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IMPLEMENTATION OF BILLING SYSTEM AT ELECTRICAL VEHICLE CHARGING STATIONS IN ELEKTROPRIVREDA BIH

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Abstract: Electromobility is strongly encouraged in the European Union. Elektroprivreda of Bosnia and Herzegovina (EP BiH) is the only company in BiH that uses Charge Point Management Software. To ensure a functional process of calculation and billing of charging consumption, it is necessary to implement appropriate software solutions. This paper provides a comparative analysis of possible models of ad-hoc charging at electric vehicle charging stations. As a result of a comparative analysis of the advantages and disadvantages of each of the observed variants, a more detailed description of one selected model was given, which, due to its characteristics, as well as readiness for quick implementation in existing environment of EP BiH, proved to be the most adequate solution for business requirements of the company. The paper describes the economic effects of the introduction of the selected billing model, as well as the tariff model for charging.

Keywords: CPMS, electromobility, electric vehicle charging stations, mobile application, ad-hoc payment, pay as you go

INTRODUCTION

The need to introduce a payment system at EP BiH charging stations can be seen from several angles [1].

First of all, in the previous 2-3 years, payment of charging of electric vehicles (EVs) at charging stations was introduced by all major operators of charging stations in Croatia and Slovenia. Charging in BiH is still free at the vast majority of charging stations.

Secondly, EP BiH invested money in the construction of a network of EV charging stations, and it is necessary to pay back the investment through collecting payment for the charging. The costs of the DC charging station are especially high, which, in addition to the cost of the investment, also bears the cost of land rent to JP Autoceste FBiH, as well as the high electricity bill caused by the high peak load that is withdrawn during charging of 50 kW. Therefore, the first priority is to introduce a billing system at DC charging stations. Another reason is that for a DC charging station, drivers will very likely be willing to pay for an 'exclusive' fast DC charging service, available only at a few DC charging station locations in Bosnia and Herzegovina. For slower AC charging, however, the challenge is to introduce a billing system and expect drivers to pay for the service. The main reason is that charging at almost all AC charging stations is still free and a very likely assumption is that, in the event that charging payment is introduced at EP BiH AC charging stations, the drivers would just switch to charging at another nearby AC charging station that is free. However, this should be looked at in the long term, because the introduction of a billing system at a few AC charging stations will lead to a greater number of AC charging station owners wanting to introduce payment. This is in accordance with the experiences from Croatia and Slovenia, where along with payment at DC charging stations charging payment was introduced at AC charging stations also, and charging is paid for at most AC charging stations today.

Thirdly, EP BiH already has a client who requests that charging should be done through EP BiH, which is an additional motivation for EP BiH to introduce a payment service at charging stations as soon as possible. This business model is not a novelty, but an opportunity for EP BiH to develop this model and position itself among the first ones on this market. An example is HTelekom, which has a very small number of its own charging stations in the system, rather it focused more on the inclusion of third-party charging stations in its system.

This paper is organised as follows. After the Introduction, in Section 1 regulations in the field of electromobility in EU countries is presented. Section 2 explores billing and payment collection models in charging stations, such as RFID cards, POS terminals, as well as mobile application model with certain process flow. Economic effects of the introduction of the selected calculation and billing model is explored in Section 3, while Section 4 gives the conclusions.

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1. REGULATIONS IN THE FIELD OF ELECTROMOBILITY IN EU COUNTRIES

After the European Green Plan was announced in 2019, the EU is now working to reduce greenhouse gas emissions from traffic by 90% by 2050 compared to 1990 levels. Approximately one quarter of all greenhouse gas emissions in the EU are caused by traffic, primarily road traffic [2].

A key part of reducing greenhouse gas emissions from road transport is the transition to alternative fuels with lower carbon emissions, such as electricity, hydrogen, biofuels or biogas. The EU adheres to the principle of technological neutrality in the sense that it does not favour any type of alternative fuel, but believes that there should be common technical specifications and that all fuels (i.e., infrastructure) should be available at EU-wide level. However, it is evident that electricity occupies a leading place among alternative fuels in road traffic.

