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## **"ENERGETICS XXI" PROGRAM AS A WAY OF SPREADING TECHNICAL KNOWLEDGE IN SCHOOLS**

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Abstract: Poland's industrialization level remains relatively high compared to the rest of Europe. Unfortunately, the technical education system (on the lower and higher levels) does not keep up with the number of engineers that today's industry needs. This is mainly due to the common opinion, repeated many times in the media, that there is almost no industry in the country. The article presents the project entitled "Energetics XXI" implemented by the Warsaw University of Technology, which aims to encourage young people to develop in the technical direction.

Keywords: industrialization, popularization of science, technology, energy.

## **ПРОГРАММА «ЭНЕРГЕТИКА XXI» КАК СПОСОБ РАСПРОСТРАНЕНИЯ ТЕХНИЧЕСКИХ ЗНАНИЙ В ШКОЛАХ**

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Аннотация: Уровень индустриализации Польши остается относительно высоким по сравнению с остальной Европой. К сожалению, система технического образования (на низших и высших уровнях) не поспевает за количеством инженеров, которое требуется современной отрасли. В основном это связано с распространенным мнением, многократно повторявшимся в СМИ, о том, что в стране практически нет промышленности. В этой статье представлен проект под названием «Энергетика 21 века» реализуется Варшавским Политехническим Университет, целью которой явля-

ется поощрение молодых людей к развитию в техническом направлении.

Ключевые слова: индустриализация, популяризация науки, технологии, энергетика.

Despite the predictions, the degree of industrialization in Poland in the last thirty years, defined as the share of industry in GDP, has not decreased as drastically as it has been in many European countries with the development of services. In the period from 2009 to 2019, it even increased slightly [3]. Figure 1 shows the percentage of industry in the GDP of selected European countries in 2019. The diagram shows significant differences between countries.

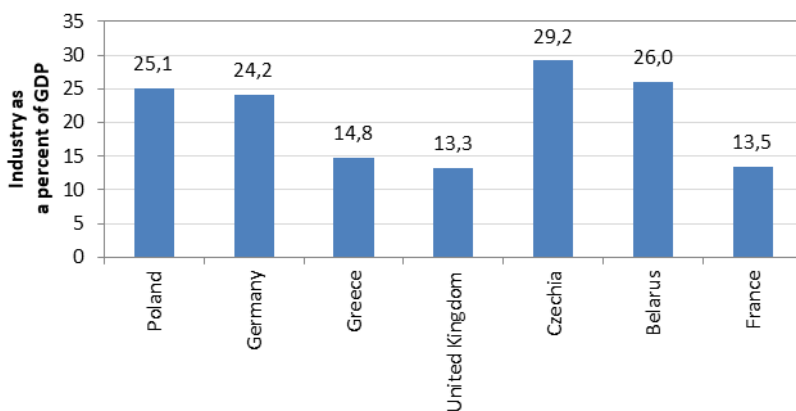


Fig. 1. The industrialization level of selected countries in Europe (without Construction) [1,3]

Nevertheless, the media information about the collapse of the industry caused a problem with education in technical faculties. At the end of the 90s, the vast majority of vocational schools and technical schools preparing for work in the broadly understood industry were closed in Poland. It also caused a drastic drop in the number of students at polytechnic universities. There is now a slow process of restoring technical education at both a lower and a higher level. It also requires the involvement of technical universities to popularize the technique. The

market shows a great demand for technical workers and engineers, which the education system simply does not generate [6].

One of the projects aimed at increasing the number of students of technical universities is the Energy of the 21st Century project, the aim of which was to interest young people in technology as such, in particular in energy. The energy department was chosen because the project is implemented by the Faculty of Power and Aeronautical Engineering of the Warsaw University of Technology, and also because of the changes taking place in the European and Polish energy sectors. Despite the improvement in the energy efficiency of all processes, energy consumption continues to increase. An even greater impetus for the development of the energy industry comes from the transition to the so-called electromobility, i.e. the use of electric cars. Climate changes and related restrictions mean that the power industry from large heat and power plants is moving to renewable distributed systems [2]. Added to this is the fourth industrial revolution - that is, combining everything into intelligent ICT systems [7]. All these aspects cause that employment in the industry is constantly growing, and at the moment the market is alarming about a significant shortage of specialists [5,6].

### **Project assumptions**

Popularization of science is significantly different from teaching at the academic level, and at the same time it is more demanding as the recipients are a younger age group.

Courses with students were held both at the University of Technology and in primary or secondary schools. The project "Energetics XXI" included such issues as: photovoltaics, wind energy, water energy, clean coal technologies, nuclear energy and energy efficiency. The classes were conducted both in the form of laboratory classes and lectures.

### **Conclusions from the project implementation**

- the young people who participated in the project managed to show that industry is a very large part of the economy and there are many jobs in it;
- during the implementation of the project, it turned out that the laboratory classes attract students more than any other form;

- classes should be organized in smaller groups - many schools teachers brought students from other classes, which meant that up to 40 pupils participated in them;
- the classes should take students no more than 2 hours a day - with longer classes it was difficult to focus their attention.

### **Summary of the project**

A sad conclusion from the implemented project is the fact that young people have little knowledge of technology and industry. And this thesis applies to every technical industry, not only energy. Young people have no idea what engineers graduating from Polytechnics do. After such a short period of project implementation, it is difficult to assess whether the effect of the project implementation is satisfactory. It will be possible to assess this only when the persons participating in the project are at the stage of choosing their studies. Nevertheless, it can be said that the issues of technology and engineering were introduced to students. The project should be implemented over the next few years. The effect should also be monitored 5-10 years after the start of the project.

### **References**

1. Belarus.by: The business environment in Belarus.
2. Czarnecki Ł.: Energy transformation in Mexico, *Energetyka* 6 (2020). – 289-291.
3. Eurostat, statistic explained. National accounts and GDP.
4. Hevko I. V.: Current Problems of Professional Training of Service Specialist, *Journal of Education, Health and Sport* 10(1) (2020). – 158-164.
5. Hetmański M., Rycerz J., Szwarec K., Jakub J.: Solidarność międzypokoleniowa w transformacji energetycznej. Opracowanie koncepcji dla Polski, *Elektroenergetyka: współczesność i rozwój* 1(20) 2019. – 32-40.
6. Money.pl: Praca po studiach inżynierskich.
7. Skrzypek A.: Components of 4.0 industrial revolution, *Problemy Jakości* 52(7) (2020). – 2-9.