and fleet management, where applicable.

The Energy Policy should:

**Set an overall goal and specific objectives to be achieved.** Clear, measurable objectives that reflects the organization's commitment, culture and priorities is of the utmost importance. The Energy Coordinator with the cooperation of the school staff shall oversee the implementation of the Action Plan. The objectives can be the following: to conserve energy resources, save energy and contribute to minimizing air pollution, to consider the school system's policies and operations that affect energy use, to devise a strategy to take advantage of all reasonable opportunities to reduce energy consumption, to include appropriate



measures to monitor resources and energy use and the evaluation of measures undertaken and to identify education, management and other relevant policy changes that are part of the implementation plan.

**Establish accountability.** Define the roles as assigned in the ESET and ESMT and in the school as a whole and make clear what are the duties of each participant.

**Ensure continuous improvement.** Include formative assessments periodically to review and update the policy to reflect changing needs and priorities.

## STEP 2: Assess performance: Build a monitoring consumption plan.

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To improve energy efficiency and develop the use of Renewable Energy Sources (RES), Eco Smart schools need to have a clear view and understanding of the energy use.

Assessing performance is a key process of evaluating energy use of the building. It will give a baseline to view the amount of energy generally used and to measure the future results of efficiency efforts.

The monitoring consumption plan will include 2 key points:

- **Collecting data**
- **Analysing and evaluating**

### Collecting data

Energy consumption reduction is based on a good knowledge of the energy use. This is the essential part of the energy audit. This energy audit will reveal energy flows, costs and will identify the energy optimization potentials. The more data that is gathered, the more precise the audit will be and the easier it will be to determine improvements and to measure them. Without data, Energy Teams will be blind to see the actual consumption but also to measure if the energy efficiency goals are reached. The energy audit must be continuous and cover all types of energy used in the school (electricity, gas, fuel and other sources). The energy monitoring strategy should allow energy teams to measure, verify and analyse the energy consumption and costs to give them the possibility to improve energy efficiency and set concrete goals from year to year.

Access of the data, such as invoices or direct access to the meters can be hard or sometimes impossible in some schools. That is why Eco Smart Schools should involve all staff and stakeholders, in and outside the school, like school administration and maintenance staff, local municipalities and authorities, the maintenance company if the maintenance is done by an external resource to have access to those vital data. The possibility of installing your own meters should be considered but it may also require authorities approbation. The step 1: Make commitment should take in consideration this essential access of data and/or equipments to involve all the stakeholders.

There is different level of energy assessment which will allow us to collect data:

- By an observation of the use of energy in the school
  - o Walk through surveys in all the school with thermometer, luxmeter, hygrometer...
  - o Observation of classrooms and building situation (use and occupancy schedules, shutdown during unoccupied periods, condition of building envelope, control of computers standby or shutdown routines etc...)
  - o Questionnaires about occupants feelings regarding energy use for comfort, electrical equipment use like computers etc...
- By monitoring energy use with meters reading and/or invoices evaluation
  - o Meter reading (electrical, gas, water...)
  - o Energy bills (electrical, gas, water...)

## Example of Energy analysis strategy

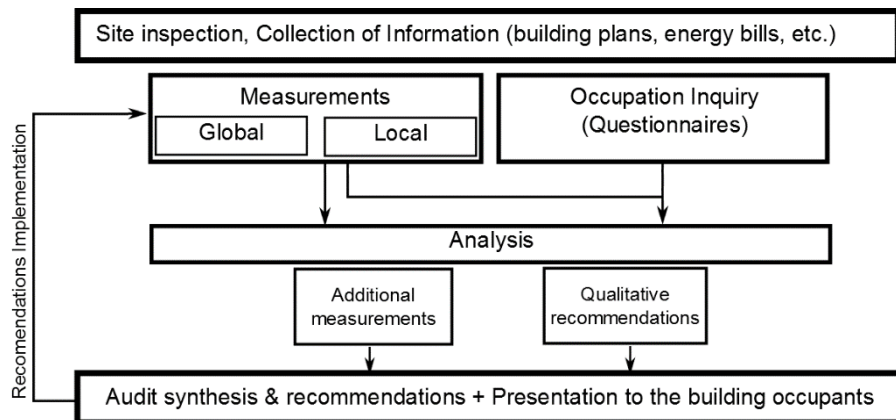


Figure 1 - Audit protocol flowchart  
Source: Energy and comfort assessment in educational building: Case study in a French university campus.

