

SOVIET STRATEGY OF TECHNOLOGICAL ADVANCE

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Soviet science has many complex problems to deal within the present context of technological advance. But, perhaps, the most important one is to learn to resolve the most urgent of them within the shortest possible time and with utmost efficiency. To attain priority in fundamental research, complete research and development studies without delay and translate them into practice as quickly as possible is the task which must be accomplished within the shortest possible time.

Academic research must be all-embracing. But there are some applied lines which are largely instrumental in shaping up the nation's scientific and technological potential and economic strength.

Power Engineering—A Top Priority. The USSR is rich in energy resources. It has a sound scientific and technological base which makes it immune to any energy crisis. It is producing one-fifth of the world's total power output. Soviet Union leads the world in oil and gas production and direct heating, and ranks second as producer of electricity and coal. The USSR has a long-term Energy Programme under way, which indicates the major routes to follow in expanding and upgrading fuel- and energy-producing capacities.

Scientists engaged in this programme concentrate on nuclear power. The capacity of some nuclear power stations is to be brought up to six million kilowatts and that of nuclear-fired thermo-electric plants—the first major units of this type are under construction outside Odessa and Minsk—up to two million kilowatts.

Plans are afoot for a full-scale introduction of fast reactors to expand nuclear fuel reproduction. A nuclear power station with a 350,000 kW fast reactor has been in operation for years at Shevchenko, a town on the Eastern coast of the Caspian Sea. This station besides supplying energy to the city also feeds a commercial desalination plant. One of the world's largest generating sets driven by a fast reactor is operating at the Beloyarsk Nuclear Power Station. Its capacity is 600,000 kW.

Serious attention is given to nuclear fusion power and MHD-generator research also.

There is a host of other energy problems awaiting their solution, like new methods to use the hydraulic resources of rivers, high-capacity thermo-electric

plants to run on cheap coals of Siberia, the harnessing of the energy of the sun, wind and subterranean heat, devising and applying energy-saving technologies.

It must be noted that sometimes energy is not used in the best possible way. It has been estimated, however, that investing in thrift comes out cheaper by one-third to half than increasing capacity in the same proportion. That has promoted the idea of having nearly 60 per cent of the additional demand of the national economy for fuel and other energy-bearing resources. This problem is expected to be resolved not only by means of the commonly known technological solutions but also by some new technologies arising from latest achievements of fundamental research, like catalysts permitting lowering temperature of chemical reactions, better performance installations, and low energy-consuming patterns of production. The maximal possible combination of technological operations is yet another problem that brooks no delay. For example, combining the process of pig-iron smelting, steel production and rolling will save the energy used for multiple metal heating and smelting.

The Factories of Tomorrow. The technological revolution involves expanding automation. Overall automation does not only raise productivity greatly but also alters the man-technology relationship in the process of production, making it more constructive. The Soviet Union is developing automated production lines and diversified manipulators. Computer equipment is the heart and soul of modern production. About 800 computer-based automated processes will be started up in 1985 and production control systems are increased by 30 per cent. By the end of 1985, 1150 computerised miniprocessor control units for machinery, equipment and instrument automation will come into service affecting an increase of 57% over last year. The robotisation of production also depends on the development of computer technology and data reduction facilities. The USSR has thousands of industrial robots in operation, and hundreds of flow-lines using robots will be installed at engineering works in the course of this year.

A New Industry. Mention should also be made about some of the newest areas of biology, genetic engineer-

ing, microbiological synthesis and the production of physiologically active substances. The creation of yet another major sector of the national economy—biotechnology—is on the agenda. Microbiological synthetic factories today turn out 1.2 million tonnes of fodder protein. It is grown on the so called alkanes of oil and, partly, pulp hydrolysates. But fodder protein can also be obtained from microscopic seaweed and protozoa.

Genetic engineering, which is just a little over ten years old, has produced interferon and insulin, a number of hormones and valuable physiologically active substances. Soviet biotechnologists have learnt to produce the semi-synthetic antibiotics, most of amino acids, and many ferments. All these provide a solid groundwork for the continued advance in medicine.

Chemists are focussing on the problems of integrated mineral processing and producing new types of material with prescribed properties, metal alloys, silicates and other inorganic substances, various plastics and polymers. More research is under way on fine organic synthesis, basic for the production of medicines, pesticides and household chemicals.

Environmental Protection. The Soviet Union is also interested in the protection and rational exploitation of natural resources. Advanced sewageless systems of

water management are also being developed. The construction of installations to trap industrial gas and render it harmless will make it possible to trap up to 78% of harmful substances in 1985.

Integrated Target Programmes. The drafting and implementation of integrated target-oriented programmes is a feature of technological advance in the Soviet Union. This is going on parallel with a search for effective economic expedients and method of organisation to ensure that research findings are put into practice within the shortest possible time.

Social Aspects. National economic growth and effective fusion of the advances of the scientific and technological revolution with the advantages of the socialist organisation of society have led to the Soviet national wealth expanding 2.3-fold in the last 15 years. The average wages and salaries have increased by half as much again and the social fund has more than doubled during this period.

The school system in the USSR is being reshaped. In a matter of years, it will become as common for a school child to use the computer as read and write. The Academy of Sciences of the USSR has established an Informatics, Computer Technology and Automation Division and has also set up a number of research institutes for fundamental research in this field.

NEWS

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[(Deborah Cozort Day (Scripps Institution of Oceanography, La Jolla, CA) in *American Archivist* 48(1):56-63, Winter 85 [pd 2601j]. Reproduced with permission from Press Digest, *Current Contents*®, No. 26, July 1, 1985, p. 9. (Published by the Institute for Scientific Information®, Philadelphia, PA, USA)]