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Innovation of Energy Sector in Slovakia: high hopes without strategy?

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The Slovak Republic is a Central European country with an industry-intensive economy focused mainly on machinery and automotive production, with big potential for further grow in the sector. In 2017, yet another big company started building a factory in Slovakia—Jaguar Land Rover in the western Slovak town of Nitra.

A growing industry is the main reason behind the growing energy consumption in Slovakia, especially electricity. Electricity consumption was 30.103.000 GWh in 2016 and the trend has been growing steadily since the lowest point in the year Slovakia became independent, 1993, (24.497.000 GWh). There was a drop in consumption because of the global economic crisis in 2008, but since then the consumption is growing again and is now above the pre-crisis level.[1]

With the prospect of consumption in Slovakia being that of a continued growth, it is important for the Slovak economy to ensure the stability and security of the energy sector. At the same time, the need to reduce CO_2 emissions arises. Even though the International Energy Agency states that there has been a sharp decline in greenhouse gas (GHG) emissions since 1990, 'the Slovak Republic remains a GHG-intensive economy by OECD standards, with energy-related CO2 emissions accounting for over 70% of total GHG emissions.'[2]

[1] http://sepsas.sk/Vyroba_Spotreba.asp?kod=568

[2] http://www.iea.org/publications/freepublications/publication/energy-policies-of-iea-countries---the-slovak-republic-2012-review.html

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According to the IEA,[3] the drop in emissions was primarily the result of the decline of economic activity and industry. Since the economy and industry are now growing, it is vital for Slovakia to push for use of more efficient technologies to reduce the energy demand and for a larger share of renewables in electricity generation.

According to Slovenské elektrárne, as much as 90% of electricity produced in Slovakia is generated without greenhouse gas emissions.[4] That includes energy from nuclear, photovoltaic, hydroelectric and biomass sources. IEA states that in 2016, from total Slovak electric energy generation, 57% was generated in nuclear power plants, and 25% from renewables (biofuels and waste, hydro and solar).[5]

Nuclear power and renewables will play central roles in the Slovak Republic's transition to low-carbon production of electricity that will meet the country's economy and industry requirements for growth. According to the IEA, 'significant efforts can also be made to improve energy efficiency, especially in the transport and building sectors'.[6]

This paper will sum up the Slovak government's approaches and strategies to support these transitions, especially by focusing on energy efficiency and innovation in the energy sector. The paper will take a brief look at the transport sector. As Slovakia's economy and industry stands on automotive production, electromobility seems like a special field of opportunities for the country. The paper will also sum up the regulatory environment in the country and the research efforts in Slovakia, with focus on EU funded research and innovation projects.

Government strategies towards the innovation in energy

Despite the fact that research and innovation are the cornerstone of a successful low-carbon energy policy, the Slovak Republic does not have any official strategy towards innovation in the energy sector. The principles, which should be the major part of such a strategy (transformation towards less energy-intensive industries, energy efficiency, low-carbon energy generation and usage of renewables), are nonetheless part of the other energy-related strategies that Slovak governments approved in the past or that are in the process of being drafted this year (2017).

The first such document is the Energy Policy (2014).[7] This strategic document, which defines the main goals and priorities of the Slovak energy sector until 2035 with perspective until 2050, was approved in November 2014. It reflects the basic pillars of the EU energy policy and defines them as the pillars of the Slovak energy policy: energy security, energy efficiency, competitiveness and sustainability. It also reflects the goals set by the EU Action Plan for Energy Efficiency[8] set to be achieved until 2020: to save 20% of annual consumption of primary energy by 2020 (compared to the energy consumption forecasts for 2020); to reduce emissions of the GHG by 20% until 2020 when compared to the 1990 emissions; to increase the share of the renewable energy sources to 20% by 2020; and to achieve 10% of renewable sources of energy in transport by 2020. In the strategy, Slovakia defined that it will achieve these goals and further until 2035 by focusing on a strong, centralised energy sector built on the potential of nuclear energy.[9] It does not, however, address the problem of energy innovation directly.

