



Analysis of the socio-economic justification of the existing system of concession fees and incentives for small hydro power plants in Bosnia and Herzegovina

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Glossary of terms and abbreviations

B&H = Bosnia and Herzegovina

Concession = Right to perform economic activities by using public goods, natural resources and other goods of general interest, as well as the right to pursue an activity of general interest. That right is conceded to a concessionaire for a specific period of time, on the conditions provided for by law, against the payment of a concession fee.

Concessionaire = Business subject founded in accordance with B&H laws to whom a concession is awarded and which implements a concession agreement.

Concession grantor = Body authorized by law to grant concessions.

Concession Fee = Fee paid by the concessionaire in accordance with the concession agreement.

DERK = B&H State Electricity Regulatory Commission

EnC = Energy Community

EU = European Union

FB&H = Federation of Bosnia and Herzegovina

FERK = Regulatory Energy Commission in the Federation of Bosnia and Herzegovina.

FiT = „Feed in Tariff“ - it is an economic policy mechanism that encourages investments in renewable energy sources and the development of technologies, implying long-term contracts on purchase of electrical energy at guaranteed prices while taking account of actual costs of investing in technologies of production from renewable sources.

GFEC = Gross final energy consumption defined as consumption of energy with losses in transmission and distribution and with the electrical and thermal energy power plants own consumption, whereby non-energy consumption is not taken into consideration. In accordance with this definition and according to the Eurostat methodology, BFPE is calculated as final energy consumption (PFE) plus electrical and thermal power plants own consumption and losses in distribution and transmission. Actual consumption of renewable energy sources must be averaged due to the influence of extremely dry or rainy years in the production of electrical energy in hydro power plants.

Guaranteed purchase price = Price of electrical energy paid to a privileged producer of electrical energy from renewable energy sources and efficient cogeneration during the term of the Contract on Purchase of Electrical energy in FB&H, or a producer with the right to the obligatory purchase at the guaranteed purchase price in RS.

KTOE = International unit for energy conversion expressed as the equivalent energy obtained by burning one kiloton of oil (toe = ton of oil equivalent).

Megawatt (MW) = 1000 kW (kilowatt) - Unit of measurement of installed power.

Megawatt hour (MWh) = 1000 kWh (kilowatt hour) – Unit of measurement of produced or consumed quantity of electrical energy.

OIEIEK = Renewable energy sources and efficient cogeneration operator in the Federation of Bosnia and Herzegovina.

OSP MH ERS = The system of incentives for renewable energy sources and efficient cogeneration operator in the Republic of Srpska, part of the Republika Srpska Power Utility.

Reference price in FB&H = Price of electrical energy in the system of RESs incentives which is equal to the accomplished price of trade of electrical energy in FB&H over a certain period of time, plus 20% of incentives under which the purchase of electrical energy is done from a RES plant that do not have a status of a privileged producer. It is determined by FERK.

Reference price in RS = Price of electrical energy in the system of obligatory purchase which is equal to the average price at the threshold of power plant for supply to tariff customers, i.e. customers in the system of public services determined by RERS.

RES = Renewable Energy Sources

RERS = Republic of Srpska Regulatory Energy Commission

RS = Republic of Srpska

Tariff coefficient (TC) = Numerical value associated to each group and type of plant for electrical energy production from renewable energy sources which, multiplied with a reference price, makes the guaranteed purchase price of electrical energy in FB&H.

SHPs = Small hydro power plants, with total installed power up to 10 MW.

WB6 = members of the EnC in the area of the so-called West Balkans (B&H, Serbia, Montenegro, Macedonia, Albania and Kosovo*)

Introduction

By joining the Energy Community in 2005 and signing the Treaty establishing the Energy Community, B&H committed to a number of obligations according to which the electric power system and the electric power sector in the country should be adjusted and transformed in accordance with the model, goals, policies, rules and directives governing/prevailing in the EU energy sector.

In accordance with that, the B&H Council of Ministers adopted in 2012 the Decision on Implementation of the EU Directive 2009/28 on the promotion of the production of energy from renewable sources, thus defining the binding goal for B&H of a 40% share of RES in the domestic gross final energy consumption by the year 2020. The year 2009 was taken as a starting basis, recognized by the EnC Secretariat, as well as a 34% share of RES in the total domestic consumption.

In order to accomplish the binding set goal of increase of domestic consumption from RESs by the year 2020, and ensure the missing 6% share of RES in the consumption, the Governments of the Federation and RS adopted in 2014 Action Plans for the use of RES and for the promotion of the production from RES.

Joining the EnC and especially the implementation of the directive for the promotion of the production of energy from RES, represented, for all domestic and foreign investors, in all countries members of EnC from the WB6 group, a good excuse to „attack“ all the watercourses in the area of West Balkans, be they rivers, small rivers, creeks and no matter if these watercourses were situated in protected areas, national parks or parks of nature.

The incentives for the production and the guaranteed purchase system (Feed-in Tariff (FiT) as well as the applicable concession policies and the guaranteed profit over a long time period without the usual market risks, along with inadequate government policies on protection of natural resources, made that „attack“ frontal, comprehensive and unscrupulous, totally ignoring the actual and realistic interests of the society, local communities and the general public.

Such a situation has led to controversies and open conflicts between citizens, local communities and organizations for the protection of nature on one hand and investors and authorities on the other hand, in which all had arguments pros and cons regarding the construction of SHPs.

The goal of this Analysis is to try to give, based on the collected data and information, a whole picture of the real economic effects of the implementation of the existing concession policies and the incentives system for the construction of SHPs in B&H, from the point of view of the society as a whole, by using an analysis of social costs and social benefits (cost-benefit analysis) and identifying real winners and losers in the entire process.

All the opinions, conclusions and recommendations provided in this Analysis represent solely the author's views and do not necessarily reflect the views of Center for Environment.

1. Role and importance of SHPs in electrical energy generation in B&H

As already pointed out in the Introduction, in order to achieve the binding goal of 40% share of production from RES in the total domestic energy consumption, the Governments of RS and FB&H passed appropriate laws and action plans for the use of RES and the promotion of the production from RES.

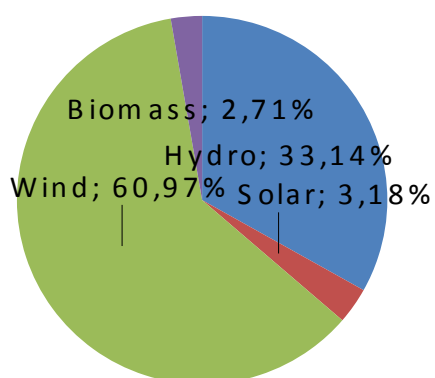
According to the action plan in FB&H (2), by the year 2020, additional capacities will be encouraged:

- 71 MW power from SHPs with the expected output of 291 GWh,
- 8.1 MW power from solar power plants with the expected output of 12.1 GWh,
- 230 MW power from wind power plants with the expected output of 575 GWh, and
- 9.01 MW power from plants on biomass with the expected output of 54.7 GWh.

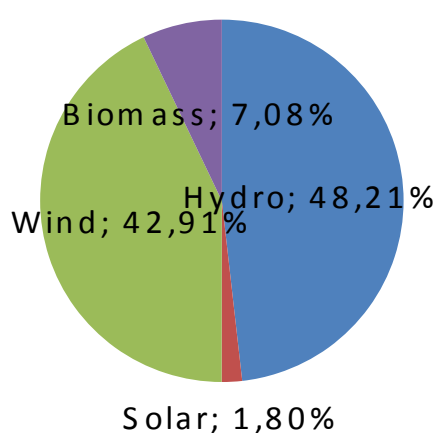
In contrast to the FB&H action plan, for RS (3), the encouraging of the additional capacities was planned as follows:

- 80.3 MW power SHPs with the expected output of 357.57 GWh,
- 1.2 MW power from solar power plants with the expected output of 1.4 GWh,
- 70 MW power from wind power plants with the expected output 140 GWh, and
- 11.5 MW power from biomass power plants with the expected output of 31.19 GWh.

The graphs below present the structure of RES planned capacities and the planned structure of production from these capacities by the entities by the year 2020, with a remark that the presented data relate only to the new capacities entitled to the incentive, i.e. subsidies, that is to say, they do not include the production from the planned new hydro power plants capacities over 10 MW because their production is not subsidized:

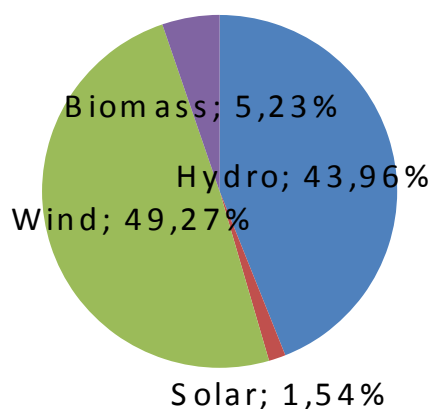


Planned installed power FB&H

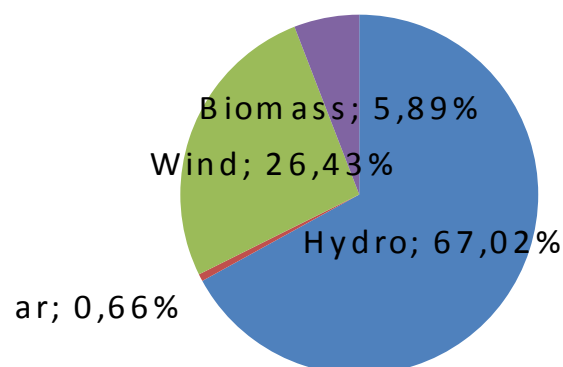


Planned installed power RS

The presented data show that FB&H's plan was to focus on the wind energy, while the RS focused on hydropower potential as a backbone of the development of new RES capacities subject to subsidies.