In the European Green Plan, it is estimated that by 2025, 13 million vehicles with zero and low emissions will circulate on European roads. In accordance with the key stages established by the Commission in the Strategy for Sustainable and Smart Mobility from 2020, the number of zero-emission vehicles should reach 30 million by 2030, and by 2050 almost all emissions from vehicles should be at zero level [2].

In line with the 2016 European Strategy for Low-emission Mobility, the ultimate goal is to make charging electric vehicles as easy as charging the fuel tanks of conventional vehicles, in order to achieve mass acceptance and deployment of electric vehicles [3].

2. BILLING AND CHARGING MODEL IN CHARGING STATIONS

In the market of accounting and billing services at electric vehicle charging stations, the application of three models has been recorded:

- RFID card,
- POS terminal,
- Mobile application.

2.1. RFID card

Although the use of RFID cards was initially the basic method of authentication for users of charging stations, with the development of backend systems and mobile applications, this form of authentication is losing its primary role. Today, RFID authentication is not supported by all providers and is mostly used for unregistered pre-paid users who pay for the service by purchasing a voucher of a certain value, or by topping up the user's account (at the point of sale, through an online transaction or by payment to the account). Authentication via RFID cards can also be used for subscribers with a signed contract who pay at the end of the month.

2.2. POS terminal

To realize the payment using POS terminal, it is necessary to provide:

1. delivery, installation and maintenance of POS terminals that have been verified for use in Bosnia and Herzegovina;
2. communication between the POS terminal and the charging station, in order to integrate the authentication process and the display on the charging station's menu;
3. online payment process;
4. communication of the POS terminal/payment system with the CPMS system in order to identify the charging station, exchange information about the performed authentication based on the bank card, and exchange information about the completed payment;
5. for the purposes of issuing/printing invoices, it is necessary to install an additional printer at the location of the charging station.

2.3. Mobile application

Billing through the mobile application is supported by all considered service providers, while user registration and billing with different providers is realized in different ways:

1. users can be registered or unregistered, depending on the specific provider and/or user selection;
2. with all providers, payment is possible online, according to the pay-as-you-go principle;
3. some providers also allow payment on a pre-paid basis, as well as special payment methods for business users.

2.4. Chosen solution

It can be concluded that the mobile application, integrated with the CPMS system, represents a practically universal authentication and payment solution for registered users of charging stations. This solution also enables various additional functions that are practically necessary for drivers of electric vehicles, due to the specifics of their use (small number of charging stations, long-term charging, relatively short range...). The main advantages of using a mobile application for authentication and payment at charging stations are listed below:

1. in addition to the mobile application itself, for the implementation of the service it is only necessary to ensure online payment (which is a well-known and well-established process), and the connection of the billing system and the CPMS system;
   - in the simplest case, the CPMS system can already be integrated with providers present on the BiH

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market, and no additional integration activities are required (this is the case, for example, with the Megatel Slovenia solution, where the so-called mobility application is already integrated with payment through the Bamkart provider's portal, which works in combination with NLB Bank, and which are also present on the BiH market);
- in the event that the described integration is not provided, it is necessary to confirm the compatibility of the CPMS system and the business model of the payment providers present on the BiH market (this is the case with the OCEAN system, which has tested connections to the Monri payment provider, indirectly through the eComCharge provider

In both cases, the software should provide integrated functionalities of the mobile application and in the background of the online payment service.

2. the mobile application can be used with different usage/billing models (pay-as-you-go, pre-paid, contract users), depending on the specific system and provider's decision; In the existing OCEAN system [4], the mobile application is used for subscribers who pay the bill at the end of the month and pay-as-you-go users who pay the bill after charging. In the Megatel system [5], the mobile application enables prepaid payment for registered users;
3. for drivers, the mobile application represents an accessible and simple method of authenticating with the application, drivers do not have the problems characteristic of cards (way and place of collecting the card, loss, damage, etc.);
4. the use of the mobile application enables easy finding and arrival at charging stations, insight into the characteristics and status of charging stations, and their reservation;
5. via the mobile application, drivers can monitor charging parameters (time, energy, amount);
6. the use of the mobile application enables automation in the process of working with users and minimization of activities by the operator of the CPMS system, thanks to the following functionalities:
   - automatic entry of registered users
   - automatic process of online billing and issuing invoices
   - reporting problems directly through the application to the CPMS system
7. authentication does not depend in any way on the charging station and the characteristics of the charging station, which is especially important for providers who integrate into their system charging stations owned by third parties;
8. the use of the mobile application enables roaming users to easily find charging stations with which roaming is provided, and other relevant functions (insight into the characteristics and status of charging stations, reservation...).