[3] http://www.iea.org/publications/freepublications/publication/Slovak2012_free.pdf Page 37
[4] https://www.seas.sk/key-information
[5] https://www.iea.org/media/countries/SlovakRepublic.pdf
[6] https://www.iea.org/countries/membercountries/slovakrepublic/
[7] http://www.rokovania.sk/File.aspx/ViewDocumentHtml/Mater-Dokum-168597?prefixFile=m_
[8] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:l27064
[9] https://www.energiaweb.sk/2015/05/11/energeticka-politika-sr/

Based on the goals set by the strategic document Energy Policy and by the EU Directive 2009/28/ES, the Ministry of Economy of the Slovak Republic publishes in reports on the progress in the promotion and use of energy from renewable sources. The latest accessible one from 2015[10] states that the total share of renewable sources of energy in the energy consumed in Slovakia in 2014 was 12.7%.

Based on these documents, we can also identify what the Slovak approach is in terms of regulatory environment. There are several regulatory measures approved by the government that aim at increase in the usage of renewable energy sources.[11] For example, in the area of transport, it is mandatory to add bio additives to fuels, or that there are guaranteed prices for electricity produced by bio methane (and other renewable sources). Again, it seems like the focus is not on research and innovation.

Today, there are two big strategies being prepared by the Slovak ministry of environment, that will have a direct effect on the innovation in the energy sector in Slovakia by pushing for more clean and renewable energy sources to be utilised: Low Carbon Strategy for 2050 and Environmental Policy Strategy for 2030. They are both linked to the Sustainable Development Strategy from 2002, which was the last strategy of this scale in Slovakia. According to Norbert Kurilla,[12] the state secretary responsible for drafting these strategies, the linkage of the strategies with innovation in the energy sector is clear. 'The Slovak economy depends on heavy and energy intensive industries and we must protect them sufficiently provided their investments go into modernisation, innovations and clean technologies.' Because the Slovak economy is dependent on energy intensive industries but at the same time Slovakia is setting its goals toward decarbonisation, the only viable strategy is to move towards clean and renewable energy sources: 'The decarbonisation trend in energy and industry is unstoppable. We have approved global documents like the Paris Climate Agreement and the Sustainable Development Goals. We also see bottom-up initiatives. The innovation potential is clearly present—energy efficiency translates into a growing focus on clean energy.' Even in the scope of these new strategies, it still seems like the focus of Slovakia will not be on the research and innovation, but rather on more extensive usage of known technologies, such as nuclear energy: 'Concerning the energy sector, we hope that Mochovce [two new nuclear reactors – ed.] will be finished two years from now and 80% of our electric energy will then be carbon-free. And in 2030, almost the entire energy sector will be carbon-free.'

Both strategies are being prepared with primary focus on air quality protection in the context of the changing climate. According to Kurilla, the Low Carbon Strategy will be based on a low-carbon study prepared in cooperation with the World Bank 'which will identify the potential of CO_2 reduction in specific sectors, including energy'. The Environmental Protection Strategy will cover seven themes and is being prepared by over 150 experts and should be approved by the Slovak Government before the end of 2017. Low Carbon Strategy should be much wider than the Environmental Protection Strategy and will cover areas: economy, industry, energy sector, transportation, agriculture, housing and waste. It is being prepared to be compatible with the Slovakia's climate-energy strategy within the Energy Union that needs to be submitted to the European Commission by 2019.

[10] http://www.economy.gov.sk/uploads/files/DuDNSQPK.pdf
[11] http://www.economy.gov.sk/uploads/files/DuDNSQPK.pdf, page 6–7
[12] https://setplan2017.sk/index.php/news/993-slovak-state-secretary-decarbonisation-of-the-energy-sector-is-unstoppable

The goals of both strategies are that by 2030, 'almost the entire energy sector will be carbon-free,' which suggests that by 2030, Slovakia will no longer be burning coal. That, however, brings to the table several other socio-economic challenges which, together with the absence of a clear research and innovation strategy, creates concerns about the viability of Slovakia's general state approach towards the transformation of the energy sector.

