

## Future Power

Hybrid and electric cars and their refueling stations, aircraft, hydrogen, windmills, gardens, small local biogas, energy crops - which is already 20 years might look like energy landscape

Future energy scenario outlined in a lecture inaugurating the 65 academic year, Making the global energy conversion is - in the assessment of scientists - change civilization. The traditional perception of this domain through the prism of energy production gradually moving towards an accent on its management, as closely as possible, and at the same time economically and safely, to use its energy resources, using the latest technologies. To energy future are to make not only better and better technologies, energy production, but also solutions that protect the environment, ICT and biotechnology - all of these areas are to intersect, with the assistance of modern technology and appropriately changing legal regulations, in keeping with the principles of economics. Such energy, which is a synthesis of these fields, while benefiting from the synergies between them, called synergist. It is to forge a just fifth wave of innovation. Earlier waves, building in stages modern energy, in turn resulted in the development of coal power (since the invention of the steam engine), transport, based on crude oil, power system (including nuclear) energy and gas. Last wave of innovation in the energy associated with computerization and the Internet. "At the beginning of the twenty-first century is the time to reverse the order: to build a knowledge society by sustainable energy, providing the individual man and the world energy security and environmental concerns. Energy, matching the characteristics of the knowledge society" - Professor believes. In his opinion, the fifth wave of innovation will be the wave of the Energy-Environment-society, and its essence will be crossing borders between the three segments. Synergies (including savings and coordination), which should result from this, to build energy quite different from today. Synergist is to be the foundation of the hydrogen age - zero emission. According to Professor. POPCZYK, synergist Polish energy landscape will change - figuratively and literally. Already 20 years can ride through the streets of several millions of electric vehicles, using several million terminals (mostly private) for "refueling." The Polish landscape will be one thousand to many hundreds of solar collectors, heat pumps, photovoltaic cells and windmills gardens. Aircraft will be "refueled" from hydrogen. Fuel cells, including are common technologies. Going through - such as an electric car - the driver sees the road about 4.5 thousand. wind turbines on high masts (to the north are grouped in large farms after 30-100 turbines, south of small, medium in the center), but will not know that they give up to 9 thousand. megawatts of installed capacity, but only 900 megawatts of power flexible and produced only 18 current year. Observer - continues Professor - see 100 thousand on farms, for biodegradable waste and risk management for the purpose of food crops can give more than 2 thousand. megawatts of power and 15 annual production of electricity. The same observer will see the 3 thousand. individual biogas in rural areas, where energy will be cultivated maize and sugar. On such crops, farmers may spend up to 20 percent. land. Individual biogas plants have to give 3 thousand. megawatt of power and up to 45 of the annual electricity production. At the same time, if the proponents of biotechnology win the battle for the use of GMOs in agriculture, energy, and in 2030, will be able to offer hydrogen produced from biomass directly, without passing through the gas phase. Thus, scientist will be able to prepare for the publication of information that begins the era of the hydrogen society. University of Technology Professor. one of the most well known experts in this field. He said, energy is waiting, "the fifth wave of innovation" that will change the shape of the energy. Traditional sources of great energy undergo profound modernization - the old coal blocks will be replaced by new, with supercritical parameters, a much larger capacity and significantly larger, operate large plants clean coal technologies that produce synthetic gasoline, and hydrogen gases, synthesized, and the use of nuclear reactors as heat sources. Fuel from coal preparation to reach a network of distributed resources.