When choosing a mobile application for authentication and payment, it is important to keep in mind that every change in the CPMS system used is accompanied by a change in the mobile application (in the case of an integrated system) or the creation of an interface between the CPMS system and the mobile application (in the case of interconnected components of different manufacturer).

The implementation time of this method of authentication and payment is relatively short and depends to the greatest extent on the time of implementation of online payment (opening of an online account, connection of the payment provider with the charging station management system/ payment gateway).

Despite the high price of the application (from the point of view of the EP BiH at the moment, due to the small number of charging stations and potential users), for the above reasons, the use of the mobile application will be discussed below as a means of authentication and payment for registered users and described in detail as a process. The existing OCEAN system enables the registration of subscribers and pay-as-you-go users via a mobile application.

According to the experiences of providers from the region (Elektro Ljubljana, HEP [6], Megatel [7]), this method of payment is simple, efficient and reliable, and in practice there are no significant problems. Difficulties can arise only in the segment of procedures for connecting payment providers to different banks.

Taking into account the capabilities of the equipment and the implemented charging capabilities of various electric vehicle charging service providers, it can be concluded that the primary method of authentication and charging in electromobility systems is registration through a mobile application, which in some cases is combined with a web application. For the above reason, we believe that this model is optimal for the needs of Elektroprivreda BiH, as it provides the possibility of choosing between several service providers, as well as the possibility of registering and monitoring users and billing transactions based on user credentials.

Considering the high cost of owning such software, all companies in the region and beyond, decide on the principle of Cloud services, i.e., software rental for a certain period of time during the contract. Only when the number of charging stations for electric vehicles and charging reaches an enviable number, which in the case of the number of charging stations is measured in thousands, can we talk about the profitability of purchasing software.

With this model, users must have a mobile application installed that is used for registration, login, charging and payment. This billing model has a simple registration that requires entering the user's basic data (depending on the

specific application), as well as an e-mail address. After the initial registration of the user, each subsequent access is done by entering the user account with the possibility of memorizing it. As part of user registration, it is possible to register a card that will be used for payments, or data can be entered later, before charging. Payment is made after charging.

In the case of prepaid users, payment is made in advance, by topping up the account or purchasing a voucher of a certain value, in the same way as for pay-as-you-go users.

User registration

User registration through the mobile application is done by entering user identification data (most often e-mail and password), after which it is possible to select the charging station where you want to fill up, enter the card as a means of payment, top up the user account, and the like, depending on the specific system /applications.

Payment conditions

Authorization of the payment card is a necessary step to initiate charging, and it involves entering information about the card owner (name and surname), the card number and its validity period, in the mobile application. The entered data is not stored in the database, but is used only once to start the session and the payment transaction for it.

After entering the required data, the authorization and validation process of the card is started, through the interface to the payment gateway and in the background to the card house/bank that issued the card.

In the event that the card is not valid (e.g., the entered data is not correct, the card has expired, etc.), the user will receive a notification through the application to repeat the data entry. If the card's validation is in order, a pre-defined amount is reserved on it, which is a condition for starting the charging process. The predefined amount of the reservation is determined according to a predefined methodology (e.g., the average amount of charged energy at a given charging station, the maximum amount of charged energy at a charging station, etc.). Regardless of the methodology used, the reservation process should be explained to the user through the mobile application (e.g., through frequently asked questions) or in another way (notice at the charging station, website, etc.).