Some key data are significant to build the energy audit plan:

- Total energy consumption of all energy sources of the past years (unrepresentative years due to exceptional situation like 2020 and 2021 with the Pandemic impact should not be considered)
- Building plans
- Number of students
- Heated area of the school
- Operating periods of the school (days and daily hours)
- Survey of the energy use (temperature, luminosity...) and user's behaviour during walkthrough investigation

Energy invoices provide a lot of information and a structured document. Period, units, amount of energy, costs. Meters are a useful tool for energy consumption tracking. In order to have useful data that can be analysed a meter reading plan must be built. There are some advantages and inconveniences in the use of meters and we will see further what we can set to have an accurate collecting and analysing phase.

In the eco smart case pool deliverables, you will find some schools energy assessment to compare with. See if your school energy consumption is lower, at the average or above other similar buildings.

## Analysis and evaluation

The purpose here is to understand the energy use trends. The accuracy of the analysis will depend on the collection of data. If too few data are collected the analysis will lack of precision and will not give the real picture of the energy use. On the contrary, if too many datas are collected, the analysis may be hard and cause errors and maybe exhaustion of the teams because it requires time and effort to collect and analyze the data.

The energy audit will allow us to set the baseline according to the reference consumption determined by invoices or meters reading. With this baseline set, we will be able to estimate and measure the energy savings. So, the analysis phase is as important as the collecting phase to correctly identify the trends of energy use and to be able to see the areas of improvement.

The main domains of energy school's consumption and where energy saving potentials are:

- Space heating/cooling
- Lighting
- Domestic hot water
- Ventilation
- Cooking
- Office equipments

It is needed to evaluate the operating performance of facility systems and equipment to determine improvement potential.

After gathering all the datas, ESET and ESMT will analyze them to collect the energy saving potential and measure the impact of the user's behavior.

A full energy source (purchased or produced) inventory must be made.

The most common energy sources are:

- Electricity [kWh]
- Natural gas [m<sup>3</sup>]
- Fuel [liters or kg]
- Biomass [kg]
- Photovoltaics [kWh]
- Solar thermic [kWh]
- Geothermal energy [kWh]
- Coal [kg]

To assess the energy consumption, have accurate measurements and to allow energy use comparison from year to year or between different schools, data need to be adjusted by conversion factors. Equivalences allow to convert figures between the most frequently encountered units.

Kilowatt per hour [kWh] will be used for all types of energy sources to unify the results and make comparisons. Students will have to convert for each type of energy used its energy unit expressed in kWh. This is a key competence for high school students and they will understand the link between Power and consumption.

A suitable competence to understand the challenges of energy consumption and climate change.

Also, to measure the impact of the energy use, the CO<sub>2</sub> emission will be calculated by using energy conversion values (link to create).

The CO<sub>2</sub> emission values takes consumption but also “grey” pollution (pollution caused by the energy production, i.e. primary energy) and its transportation into account. According to each country's electricity production installation, CO<sub>2</sub> value may be completed. For example, France’s electricity production is mainly done by nuclear power plants with a low value of CO<sub>2</sub> emissions. Other countries with gas/fuel/coal generating plants will have higher CO<sub>2</sub> emissions value. RES used for generating electricity contributes directly to a drastic reduction of CO<sub>2</sub> emission values.

**Table 1: Lower Heating Value and main CO<sub>2</sub> emission coefficient (Source Ademe, RTE)**

Energy source	Unit	Lower heating value	CO <sub>2</sub> per unit [kgCO <sub>2</sub> /unit]	CO <sub>2</sub> per kWh [kgCO <sub>2</sub> /kWh]
Electricity (nuclear plant)	1 kWh	1 kWh	0.01 kgCO <sub>2</sub>	0.1 kgCO <sub>2</sub> /kWh
Electricity (gas-fired plants)	1 kWh	1 kWh	0.43 kgCO <sub>2</sub>	0.43 kgCO <sub>2</sub> /kWh
Electricity (oil-fired plants)	1 kWh	1 kWh	0.78 kgCO <sub>2</sub>	0.78 kgCO <sub>2</sub> /kWh
Electricity (coal-fired plants)	1 kWh	1 kWh	0.97 kgCO <sub>2</sub>	0.97 kgCO <sub>2</sub> /kWh
Natural Gas	1 m <sup>3</sup>	10 kWh	2.3 kgCO <sub>2</sub>	0.23 kgCO <sub>2</sub> /kWh
Biomass	1 kg	5 kWh	0.2 kgCO <sub>2</sub>	0.04 kgCO <sub>2</sub> /kWh
	1 m <sup>3</sup>	3250 kWh	26 kgCO <sub>2</sub>	0.04 kgCO <sub>2</sub> /kWh
FOD (Fuel Oil Domestic)	1 kg	11.9 kWh/kg	3.4 kgCO <sub>2</sub>	0.3 kgCO <sub>2</sub> /kWh
	1 Liter	10 kWh/l	2.8 kgCO <sub>2</sub>	0.27 kgCO <sub>2</sub> /kWh
Coal	1 kg	8.9 kWh	7.3 kgCO <sub>2</sub>	0.82 kgCO <sub>2</sub> /kWh