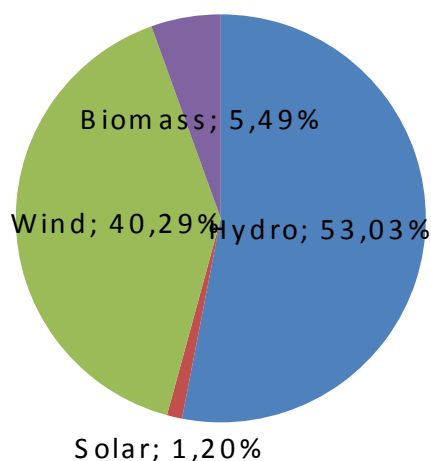


Planned production FB&H



Planned production RS

With the realization of these plans by the year 2020, B&H should have 610,29 MW total power installed capacities in subsidized RES of with a total output of 1923,68 GWh according to the structure of RES as follows:



RES production structure in 2020 for B&H according to action plans (NREAP)

The presented data show that the backbone of the energy transition to RES in B&H, in the segment for which the incentive to the production was planned, includes the production from hydro energy, i.e. SHPs, which, along with the wind energy, is perceived as the main resource for the production of electrical power from RES.

The data outlined below shows the best the status of the current situation and the real contribution of SHPs to the production of electrical energy in B&H and to the fulfillment of the set goals:

Table 1.

Electrical energy statistics	2015	2016	2017
Total production in B&H (GWh)	14,407.86	16,509.00	15,151.40
Total consumption in B&H (GWh)	12,605.66	12,865.10	13,366.40
Total installed power (MW)	4,009.14	4,351.88	4,384.77
Thermal power plants	1,856.23	2,156.23	2,156.23
Total hydro power plants	2,150.44	2,180.24	2,207.47
of which SHPs	95.54	96.74	124.00
Production from hydropower plants total (GWh)	5,426.00	5,469.00	3,831.00
Production from small RES power plants (GWh)	246.90	400.80	380.52
SHP	224.07	374.27	352.27
Wind	0.03	0.03	0.03
Solar	22.80	26.50	21.16
Biomass	0.00	0.00	6.79
% share of SHPs in total capacities	2.38	2.22	2.83
% share of SHPs in hydro capacities	4.44	4.44	5.62
% share of SHPs in hydro power plants total production	4.13	6.84	9.20
% share of SHPs in electrical energy total production	1.56	2.27	2.32
% share of SHPs in incentives system total production	90.75	93.38	92.65
% share of SHPs in total consumption	1.78	2.91	2.64

Izvor : DERK Report for the year 2017

The data clearly show that the share of SHPs in the total production of electrical energy is only 2,32% while their share in the total production in hydro power plants is less than 10%.

Having said that, another fact to have in mind is that the share of SHPs in the system of incentives of B&H is as high as 92.65 %.

Based on the aforementioned, it is quite clear that the selected concept of promotion of production from RES, thereby from SHPs too, or the established incentives system, has no significant effect whatsoever on the increase of total RES capacities or on the increase of production from RESs.

The situation gets even clearer if we compare the planned parameters of production for the year 2017 from RES contained in the entities' actions plans with the accomplished results in the year 2017, as follows:

Table 2. B&H –Installed power and production compared to plans, year 2017

RES	Installed power			Production output		
	Planned	Accomplished		Planned	Accomplished	
	MW	MW	%	GWh	GWh	%
Hydro	150.69	124	82.29	646.21	352.27	54.51
Solar	11.65	16.52	141.80	16.38	21.16	129.18
Wind	199	0.3	0.15	470	0.3	0.06
Biomass	14.38	1.24	8.62	55.21	6.79	12.30
Total	375.72	142.06	37.81	1187.8	380.52	32.04

From the above table it is evident that the development plan for the new capacities was accomplished only at the level of 37,81%, while the output plan was accomplished only at the level of 32%. Having said that, the solar segment is the only bright spot, as the planned values in the installed power and production were exceeded by as much as 41% and 29% respectively. As far as the wind energy is concerned, there was an absolute failure compared to the plans, which is also the case with the production of energy from biomass. In March 2018, the first wind power plant in B&H was commissioned. Mesihovina WP has the installed power of 50,6 MW, so that its putting into function will contribute to accomplishing the set plans, although not sufficiently to be deemed as successful.

In the SHPs segment we can see the biggest percentage of accomplishment of the plan speaking of installed power (82.29%), while the production, with only 54,51%, is by far lower than the planned. It is noteworthy that in 2017 there was an extremely poor hydrological situation throughout B&H which partly contributed to the results accomplished in the production of electrical energy from SHPs, but did not have a major impact on the share of SHPs in the total production of electrical energy from RES and hydro power plants in B&H.

From everything mentioned above it is clear that SHPs are not, nor can be, a significant factor in the production of electrical energy in B&H, despite their largest contribution to the total increase of production from RESs. Given the fact that SHPs, compared to the other technologies of production of electrical energy from RESs, have the biggest influence on the environment, micro climate and biodiversity, insisting on these capacities for production of RESs becomes even more questionable.

In other words, given the presented data and the results achieved in the production of electrical energy from RESs, a serious question is raised, whether it was really worthwhile to develop and establish the functioning of the system of promotion and encouragement of the production of electrical energy from SHPs. Although this question may be raised for other technologies too related to the production from RESs, the SHPs, unlike the other (new) technologies, imply conventional technologies of production which additionally have a devastating effect on the environment. Therefore, one may justifiably wonder whether all the accent of promotion and the system of incentives for RES should have been directed on new technologies, any other but SHPs?

In addition to the above, from the point of view of energy policies of B&H, the commitments taken according to EU directives and the obligation of a 40% share of RESs in the total gross energy consumption in B&H, it is also legitimate to ask why the policies in achieving the goals from the commitments are largely based on the production of new capacities, rather than on overall decrease of gross domestic energy consumption, given a well-known inefficiency of B&H from the point of view of energy consumption. According to the energy intensity indicators for the year 2015, B&H spends even 4.9 times more energy per unit of GDP compared to the EU countries (10).

According to the data from the entities' action plans, the structure of gross domestic consumption of energy in B&H in 2013 was the following:

Table 3. Structure of gross final energy consumption in B&H in 2013

KTOE	FB&H	%	RS	%	B&H	%
Heating and cooling	1917	59.35	441.3	41.59	2358.3	54.96
Electrical energy	727.8	22.53	335.3	31.60	1063.1	24.78
Traffic	585	18.11	284.4	26.80	869.4	20.26
GFEC	3229.8	100.00	1061	100.00	4290.8	100.00

Given that almost 55% of total energy consumption in B&H is made of the energy used for heating or cooling the facilities, it seems more logical to focus the energy policies on reducing the consumption, i.e. the increase of energy efficiency in building construction, rather than on promoting and encouraging additional production from RESs. It is also true that these measures are also a part of action plans, but their share and a total effect in the plans is negligible.

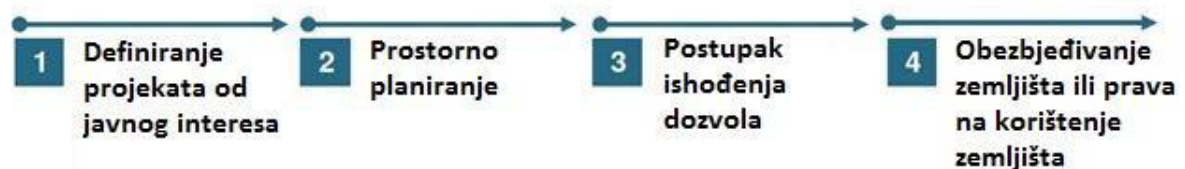
Having in mind that all electrical energy consumers in B&H pay a fee for renewable energy sources from their monthly electricity bills, it may be perhaps more appropriate to direct a part of that money to encouraging the reduction of energy consumption through measures such as buildings insulation, heat pumps, LED lights, solar boilers, energy efficient devices, etc. rather than spending the money on promotion of the production from conventional technologies such as SHPs.

In the author's opinion, this change of policies and incentives could make a better and quicker contribution to the accomplishment of the goals and the commitments speaking of share of RESs in the gross domestic power consumption.

2. Concessions, concession policies and concession fees for SHPs

Awarding concessions for the construction of SHPs in B&H represents one of the first steps defined by the so-called Berger Study (5) accepted in the EU as a general acceptable framework for the process of approval of energy projects.

