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## TURKEY'S RENEWABLE ENERGY OUTLOOK AND A GENERAL ASSESSMENT OF RECENT DEVELOPMENTS

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### ABSTRACT

Turkey is the world's 17th and Europe's 6th largest economy and the country has made significant advances and breakthroughs in its economy since last two decades. Turkey is a very rich country in terms of geographical location and geological structure due to renewable energy sources. The country has planning to take advantage of these resources to the maximum extent aiming both will contribute to security of energy supply and prepare the ground for the creation of new jobs. The installed power of renewable energy sources, which was 12,305 MW in 2002, has reached the value of 36,702 MW in the third quarter of 2017 with an increase of 198%, approximately. This is an indicator that the renewable energy can be a solution to achieve the country's future goals of energy. This paper presents an overview of Turkey's renewable energy appearance and a general examination of renewable energy status with the latest figures, which determined according to the recent developments. It is also aimed to contribute to all fields, businesses and the industry working on renewable energy, not only to whom seeking the newest developments and latest numbers, but also planning to produce green energy and create green jobs for the country's sustainable development.

**Key words:** Renewable Energy, Turkey, Energy Developments

## AN EXAMINATION OF MEASURING AND CONTROL SYSTEMS IN AN INDUSTRIAL BIOGAS PLANT IN TURKEY

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### ABSTRACT

As an alternative method to the classical energy productions, the concept that energy can be consumed where it is produced has been successfully applied today to minimize the increasing energy costs and use more efficient and clean energy. Even though the fossil-based energy sources are gradually decreasing, they continue to harm the environment with many negative effects such as air, water, soil pollution and global warming. Protecting the environment from these harms, and reducing these negative effects has become the most important targets of many countries in the world. The solutions can be found via renewable energy sources by producing "green power". As these types of solutions increase, the ratio of greenhouse gas emitted at the atmosphere decreases, which is an extremely environmentally friendly approach. Despite the possibility that fossil fuels will end up in a certain period, these alternative energy productions need to be spread over a wider area to achieve sustainable green energy productions. As a good alternative choice, biogas production by evaluating organic wastes in an industrial biogas plant, methane gas is produced and converted into heat and electricity energy in cogeneration systems. Measurement and control systems are needed for the biogas production and cogeneration systems. In this context, pressure, level, temperature measurements are made and biogas content is analyzed, successfully. The pump, mixer, blower and heating system are controlled according to the information obtained from the measuring systems. In this study, an examination of measuring and control systems in an industrial biogas plant in Turkey is discussed in detail.

**Key words:** Industrial Biogas Plant, Measuring and Control System, Sensor

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## BIOMONITORING OF SO<sub>2</sub> SPATIAL DISTRIBUTION ON THE TERRITORY OF THE REPUBLIC OF MOLDOVA

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### ABSTRACT

Based on the Air Quality Assessment Grades (GECA) and the Lichens Toxicity Scale (STL) versus SO<sub>2</sub>, developed by us, was tested the air quality, in 2007 and 2017, from 60 and 107 forest ecosystems and stations, respectively, in order to achieve air quality monitoring at national and international level by non-instrumental methods, for honoring Republic of Moldova's obligations under the Geneva Convention (1979). It was established that the moldavian forest ecosystems do not contain reserves to critical loads of SO<sub>2</sub> pollution, the annual average for the vegetation season for dendrological species is 0.02 mg / m<sup>3</sup> air, and for communities of lichens and cyanobacteria (organisms sensitive to pollution) - only 0.01 mg / m<sup>3</sup>. Lichens indication demonstrated that the current level of air pollution with SO<sub>2</sub> is between 0.05 and 0.5 mg/m<sup>3</sup>, what indicates long-term, adverse effects, manifested in all studied forest ecosystems. Over 10 years, air quality has improved, particularly in the northern and central areas of the country, while the southern and south-eastern areas remained practically unchanged. Of the 107 ecosystems and stations, evaluated in 2017, it was found that in 10 forest ecosystems the air quality is assessed as *clean air*, 24 - *low polluted air*, 54 - *moderate polluted air*, 15 - *polluted air*, 4 - *high polluted air* and those with *critical polluted air*, were missing.

**Keywords:** lichens, bioindication, air pollution, SO<sub>2</sub>, monitoring.

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## A GENERAL EVALUATION OF TURKEY'S ENERGY DIPLOMACY AND THE LATEST CLIMATE CHANGE STUDIES

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### ABSTRACT

Energy imports in Turkey increased around 36.1 percent annually for the first 10 months of 2017, and this amount rose to 41.7 percent in the August-October period, which relatively high increase in oil prices was experienced as it is expected. The country aims to reduce the dependence on imported inputs, especially in energy and related matters. Also, it is targeted to continue structural reforms with stability, accelerating technology with intensive productions and reduce the ratio of current account deficit to the national income to the level of 3.9 percent by reducing this dependence on imported energy at the end of the Medium-Term Program. In this study, a general assessment of Turkey's energy diplomacy and the latest climate change studies are examined according to up to date developments and the numbers. Therefore, it is aimed to contribute to the energy diplomacy in Turkey and raise awareness on the climate change studies.

**Key words:** Turkey, Energy, Energy diplomacy, Climate change studies

## AN ENERGY AUDIT AND OPTIMIZATION IN BAR MILL ANNEALING FURNACE

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### ABSTRACT

Due to today's competitive conditions and rising energy prices, the efficient use of energy consumed by facilities is only possible with the energy savings that can be made by investing in time, updating the technology, optimizing operating conditions and constant controlling. In this direction, The Bar Rolling Mill authorities have started this work to detect possible energy losses on the site and to increase energy efficiency. Measurements and evaluation of the results were made on the surface insulation inspections in annealing furnace, annealing furnace flue gas and annealing furnace cooling water, compressors, compressed air lines, pumps and annealing furnace burning air fan and hydraulic motors in Bar Mill. In the studies of the measurements, each equipment and line were examined separately and necessary calculations were done. Some suggestions were made on determined points which cause energy losses, how much loss is realized through these points and necessary investments to compensate for these energy losses, the price information. In the light of these works carried out in the factory; It is possible to save a total of 1,767,120.04 kWh/year energy and 441,780.01 ₺/year saving of money. Total investment cost is 558,500.85 ₺. The average return on investment (ROI) for all application plans is 1.26 years. After all these improvements, CO<sub>2</sub> emission values will be reduced to 1,030.23 tons per year.

**Key words:** Bar Rolling Mill, Energy Efficiency, Energy-Saving, Annealing Furnace, Pump, Hydraulic Motor.