Likewise, some data will require correction. For heating, a correction factor called degree day will correct the heat consumption according to the harshness of the winter. Same principle applies to cooling. Degree day is the difference between the outside temperature and a reference temperature which makes it possible to estimate thermal energy consumption to maintain a comfortable building in proportion to the winter severity or summer heat.

## **Key performance indicators (KPI)**

By using the key data (surface, number of students, occupation schedule etc...), it will be possible to create values that will offer a visual of the energy consumption and the possibility to:

- Verify if the energy consumption is too high or in the average for this type of facility.
- Assess if the energy saving measures are effective.
- Easily monitor the evolution of energy consumption
- Prioritize poor performing equipment for immediate improvement.
- Understand the cost of energy expenditures.

Those ratios will be built by using the energy consumption or expenses and a key value.

**Table 2: Key Performance indicators**

KPI	Consumption per volume	Consumption per heated area	Consumption per students	Consumption per day	Expenses per kWh
	kWh/m <sup>3</sup>	kWh/m <sup>2</sup>	kWh/student	kWh/day	€/kWh

Those ratios can be compared with other Eco Smart schools or to other national school ratios. With all the gathered data, Eco Smart Energy Team will be able to quantify the energy saving possibilities and set goals to reach.

**Table 3 – Evolution of school energy consumption ratio/regulation year (France)**

*Source: Guide CPE établissements d'enseignement secondaire*

Construction/Refurbishment year	kWh/m <sup>2</sup>
Without building energy standards	120
1976 energy standards	111
1982 energy standards	102
1988 energy standards	86
2000 energy standards	72

**Table 4 – Evolution of school electrical consumption ratio/regulation year (France)**

*Source: Guide CPE établissements d'enseignement secondaire*

Construction/Refurbishment year	kWh/m <sup>2</sup>
Without building energy standards	36
1976 energy standards	38
1982 energy standards	33
1988 energy standards	35
2000 energy standards	32

One of the Eco smart school aims will be to reduce those indicators to the minimum possible value by implementing an energy saving strategy based on the energy audit, installation and equipment optimization (cf optimization process document) and user behaviour change.

After analysis comes the evaluation phase. At this point, evaluators should have a clear view of the school consumption. It is essential, in order to have a reliable evaluation, that the collected data are clarified and adjusted. Especially with the heating and cooling energy consumption that need to be adjusted with the average outside temperature (Degree Day).

A report that contains the most important data will be written to give to all involved people a clear view of the building state and its energy use. It should be addressed to all responsible persons.

Accurate tables and charts will illustrate the trends. Energy saving potentials will be clearly established by the energetical and financial gains but also by their costs.

The evaluation report structure could be:

- Building presentation (Plan, construction year, surface, levels...)
- Detailed Energy audit
- Description of the energy saving potentials.
- Concrete energy saving recommendations and procedures (cf step 3: Set goals)
- Costs and funding opportunities

## STEP 3: Set goals

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Performance targets are important for energy management activities. In this context, it is necessary to set realistic and measurable goals, internalize the targeted results, establish the right strategies and achieve financial savings. Well defined goals are essential for tracking and measuring process. Communicating can motivate staff to support energy management whole school.

### **Setting goals helps to:**

- Track and examine the success of the energy action plan
- Support the individuals who are responsible for the implementation of the energy action plan in terms of determine the improvement and deficiency.
- Indicate commitment to decrease negative environmental impacts
- Define timeline for upgrade activities and identify milestones to develop efficient performance goals, determine scope, estimate potential for improvement and finally set goals.

