



The key findings of the OSKA study of the **energy and mining sector**

The OSKA study of the **energy and mining** sector provides information about the demand and potential supply of labour force. The study answers the question of **how to change the supply of education and training to meet the need for labour force and professional skills of the energy and mining in the forthcoming 5-10 years.**

Energy and mining is a fast-developing and innovative sector with high added value. The sector is very important for the functioning of Estonian society and the national economy. There is a growing need for engineers and technicians in the sector, whereas the number of unskilled jobs is decreasing.

During the last ten years, the number of employees in energy and mining has decreased due to the modernisation and technological development. The demand for labour force has decreased over the years compared to the other industries.

The structure of the labour force is changing – the proportion of engineers and technicians increases, the number of skilled workers decreases and unskilled jobs decreases significantly. The demand for labour force shifts towards jobs creating higher added value.

Although the number of employees in oil shale mining is decreasing, the need for specialists with training in mining related specialities does not disappear, because the use of new mineral resources creates new jobs in the future. In the mining of peat and building minerals, the demand for the labour force will be rather stable. The employment decreases also in producing electricity from oil shale and shifts towards oil shale chemistry. The demand for labour force increases in the renewable energy sector. The employment decreases moderately in the maintenance of power networks and remains stable in the construction of networks and electrical installation.

Well-planned cooperation between companies, professional associations, education and training institutions and the state is necessary to promote the perspectives of working in the energy and mining sector and the interesting content of the work.

The age structure of the population changes in Estonia (and in the whole Europe): the proportion of young and middle-aged people decreases and the proportion of older people increases. Such demographic trends influence the supply of labour force significantly. The shortage of employees with suitable skills for the sector is substantial already now, the average age of employees is rather high, the specialities related to energy and mining are not popular among the youth and the number of graduates is smaller than the need of the labour market. The reasons are negative public opinion and complexity of the studies. The decrease of working force-age population and the aging of people employed in the sector require joint efforts of employers, professional associations, educational and training institutions and the state. Energy and mining needs to be acknowledged by the public as modern and attractive



sector with great future perspectives. It is necessary to introduce young people the up-to-date image of the specialities of the sector to find employees with suitable knowledge, skills and values for the employers of the sector.

The sector needs new labour force to replace the retiring employees, because 40% of the employees working in the main occupations are 50 years or older.

The problem of the sector is a large proportion of older employees, 40% of the employees working in the main occupations are 50 years or older. **The main occupations need approximately 280 new employees per year according to the prognosis – approximately 50 in mining and 230 in energy production, construction of power networks and electricity installation.** Based on the statistics of the last three academic years, **the potential supply of new labour force in the sector is 200-250 people per year, i.e. the number of graduates does not cover the demand for labour force in the sector.**

The new generation of mining, power, gas and electrical engineers is insufficient, because the number of entrants in energy and mining related specialities of higher education has decreased by half.

During the last five academic years, there have been approximately 30 graduates per year in the mining specialities of **higher education** (total of all academic levels) and 170-200 graduates per year in the electrical and power engineering specialities. **In the upcoming years, the number of graduates decreases significantly, because the number of entrants to the programmes in mining, power and electrical engineering has decreased by half over the last five academic years.** Therefore, the sector lacks employees qualified for engineering work and the problem is increasing significantly in the upcoming years.

Substantially more graduates with professional higher education are needed.

Some of the functions of skilled workers are shifted to associate professionals (technician) and therefore the need for specialists with professional higher education and level 5 vocational education increases. At the same time, the supply is substantially lower.

Future employees of the energy and mining sector need good general skills in addition to professional skills.

An important prerequisite of working in the sector are good professional knowledge and skills (e.g. geotechnology/mining; electrical engineering, energy). The experts propose that all employees in main occupations also need good general skills, most importantly:

- communication skills – presentation, argumentation, visualisation, consulting, communicating in foreign languages;
- management skills, incl. self-management, team management and project management skills;
- cooperation skills, incl. working in international teams;
- seeing the bigger picture.



It is necessary to consider the global trends in the development of the curricula.

The factors influencing energy and mining sector are diverse – political decisions, fast development and cheapening of technologies, constant growth of the proportion of renewable energy, energy prices in the world market, internationalisation of markets etc. The changes in the sector are therefore difficult to forecast. Thus, it is important that the study programmes of the specialities related to the sector become more interdisciplinary – it would give the employers an opportunity to choose a business model more flexibly, and the employees could combine specific knowledge of different professional areas. In addition, a more versatile preparation allows the employees better mobility inside one company or between different companies.

The trend of diversifying energy sources and increasing the proportion of renewable energy means a growing need for specialists dealing with renewable energy and creating added value to traditional energy sources. There are not enough control engineering and mechatronics specialists for wind and solar energy as well as for power engineering in general, and no study programmes for maintenance technicians of wind turbines. The trend is towards a greater integration of an electrician's job with automation, therefore it is important to consider combining the study programmes of electricians and control engineers.

The work environment and tasks performed change very fast. Therefore it is important for employees to have the potential to learn, grow and adapt, perform various tasks and work in different teams. The prerequisite for training such employees are curricula which allow it, e.g. offer the energy technicians an opportunity to acquire additional skills in management, financial management, IT and automation.

Knowledge and skills in IT and cyber security are becoming inevitable for the employees of the sector.

The development of technology sets increasing expectations on the knowledge and skills of all employees. Due to fast-developing technologies, all employees have to be able to learn and adapt to the changes. A continuing trend is automation, therefore the **need for good IT skills in all main occupations of the sector** is growing. Employees of the sector older than average need training in sector-specific IT skills.

Wider use of new technological possibilities (e.g. internet of things) brings along the need to ensure the **cyber security** of new technological processes and equipment (e.g. electrical equipment, heating and ventilation systems, etc.). The most important need for in-service training in the sector in the coming years also arises from fast changes in technology.