PROCES ODOBRAVANJA



Source: Berger Study (5)

The identification of the public interest and hence defining the project as of public interest is the basis for issuing concessions for SHPs. The regulation of the overall awarding concessions issue for SHPs is regulated by the concession laws. In B&H, in line with a complex state structure, this issue is regulated by as many as 14 concession laws (B&H, RS, FB&H, 10 cantons and District Brčko).

a) Concessions for SHPs in RS

In RS, the awarding of concessions for SHPs is regulated by the Law on Concessions (Republika Srpska Official Gazette, nos. 59/13 and 16/18), by the Document on the Policy of Awarding Concessions as well as by various rulebooks. In addition to the interested concessionaires, other participants in the whole process of awarding concessions include the RS Government, i.e. the relevant Ministry, the RS Concession Commission and the local communities in the territory of which the concessions of SHPs are awarded.

The Law provides that a procedure for awarding the concessions may be initiated in three ways:

- a) based on the initiative of a relevant body
- b) based on an interested individual's initiative (self-initiative offer)
- c) based on an offer in a negotiation procedure.

It is the fact that almost all concessions for SHPs in RS during in the past have been obtained based on an initiative of interested individuals, i.e. self-initiative offers.

Regardless of the type of the procedure in the process of making a concession agreement, the concessionaire is required to develop the Feasibility Study, while the RS Concession Commission is in charge of granting an approval for the Study, of the public bidding documents, of opening an evaluation of the received bids in a public call for awarding the concession, of making a proposed solution on the selection of the best bidder and the award of the concession, of issuing an approval for the award of the concession agreement and the change of concessionaire's ownership structure and of keeping the concessions register.

The legal solution that enabled the transfer and award of the concession agreement and the change of concessionaire's ownership structure opened up a possibility for numerous speculations for concessions for SHPs, so that a big number of these concessions were awarded to persons who have never intended to be involved in the production of electrical energy in the first place, but who entered the whole process with an intention to make profit by selling a concession at a certain point in the process.

According to the law, a concession agreement for a SHPs can be awarded for a 50-year period, while in practice most agreements are awarded for 30 years with a possibility of extension of the Agreement.

A concessionaire is required to pay a concession fee to the concession grantor, which consists of two parts:

- a) a one-off concession fee for the awarded right that is paid as a lump-sum upon the conclusion of the concession agreement, and
- b) concession fees for operation (use) which is expressed as a percentage of the annual income made by performing the concession activity.

The concession fee for the awarded right to SHPs is defined within a range of 0.5 to 5% of the value of the planned concessionaire's investment, whereby the law does not provide the criteria determining why someone should pay only 0.5%, and someone else ten times more. By this, the concession grantor was left both the space and a discretion to decide on the amount of this fee, which opens up a possibility for corruption and preferential treatment of certain concessionaires over others.

Until the passing of the latest amendments to the Law on Concessions in 2018, the amount of the concession fees for SHPs was determined on the basis of the Rulebook on the Criteria for Determining the Amount of the Concession Fee, which, in addition to the amount of investment and technical parameters, also scored other elements such as economic, ecological and sociological aspects. The Rulebook was issued by the relevant ministry, with a prior procurement of the opinion of the Concession Commission and the approval of the RS Government. The Rulebook was amended during the time, resulting in the occurrence of quite weird situations, such as, for example, a case in 2014 where for Ziraja II SHP, with the investment value estimated at 1.945.000 BAM, a one-off concession fee for the awarded right was defined in the public call at 7.210,00 BAM, while at the same time for Gornje Pale SHP with estimated investment value of 4.850.000 BAM (almost two and a half times more than Ziraja II), a one-off concession fee was determined at only 6.330 BAM (0.13% of the estimated investment value). There was an even more interesting situation in 2017, in which, in the public calls for SHP Nevacka and SHP Jezernica, a one-off concession fee was determined at 3% (Nevacka) and 1% (Jezernica), measured as a proportion of the investment made.

Speaking of the concession fee for the use of a concession (good), it was calculated as a percentage of the gross annual income made through the operation of the concession activity.

Similarly to the one-off concession fees, in this area too, speaking of SHPs the situation is uneven. According to the available data, the amount of the concession fees for the operation of the built SHPs ranges between 1.25 to 3.5% of total income.

After the adoption of the amendments to the RS Law on Concessions in February this year, the amount of the concession fee for the operation was set as a single amount i.e. 0.0055 BAM/kWh of produced electrical energy for a SHP. This should introduce more order in this field.

It is also noteworthy that no concession fee is payable in RS for SHPs with 250 kW of installed power.

The revenue made from the concession fees for the use of a concession (good) was distributed between the RS budget and the local governments in the following proportion:

- a) 30 : 70 for developed local governments,
- b) 30 : 70 for medium developed local governments,
- c) 20 : 80 for undeveloped local governments, and
- d) 10 : 90 for extremely undeveloped local governments.

According to the latest amendments to the RS Law on Concessions that came into force early this year (2018), the revenue will be distributed at the proportion 5:95 in favour of local governments. A one-off concession fee for the awarded right remains the revenue of RS budget.

According to the data of the RS Concession Commission, a total 104 concessions were awarded for SHPs of which, at the end of 2017, 20 SHPs were in operation, while the others are at different stages of the implementation and approval process.

According to the data of the RS Ministry of Industry, Energy and Mining, the revenue from the concession fees for SHPs in the previous three years amounted to:

in BAM	2015	2016	2017
One-off concession fee	457,927	764,812	256,570
Concession fee for operation	178,404	376,594	376,491*
Total	636,331	1,141,406	633,061

* incomplete data

The above data are not suitable for any serious analysis, considering the fact that the concession policy changed in the meantime with both concession fee types, that the start up production dynamics of certain SHPs is unpredictable, and that the hydrological circumstances varied in the observed three years, what all together influenced the level of revenue from the concession fees.

What can be actually used for the analysis is the data on paid concession fees for operation/use in the year 2016, which, if compared to the SHPs' production reached that year, gives an indicative data on the amount of the concession fee per kWh of produced electrical energy if it

would have been paid by kWh instead by the percentage of total income. Comparing these two data, we arrive at the conclusion that the concession fee for the operation amounted to 0.0035 BAM/kWh.

b) Concessions for SHPs in FB&H

Unlike the RS, where issuing of the concessions for the SHPs is centralized, in FB&H, based on the Law on Concessions (FB&H Official journal nos. 40/02 and 61/06), the responsibility for issuing the concessions for SHPs is divided between FB&H and the cantons, in a way that the cantons are responsible for issuing the concessions for SHPs of installed power up to 5MW. Consequently, all cantons in FB&H adopted their legal regulations related to the concessions as well as the accompanying set of decisions and rules governing this issue.

The procedure for issuing concessions for SHPs in FB&H may be initiated on the basis of the decision of a relevant body or by submitting a self-initiative offer, which has mainly been the practice in the previous period. Legal solutions in FB&H provide that the concessionaire should pay a one-off concession fee and a concession fee for operation.

The possible period for which concessions for SHPs are awarded vary between 30 and 50 years, being 30 years the most common in practice, with a possibility of extending the concession term by additional 15 years.

The analysis of the laws, rules and decisions on concessions in FB&H by cantons and the analysis of public calls for awarding concessions for SHPs, shows that the situation regarding awarding the concessions for SHPs in cantons and between certain cantons is quite diversified both in terms of the policy of concession fees and the policy of distribution of the concession fees.

As concession grantor for SHPs appears, as general rule, the cantonal government, but in some cases, that right has been transferred to the municipality level. Thus, for example, in Herzegovina-Neretva Canton, the canton government is a concession grantor for 9 SHPs, Prozor Municipality for 7, and Konjic Municipality for 10 SHPs.

Distribution of revenue from concession fees for SHPs between the cantons and the local governments ranges from 20:80 in Canton Tuzla to 60:40 in Bosnia-Podrinje Canton.

Speaking of the concession fees for the right to use/operation, the situation is even more confusing.

In certain cases no one-off concession fee was asked, but only the concession fee for operation; in other cases, instead of a lump-sum concession fee, the investor was requested to make certain investments in the local community infrastructure in the territory where the concerned concession for SHPs is located, and in third cases, both were requested. As a rule, the amount of the lump-sum concession fee mostly ranged within 1.5% of the amount of the planned investment.

Speaking of the concession fees for use/operation that are calculated on the gross income made from the concession activity, the situation is not at all better, because the defined concession fees range from 1.8% (Central Bosnia Canton) to as much as 10% in certain cases (Zenica-Doboj Canton), while the level of this fee within the cantons themselves vary from one concession to another (for SHPs), so that in Central Bosnia Canton, in which a total of 67 concessions for SHPs were issued, of which 30 are in operation, this range goes from 1.8 to 3%.

It is certain that such an approach to granting concessions for SHPs in FB&H as well as the concession policies that are applied, open up the space for favoring certain concessionaires and cast a doubt regarding the possibility of potential corruption actions and favoring the investors both in terms of granting the concession for construction of a certain SHP and in terms of the amount of the concession fees payable by the concessionaire.

