



# Energy and water efficiency for industries and enterprises

**National Cleaner Production Centre, Sri Lanka**

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## What is energy efficiency?

Energy efficiency means “using less energy to provide the same service.”

The goal of energy efficiency is to reduce the amount of energy required to provide products and services without reducing the quality of that product or service. Energy efficiency together with renewable energy is a key element in achieving sustainable development.

Energy conservation on the other hand can have a slightly different meaning. It is reducing or going without a service with the objective of conserving energy. For example, turning off a light is energy conservation. Replacing an incandescent lamp with a compact fluorescent lamp (which uses much less energy to produce the same amount of light) is energy efficiency.

## Why promote energy efficiency?

Today, 85% of global energy comes from non-renewable sources such as coal and oil. According to the National Energy Balance of Sri Lanka (2007), fossil fuels contributed to 60% of the total electricity generated, while hydropower contributed only 40%. It is a well-known fact that fossil fuel resources, which have taken 3 million years to form, are depleting at an alarming rate and will not be available for future generations. In the last 200 years, we have consumed 60% of all global resources. So the question is: What do we do when the world runs out of fossil fuels?

In addition to the problem of resource depletion, the burning of fossil fuels causes irreversible environmental damages in the form of green house effect, which leads to the greatest environmental threat faced by man today — global warming. As a result of this growing concern, the demand for efficient use of energy sources is becoming more important. Industries are, therefore, operating in a highly volatile situation where their very existence depends on how efficient their processes are.

There are various motivations for industries to adopt energy efficiency. The foremost of these being that reducing use reduces costs and results in considerable financial savings. Usually these savings offset additional costs of implementing energy efficient techniques and technologies. Reducing energy use is also a key solution to the problem of reducing greenhouse gas emissions. It also has a national energy security advantage, because it reduces our dependence on energy imports from foreign countries.

## What is water efficiency?

Water efficiency is usually defined as carrying out a function, task or process, to achieve the same result with the minimal amount of water usage. While water efficiency and water conservation are usually considered to mean the same thing, there is a clear difference between them.

Water efficiency differs from conservation in that it focuses on reducing waste rather than restricting the use of water. It also emphasizes the need for consumers to make changes in their attitude and behavior to reduce water wastage by choosing water efficient products and services.

Some of the simple water efficiency measures for industries/enterprises include:

- Identifying and eliminating wastage (e.g., leaks) and inefficient processes (e.g., continual spray devices on stop start production lines) and implementing procedural changes, such as cleaning plant areas with brooms rather than water.
- Changing processes, equipment, and technologies.
- Reusing wastewater.

## The need for water efficiency and conservation

According to the Second United Nations (UN) World Water Development Report, if the present water consumption pattern continues, two-thirds of the world's population will face water stress by 2025. Increasing human demand for water together with the effects of climate change spells considerable danger to global water security. We must note that as of now, 2.6 billion of the world's population does not have access to safe drinking water.

The changes in human lifestyle and activities mean that per capita water consumption will increase significantly in the future resulting in tighter competition for water amongst agricultural, industrial, and human consumption.

The task of saving water through efficient use should be carried out with long-term benefits in mind. As water is a fundamental element in the lives of humans and animals, the better supply, management, and conservation of water play a significant role overall. Industry as a major water consuming sector, therefore, has an enormous responsibility to ensure that efficient water use practices are adopted and implemented.



# “Green factory” — SME exit strategy in green growth era

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The government is strongly promoting a low-carbon, green growth policy that minimizes use of resources and environmental pollution while utilizing it as an engine for economic growth.

Green growth is a new paradigm that was suggested to maximize environmental and economic synergy effects by responding to energy and environmental problems, the increasing mandatory climate change burden, high oil prices, exploitation of environmental markets, etc., with economic policies.

The green paradigm transition era requires small and medium-sized enterprises (SME) manufacturing process innovation that coincides with low-carbon green growth, i.e., “Green Factory” management.

“Green Factory” means a low-carbon economic era-type facility equipped with eco-friendly design and manufacturing processes that efficiently improve greenhouse gas emission, environmental pollution, and energy consumption. In other words, “Green Factory” is green-izing process, green-izing workplace, and green-izing product.

First, green-ization improves the manufacturing process efficiently and reduces consumption of energy and resources. Second, it also pursues high efficiency in all areas of the manufacturing workplace, installing solar cells on the factory roof, replacing motors with 3-phase induction motors, and fluorescent lamps with LED lamps, etc. Third, it improves product design in a way that uses less energy when producing and using the products, develops products with a longer life span, and facilitates recycling of after-use waste materials.

SMEs, viewed from a green growth perspective, despite being small in scale, are equipped with a centralized power-type organizational structure. So, manager influence is greater and employee participation in low-carbon, green growth is stronger compared with large enterprises, assuming that communication is smooth.

As for the SMEs that have organic relationships with large enterprises, their active utilization of SCM would facilitate their acquisition of new technologies as well as introduction and establishment of a green management system. Furthermore, as several such companies are collocated in a particular area (industrial complex, etc.), cooperation and strategic alliances between enterprises become easier.

Also from an environmental perspective, if their small corporate scale and comparatively simple production facilities are taken into account and the wastes minimization programs practiced in the United States, the United Kingdom, and Netherlands are applied, SMEs can more easily pursue technological alternatives and secure profit-creating opportunities as well as reduction of wastes.

Furthermore, in the green growth era, SMEs should actively respond to changes in competition conditions.

Due to the characteristics of the green industry, first, dynamic SMEs should pursue a rapid market advance. Second, SMEs should exert utmost efforts for development of core technologies, narrow the technological gap with advanced countries, and accelerate localization of parts. Third, SMEs must secure overseas source technologies and patents and resolve technical barriers. Fourth, SMEs should secure and nurture excellent manpower through industry-academia-research institute cooperation in line with the green growth era when development of excellent manpower is more important than ever before. Fifth, SMEs have to advance into the world, which has already grown into a large, single market, to secure new outlets for their products and services.

Unlike other growth paradigms, low-carbon, green growth will not develop by itself in response to the market. Therefore, the government should support diverse policies, including designation and cultivation of green-specialized research institutes, cultivation of green technology design centers, supply and technology development of green facilities and equipment, support for global green partnerships, support for green technology information development and exchanges, and cultivation of green production and environmental manpower.

To grow green SMEs equipped with global competitiveness, the government should also establish long-term goals and, in parallel, continuously implement complementary revisions to processes to achieve the goals. In order for SMEs to develop the necessary competitiveness in the paradigm transition, they must be made aware of the potential and benefits of low-carbon, green growth and management in a low-carbon economy, i.e., “Green Factory” management.