## Determine Scope

### **Identify school and timeline parameters for goals.**

The level of the performance target relates to how the school uses energy. Common school levels for setting goals include:

- Setting goals ahead of time shows how the school wants to improve. School-wide goals are important for the success of the energy action plan.
- Facility level goals are important in terms of benchmarking results or energy audit to help school to meet its goals.
- Defining proper and realistic target timeline for goals ensures that they are purposeful and promote change.
- Long-term goals are usually school-specific and may be defined by:
  - School strategic plans
  - Set horizons and guidelines for plans

### **Estimate Potential for Improvement**

Examine baselines, benchmark to decide about the potential and order of upgrades and conduct technical assessments and audits. To set goals, it is important to have a good prediction of what level of performance is achievable. The methods are based on many factors that we have to decide such as, time, available sources and used energy types and school of the energy program.

### **Reviewing performance data and benchmarking**

Setting baselines specify differences of energy use between similar structured buildings to show potential improvements. Data of a longer period like 1 year data will be more useful for understanding improvement of energy use in terms of tracking over time.

Benchmarking provides a standard for monitoring and evaluating improvement opportunity when sufficient data is available to highlights trends in energy use.

The scope of performance goals can include multiple levels of the school as well as various time periods for completion of specific goals.



**Reviewing technical assessments and audits and compare to other schools:** Decrease energy use identified during technical assessments and audits.

Also, examine performance goals of other schools can help to enhance and let you know of the potential for your own school.

### Establish Goals

Create and express clear, quantifiable goals, with target dates, for the entire school, facilities, and other units. As soon as the potential for improvement has been envisaged, goals can be established at the convenient school levels. Energy performance goals should be recognized by senior management (School board, principal) for the whole school. Identifying development potential should be a starting point for the possibility to act.

Common ways for establishing goals include:

**Defined reduction:** Goals should show energy use as a specific amount or percentage reduction such as 5 tons of furnace oil or 15 percent reduction of electricity consumption.

**Efficiency improvement:** One of the goal should be decrease the energy intensity such as 5 kWh per unit of ACs.

**Environmental Improvement:** Energy saving is important in terms of preventing or reducing pollution.

### Actions

When setting goals, be sure to use a wide range of knowledge to help set promising, yet achievable goals. Have school board review your goals to enlist their feedback and support.

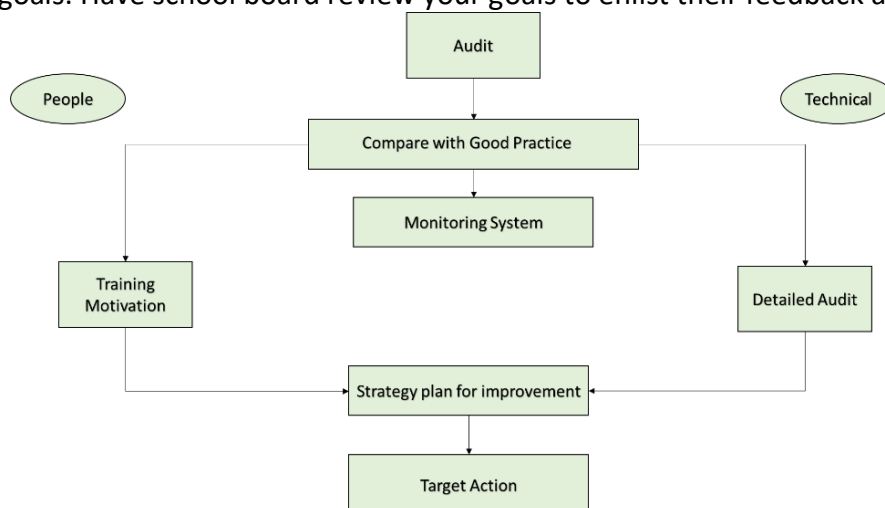


Figure 2 – Action plan to achieve goals

Before forming the action plan, it can be a useful exercise to define the goal to be achieved, and to assess what obstacles must be overcome. These obstacles and influences can be thought of as negative and positive forces respectively. Force field analysis is a fundamental tool that can be used to gain additional insight about the change progress to be followed. The steps involved in force field analysis are:

State the school goal and indicate the course that implies moving towards that goal: for example, the goal might be "improve energy efficiency in the assembly plant" or "reduce energy consumption in the facility for current occupancy levels".