Given the diversification of the system of issuing concessions for SHPs, the lack of systematized and up-to-date registers and records at the level of B&H, even by individual cantons, it was not possible, given the time and the resources that were available for this Analysis, to determine the exact number of the concessions granted so far for SHPs in FB&H. As an illustration we will state an example of the already mentioned Central Bosnia Canton in which, according to the cantonal government data, 67 concessions were granted, while according to the register of OIEiEK (6) that number is 46. Based on the partially collected data, it is estimated that in the territory of FB&H, about 160 concession agreements have been made so far, for construction and operation of SHPs.

Due to incomplete and unavailable data on the amounts of collected concession fees for the operation of SHPs for the needs of this Analysis we are forced to make an estimation of the revenue from the collected concession fees for the operation of SHPs.

In this estimation we have taken into account the output level obtained from SHPs in previous years, the amount of the fees charged by certain cantons and in relation to RS, as well as the installed capacity and the dynamics of commissioning of certain capacities. Based on the above, it is estimated that the average annual level of income from the concession fees for the operation of SHPs in FB&H does not exceed 1.000.000 BAM, while the average annual amount of revenue from lump-sum concession fees is estimated at the average 800.000 BAM on the annual basis.

If the above estimate would be taken as valid, it would mean that about 1.3 million BAM is collected in B&H averagely, on annual level, from one-off concession fees for SHPs and about 1.4 million BAM based on the concession fees for the operation of SHPs.

In the opinion of the author of this Analysis, the above amounts represent, by their own merit, a sufficient proof that the concession policies in the field of SHPs do not fulfill their basic function or economic goals defined by the concession laws and policies, nor do they provide for a realistic valorization of the utilization of natural resources.

In addition to the above, it is obvious that a myriad of regulations and non-coherent and inconsistent practices, combined with many instances of discretionary decision-making (regardless of it being within the default parameters) leaves a lot of space for manipulation, uneven treatment of individual investors, and thereby for favoring or making it difficult for certain investors in what apparently seems an equal market game of concessions for SHPs.

3. System of incentives for SHPs in B&H

The current system of incentives for SHPs in B&H is defined by the entities' laws on use of renewable energy sources and efficient cogeneration and action plans, promulgated by the RS and FB&H Government. Through their action plans for the use of renewable energy sources, the governments defined the annual dynamical quotas for SHPs that define the maximum level of installed capacities, i. e. the production which is promoted during a calendar year.

The laws also define the place, the role, and the rights and obligations of each participant in the incentives system.

The actors in the incentives system for SHPs include the following:

- a) Producers of electrical energy from SHPs.
- b) Regulatory commissions for energy (RERS and FERK).
- c) Incentives system operators (OIEiEK in FB&H and OSP MH ERS in RS).
- d) Entities' governments.
- e) Consumers, i.e. the electrical energy end buyers.

In addition to actors, the laws define the incentives system that comprises the following:

- a) Obligatory purchase of electrical energy from SHPs.
- b) Purchase at guaranteed and reference prices that incorporate the premium, i.e. incentive.
- c) Fees for the promotion of the production from RESs and efficient cogeneration.

Considering that the energy system is complex, the incentives system itself is rather complex too; so that, below in this Analysis we will try to describe as briefly as possible the entire system relating to the incentives for SHPs, i.e. the system elements relevant for this analysis.

a) Producers of electrical energy from SHPs

The producers of electrical energy from SHPs in RS are grouped in three categories according to the installed power:

- SHPs up to and including 1MW
- SHPs over 1 MW up to and including 5 MW and
- SHPs over 5 MW up to and including 10 MW

In FB&H, the producers of electrical energy from SHPs are grouped in the following categories according to the installed power:

- micro HPs: from 2 kW up to and including 23 kW,
- mini HPs: from 23 kW up to and including 150 kW,
- small HPs: from 150 kW up to and including 1 MW,
- medium HPs: from 1 MW up to and including 10 MW.

By being grouped into these categories, the producers accomplish different guaranteed prices in the obligatory purchase, and hence different right to the level of premium, i.e. incentive.

All producers of energy from SHPs are guaranteed the purchase of all generated electrical energy regardless the situation and the needs of the system, and all have a priority when it comes to delivery, i.e. dispatch of electricity.

In addition to the above, the producers of electrical energy from SHPs enjoy the following benefits too:

- Priority and privileges during connection to the grid
- Right to the guarantee of origin
- Right to the purchase at guaranteed or reference price and right to premium/incentive

b) Regulatory commissions for energy (RERS and FERK)

As far as the incentives system is concerned, the entities' regulatory commissions for energy are responsible to:

- determine the guaranteed and the reference prices of electrical energy,
- define the amount of premiums and technical coefficients (TC),
- issue decisions on the status of the producer and the right to the guaranteed and reference prices and the right to the incentive,
- issue the guarantees on origin of electrical energy,
- define the amount of the fee for the promotion of the production from RESs and efficient cogeneration.

c) Incentives system operators (OIEiEK in FB&H and OSP MH ERS in RS)

Incentives system operators in entities have the following responsibilities:

- to manage the funds collected on the basis of the fees for the promotion of the production from RESs and efficient cogeneration,
- to make contracts on purchase of electrical energy from producers of electrical energy from SHPs in accordance with the regulatory commissions' solutions,
- the purchase of electrical energy from the producers from the incentives system at reference and guaranteed prices,
- the payment of the premium, i.e. incentives to producers from the funds collected from the fees for the promotion of the production from RESs and efficient cogeneration.

d) Entities' governments

Entities' governments, and as part of them, the relevant ministries, pass the legal regulations relevant for the incentives system, issue action plans for the utilization of RESs and grant the approval for the regulatory commissions' decisions on guaranteed and reference prices of electrical energy and the amount of the fee for the promotion of the production from RESs and efficient cogeneration.

e) Consumers, i.e. end buyers of electrical energy

All end consumers of electrical energy in B&H have an obligation to pay the fees for promotion of the production from RESs and efficient cogeneration. The fee is charged according to the spent kWh of electrical energy and is paid on a monthly basis as part of the bill for spent electrical energy.

f) Obligatory purchase of electrical energy from SHPs

All producers of electrical energy from SHPs have an amenity of obligatory redemption, whereby they are guaranteed that all the electrical energy produced by them will be bought, regardless of the supply and demand oscillations in the energy market in B&H and the region.

Producers acquire the right to obligatory purchase after fulfilling the conditions and getting a decision from regulatory commissions, while they make the contracts on redemption of electricity with the relevant incentives system operators (OIEiEK in FB&H and OSP MH EPS in RS).

Contracts on guaranteed purchase at guaranteed prices are made with the producers of electricity from SHPs as follows:

- For a 12-year period in FB&H;
- For a 15-year period in RS.

Having said that, it is noteworthy that the contracts are made at guaranteed prices that are valid as of the day of signing the contracts and that the producers are paid for the produced quantities of electrical energy at agreed upon guaranteed prices throughout the term of the contract, regardless of the situation in the market, market prices and changes in the amount of the guaranteed price, that are periodically made by the entities' energy commissions.

According to the data for RESs in B&H, in the past three years, the following quantities of electrical energy from SHPs in the system of guaranteed purchase at guaranteed prices, i.e. from the producers with a status of privileged producers, were bought:

kWh	2015	2016	2017
RS	43,339,026	109,022,799	116,142,792
FB&H	87,891,000	95,443,000	71,696,540
Total	131,230,026	204,465,799	187,839,332

As of 31 December 2017, the Operator for RESs from FB&H (OIEiEK) carried out the purchase of electrical energy at guaranteed purchase prices from a total of 40 producers from SHPs, while the operator from RS (OSP MH ERS) from a total of 19 producers.

g) Guaranteed and reference prices for SHPs

The level of the guaranteed and reference prices for purchase of electrical energy in the incentives system for RESs is determined by the regulatory commissions with the approval of the entities' governments, and the examples for both entities with the calculation methodology are provided in Annexes 1 and 2.

The level of guaranteed prices in FB&H in the year 2015 amounted to as follows:

Guaranteed prices in FB&H in 2015 in BAM/kWh

SHP Power	Reference price	TC	Guarant. price	Premium	Premium share in guaranteed price (%)
micro	0.105696	2.7471	0.29036	0.18466	63.60
mini	0.105696	1.7211	0.18192	0.07622	41.90
small	0.105696	1.3010	0.13751	0.03181	23.14
medium	0.105696	1.1706	0.12373	0.01803	14.58
Average			0.18338	0.07768	35.80

It is important to see that the higher the guaranteed price and the premium, the lower the installed power, and hence higher the incentive through the premium for lower capacities.

In 2017 the amount of guaranteed prices determined by the FERK decision amounted to:

Guaranteed prices in FB&H in 2017 in BAM/kWh

SHP Power	Reference price	TC	Guarant. price	Premium	Premium share in guaranteed price (%)
micro	0.105858	2.7429	0.29036	0.18450	63.54
mini	0.105858	1.7185	0.18192	0.07606	41.81
small	0.105858	1.2990	0.13751	0.03165	23.02
medium	0.105858	1.1688	0.12373	0.01787	14.44
Average			0.18338	0.07752	35.70

Compared to 2015, there was a slight increase in the reference price and a decrease of technical coefficients (TC), which resulted in the same level of the guaranteed purchase prices; at the same time a share of the premium in the guaranteed price slightly decreased.

