

ENERGY SAVING TECHNOLOGIES

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Energy conservation represents a modern technological trend and a vital response to the rising cost of energy and increasingly stringent environmental demands. In the expenditure breakdown of a typical commercial building, energy costs make up around 30%. In certain industries like metallurgy, chemicals, and petroleum refining, the proportion of energy expenses in the product's total cost can even reach 60%. Hence, a thoughtfully devised energy conservation initiative can considerably cut costs and streamline budget management. (Shen, 2019)

The primary focus in the worldwide energy sector is the adoption of alternative and sustainable sources like solar, wind, water, and biofuels. In the case of Ukraine, there is also a pressing need for the utilization of agricultural and industrial waste, pellets, as well as the modernization of gas boilers. (Shen, 2019)

Lighting constitutes nearly 20% of the world's energy consumption. The current standard practice involves replacing incandescent bulbs with LED lights, resulting in a potential 5-7 times reduction in energy usage. Despite their initial higher cost compared to incandescent bulbs, LED lighting elements offer a significantly longer lifespan of 7-10 times. One notable drawback of LED lighting is the presence of mercury, which necessitates proper bulb disposal planning. (USAID, 2019)

The next phase in cutting lighting expenses of energy may involve the installation of light and motion sensors, alongside optimizing the use of natural daylight. By incorporating various sensors, it becomes possible to automatically adjust lighting brightness and switch off lights when spaces are unoccupied. In certain scenarios, this approach could yield an additional 20% in energy savings.

Air conditioning and ventilation systems are widely employed for regulating indoor environments. The predominant approach to cost reduction with these systems involves the implementation of heat recovery systems. By ensuring precise calibration and regular maintenance, potential cost savings of up to 10% can be achieved. While it is preferable to integrate such systems during the initial construction of a building, there are situations where retrofitting becomes necessary for existing structures. In these cases, seeking guidance from seasoned designers is

essential to accurately assess all parameters and install the system in the most efficient manner. (USAID, 2019)

Water supply: A commonly employed method for water conservation involves the collection and treatment of rainwater for future use within a structure. This strategy is primarily applicable in areas where rainfall is frequent and there are no freezing temperatures during the winter. In most developed nations, the use of automated water supply sensors and harnessing the residual heat transfer capacity for water heating are pertinent practices. (Енерго X, 2019).

Alternative sources of electricity are witnessing a rapid evolution in response to the growing demand for sustainable and energy-efficient solutions. Individuals, particularly in residential settings, are now empowered to harness these alternatives and contribute to energy conservation. One notable avenue is the ability to sell excess electricity generated through renewable sources back to the grid at favorable "Green" tariffs. This arrangement not only encourages the adoption of renewable energy technologies like solar panels and wind turbines but also fosters a culture of energy frugality among individuals. Homeowners who invest in solar panels, for instance, can not only power their households but also generate surplus electricity when the sun is shining abundantly. This surplus energy is then seamlessly integrated into the grid, reducing the overall demand for non-renewable energy sources. (Енерго X, 2019)

Energy-saving technologies are revolutionizing the automotive industry, ushering in a new era where electric vehicles (EVs) and hybrid systems are gaining remarkable traction. This transformative shift is driven by an acute awareness among consumers and manufacturers of the pressing need to curtail fossil fuel consumption, not only for economic and environmental reasons but also as a response to the global call for sustainability. (International Energy Agency, 2019)

Household appliances such as washing machines, dryers, dishwashers, dehumidifiers, refrigerators, and freezers have made significant strides in energy efficiency, resulting in both reduced environmental impact and cost savings for

consumers. These innovations are achieved through advanced technologies, improved insulation, and optimized operation modes, contributing to a more sustainable and affordable home environment. (USAID, 2019)

Energy-efficient motors and pumps represent a crucial aspect of modern industrial and commercial processes, as well as numerous household applications. These technologies have evolved to reduce energy consumption, operational costs, and environmental impact. Through innovative engineering, enhanced materials, and smart control systems, these devices are leading the way toward a more sustainable and resource-efficient future. (Institute for the study of human knowledge, 2023)

In conclusion, the world of energy-saving technologies is not just a realm of innovative engineering and cutting-edge solutions; it is the key to a sustainable, economical, and environmentally responsible future. From the adoption of LED lighting to the embrace of electric vehicles, from the widespread use of heat recovery systems to the implementation of smart grids and sensors, these technologies hold the promise of transforming the way we produce, consume, and think about energy.

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