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INCREASING THE ECONOMIC EFFICIENCY OF THE RENEWABLE ENERGY SYSTEM IN UZBEKISTAN

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KEYWORDS

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ABSTRACT

The history of industrial civilization is the history of energy transitions. In less developed agricultural economies, people's basic need for food calories is provided by simple forms of agriculture, which, in fact, is a method of capturing solar energy for human use. Solar energy stored in firewood or other biomass energy meets other basic needs for home heating and cooking. As the economy develops and becomes more complex, energy needs increase significantly. Each stage of economic development was accompanied by a characteristic transition of energy from one main fuel source to another. This transition is driven by many factors, including concerns about the environmental impact (especially climate change), restrictions on the supply of fossil fuels, prices and technological changes.

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INTRODUCTION.

In a sense, renewable energy sources are limitless, since their reserves are constantly replenished by natural processes. The daily supply of solar energy is theoretically enough to meet all human energy needs for a whole year. But solar energy and other renewable energy sources are limited in the sense that their availability varies in space and time. Some regions of the world are particularly well suited for the use of wind and/or solar energy. For example, the potential of solar energy is highest in the Southwestern United States, North Africa and the Middle East, as well as in some parts of Australia and South America. Some of the best regions for wind power include Northern Europe, the southern tip of South America, and the Great Lakes region in the United States. Geothermal energy is widespread in countries such as Iceland and the Philippines. Each region of the world has some renewable energy resources, although the availability and cost of using them vary.

Most renewable energy sources are, ultimately, solar energy. The energy of the sun can be used directly to generate heat or electricity. Hydropower comes from falling water, which occurs because solar energy evaporates water at low altitudes, which later rains at high altitudes. The sun also creates wind through differential heating of the earth's surface. Biomass energy comes from plant matter produced during photosynthesis under the influence of the sun. Thus, biomass, wind and hydropower are only secondary sources of solar energy. Non-solar renewable energy sources include geothermal energy that comes from the earth's core, in some combination of energy left over from the origin and ongoing decay of nuclear materials. Tidal energy is another non-solar renewable energy source driven by the moon. Although nuclear energy from fission is not renewable, there is a great debate about whether nuclear energy should be part of the energy complex after fossil fuels.

Biomass is any fuel obtained from plant raw materials in the recent past, and includes wood, agricultural crops, plant residues and animal husbandry waste. Fossil fuels were also once biomass, but in the distant past. Biomass is the original source of humanity's energy, used since the discovery of fire. It still accounts for 10% of the world's primary energy supply and is the world's largest single renewable energy source, as most of the world's population uses wood, charcoal, straw or animal manure as fuel for cooking. Industrial economies can use biomass energy in several different forms. There are many technologies for the utilization of biomass, so the literature on this issue can be confusing. In its most basic state, biomass in the form of pieces of wood, wood chips or sawdust can be burned. Similarly, grass and plant residues can be compressed into pellets or bricks for burning. Biomass burning can be used to generate heat (as in a wood-burning stove), or it can generate electricity

in a power plant, like coal burning.

Chemical processes can also convert biomass into fuels such as ethanol and methanol, and some crops produce vegetable oil, another fuel. In addition, when biomass decomposes anaerobically (without air), methane gas is formed, which is another potential fuel (methane is CH4, the main component of natural gas). All these energy sources are obtained from the biomass of plant matter. Biomass for energy is usually burned in some way, which leads to the release of pollutants into the air, which is a negative external effect of using biomass.

Like biomass and hydropower, wind energy has been used since ancient times. In the best areas, modern electricity generation from wind is very close to cost parity with sources such as coal and nuclear energy. But there is a big difference between the cost of wind energy on the best sites and on less suitable ones. Wind energy is generated by the energy of moving air, and the available energy varies depending on the cube of wind speed. Doubling the wind speed leads to 2*2*2 8 times more potential energy; tripling the wind speed leads to 3*3*3 27 times more energy. More potential energy usually means less cost for a given amount of energy. Like biomass and hydropower, the potential of wind power in most regions is finite and limited by the number of sites where an energy source can be developed at reasonable prices. Not only does the average wind power vary greatly depending on the site, but the power available at any given moment also varies greatly depending on the wind speed. On windy days, there is much more energy than on calm days. This intermittency characteristic is typical for most renewable energy sources, but it is especially difficult for wind, given the degree of change in potential energy depending on wind speed.

Solar energy comes in three main forms: 1) Low temperature solar thermal energy, 2) solar electric or photovoltaic (PV) and 3) High temperature solar thermal energy. Low temperature solar applications include solar water heating and solar space heating. Sunlight falls on some kind of surface, usually black to maximize the absorption of sunlight, which in turn heats the air or water. The protective layer of glazing helps to retain trapped heat. Solar heat can be stored in such massive materials as water or stone. Low-temperature solar energy usually uses simple and proven technologies. Solar water heating is already financially competitive with fossil fuels in many climatic zones. Solar space heating is also possible, but the problem with the economics of solar space heating is that the monthly demand and supply are almost completely opposite: the greatest demand occurs in winter, when there is the least supply of sun, and the greatest amount of sunlight occurs in summer, when the demand for thermal energy is the lowest. In practice, this means that solar room heating systems almost always require some kind of additional heat source, since the

marginal costs of collecting solar energy in the middle of winter are extremely high. Additional heating increases the cost of solar heating systems.

Energy is a fundamental contribution to economic systems. Current economic activity is overwhelmingly dependent on fossil fuels, including oil, coal and natural gas. These fuels are non-renewable. Renewable energy sources, such as hydroelectric power, wind and solar energy, currently provide less than 10% of the world's energy. There are many sources of renewable energy that have been used for centuries. Most renewable energy sources are less affordable and/or have a higher cost than fossil fuels used in the recent past. The costs of renewable energy sources are partly explained by their inherent characteristics, in particular their low clean energy coefficients, periodic availability and capital intensity. The development of new technologies will reduce the cost, but will not make the cost of renewable energy competitive with market prices for fossil fuels in the near future, if external factors related to fossil fuels are not taken into account. The speed of the transition to renewable energy sources will largely depend on the policy choice. Reforming fossil fuel subsidies and introducing pig taxes are two policies that can produce more cost-effective results. Other potential policy measures include increased spending on energy research and development, preferential tariffs, and renewable energy targets. Public policy can also help in providing capital for renewable energy projects and in providing a reliable electricity grid to move energy over long distances. Reducing the cost of solar photovoltaic energy and the cost of energy storage (for example, batteries) are two key areas of technology development that can significantly reduce the cost of renewable energy in the long term.

With higher energy costs, buildings, transportation networks and manufacturing will be redesigned to use less energy. Most of the transition to renewable energy is likely to be achieved not by providing new sources of energy, but by rebuilding systems to consume less energy. This will be stimulated by higher renewable energy costs, as energy conservation is optimized where marginal energy conservation costs are equal to marginal renewable energy costs. Solar photovoltaic energy is sustainably available in almost unlimited quantities, and the marginal cost of solar photovoltaic energy is the upper bound of all energy costs. The final transition to renewable energy sources is inevitable, so the question is how best to manage it, minimizing the total cost of energy services plus the cost of damage caused by the use of energy. The combination of environmental and renewable energy sources will eventually replace the current energy system, which is dominated by fossil fuels. Addressing climate change suggests that it should happen sooner rather than later.

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