The perspectives of the development of electromobility

Slovakia is one of the countries of Central Europe with its economy based on the construction industry, with the automotive industry playing the leading role. It is the largest producer of cars per capita in the world since 2007.[13] In 2016, the automotive industry produced approx. 1.04 million cars.[14]

Automotive holds a share of 12% of the GDP, which accounts for 44% of the total industrial production in the country.[15] It also creates 35% of the country's industrial export and creates over 80,000 jobs directly, with the number of jobs created indirectly reaching over 200,000.[16]

Therefore, it is in the vital economic interest of Slovakia that research in the area of electromobility takes place within its research capacities and that innovation takes place within the production capacities already existing in Slovakia, so that new types of transport and EVs, which are the future of the automotive industry, will be produced in Slovakia. The producers, however, until now show only limited interest in placing their electromobility-oriented production in Slovak factories.

The most notable from the producers established in Slovakia is the case of Volkswagen. In its Bratislava-based factory, it has been building the hybrid model of Touareg since 2010.[17] Moreover, it is about to launch the production of the Q8 hybrid SUV starting next year.[18] The most notable is the current production of the e-Up! EV model. As the image of the brand has suffered notably because of the 'dieselgate' scandal, the brand is now trying to use these vehicles to improve its public perception, also by supporting several smaller projects as the first car-sharing initiative in Bratislava 'Up! city' [19] or lending the e-Up to the Slovak police for testing.[20]

Other car producers in Slovakia, however, do not seem interested in establishing or redirecting their construction capacities in SR to the future technologies. Peugeot-Citroen reacted to inquiries by citing their La Rochelle (FR) city project and stating that they are offering two models of EVs in Slovakia—neither of which is produced in Slovakia. They refused to comment on their future plans.[21]Kia commented they are selling plug-in hybrid and hybrid versions of Nira and Optima models as well as Soul EV model. None of the models or electric motors or hybrid aggregates are produced in Slovakia.[22]

[13] http://www.industryweek.com/global-economy/slovak-car-industry-production-almost-doubled-2007
[14] https://spectator.sme.sk/c/20436752/slovakia-again-breaks-car-production-record.html
[15] Data for 2015, http://slovakia.speedchain.eu/files/uploaded/UserFiles/2016%20SK/prezentace/zap.pdf
[16] Data for 2015, http://www.teraz.sk/ekonomika/na-slovensku-sa-vlani-vyrobilo-viac-ako/175550-clanok.html
[17] https://byznys.ihned.cz/c1-42367580-seznamte-se-touareg-hybrid-made-in-bratislava
[18] http://eautoportal.sk/audi-q8-vyroba-bratislava/
[19] https://auto.sme.sk/c/20575090/v-bratislave-sa-rozbieha-car-sharing-mozete-si-pozicat-elektricky-up.html
[20] http://www.teraz.sk/slovensko/policia-vw-sluzobne-auto-vymena/81882-clanok.html
[21] E-mail communication with PSA Peugeot Citroen spokesperson in Slovakia Ivana Orvinska, 17.10.2017
[22] E-mail communication with KIA Motors Slovakia spokesperson Jozef Bačé, 17.10.2017

One of the reasons behind the limited interest of producers might be the limited capacity of the government to promote electromobility, either by making it popular within its population to create an interesting market for producers, or more importantly, by promoting the research and innovation in the area within its universities to create an interesting workforce for the producers.

The government approved the Strategy for the Development of Electromobility in Slovakia[23] in 2015. It recognised the potential of Slovak industry for the development of the innovative EV technologies and some strategies to promote electromobility have been introduced: The pure EVs pay the lowest amount for the registration tax, €33. That is the same amount as traditional gas or diesel vehicles of the lowest power range. They are also exempt from the annual circulation tax. Hybrid owners are paying circulation tax reduced by 50%.[24]

The most notable incentive from the government is the provision of subsidies to the sales of electric vehicles (€5,000) and hybrids (€3,000). The plan started in January 2017 for the duration of 1 year, with the goal of promoting the sale and registration of 1,000 EVs.

The result so far is that the number of EVs on Slovak roads doubled. However, it is seriously underperforming in relation to the original goal—during the 10 months of 2017, only 370 EVs were registered in Slovakia. Slovak Electric Vehicles association is asking for an extension of the plan nonetheless,[25] the government is considering it.

