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New facts in renewable energy

The U. S. is pushing ahead to try to increase energy production from renewable sources. This is in line with the government strategy of generating a sustainable economy that is no longer dependent on fossil fuels. Recently, much effort has been invested to accelerate and expand technological development in wind, solar, biofuels, and hydropower. For instance, last year the installed wind capacity of the U. S. doubled with respect to the previous year. Also, last year wind energy generation positioned as top one with about 40% of all new facilities. As a result, an important number of new businesses focusing on wind have been created nationwide: approximately four hundred and seventy facilities are now manufacturing parts for wind turbine systems. Solar energy has also attracted significant attention due to the incredibly large amount of solar energy impacting planet earth every year: almost ten thousand times the energy consumption of human history. Capturing this energy is a complicated task considering that solar energy is highly diluted. The most common approach to capturing energy is through solar cells, which are devices that incorporate a semiconductor material to help converting solar energy into electricity. Until recently, solar cells were considered a relatively expensive investment due to high manufacturing and installation costs. Fortunately, rapid technological advancement has contributed to lower the price of watt for a solar cell to approximately eighty cents. It is projected that by 2030 this price could be as low as one cent. Some concerns about the land use have also created some opposition to solar installations. Recent reports have demonstrated that the land can be shared with other activities such as cattle pasturing. Emerging solar businesses are on the rise and the

by the end of last year solar generation approached two thousand and five hundred megawatts. Other important renewable energy source is biomass, which can be found in trees, perennial grasses, wheat, corn, sugar cane, and oil rich crops. The conventional processes for biomass conversion are combustion, gasification or fermentation. In combustion, wood and vegetable oils are burned to produce heat. Gasification is a process where biomass is converted into gases at high temperatures in an oxygen-depleted environment. The produced gases are subsequently reacted to liquid fuels. Fermentation is the process that allows converting sugar- and starch-based biomass such as corn and sugar cane into ethanol or butanol. The process requires microorganisms capable of turning sugars into alcohol. The major concerns with biofuels are the replacement of tropical rain forest by energy crops and the use of products intended for feeding purposes. In this regard, innovative fermentation technologies have been recently proposed that replace the sugary sources by non-edible cellulose biomass sources. This implies that wood and other hard agricultural materials are now considered as inputs of fermentation processes. Energy from biomass is expanding and numerous biorefineries are being built across the nation. Currently, it accounts for about three percent of U. S. energy consumption in the form of electricity, heat and biofuels. An additional advantage of biofuels is that they contribute with about eighty percent reduction in greenhouse emission. Today, the production of biofuels is of approximately fifteen billions of gallons but is expected to approach thirty five billions of gallons by 2022. All these renewable energy initiatives are encouraged by customers through green power marketing, which refer to the opportunity of consumers to

purchase power generated from renewable energy sources. This framework allows consumers to voluntarily adopt renewable energy for their homes or businesses. This market approaches forty million megawatts hour.