In RS, the level of guaranteed purchase prices for electricity producers from SHPs amounted to:

Guaranteed prices in RS in 2015 in BAM/kWh

SHP Power	Reference price	Guarant. price	Premium	Premium share in guaranteed price (%)
Up to incl. 1 MW	0.0541	0.1541	0.1000	64.89
1MW up to incl. 5 MW	0.0541	0.1327	0.0786	59.23
5 MW up to incl.10 MW	0.0541	0.1245	0.0704	56.55
Average		0.1371	0.0830	60.22

In the RS, as in the B&H, the higher the incentives, the lower the power of installed capacities; at the same time, the premiums per kWh are higher than the reference prices in all categories of installed power.

The amount of guaranteed prices in 2017, according to the RERS decision, was the following:

Guaranteed prices in RS in 2017 in BAM/kWh

SHP Power	Reference price	Guarant. price	Premium	Premium share in guaranteed price (%)
Up to incl. 1 MW	0.057	0.1396	0.0826	59.17
1MW up to incl. 5 MW	0.057	0.1227	0.0657	53.55
5 MW up to incl.10 MW	0.057	0.1186	0.0616	51.94
Average		0.1270	0.0700	54.88

In 2017, in RS, there was a slight increase in the reference price and a decrease of guaranteed prices, as well as the decrease of premiums, so that a share of premiums in the guaranteed price fell by almost 10% on average. A slight increase in the reference price can be attributed to the growth of prices in the market, given the fact that the reference price in RS is determined on the basis of the market price, while decreasing the level of guaranteed prices and premiums is primarily due to the fact that the funds collected from the fee for renewable sources in 2016 were barely enough to cover the premiums demanded by the electricity producers from SHPs.

If we compare the policies of guaranteed prices and the policies of premiums in entities, we can see the following:

- that the reference prices in RS are by far lower compared to FB&H, i.e. by as much as 46.2%, which is a consequence of two factors. The first is that the market prices in the purchase of electrical energy in RS are actually lower than in FB&H, while the other is reflected in the fact that the reference price of electricity in FB&H does not only reflect the actual market price, but is by 20% higher than the market price, in accordance with the definition of the reference price from the Federal law, which already incorporates a part of the incentives for renewable sources.
- Guaranteed prices in FB&H are by far higher compared to RS, i.e. by 44% on the average, while the premiums that are paid from the funds of the fee for renewable sources paid by the consumers are on the average higher by only 10.7%.

All this leads to a conclusion that a considerable part of subsidizing of the production of electrical energy from SHPs in FB&H is actually incorporated in the regular price of electrical energy paid by the end consumers, and not only through charging of the fee for promotion of the RESs.

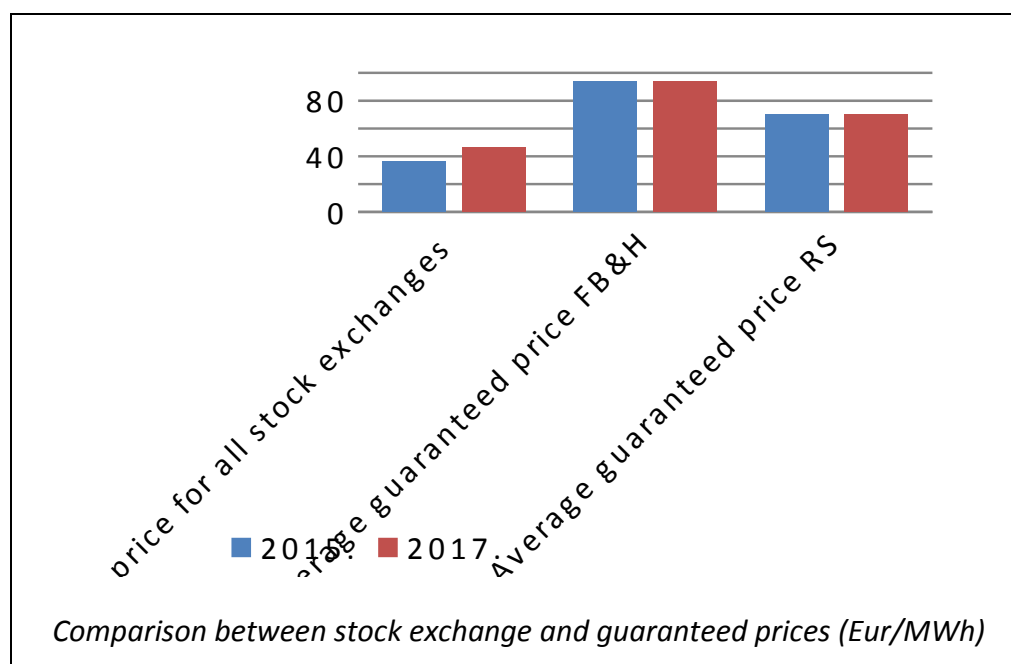
Another fact in favor of this assertion is the data on the level of premiums paid to energy producers from SHPs from the funds collected from the fees for the promotion of RESs by the incentives system operators in the previous three years, expressed in BAM:

BAM	2015	2016	2017
FBiH*	1,695,220.00	2,646,366.47	2,648,703.90
RS**	3,366,384.20	8,048,839.04	8,550,995.10
Total	5,061,604.20	10,695,205.51	11,199,699.00

* OIEiEK data, ** OSP MH EPS data

For the sake of this analysis, it is also interesting to compare the guaranteed prices paid to the electricity producers from SHPs in B&H with the average annual prices at which the electrical energy is sold in energy stock exchanges. Average annual prices in stock exchanges are calculated on the basis of the data provided in Annex 3.

Price in Eur/MWh	2015	2017
Average stock exchange price for all stock exchanges	36.58	46.08
Average guaranteed price FB&H	93.76	93.76
Average guaranteed price RS	70.10	69.93



h) Fees for the promotion of production from RESs and efficient cogeneration

All end consumers of electrical energy in B&H are required to pay a fee for the promotion of electrical energy production from RESs and efficient cogeneration, based on their actual consumption. The fee is paid per kWh, on a monthly basis, as part of the bill for consumed electrical energy.

The funds collected on the basis of that fee for promotion represent the income of the Operators for RESs and are used for the payment of the incentive part from the guaranteed price for produced electrical energy of privileged producers, for covering the operating expenses of the Operator and for the payment of the expenses of balancing the energy system incurred due to deviations in the values of planned and produced energy from renewable energy sources and efficient cogeneration. In RS, 10% of the collected funds are paid to the RS Environmental Protection and Energy Efficiency Fund.

Currently, the amount of the fee in the RS amounts to 0,0052 BAM/kWh, and in FB&H 0.002128 BAM/kWh.

According to the operators' data, in the past three years, the revenue from the fees amounted to:

in BAM	2015	2016	2017
FB&H	6,810,074.11	5,869,128.66	10,884,962.61
RS*	7,141,876.72	8,840,464.05	16,304,166.65
Total	13,951,950.83	14,709,592.71	27,189,129.26

* invoiced

Given the fact that the data for RS are expressed as invoiced, rather than as collected value, it is estimated that the actual revenue on this basis at the level of B&H in 2017 summed up around 24 million BAM.

The growth of the revenue from fees has been mostly influenced by a constant growth of the level of the fee for renewable energy sources, which rose from 2015 until now by more than twice, as a consequence of the fact that the whole system of incentives was set solely on financing from the end consumer.

Comparing the data on paid incentives to the electrical energy producers from SHPs with the total level of collected fees, one may conclude that almost half of the collected funds (46.7%) is allocated, in the observed period, to producers from SHPs in form of premiums. In 2016, this percentage in the RS was as high as 91%.

4. Socio-economic justification analysis of the concession fees and incentives system for SHPs

The previous chapters create the basis for the evaluation of the economic, or social - economic justification of the current fees and incentives model applied in the sector of electrical energy generation from the SHPs.

Socioeconomic justifiability means cost-benefit analysis, that is, the analysis of the benefits gained and costs borne in respect of the construction and functioning of the SHPs in B&H.

The direct comparison of the social benefits and costs borne by the community for a model to function results in the evaluation of how justifiable is a certain action from the social aspect. Any economic activity producing social benefits that equal or exceed the costs involved is justified for a community, while the situation in which a community suffers the economic, that is, the financial loss is not acceptable. This method is useful for the evaluation of either single projects or the effects of the existing, or the decision-making on new policies or the modification of the current ones through an economic prism.

From the social aspect, premiums paid to the producers of electrical energy from SHPs in the framework of the system of incentives and guaranteed purchase prices/feed-in tariffs constitute a direct social expense. In addition to the premiums, the part of the reference price (20%) in the FB&H paid to the producers above the electrical energy market price constitutes a subsidy for the SHPs and also constitute a direct social expense, just like the premiums.

On the other hand, the social benefit is consisting of the following:

- a) Revenues from concession fees.
- b) Revenues from indirect taxes (VAT) on the electrical energy produced from SHPs.
- c) Revenues from special water management fees against the usage of water for energy production.
- d) Tax on the salaries of the employees working in the companies producing energy from SHPs.
- e) Corporate income tax applicable to the profit of the companies producing energy from SHPs.