Measurement and calculation of charging

Based on the reservation of funds on the card, the CPMS system initiates the charging process, which fulfils the conditions for the start of the session. The user manually starts and stops charging through the application. During the charging process, charging time and consumed energy are registered and displayed at the charging station, and the data is periodically transferred from the charging station to the CPMS system and displayed via a mobile application. After the user stops charging and information about the end of the session is transferred from the charging station to the CPMS system, the CPMS system calculates and records the charging price.

The charging price can be calculated per session, on the basis of consumed electrical energy or on the basis of charging time. In addition, it is possible to calculate additional costs for the user (parking, reservation, etc.). Sessions, start and end of charging are registered at the charging station, and the information is transferred to the CPMS system via the OCPP protocol. The consumed energy is measured by a meter in the charging station itself and the measured value is transferred to the CPMS system via the OCPP protocol. Tariffs and charging prices should be defined in the CPMS software, for which you need to have an active Billing module in which the selected calculation model (per session, per minute, per kWh) and tariffs are defined, and the calculation is performed according to the valid tariff model.

Information about the calculated amount is transferred from the CPMS system to the payment gateway, through which this amount is charged and the remaining reserved amount is released. The calculated amount, minus commission costs, is paid to the account of the Seller/EP BiH.

After the calculation has been performed through the CPMS system, the calculated amount should be presented to the user through the application.

Charging process

After the amount to be charged is presented to the user through the application, and since there is already a reservation, the required amount is withdrawn from the payment card and transferred to the dedicated account of the correspondent bank.

After a successful payment transaction, the payment gateway delivers information about the amount charged to the CPMS system, for the purpose of recording and control. Through the e-mail address entered in the registration process or through the mobile application, the user receives an invoice from the CPMS system for the service performed.

In the event that, despite the successful validation of the cards and reservation of the amount, there is a problem with billing, the session is recorded in the system, and the billing is realized later.

The bank through which the payment is transferred has the obligation to generate a statement of payments to the given transaction account, in such a way that it aggregates all payments to the given account from all locations, and submits the same in the form of two statements:

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1. PDF statement which is a control and represents the bank's official confirmation that the payments have been successfully made and
2. .txt (or another editable format) extract containing analytics and synthetics of payments based on which the invoice is manually created in the SAP system.

The txt statement is generated at the level of the transaction account and should contain at least the following data:
- date of payment,
- payment amount (a synthetic record containing the sum of all individual payments at all locations that were made to a given account),
- currency,
- bank transaction account,
- place of payment (name of charging station)...

Data from bank statements are periodically entered into the SAP system. Considering the monthly dynamics of invoicing, at this stage of the project it is not proposed to link the SAP and CPMS systems, especially bearing in mind the fact that the SAP system analysis project is currently being carried out, which as a result should provide guidelines for the future work of the ERP system in the Electric Power Industry of BiH. Only after the establishment of the new system can an assessment of the establishment of automatic data exchange be given.

The key condition is that the billing module can be integrated with the payment gateway. The best solution from the perspective of implementation, and especially future maintenance, is for all system components to be part of a common platform from the same vendor/implementer. The mobile application in the background should be integrated via a payment gateway with all leading card companies (Visa, MasterCard...), or banks that provide them to their clients.

Figure 1 shows basic charging and billing process.

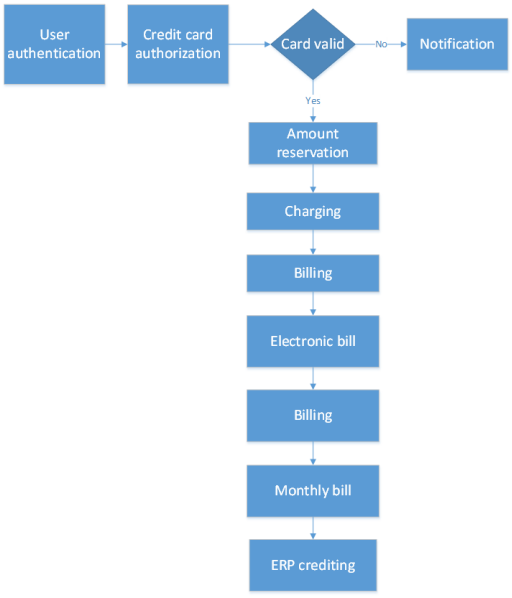

Figure 1: Charging and billing business data process

3. ECONOMIC EFFECTS OF THE INTRODUCTION OF THE SELECTED CALCULATION AND BILLING MODEL

3.1. Analysis of the economic profitability of the introduction of the billing system

When determining the economic effects of the introduction of the billing and billing model, it is necessary to take into account the costs of using software for managing charging stations and billing, as well as the costs of electricity that is paid to Elektroprivreda BiH through own consumption.

