



**A**bout a new educational offer for students, prospects of eco- and electromobility development in Poland, and also about cooperation of the university with the transport sector enterprises Michał Wroński talks to Prof Rafał Burdzik, Deputy Dean for education of the Faculty of Transport, Silesian University of Technology.

# There is no move away from eco- and electromobility

Therefore personnel should be educated already today

**Electromobility captures the next bridgeheads. It is the subject of discussions at conferences, in the government and local governments, and now your students will learn about it ...**

About it, but not only about it. From this academic year we have started two new specialities in the Faculty of Transport. One is the road transport and forwarding, which has already been working and in which the first group of students has recently started classes. While eco- and electromobility is the second one.

**So you have integrated with the governmental programme of electromobility in Poland.**

In fact, we have started to work on that earlier, than the programme has originated. We were ahead of it.

**So congratulations!**

Its only drawback was that now we have to do that using own resources and with the assistance of our

partners. Because the work on starting this speciality lasted for almost a year. At the university we have appointed a special team, comprising representatives of nearly all departments interested in this field of education. We have consulted that also with external companies. Finally the syllabus was approved during the Faculty Council meeting on 22 June and from 1 October it is offered to students as a speciality on the second degree. However, whether a group will start, we will see after the first semester.

**So this is not an offer for new secondary school graduates?**

No. We made a decision that this speciality will appear only on the second degree of studies. If someone would like to learn eco- and electromobility without the basic knowledge of vehicles structure and operation, that would be a major challenge for such a person.



Because today there are many reports on the electromobility implementation, however there is still a shortage of knowledge about the way of these vehicles maintenance, of such vehicles fleet management, of creating operational policy for a large fleet of such vehicles, of supplying the entire operational and maintenance facilities for those means of transport

◆ **What people interested in studying this speciality should know about it? How long the studies will last?**

This will be a three-semester course, where semester one will comprise the common subjects. Subjects related strictly to the speciality will appear only in the next two semesters and that will be a period of very intensive learning. The scope of eco- and electromobility comprises as many as 19 subjects, and each of them consists of two or three modules – there is always a lecture and classes or laboratories. The number of class hours will be great, indeed.

**So how the path looks like, which would allow students (or still pupils of secondary schools) interested in those new specialities to start learning them?**

First of all, those who still think about studying at our university, must know that now the technical higher studies in Poland are divided into three stages: stage one are engineer studies, in stage two – lasting three semesters – the title of M.Sc.Eng. is obtained, while stage three are doctoral studies. In this specific case, students on the first stage can select speciality ‘motor vehicles operation’, during which they learn basic knowledge in the field of motor vehicles operation. On the second degree they will be capable of continuing learning in the field of motor vehicles operation, but they can also conclude, that it would be worth to narrow their speciality a bit and to get involved in the electro- and ecomobility in vehicles. In turn, in the case of road transport and forwarding the students on the first degree of studies can select the speciality ‘technology and management in the road transport’, while on the second degree they can continue it, but they can also narrow it to the ‘road transport and forwarding’. It is worth also emphasising that these specialities are open as well to graduates of courses related to the machine design or electrical engineering and mechatronics.

**The more talks about e-mobility, and recently there is a lot of them, the greater will be probably students interest in this speciality.**

This time is now valuable for us. Each month provides a possibility to modify our teaching facilities.

We try all the time to expand them so that these subjects would be delivered with due care and with a good quality. Each week, allowing us to develop those facilities, makes that the classes will be better delivered. And companies willing to help in the teaching facilities expansion call us on their own. The response we have received is already big, but if anybody would know that (s)he can still add some contribution into the development of young engineering staff and support us in this process, in particular in the field of teaching facilities, then we are still open, of course.

**If it starts, the first graduates will enter the labour market in 2019. So they will probably hit the coming electromobility boom.**

I think the boom already exists. But now it is visible at the stage of procurement decisions. Anyhow, it would be good, if they are made with basic technical knowledge, because otherwise it can turn out that we have bought too much or too little of something, unnecessarily or we have simply wrongly diversified the fleet. But referring to the boom in the market, it will multiply, when the operational issues will start.

**So you assume that graduates of this speciality will be on the one hand – simplifying a bit – designing electric vehicles, and on the other hand – be involved in their operation?**

I think that even more often they would go to companies operating such vehicles. Because today there are many reports on the electromobility implementation, however there is still a shortage of knowledge about the way of these vehicles maintenance, of such vehicles fleet management, of creating operational policy for a large fleet of such vehicles, of supplying the entire operational and maintenance facilities for those means of transport. And what we are going to do, when the period of practical operation will end and we will have to think about recycling, which for electric vehicles is a major challenge, even as of today.

**So the education of designers will not be a priority?**

In the syllabus we have several subjects, which are dedicated to designing, manufacturing of assemblies or sub-assemblies or even of entire vehicles. However, we will be more interested in the operation, because in this field we have definitely much greater experience and it will be easier to do for us. Over time – if the market of electric car manufactures expands – it is very likely, that we will move towards reaching both designers and construction engineers. For the time being the truth is that in Poland there is no R&D area in the automotive sector. Let us hope that it will change and after some time we will have more research-design centres in the country.