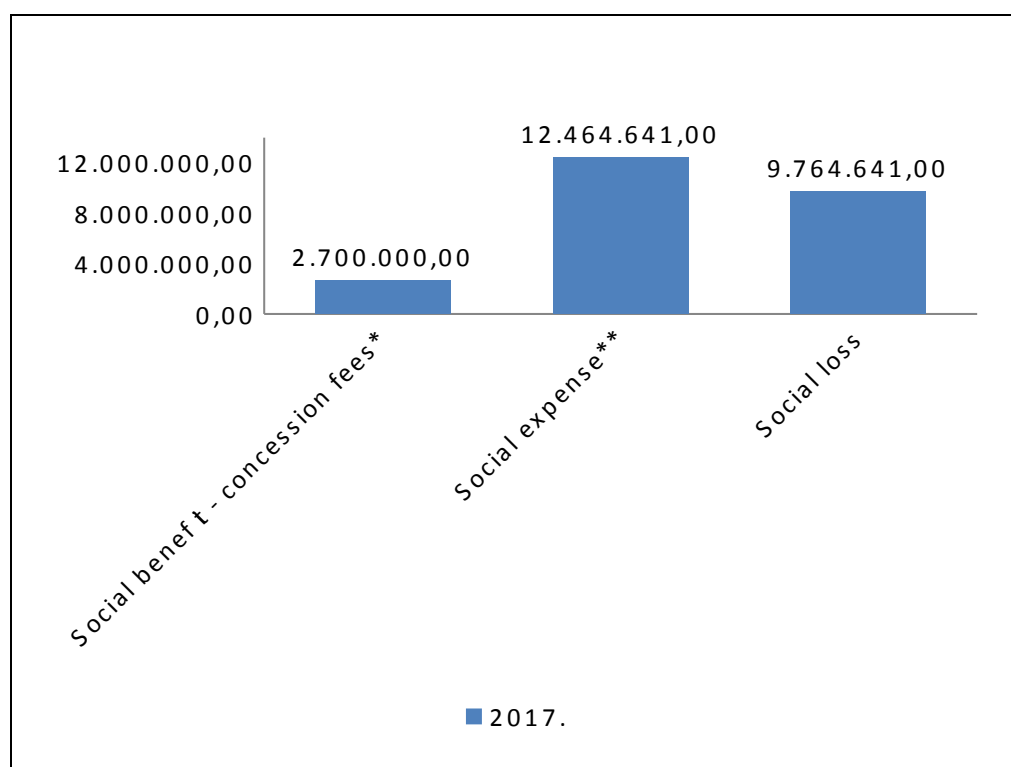
From the social aspect, indirect taxes (VAT) on the electrical energy delivered from SHPs which fill in the public budgets constitute a social benefit just as the direct taxes (tax on the salaries and profit tax), which would not exist if a new value created by the use of work and capital had not been created.

Unlike this, the VAT calculated to the fees for the promotion of RES cannot be economically treated as a social benefit since it is not calculated against a newly created value, but it represents a shear transfer of social wealth, reallocated from the citizens to the public budget.

Employee's contributions (pension and disability insurance and health care), although at first may seem to constitute a social benefit since they fill in the public funds, on the long term cannot be regarded as a social benefit: Those for whom these contributions are paid in respect to their salaries use the health care services and in the future will receive pensions from the public funds, so these funds should be as well treated as a social transfer, but with partially postponed effect.

a) Concession fees

If we compare the direct revenues that the community creates from the concession fees including the premium's expenses paid to the producers of energy from SHPs in the feed-in tariffs system, it is easy to establish that the social expense here, is even several times higher than the social benefit.



* Partially estimated information

** Social expense= paid premiums + part of the reference price paid above the market price

b) Value-added-tax (VAT)

VAT revenues on the electrical energy supplied from the SHPs within the feed-in tariffs for B&H is calculated based on the data on the supplied quantities and feed-in tariffs for 2017 and it amounts at 4,742,634 BAM.

c) Special water management fee

In addition to the concession fees, social benefit comprises also the revenues originating from the special water usage fees paid against the use of water used for the production of electrical energy paid by the producers of electrical energy from SHPs per kWh of generated electrical energy.

This fee in both entities amounts 0,001 BAM/kWh produced electrical energy.

The multiplication of the generated energy from the SHPs by the entities with the responding water management fees results in data on the total amount of funds paid by the producers of electrical energy from SHPs in the feed-in tariff system in 2017:

2017	Production (kWh)	Special water management fee (BAM/kWh)	Amount (BAM)
FB&H	71,696,540	0.001	71,696.54
RS	116,142,792	0.001	116,142.79
Total	187,839,332		187,839.33

Total revenue acquired based on the above, that is, the social benefit in 2017 amounted at 187,839 BAM.

d) Taxes on salaries

Although the most of SHPs are fully automated and does not require staff hiring and since a great deal of the investors owns multiple SHPs, the share of taxes paid by the Employer in the amount of social benefit from the SHPs, due to the incompleteness and lack of availability of concrete data, will be estimated based on the following presumptions:

- That every producer within the feed-in tariff incentives system has 2 employees per a SHP
- That average net salary of an employee amounts at 1,000 BAM a month, and
- That the tax on salaries is 10% without the tax base reduction

In accordance with the above assumptions, the estimation would be the following:

59 producers with feed-in tariffs x 2 = 118 employees

118 employees x 1,000 BAM a month x 12 months = 1,416,000 BAM a year

Tax on salaries = 1,416,000 BAM x 10% = 141,600 BAM a year

e) Corporate income tax

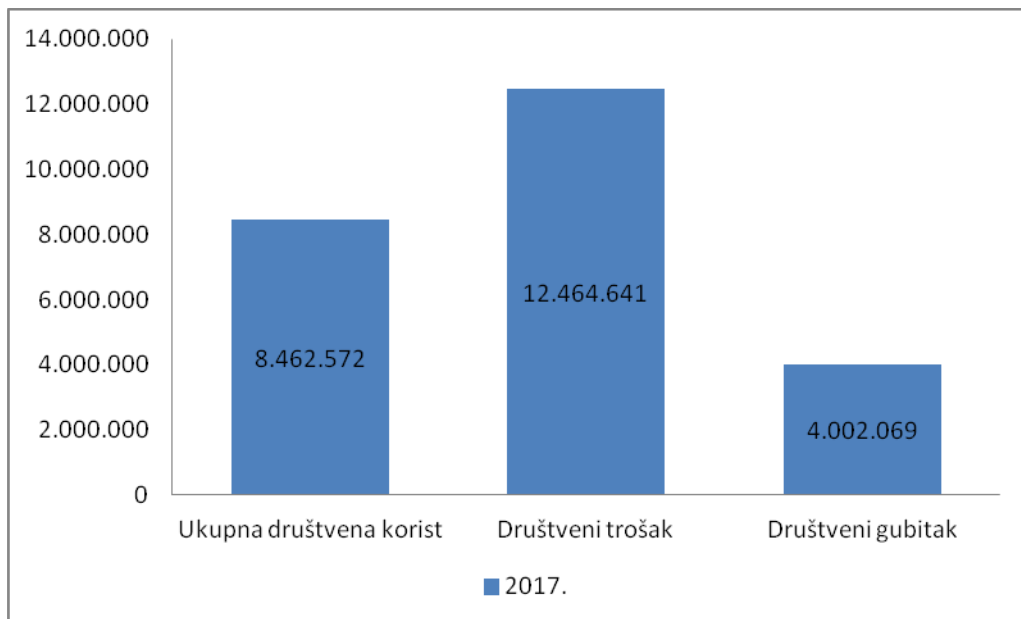
Calculating the social benefit from the corporate income tax is far more complex. For these purposes the calculation will be done for each Entity separately and based on the methodology used by the regulatory agencies (see Annexes 1 and 2) for acknowledge costs and guaranteed price determination for a 1 MW installed power SHP. The revenue will be calculated for the yearly production, in kWh, using feed in tariff. The aim is to establish the amount of the corporate income tax per 1 kWh of generated electricity in SHPs.

	RS	FB&H
Power (kW)	1000	1000
Investment value (BAM)	3,716,077	3,099,991
Work hours (h/year)	4,200	4,100
Variable costs (Eur/kW)	66.02	68.50
Annual production	4,200,000	4,100,000
Feed-in tariff (BAM/kWh)	0.13960	0.13751
Total revenue	586,320	563,791
Concession fee	20,521	21,424
Special water management fee	4,200	4,100
Variable costs	129,124	133,974
Depreciation	123,869	103,333
Other costs and expenses (5% of total revenue)	29,316	28,190
Loan interest rates	132,292	110,360
Expenses total	439,322	401,381
EBIT	146,998	162,410
Corporate income tax	14,700	16,241
Profit after tax	132,298	146,169
Corporate income tax (BAM/ kWh)	0.003499945	0.0039612

The total amount of the corporate income tax for a SHP as social benefit will be calculated through applying the corporate income tax rate per kWh in 2017 to the produced quantities of the electric power generated from the SHPs within the incentives system:

2017	Production (kWh)	Corporate income tax (BAM/kWh)	Amount (BAM)
FB&H	71,696,540	0.00396122	284,006
RS	116,142,792	0.003499945	406,493
Total	187,839,332		690,499

Adding to the revenue from the concession fees the revenues gained on the other aforementioned basis, we have the total social benefit. If we compare it with the total social expenses, we may state that the current system involving incentives for the electrical energy production from SHPs is not socially and economically justified. On contrary, it creates a direct financial, that is, economic damage to the community, which amounted at 4,002,069 BAM in 2017.