The government strategies so far have shown little success and most of the drive for EV introduction in SR derives from pure economical interest of the brand that tries to associate itself with 'clean' technologies after the 'dirty' affair. What is furthermore important is that according to PSA, the subsidy from the government is relatively small and only finance-oriented. More benefits in the fields of tax deductions, free parking etc., would be beneficial.[26] Another issue of its own is the development of the charging stations infrastructure.

Research and innovation projects in Slovakia

With the limited activity of the state in the sector of energy innovation, it is mostly private companies that are paving the way and creating avant-garde in business in the area. Many times, they achieve that also with the support of financial instruments of the European Union.

One such example is the Greenway company, which focuses on the problem identified above—the lack of charging infrastructure that would increase the possibilities of electromobility in the country. The company came with a vision of improving the quality of environment by creating the network of charging stations across Slovakia, because most of the pollutants in the air come from transport.[27] The company was financially supported by the European Union's Connecting Europe Facility: 'a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level.'[28] Now it operates 20 fast-charging stations placed around main roads and highways in Slovakia. It also provides services such as the installation of own charging stations for customers and/or adding them into their network. The company has proven economic viability of the business model based solely on the development of electromobility.

[23] http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=24933
[24] https://www.acea.be/uploads/publications/EV_incentives_overview_2017.pdf
[25] http://www.seva.sk/images/SEVA_Podpora%20EV_otvoreny%20list.pdf
[26] E-mail communication with PSA Peugeot Citroen spokesperson in Slovakia Ivana Orvinska, 17.10.2017
[27] http://www.greenway.sk/kto-sme
[28] https://ec.europa.eu/inea/en/connecting-europe-facility

Another notable example from Slovakia is the GA Drilling company, which focuses on the development of a new milling and drilling technology they call 'PLASMABIT,' with potential usage in mining for minerals, oil and gas, and also in geothermal energy. The company implemented eight research and development projects funded by the Horizon2020 Framework Programme 7 (FP7) integrated projects, cross-border and national projects and structural funds of the European Union,[29] which makes it one of the top Slovak researchers in the area of energy research and innovation.Horizon2020 is also one of the most important instruments for research, development and innovation in Slovakia, with 27 projects being currently funded in Slovakia.[30]

Conclusion

Slovakia is a growing economy with growing appetite for energy. The bulk of the economy is based on the energy-intensive industry, with automotive being the most important part of it. Therefore, Slovakia is focused mainly on the energy security. At the same time, Slovakia has adopted international and EU commitments such as the Paris Agreement and EU Energy Efficiency targets, and is confident it can achieve no-carbon electrical energy production by 2030, as should be specified by upcoming grand strategies: Environmental Protection Strategy and Low Carbon Strategy. With the automotive industry playing such a huge role in the Slovak economy, it is natural that Slovakia cannot underestimate the role of transport transformation towards electromobility and should aim for high numbers of EVs on the roads as well as in the factories, to keep the automotive production even after the transformation, unless it wishes to meet 'the end of Detroit'.

However, with hopes set high, the reality seems to fall behind. It seems that Slovakia is seriously underestimating the role of research and innovation in the energy sector. In energy production, it is focused on the centralised system and utilisation of big nuclear power plants. Renewable sources seem to be underestimated and research in the area is lacking. The situation is similar in the area of electromobility, where the Slovak government tries to promote EVs through subsidies, but the policy is seriously underperforming even against already uninspiring goals. Research and innovation oriented activities are again missing.

There is no grand strategy being prepared for energy innovation in Slovakia and if there are research and development projects being implemented, it is more likely by private firms than by state institutions. The situation seems to be a sad reflection of the poor conditions that science as such operates in Slovakia in general.

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[29] http://www.gadrilling.com/research-projects/
[30] http://cordis.europa.eu/projects/result_en?q=(contenttype%3D%27project%27%20OR%20result/relations/categories/resultCategory/code%3D%27brief%27,%27report%27)%20AND%20programme/code%3D%27H2020EU.3.3.%27%20AND%20relatedRegion/region/euCode%3D%27SK%27