The costs of purchasing and maintaining charging stations have not been taken into account, given that Elektroprivreda's strategic commitment is to invest in the development of the infrastructure of electric vehicle charging stations as a development project, therefore, in this development phase of the project, it is not expected that the introduction of the charging system will economically cover the costs of new charging stations. What is expected from the introduction of the billing system is that it minimally covers the costs of using electricity at the charging point, and that it covers the costs of renting billing software.

With an increase in the number of charging stations, the number of electric vehicles, and consequently the number of charging stations, the return on investment is higher, that is, the probability of generating income based on payment collection for the charging is higher. The company's interest is to increase the number of charging stations where billing will be done, in addition to investing in its own infrastructure, by concluding contracts with third-party owners of charging stations. In this way, the number of charging sessions will increase, and the percentage share of software costs in the total price of the service will decrease, and on the other hand, third parties will receive a reliable and secure billing service for their users. By consolidating the charging service, an economic and business benefit is achieved for all companies participating in this process.

Electromobility is considered as a development project in EP BiH, so there is no imperative to return the investment in charging stations infrastructure through the implementation of billing system. This is not even a realistic goal due to huge amount of investments in charging infrastructure on one hand, and low number of charging stations and electrical vehicles, on the other hand.

However, with an increase in the number of charging stations, the number of charging sessions is also expected to be increased, and all this should lead to the profitability of the investment in charging stations. When we get to that phase, the project moves from development to the commercial phase.

From the experience of other electrical companies in the region, when a market reaches a significant number of

charging sessions, number of which each company determines, the project becomes commercial and from that point all investments in the infrastructure should be calculated in return-on-investment (ROI) matrix.

When creating a model of the economic feasibility of introducing a charging system, the following input parameters were taken into account, separately for AC and DC charging stations:

- number of charging stations,
- number of electric vehicles [8],
- number of sockets per charging station,
- number of charging sessions per year,
- average consumption per session (kWh),
- average kWh price (KM),
- cost of EE per month and per session (KM),
- software rental cost per session (KM),
- one-time cost of software implementation (KM).

When calculating the number of charging stations, in addition to the own infrastructure that the EP BiH currently owns, and the projection of new charging stations, the number of charging stations of the Porsche company that expressed interest in using our system's billing services was also taken into account. The projection of the number of charging by years was done taking into account the projection of the increase in the number of electric vehicles in Bosnia and Herzegovina, and the source for the same is data from the IDDEEA Agency. in Lepenica, where approx. 686 charging sessions were used in one year. 16,380 kWh of electricity, which means that an average of 23.94 kWh was charged per session. The average electricity consumption per session for an AC charging station at the level of one year is 10.81 kWh.

In the calculation of the average power, data from the Billing system database for the year 2022 was used, as shown Table I and Table II.

Table I: Overview of the calculation of monthly power costs on the DC charger

METER POINT	POWER (kWh)	UNIT PRICE (KM)	TOTAL PRICE (KM)
11024689	42.65	7.24	308.84
11024689	52.368	7.24	379.14
11024689	61.572	7.24	445.78
11024689	49.356	7.24	357.34
11024689	53.616	7.24	388.18
11024689	69.624	7.24	504.08
11024689	61.248	7.24	443.44
11024689	63.444	7.24	459.33
11024689	52.644	7.24	381.14
11024689	53.904	7.24	390.26
11024689	53.964	7.24	390.7
Average:			**404.3845**