Identify barriers that tend to prevent the achievement of the goal: these may be internal to the school (for example, a lack of expertise related to energy management) or external (for example, energy rate structures or governmental regulation).

Identify positive influences or forces that tend to work towards achievement of the goal; these may also be internal or external.

Estimate the relative strength of the negative and positive forces (for simplicity, we may want to identify them as low, medium and high strength).

Prioritize those forces that can be strengthened or weakened through your action plan with the greatest effect on achieving the goal. It is mostly more effective to try to minimize negative forces than to try to strengthen forces that are already positive. A standard force field analysis chart is shown in Figure 3.

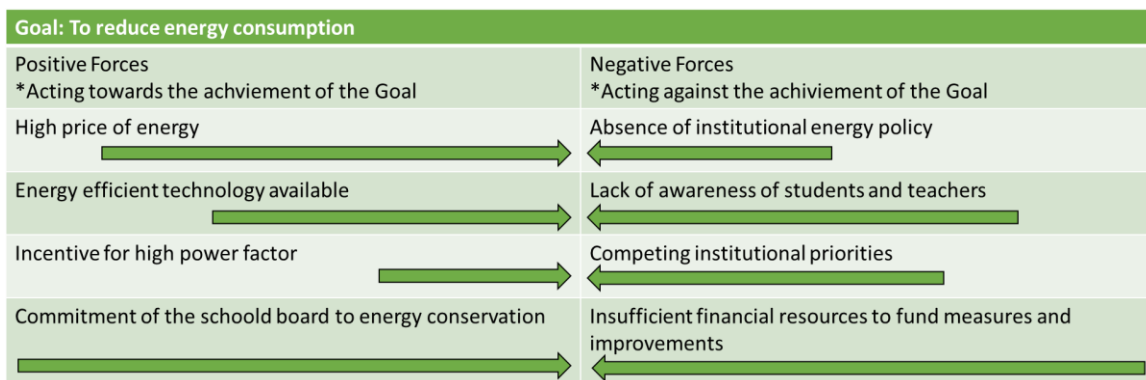


Figure 3 – Forces Analysis

## STEP 4: Create Action Plan

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After the team has set goals, action plans should be developed to provide a roadmap for achieving those goals. Using the reporting form for the goals you've outlined, write a detailed action plan to ensure team projects and activities are carried out. It should be implemented in a systematic process. Each goal can have more than one action plan, such as reducing energy consumption in the school or training the school community.

1. Carry out brainstorming activities which will support you in achieving the goals
2. Complete an action plan for each goal using the planning and reporting form as your framework. Your action plan will define the goals and activities that will support you achieve each goal. The plan should outline each activity and task you will use to achieve the goal, the estimated time and cost, and provide a definition of the number of individuals and materials needed while explaining the steps required to carry out each activity. Action plans also include fundraising, promotion and evaluation.
3. Students should volunteer for the tasks.
4. Develop a master plan that includes all action plans. The master plan should highlight when each of the tasks should begin and end, and who is responsible for the task.
5. Carry out brainstorming activities which will support you in achieving the goals

### Activities to Promote and Moderate the Plan

1. Display the plan at the commission/ joint teachers meeting  
To ensure participation from school teachers, administrators and other staff, showcase the action plan and describe the benefits of goals. The process will help them to understand the objectives and opportunities of the implementation of the plan.

2. Plan an assembly on energy

The energy team should be supported by all affected parts of the energy action plan- especially students. To ensure this, the team will need to convey its goals and plans to the student body and student clubs. An energy assembly is an effective way to accomplish this. While the team creates the assembly agenda, following points should be included:

- Introduction of the team to the school
- Explain way conservation of energy, water, gas is important
- Showcase the assessments regarding the building
- Motivate everyone to commit towards the goal of the action plan

Activity suggestion for the assembly:

- Use an energy quiz to break the ice and raise awareness
  - Display the current data for electricity, gas, water usage
  - Showcase how much is spent for related field and how else could have been done with that amount of money.
  - Compare the utility usage of school and home by graphs
3. Training of students, teachers, and the staff

The team can use various creative and diverse ways to train student about how energy is consumed in the facility and ways to practice efficiency. The training may include awareness-raising presentations to other classes or forming a student club on energy efficiency. All student-related activities should be documented as an output.