Legend: (from the left to the right side: **Total social benefit; Social expense; Social loss**)

This means that the total loss for the community owing to the further implementation of this model of incentives to the electrical energy production from SHPs in the next 10 years, only based on the current number of SHPs that are in function now, can be estimated at 40 million BAM.

Having said that, it should be kept in mind the fact that, based on the already acquired entitlement to the privileged energy producer status or based on the lodged application in the FB&H and preliminary entitlement to the guaranteed repurchase at the guaranteed prices/feed-in tariffs in the RS, there is as much as 69 SHPs with planned total installed power of 52,307 kW, which will additionally increase the social loss for at least the same amount, so that it can be expected that a total social loss based on the incentives for SHPs in Bosnia and Herzegovina in the next 10 years will approximately exceed 70 million BAM.

It is easy to conclude that there are losers and winners in the existing system of incentives for electricity generation, that is, those who profit from the incentive system and those from whose pockets these earnings are paid.

The winners are the owners of the SHPs who, through feed-in tariffs and guaranteed unchanged prices for 12 to 15 years of contract validity do not have to worry about the market and market conditions of their business, have secured return on their investment and make significant profits from the production of electric energy from SHPs. Therefore, it is no surprise that only two foreign investors have in their possession as many as 12 functioning SHPs in B&H, while they plan to build or the construction is already ongoing of another five SHPs (8), as well as the fact that many former and current officials, members of their families or people closely related to them, are involved in such a lucrative business as the one with SHPs in B&H.

In addition to the owners, the budgets of the entities, cantons and local governments are also winners in the incentive system, as significant funds are added to their budgets on the basis of taxes and fees.

Of course, we should not forget the banks, both large international and domestic, which, through the financing of the SHPs construction projects, in the feed-in tariff system, at a guaranteed purchase price, without taking any market risk, materialize significant interest-rate profits on loans earmarked to the SHPs construction.

Finally, it is clear that the only losers in this process are the citizens and the economy of B&H from whose pockets all these winners are directly funded within this system of incentives for the production of the electric power generated from the SHPs, and they bear the entire social loss caused by this system.

5. Conclusions and recommendations

Based on the conducted research and the data and information presented in this Analysis, it is possible to draw the following conclusions:

- The established system of concession fees and incentives for SHPs in B&H does not have economic justification and is detrimental from the social aspect since it produces a direct social loss of more than four million BAM a year;
- The established Feed-in tariff system is very attractive and profitable for the investors, which is the reason of such huge interest for the concessions for SHPs and for the incentives system itself, which jeopardizes almost all watercourses in Bosnia and Herzegovina no matter the area in which they are located;
- The governments of the entities in meeting the international commitments of B&H related to the share of RES in the gross domestic consumption primarily focus on the construction of new facilities and the increase in production of the electrical energy generated from the RES instead of focusing on consumption reduction;
- The current concession granting system is complex, chaotic and unbalanced, with plenty of room for discretionary decision making, which opens the possibility for manipulation, corruption and unfair competition.

Based on the above, it is obvious that the current system of concession fees and incentives for SHPs urgently needs to be significantly modified, that is, it needs to be redefined in order to avoid further social loss which occurs from its implementation and to prevent the further social loss to be borne by the introduction of the new SHPs which are either planned or under construction.

In this context the author recommends the following:

- To adopt at once new entity action plans for the use of RES in which there will no more be quotas for the electric energy production generated from the SHPs, and instead of that, to base all future production in the RES incentives system on the wind and solar technologies for which there is already a cost-efficient potential of more than 3.5 GW for new capacities. This issue is urgent, as already in 2014, according to the EUROSTAT (9) data, the share of RES in the gross domestic consumption in B&H was 42.3%, that is, more than a target set for 2020, which renders the incentives for the construction of new SHPs facilities through the FiT system as absurd.
- In accordance with the above, to put a ban on granting concessions for the construction of SHPs on the whole territory of B&H along with cancellation of the existing concession agreements with the investors which have not started construction yet, that is, which have not obtained building permits. These investors should be indemnified from the fund collected as RES fees.

- For the SHPs which are not entitled to the guaranteed purchase at the guaranteed prices, disable the obtaining of the FiT status and offer them guaranteed purchase at market price using the model currently applicable in the FB&H for qualified producers.
- In the FB&H, to amend the law on concessions and precisely define the rules and the scope of the one-off concession fee depending on the planned power of the SHP and define the concession fee for operation/use according to the model applicable in the RS, that is, per kWh of the generated electrical energy.
- In the FB&H, to adopt legal provisions to establish an unique register of the granted concessions for the SHPs up to 5 MW.
- In the RS, to amend the law on concessions in order to precisely define categories of the one-off concession fee depending on the installed power in order to avoid the possibility of the discretionary decision-making.
- In both entities double the current amount of concession fees for operation/use, which will not significantly affect profitability of the current SHPs, and channel so collected funds through the environmental protection funds to alleviation of damage caused by the construction of SHPs and the preservation of the watercourses.

The implementation of these recommendations would provide socioeconomic justification for the operation of the existing SHPs in B&H and protect watercourses and biodiversity from further devastation. By channeling the RES incentives system towards wind and solar energy sources and technologies, and by putting the stronger focus on funds and activities earmarked to the reduction of energy consumption for heating and cooling, that is, the focus to the energy efficiency, it will be easier to reach the targets set for the next decades and commitments assumed by Bosnia and Herzegovina under the international treaties.

6. Annexes

Annex 1 – Republic of Srpska

Amount of feed-in tariffs and premiums for the sale within the guaranteed purchase system and technical and economic parameters for determination of the guaranteed purchase prices.

(RERS – January 2017)

Annex 2 - Federation of B&H

Amount of feed-in tariffs and premiums for the sale within the guaranteed purchase system and technical and economic parameters for determination of the guaranteed purchase prices.

(FERK – July 2017)

Annex 3

Exchange indices average annual price 2015 and 2017 (Eur/MWh)

Annex 4

Republic of Srpska's Diagram - Process, permits and relevant institutions for SHPs (1)

Annex 5

Federation of B&H's Diagram - Process, permits and relevant institutions for SHPs (1)

Annex 1 – Republic of Srpska

Amount of feed-in tariffs and premiums for the sale within the guaranteed purchase system and technical and economic parameters for determination of the guaranteed purchase prices.

(RERS – January 2017)

Guaranteed purchase price / Feed-in tariffs

Electric power plant type according to the energy source and installed power	Sale within the guaranteed purchase system at feed-in tariffs (BAMM/kWh)			Market sale and consumption for the own needs (BAM/kWh)	
	Guaranteed purchase price	Reference price	Premium (within the guar. price)	Reference price	Premium
Hydropower plants:					
up to including 1 MW	0.1396	0.0570	0.0826	0.0667	0.0729
above 1 MW up to including 5 MW	0.1227	0.0570	0.0657	0.0667	0.0560
above 5 MW up to including 10 MW	0.1186	0.0570	0.0616	0.0667	0.0519

Technical parameters

Production facility according to the energy source	Power (MW)	Hours of work (h/year)	Specific investment (€/kWe)	Operation & maintenance costs (€/kWe)
Hydropower plants:				
up to including 1 MW	0.50	4,200	1,900	66.02
above 1 MW up to including 5 MW	2	4,200	1,650	60.55
above 5 MW up to including 10 MW	9	4,200	1,600	57.78

Economic parameters

Capital price – 8.9% a year

Annuity factor – 12.3%

Rate of return to the own funds – 13.5 %

Rate of return to the borrowed funds– 7.7 % (The B&H Central Bank Report)

Debt equity ratio – 20% : 80 %

Return of Capital period – 15 years

Annex 2 - Federation of B&H

Amount of feed-in tariffs and premiums for the sale within the guaranteed purchase system and technical and economic parameters for determination of the guaranteed purchase prices.

(FERK – July 2017)

Unlike the RS in the FB&H SHPs are classified into 4 groups according to their power as follows:

- a) micro facilities: up to 2 kW up to and including 23 kW,
- b) mini facilities: up to 23 kW up to and including 150 kW,
- c) small facilities: up to 150 kW up to and including 1 MW,
- d) medium facilities: up to 1 MW up to and including 10 MW.