Table II: Overview of the calculation of monthly power costs on the AC charger

METER POINT	POWER (kW)	UNIT PRICE (KM)	TOTAL PRICE (KM)
10251021	21.776	12	261.31
10251021	21.776	6.52	141.98
10251021	16.808	12	201.7
10251021	16.808	6.52	109.59
10251021	17.064	12	204.77
10251021	17.064	6.52	111.26
10251021	21.912	12	262.94
10251021	21.912	6.52	142.87
10251021	18.936	12	227.23
10251021	18.936	6.52	123.46
10251021	20.156	12	241.87
10251021	20.156	6.52	131.42
10251021	21.92	12	263.04
10251021	21.92	6.52	142.92
10251021	20.216	12	242.59
10251021	20.216	6.52	131.81
10251021	21.312	10	213.12
10251021	21.312	6.52	138.95
10251021	18.552	10	185.52
10251021	18.552	6.52	120.96
10251021	21.88	10	218.8
10251021	21.88	6.52	142.66
10251021	22.104	10	221.04
10251021	22.104	6.52	144.12
Average:	**20.21966667**		**360.49**

When it comes to the price of electricity supplied at the metering point of the charging station, the metering point from which the DC charging station is supplied belongs to tariff group V3 and indicates measurement at medium voltage, in the market class of supply.

On the other hand, metering points at AC charging stations have tariff group M1 in the "own consumption" supply class.

For the purposes of this analysis, the average price was taken for all four items of the tariff package for the calculation period 04/01-04/30/2022. namely: Energy MT, Energy VT, Energy-grid MT, Energy-grid VT, and additionally the price for OiE for the DC charging station, so that the average price is 0.1369 KM for a DC charging station (Table III), or 0.10805 KM for an AC charging station (Table IV).

When it comes to the costs of purchasing and implementing a software solution for managing the charging station and

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billing for charging, given that it is a software rental service which, according to market research, amounts to EUR 8 per connector, the cost per charging sessions is calculated in such a way that 30 KM is the cost of the software (8 EUR *2 connectors per charging station) multiplied by 12 months and the number of charging stations in that year, and then divided by the total number of charging stations in that year.

The one-time cost of software implementation, according to the market research of these software solutions, amounts to approx. 30,000 EUR, and the same is divided by the total number of charging sessions for the period for which the profitability analysis is done.

Table III: Average price of EE at a DC charging station

METER POINT	AMOUNT EE (kWh)	UNIT PRICE (KM)	TOTAL AMOUNT (KM)
11024689	388.749	0.1396	54.27
11024689	388.749	0.0158	6.14
11024689	276.879	0.0931	25.78
11024689	276.879	0.0079	2.19
11024689	665.628	0.0042	2.8
Average:		**0.1369**	

Table IV: Average price of EE at a AC charging station

METER POINT	EE (kWh)	UNIT PRICE (KM)	TOTAL PRICE (KM)
10251021	118.587	0.0451	5.35
10251021	118.587	0.0689	8.17
10251021	13.693	0.0225	0.31
10251021	13.693	0.0345	0.47
Average:		**0.10805**	

Taking into account all the previously described input parameters, and the methodology of their calculation, Table V and Table VI give an analytical and synthetic presentation of charging costs for AC and DC charging stations, respectively.

Table V: Overview of costs per charging session at DC charger

Year	Charging stations num	Charging sessions num	Price of EE (KM)	Total price (KM)
2023	1	700	10.21	10.74
2024	3	3320	4.74	5.08
2025	5	9549	3.79	3.99
2026	8	26365	3.46	3.58
2027	12	68246	3.35	3.42
2028	17	166837	3.31	3.36
2029	23	389514	3.29	3.32
2030	33	578160	3.29	3.32
2031	43	753360	3.28	3.32
2032	63	1103760	3.28	3.32
2033	83	1454160	3.28	3.31

Table VI: Overview of costs per charging session at AC charger

Year	Charging stations num	Charging sessions num	Price of EE (KM)	Total price (KM)
2023	7	7000	1.79	2.17
2024	20	31621	1.30	1.56
2025	27	73664	1.23	1.39
2026	37	108040	1.21	136
2027	47	137240	1.20	1.35
2028	57	166440	1.19	1.35
2029	67	195640	1.19	1.34
2030	87	254040	1.19	1.34
2031	107	312440	1.18	1.33
2032	127	370840	1.18	1.33
2033	147	429240	1.18	1.33