## Monitor and Evaluate School Energy Use

Monitoring and evaluating the energy attitude of the building occupants is a main task of the energy team. Completing the M&E forms are vital for the efficient implementation of the action plan. The team will analyze the previous and current data to monitor the progress.

The action plan for monitoring consists of several steps:

- Define monitoring routes: The team may use the schools fire exit plan as a blueprint.
- Create monitoring agenda: Execute the monitoring activity when the classroom is mostly empty like before or after the class, lunch breaks etc.
- The team identification: in order to identify the team, it recommended to use badges, vests etc.
- Showcase results: The team should establish methods to reward good energy habits and motivate those still need to improve. It's recommended to have a special corner to display visuals, announcement and gratitude, as well as suggestions.
- Classroom participation: Create a checklist to remind positive energy conversation behaviors in each classroom.
- Create a plan for energy shutdowns and recesses

Considerable energy saving can be done when the school is not in session through the right equipment. This action will require planning and collaboration with the custodians and the administration. Following steps can be included in the action plan.

Permission: Get an approval from the principal, maintenance supervisor, and other related key individuals for shutdowns for school breaks.

Documentation: Design a checklist during a possible shutdown with your custodial staff.

Notification: the shutdown may affect various departments and services. In this context, notify the key personnel and head of departments regarding the possible shutdown in advance.

Delegation: The team should assist the shutdown procedure under the supervision of the building support staff.

- Include energy training in the curriculum  
Teachers can help the energy management program by including energy into their current curriculum. The team's energy supervisor can present an energy management program at a faculty meeting, joint teacher meeting or commission meeting early in the school year. At meetings below points can be highlighted:
  - A new school energy team has been team up
  - Energy team members can make presentations in their class.
  - Energy can be taught by using an interdisciplinary approach (especially by means of STEAM)
- Advance Planning

An award mechanism can be designed and implemented in order to recognize the achievement of the students in energy education. The mechanism can be led by students and it will demand appointing a couple of students to check the applications. Collecting applications for the rewarding is highly recommended.

## STEP 5: Implement the energy action plan

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For an accomplished implementation of the action plan; it is crucial to encourage full cooperation of key people at different levels within the school (school staff, students, parents, school administration) and also to raise awareness of the people who will implement the projects defined in the action plan.

The action plan must consist of a set of goals/activities for improving energy efficiency. Assessing potential energy savings helps determine an appropriate portfolio of goals that are clear and measurable. School has to establish both short-term and long-term goals for improving energy efficiency.

While implementing the action plan consider these following steps:

### Create a Communication Plan

To communicate successfully, you will need to designate targeted audiences, define the information that they need, and integrate your messages appropriately for each one.

### Raise Awareness

School staff, teachers, administration, students and other key stakeholders will be aware of energy performance goals and energy management, as well as their responsibility in implementing the program by the help of influential action plans. Communication strategies and materials for increasing awareness of energy use, goals and effects should be tailored to the needs of the targeted audience.

To raise awareness, consider doing the following:

#### a) General Awareness of Energy Waste

Raising overall awareness also supports the energy initiatives at school since most people are unaware of how everyday habits at home and work affect energy use and the environment.

General awareness of energy use can be increased through:

- Orientation programs for school staff -Provide basic information on school and individual energy use
- Poster campaigns, - Design catching and informative posters for change rooms, bulletin boards, staffroom, etc., that discusses energy use. Using recycled materials and wasting minimum material is also important.
- Painting/Caricature/Poster Contests – Organize small but effective contest to enhance motivation and awareness
- Organizing a “Low Energy Day” for whole school participation and awareness-raising. Inform the school of plans over intercom, school assemblies, and posters in classrooms and on the school notice board.
- Organizing visits: local wind farms, recycling centers, bioenergy hubs etc.
- Inform parents of aims for the School Energy Action Plan and encourage energy conservation at home via school newsletter or meeting.

- b) Improving School Energy Awareness

In developing school energy awareness actions use following information:

- Energy data statistics -Use general school energy facts and figures, such as overall energy costs, costs to operate equipment, environmental information related to energy use, and so on.
- Energy use of equipment -Provide information on the energy performance of equipment or processes that school staff and students regularly use as part of their jobs and activities.

- c) Providing Support from School Administration

Increasing the awareness of school administration can help to build support for energy management initiatives and it also provides awareness of how energy management affects the school budget.