**Let us go back now to the stage of these new specialities start preparations. What was the origin of the impulse, if – as you have told – this was not a response to the governmental programme?**



Photo Arkadiusz Lawrywianiec

In the case of transport and forwarding the matter was certainly simpler. We had clear declarations of forwarding sector representatives and specified market needs. We saw that this sector is short of professionals educated in this very speciality, but at the same time with a great technical knowledge. Companies signal that people working now in such positions are frequently short of technical knowledge, experience and skills of live interpreting the transport process and of used means of transport. And if we had clear signals from the sector and the stated needs, then together with large forwarders we tried to arrange the syllabus in such a way that it corresponds to the actual market needs. I think we have succeeded. Anyway, one of larger forwarding companies – JAS FBG – became our partner in the field of this speciality. It will equip laboratories and its staff will deliver classes for students.

**Was the situation different in the case of eco- and electromobility?**

In this case the impulse did not originate from the market, but from us, from the university. This results from the fact that the market needs are not that well defined yet. This market will appear only then, when the number of such vehicles will be substantially larger and decisions on the operation and maintenance will be much clearer. However, we have decided not to wait. More than a year ago – having analysed the syllabuses – I have realised that there is still no such speciality or course in Poland. I knew that it is a developing course and that a highly educated engineering staff will be those persons, who will be responsible for the pace and quality of e-mobility implementation in Poland. So it was important that we would be the first to offer such speciality of studies. Therefore I did not wait for a company to call us and tell: we need professionals. And that was right, because as it has turned out during the syllabus preparation, it was difficult to find companies aware of their needs

*Pursuant to the European Commission provisions by 2030 at least a half of collective public transport should be carried out by means of means alternative to those with combustion engines. Photo: Electric bus charging in PKM Jaworzno*

to the extent, that they could clearly define and indicate the market needs, which will arise.

**Companies did not believe very much in the e-mobility success?**

It is difficult to refer here to categories of belief in the success or its lack. We are just forced to go this way. Analysing what is going on in the European Union transport policy, as early as in the 1990s it was known, that we would be heading towards the reduction of harmful transport impact and its external costs cutting. European Commission provisions stipulate that by 2030 at least a half of collective public transport should be carried out by means of vehicles alternative to those with combustion engines. In 2050 the latter must be entirely eliminated from the public transport. In this situation an electric drive is a natural solution, but not only – hence the speciality name. So we knew that this is the direction, which we would have to follow. The more so that when last year Deputy Prime Minister Mateusz Morawiecki defined the economy development strategies, he clearly indicated the necessity to develop an innovative automotive sector.

**So what is the origin of the business resistance?**

Companies were not prepared yet to enter the area of education on a university level, and even on the second degree. They do not have any experience in this field. For example Toyota, one of eclectic cars sector leaders, have developed programmes for education and cooperation with schools, but on the secondary school level.

**Nobody became convinced to enter this programme?**

◆ It was difficult, but that does not mean, that the discussions failed. If we look at the subject timetable we will notice that it comprises subjects, which will be delivered together with enterprises. Two subjects will be delivered in cooperation with the Tychy Public Transport Enterprise – our students will be servicing CNG-driven buses. We are also going to cooperate with the JAS-FBG company, which will support us in the field of *ecodriving*, and with Scania. Despite the fact that the topic is still not very well recognised, we could develop together with companies such subjects, that compose a whole.

### **So to what extent the studies will be carried out within the university, and to what extent outside it, in companies, which decided to start cooperation with you?**

Already at the stage of creating both these specialities, i.e. eco- and electromobility and road transport and forwarding we assumed that the involvement of external practitioners will be much higher than in the

### **IN THREE STEPS TO ONE MILLION OF E-CARS**

In March this year the government adopted the *Plan for Electromobility Development in Poland*. The document defines benefits related to the dissemination of electric vehicles in Poland, indicates the economic and industrial potential of this area, and also comprises proposals of actions, which should result *inter alia* in the development of electromobility related industry. At the same time it emphasises that the industry, enterprises, financial institutions, as well as the world of science and NGOs have all to get involved in this sector building.

The strategic objective of the plan – as emphasised by the Ministry of Energy – is ‘to create conditions for Poles’ electromobility development, to develop the industry related to this new sector, and to stabilise the power grid’. The ministry assumed that the electromobility should develop in three phases, which will differ in the degree of market maturity and of the state involvement. The first (till 2018) should have a preparatory nature – during this time regulations serving the electromobility development and the directed public financing should be created. In the second phase (2019-2020) in selected conurbations an infrastructure for electric vehicles supplying is to be constructed, also incentives to buy electric cars should be increased. Moreover, the commercialisation of the results of research in the field of electromobility started in phase one, as well as the implementation of new business models for electric vehicles dissemination are expected. Instead, in phase three (years 2020-2025) – as assumed by the ministry – the electromobility market in Poland will reach that great maturity (there is a reference to one million of electric cars), that it will be possible to gradually withdraw the support instruments.