3.2. Tariff charging model

When it comes to the start of charging for charging at charging stations owned by JP Elektroprivreda BiH, the elements that will make up the price should be (at least) as shown in Table VII:

Table VII: Tariff charging model

Type of charging	Power up to 22.1 kW	Power over 22.2 kW
Higer tarrif	KM/kWh	KM/kWh
Lower tarrif	KM/kWh	KM/kWh
Entry fee	KM/session	KM/session
Connector usage	180 min	60 min
Excessive connector usage	KM/min	KM/min

Considering that the consumption of electricity at the metering point of the charging station constitutes a significant part of the cost of the charging session, it is necessary to additionally look at the way of forming the tariff package according to which the consumption calculation will be done.

The price and elements of the charging price at charging stations owned by third parties of EP BiH will not be affected, and a fee will be charged for the charging service. The fee for providing billing services should include (at least) the following items:

- fee per individual connector that is connected to the EP BiH system, including the costs incurred by EP BiH for each individual connector,

- fee for each session, including the expenses incurred by the EP BiH for each session and,
- profit margin, in order to make a profit through the provision of this service by EP BiH.

It is important to note here that the price of charging service should be formed depending on business goals, competition and other factors, and should be adjusted so as to cover costs and, ultimately, make a profit.

Specifically, this means that the tariff model needs to be formed in such a way that, taking into account the cost of billing software and the cost of consumed kWh hours, for the projected number of sessions, a profit is realized for EP BiH. Also, after the initial phase of introducing charging, and with the increase in the number of charging stations and users, it is necessary to introduce a roaming service, which will enable every driver of an electric vehicle to charge at any charging station in the country and abroad, by solving functional, technical, legal and fiscal obstacles. This service should be provided in order to meet the needs of the users, expand the user base, and ultimately, make a profit for the EP BiH (take into account the high prices of roaming services).

4. CONCLUSION

In the long run, payment collection for charging at electric vehicle charging stations represents a good business opportunity for Elektroprivreda BiH.

Bearing in mind that these services have not yet taken root in the market of Bosnia and Herzegovina, although there is an evident increase in the number of charging stations, and having learned from the experiences of other electrical companies in the region, it is necessary to urgently implement the billing system with the aim of positioning Elektroprivreda BiH as a market leader of these services.

The billing system should be modular, scalable, easy to implement, maintain and use, and as such should provide basic charging station management services, billing using modern and widespread digital channels such as mobile applications, and secure and reliable user registration, as well as integration with providers digital payment service. In parallel with the establishment of the system at charging stations owned by Elektroprivreda BiH, it is necessary to provide the aforementioned system as a service to other owners of charging stations, and in that way to position ourselves as a global provider of these services.

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BIOGRAPHY

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Svetlana Mišut was born in Sarajevo in 1969. Graduated from the Faculty of Electrical Engineering in Sarajevo in 1997. From 1997 until today, employed at JP Elektroprivreda BiH, in the ICT Department. Since then, she has worked on the planning, implementation and maintenance of ICT systems in JP EPBiH, including the following most significant projects at the level of JP Elektroprivreda BiH: Construction of the PDH network,Construction of the SDH network, Construction and maintenance of LAN and WAN networks, Uninterruptible power supply system planning, Realization of the technical protection system, Implementation of the AMR system for remote reading and management of electricity meters, Pilot project of electromobility system.

Andreja Softić was born in 1980. After obtaining a degree in economics from the University of Tuzla, she works as a director in the representative office of the Slovenian company UNIOR Kovaška industrija d.d., UNIOR BH d.o.o. Sarajevo. After that, she found employment in the FBiH Chamber of Commerce. Since 2020, employed at JP Elektroprivreda BiH d.d. - Sarajevo. She gained experience in solving complex energy problems, including studies and projects of energy efficiency, spatial planning, communal energy and the promotion of renewable energy sources.