## Build Capacity

To build overall school capacity:

Organize training and share good practices about successfully applied energy action plans in schools or other organizations, facilities etc. This will also encourage school staff and students to contribute ideas and follow procedures to succeed in the action plan. Get feedback and evaluations from staff, students and parents

Training programs may include:

- **Operational training** -Provides instruction on new operating methods or procedures designed to reduce energy use. Such training may be typically targeted towards specific audiences, such as Energy Team (students) and Energy Management Team (Teachers)
- **Administrative training** -Includes reporting, monitoring, data collection, and other administrative efforts that support energy management.
- **General conferences**- Targeting all people in a school environment (staff, students, parents etc.)

## Motivate

How to enhance incentive and motivation in school atmosphere:

- Internal competition: Use tracking sheets, scorecards, etc. to compare performance of other schools and foster a sense of competition.

- Recognition and reward: Highlight and reward accomplishments of individuals, departments, and classes.

### Track & Monitor

Tracking system assures to evaluate necessary steps, corrective actions, and identify successes. Regular review – weekly/monthly- of the activities outlined in the action plan is crucial to meet energy performance goals.

**Perform regular updates** -A system is only effective if the information it contains is current and comprehensive. Data needs to be collected and provided into the action plan periodically according to the program. Weekly and monthly updates are necessary for tracking systems.

**Conduct periodic reviews** -Periodic reviews of your progress in meeting interim goals and milestones should be conducted with the management team, the energy team, and selected groups of staff. The frequency of these reviews will vary depending upon the audience. Such reviews should focus on progress made and problems encountered

**Identify necessary corrective actions** -A tracking system is a good way to determine whether a program is performing well. It will help identify when a specific activity is not meeting its expected performance and needs review.

## STEP 6: Evaluate progress

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Throughout the course of the project, progress must be monitored and evaluated at regular intervals in order to understand whether or not the goals set out in the Action Plan are being met.

Evaluating progress is twofold and includes

- formal review of energy use data
- review of the activities carried out as part of the action plan as compared to your performance goals.

If possible, pupils should be given the responsibility for carrying out monitoring activities wherever possible

The evaluation results and information gathered during the formal review process can be used in an iterative way to create new action plans and consider if performance goals are ambitious or should be renewed.

They also act to identify best practices that can be shared across the institution.

The evaluation uses the results from the tracking system established, the goals and the KPI's

Key steps involved include:

**Measure results** - Compare current performance to established goals.

**Review action plan** - Understand what worked well and what didn't in order to identify best practices.

**(Optional) Create progress report** - Condense findings into report that is suited for communication

The regular evaluation of energy performance and the effectiveness of energy management initiatives allows energy managers to:

- Measure the effectiveness of implemented projects and programs
- To make informed decisions about future energy projects
- Recognize achievements and reward participants
- Document additional savings opportunities as well as non-quantifiable benefits that can be utilized in future efforts.

Consider transferring such opportunities and ideas to a public list for behavioural inspiration.



## Measure Results

Results from the tracking system are compared to the goals to determine whether the goals have been met.

Among the key steps in measuring results are:

Tracking data gathering

- Review energy use and cost data (capital and operating expenditures).
- Analyze tracking and monitoring reports.
- Measure and analyze your energy efficiency improvements.

Benchmarking

- Comparison of energy performance with baselines
- Compare performance against established goals for:
  - environmental performance
  - financial savings
- Analyze your energy performance in comparison to your peers and competitors to determine where you stand.

The units of measurements that effectively and appropriately express energy performance for the school are developed in the KPI section and tracking ratios can be in the form of

*Energy Efficiency Ratio= Actual KPI / Predicted KPI (goal)*

## Review Action Plan

Next, investigate the factors affecting the results and discover additional benefits of better energy performance.

You should evaluate the effectiveness of your action plan during this review. Best practices should be documented and shared throughout the institution when activities and projects are successful. When goals are not met, analyze the cause and decide what can be done to correct or prevent the problem.

Reviewing the action plan involves the following steps:

- Discuss the plan with the energy team, the implementation staff, and other departments.
- Awareness - Monitor if employee and organizational awareness about energy issues has changed.
- Finding critical factors - Identify the factors that contributed to the achievement or missed the targets.
- Estimate side benefits - Identify and quantify side benefits that arise as a result of energy management activities, such as improved employee comfort, productivity, impact on sales, reduced operation and maintenance costs, or improved public relations.