This plan, together with the national framework of the alternative fuels infrastructure development policy, provided the basis for the work on the bill of electromobility and alternative fuels presented at the end of April (now it is at the stage of consultation, the ministry of energy counts, that the law could take effect already next year).

other cases. Now we have a situation that three or four subjects will be delivered in cooperation with the industry, and I think that the entrepreneurs share will be growing. The studies will be accompanied by a developed programme of training and traineeships. However, the involvement of entrepreneurs in the process of those specialities education must be limited, anyhow. And it is for two reasons. Firstly, these are specialities in the course of transport, which has a general academic profile, and in accordance with the current guidelines in force at the Silesian University of Technology, dual studies can be established only on a practical course. For example, this is the case of the railway transport course, which we have at our faculty. It is a practical course, and as a result the involvement of entrepreneurs in the education process is higher there. While the second reason, for which the involvement of companies in the ‘eco- and electromobility’ and ‘road transport and forwarding’ is slightly limited, results from the very attitude to teaching. This is a university, its graduate is not an employee of specific company, but enters the labour market and can choose offers of many companies. So far we were lucky to cooperate with enterprises, which were aware of this fact. However, in numerous companies it happens, that the employer requirements are highly narrowed only to their own issues. And such a graduate, completing the course, is then an excellent employee, but only in this company. If (s)he is in another environment, where issues are different, then (s)he will not have that developed general knowledge, to quickly be oneself again and adapt. We – as a public university – have our mission and it is very important for us that our graduates would very well and quickly adapt to the conditions of work, and that they could apply the acquired skills in various areas. They must resolve problems well, which are not always repeatable to the same extent. We want the creating of these new specialities to be not only the development of a product for a company, but to develop a product for students. To offer them a good education, on a high level, with a broad spectrum. Directed, but broad. And that was the second restriction.

### **Have any companies already declared the willingness to employ graduates of this speciality? In many technical courses students, who still have not completed their studies, have already ensured jobs in enterprises.**

In the current situation on the transport market this no longer works. We should remember, that today we have an employee market, and in the transport and forwarding sector this trend is probably even more visible than elsewhere. Our graduates now do not have any problems with employment. Therefore you cannot encourage anybody to study a given course only because (s)he will have a job in some company. This is not the time. Such people want to have a choice of five companies after the graduation. We will give you a lot, we will be actively participating in the education, you will be able to use



our programmes, to come to us for classes, and perhaps later you would choose us – the current situation can be summarised in this way. One more thing works for the benefit of our graduates – businessmen frequently admit, that sometime they have employees, who graduated e.g. in social sciences, who very quickly become oneself again in the company realities and who are proficient in languages, but the first technical issue reveals their lack of knowledge. And those businessmen say now: after all, we prefer an engineer, who has such knowledge. To have in the team at least a few persons with technical education and not to make mistakes, which cannot be detected on a piece of paper, but which show up during the transport process.

**Deciding for the role of a kind of pioneer, you have gained an opportunity to outdistance potential competition on the educational market, but on the other hand you take on the related risk.**

It is a fact that we are on this stage, on which science was not for quite long. Because in the field of marketing or logistics the situation in recent 20-30 years looked this way, that first something was working in a company and then a conclusion was drawn that it is necessary to start teaching it. Instead, in this case we will teach something first and only later we will implement it in the reality, observe, and correct. Things, which young people will learn here, they will only verify in reality, not the other way round. We are aware of that and we are aware of the responsibility, which we bear right now. Therefore we made an assumption, that if these are quite new issues, then we will have to refresh the syllabus much more frequently than syllabuses of other specialities, which are taught by us already for 20-30 years.

**Talking about the new educational offer you strongly emphasise the issue of 'ecomobility'. It has also appeared in the specialisation name itself. What is the reason for such focusing on this issue?**

*Photo: Presentation of hybrid buses newly purchased by PKM Sosnowiec. June 2017*

Many people were saying to not add this 'eco', because it is not necessary. However, from the very beginning, preparing together with companies the template of this speciality, we knew that it cannot be electromobility – as it is frequently presented in the media – but just e-mobility. We should remember, that e.g. the transport companies have been investing for years in solutions, which contribute to the emission reduction, although they do not meet criteria of electromobility. Therefore it is also important, that the syllabus of this course would comprise the analysis of solutions not necessarily using an electric drive, but also such ones, which by the application of alternative fuels or other types of equipment reduce the harmful emission to the air. We refer here, among other things, to CNG and LNG drives or hydrogen cells. Hence we have introduced the term of ecomobility from a broader perspective, being the combination of three areas of benefits – electromobility, ecomobility, and transport economics. It is important to talk about the economic aspect of eco- and electromobility. We should remember that carriers will have to face new requirements in the 2020-2050 perspective, but if they cannot afford that...

**... then will they shift the cost onto passengers?**

If we fight for more people travelling by the public transport, and not less, then such policy definitely cannot be implemented. This will simply not work. Therefore it is important to make such decisions consciously and hence this third area, i.e. the transport economics. The point is to convince both carriers and the public that it is worth investing in more innovative solutions, in e-transport. And they should be convinced by three aspects: you will poison less, you will travel cheaper, and if you can afford – you will drive a plug-in car. I think that then such impacts will be much more effective. ■