Guaranteed purchase price / Feed-in tariffs

Hidropower plant	Reference price	Tariff coefficient (TC)	Guaranteed purchase price
Micro	0.105858	2.7429	0.29036
Mini	0.105858	1.7185	0.18192
Small	0.105858	1.2990	0.13751
Medium	0.105858	1.1688	0.12373

Technical parameters

Hidropower plant	Power (kW)	Hours of work (h/year)	Investment (Eur/kW)	Operation & maintenance costs (Eur/KW)
Micro	23	4,100	1,790	360
Mini	150	4,100	1,790	133
Small	1,000	4,100	1,585	68.50
Medium	10,000	4,100	1,483	54

Economic parameters

Capital price – 8.9% a year

Annuity factor – 13.9 %

Rate of return to the own funds – 13.5 %

Rate of return to the borrowed funds– 7.7 % (The B&H Central Bank Report)

Debt equity ratio – 20% : 80 %

Return of Capital period– 12 years

Annex 3

Exchange indices average annual price 2015 and 2017 (Eur/MWh)

Exchange indices	2015	2017
Phelix	31.66	34.21
ELIX	32.80	36.23
SIPX	41.40	49.52
HUPXDAM	40.62	50.36
OPCOM	36.40	48.17
SEEPEX	*	51.70
CROPEX	*	52.34
Average exchange price for all exchanges	36.58	46.08

Source: DERK – Work Report.

* Note: did not operate in 2015

Phelix – The Physical Electricity Index of the European Energy Exchange (EEX) for Austria and Germany

ELIX – The EEX European Electricity Index

SIPX – Slovenian Price Index

HUPXDAM – the Hungarian Power Exchange (HUPX) day ahead market Index

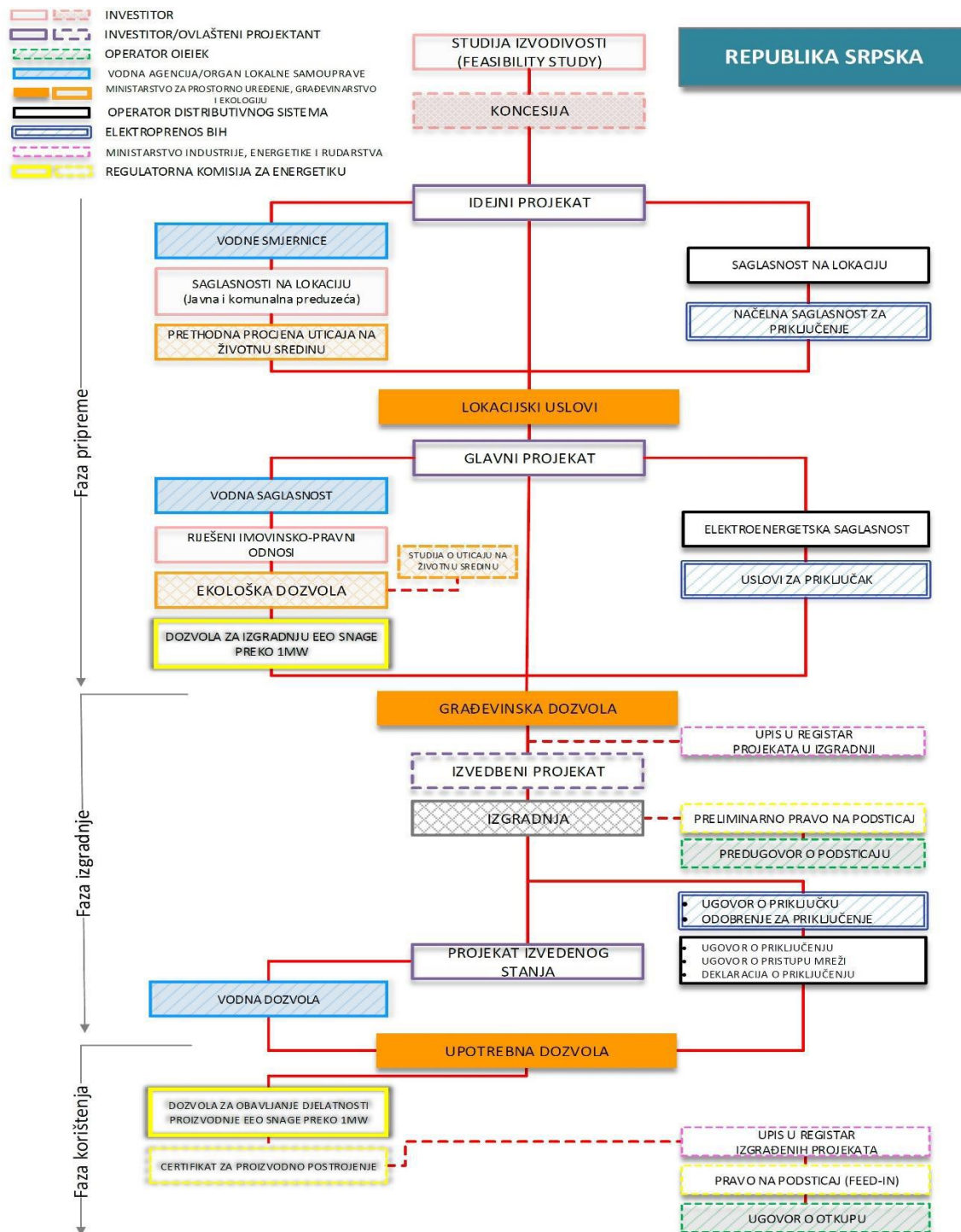
OPCOM – Romanian Exchange Index

SEEPEX – Serbian Exchange Index

CROPEX – Croatian Exchange Index

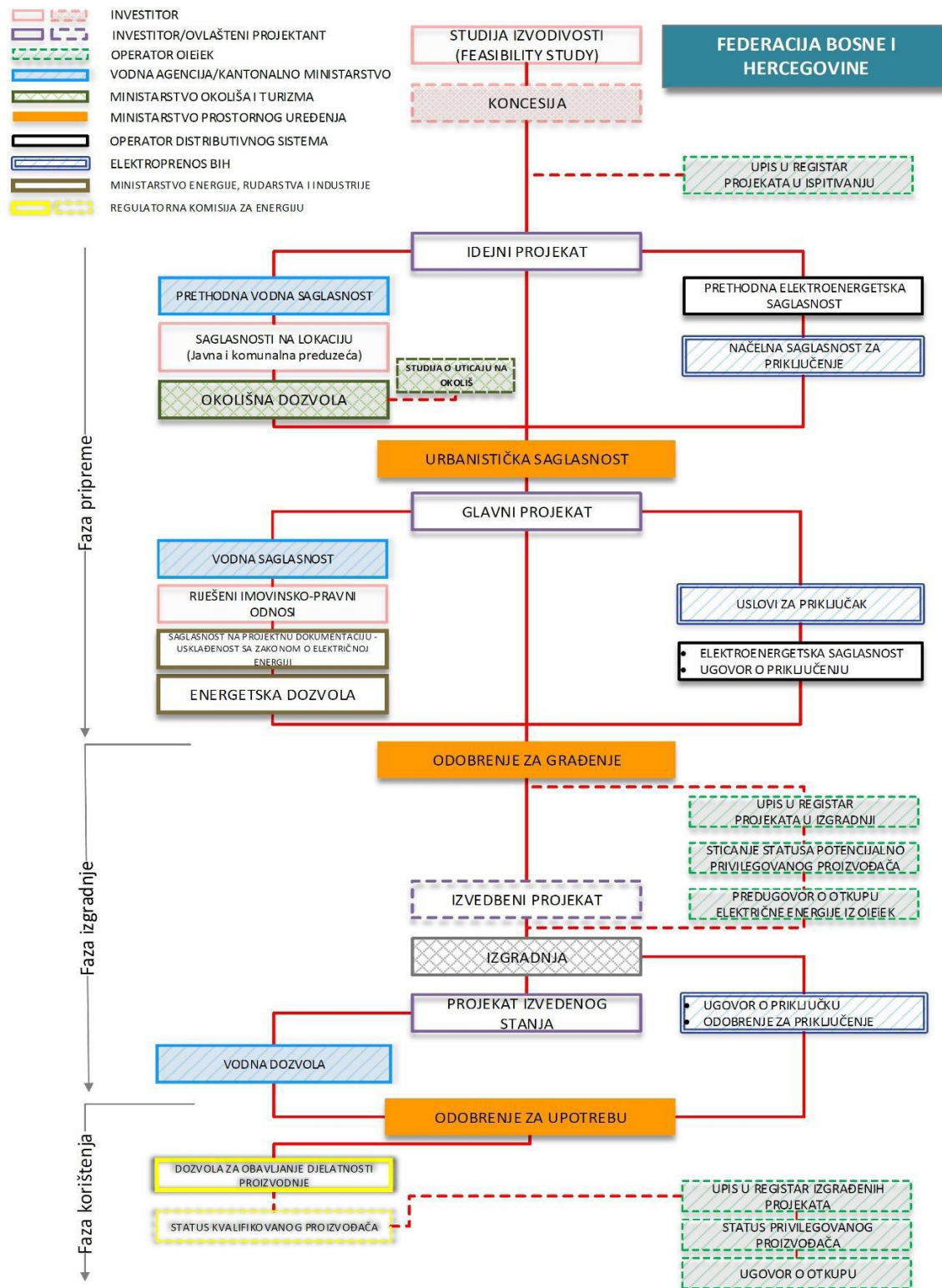
Annex 4

Republic of Srpska's Diagram - Process, permits and relevant institutions for SHPs (1)



Annex 5

Federation of B&H's Diagram - Process, permits and relevant institutions for SHPs (1)



Sources and literature

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