An action plan review involves resources, but also has many advantages:

- Discovers new possibilities for action (technologies, practices, programs).
- A way to avoid repeating failures is to identify ineffective activities and stop them from happening again.

- Evaluates the efficiency of the tracking system and other administrative tools to help ensure better management and evaluation.
- Allows staff to participate in and understand the process of energy management.
- Identifies specific success stories and financial results for stakeholders inside and outside the organization.

### **Create a progress report (Optional)**

Condense findings into a document that is suitable for communication

Establish a standard reporting format to better communicate progress with stakeholders. This should include the most relevant performance metrics i.e. key performance indicators accompanied by trends. If possible, graphs should be used. If any changes were made based on the results, include a section with the revised action plan.

This report can be used in STEP 7: Recognize Achievements

## STEP 7: Recognition of achievements. Communication Plan.

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### Recognition of achievements

Recognition of students, teachers and staff efforts and accomplishments in this Energy Action Plan is vital in creating a good work environment and engagement.

Small improvements can make a big difference; any small achievement should be recognized.

Recognition of achievements will be provided in two key steps:

- **Internal Recognition**, Peer to peer, individuals, teams, facilities.
- **External recognition**, from municipality, regional education department, social media, other organizations.

### Internal Recognition

Recognizing the effort or accomplishment of an individual or a team it is essential for our success therefore to our community success.

Providing recognition will increase the participants' motivation and engagement with the Energy Action Plan implemented in our Schools.

#### - Recognition levels:

- **Peer to Peer**, all participants must feel they own the responsibility of sharing appreciation with other peers or superiors.
- **Individual**, recognizes efforts and accomplishments of specific people.
- **Teams**, recognizes efforts and accomplishments of a specific classroom, department, group within the school.
- **Facilities**, acknowledge the performance of the whole institution.

#### - Recognition criteria:

In order to tie appreciation to strategy and goals of the Energy Action Plan, everybody (teachers, students, staff, etc) knows exactly how they are contributing to the plan.

The criteria for recognition will be for example:

- Best Good practices (especially regarding water consumption and waste management)
- Best energy saving ideas
- Achieved the greatest energy use reduction
- Greatest dissemination activities for the Energy Action Plan

#### - Recognition type:

Employees, students and other participants will value the types of recognition that memorialized their efforts and achievements or explain to an audience what they are being recognize for. There are many types of recognition that can be implemented in our schools.

Students' achievements could be recognized with ECO-EUROS. Every time they perform a successful action they will be awarded with ECO-EUROS and once they've got certain amount they can exchange them for an item at the school canteen or at any other local business.



Senior Manager team will also provide recognition to the class-rooms, teams or other school staff involved in the Plan through the creation of certificates and public appreciation.

School festivals are an opportunity for public recognition in front of other school community members or other stakeholders.

### External Recognition

Receiving recognition from other entities validates the importance of our Energy Action Plan, gives visibility to the school's efforts and accomplishments and it can also enhance our school's image.

There are many organizations and companies that reward environmental good practices or environmental programmes, one of the most relevant ones it is the **Foundation for Environmental Education (FEE)**, it is the largest international accreditation and education for sustainable development (ESD) programme in the world. They provide **the Eco-schools green flag award**, which is an international award for excellence in environmental action and learning. There are three award levels:

- Bronze
- Silver
- Green Flag

Obtaining this award will add value to our school, it will motivate more people to participate in the Energy Action Plan, it will enhance our school reputation and credibility.

### Communication Plan

Good communication is essential for an effective Energy Action Plan management. The aim of this communication plan is to reach the people involved and give them the correct message to take action.

The key points in our communication plan are:

- Internal workshops, school participants must be contacted on a regular basis. It is important that everybody knows the targets of the Energy Action Plan (e.g., the water consumption will be reduced a 10%...)
- Engaging all our building users is absolutely vital, and at the same time we should make it clear that there is Senior Management Team commitment to following the Action Plan.
- School participants must have clear what is their contribution to the Plan.
- Create a notice board where the collected data can be display in a student friendly way for a better understanding.
- Display the Energy Action Plan together with the tasks accomplished.
- Trying to get involved in different campaigns such as:
  - World Environmental Education Day in January
  - Climate week in March
  - World Environment Day in June

The most important part of communication is to make sure you report back to your school users on your and their progress. It is motivating to know that actions are making a difference.