

CIGRE SEERC Workshop

**Navigating Spatial,
Environmental and Siting
Challenges in Electric
Power Facility
Development**

**- The case of Bosnia and
Herzegovina -**

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**South East European
Regional Council**



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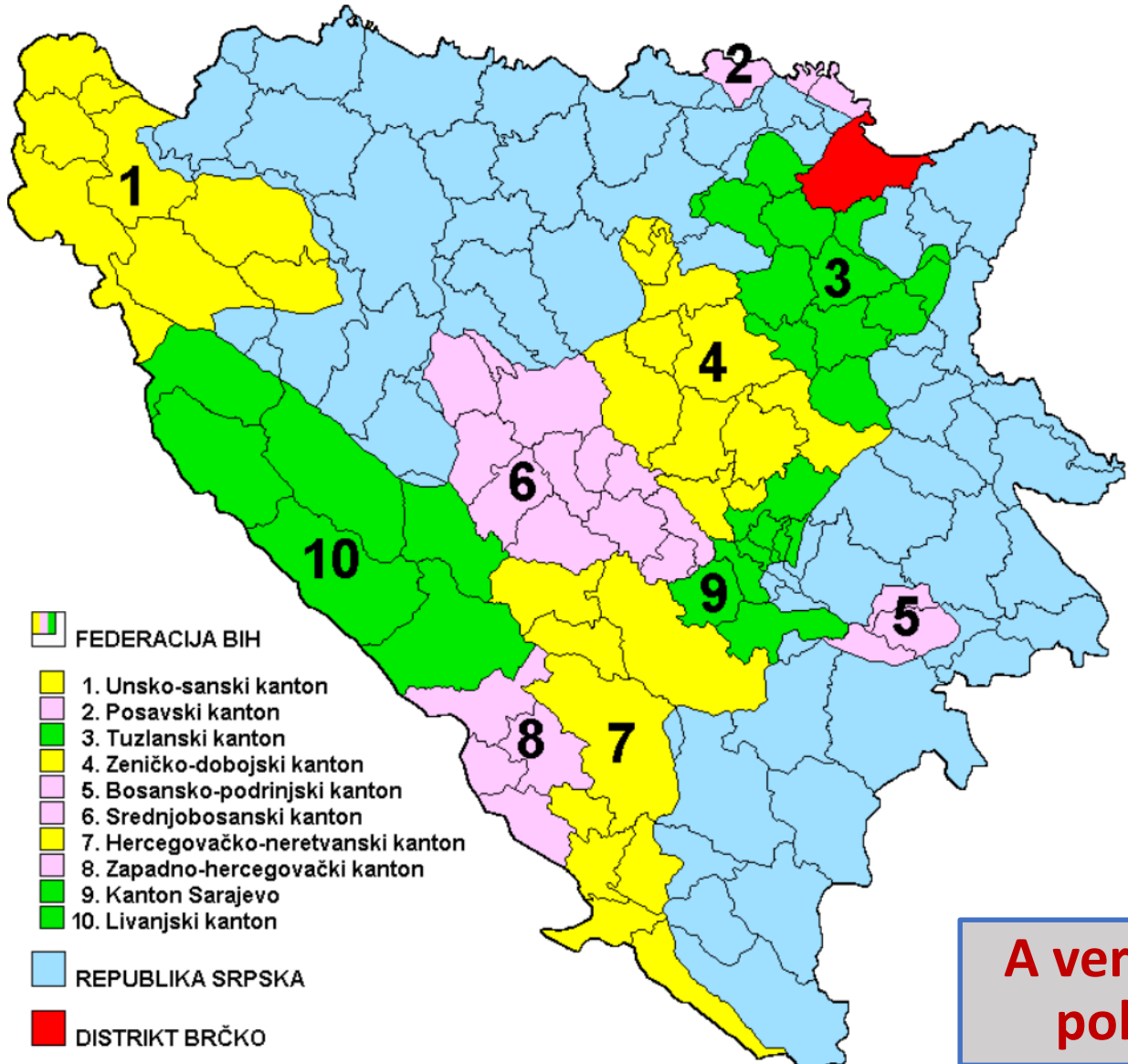
Presentation outline

- Introduction
- Spatial planning issues
- Electromagnetic fields – review of legal solutions and regulations
- Permitting issues
- Electric Power Facility Development in BiH
- Conclusions



Instead of an Introduction

Administrative organization of BiH



- Consists of 2 entities:
 - Federation of BiH (cca. 51% of the territory)
 - Republika Srpska (cca. 49% of the territory).

and the Brčko District of BiH.

- Federation of BiH consists of 10 cantons (further administratively divided into municipalities).
- Republika Srpska is administratively divided into 5 regions which are further divided into municipalities.

A very complex administrative and political country arrangement.

Legislative Framework in the Power Sector (1)

Laws at national level

- Law on transmission, regulator and operation

Regulates the establishment of:

- State Regulatory Commission for Electricity
- Independent Transmission System Operator
 - Electricity Transmission Company

Law on concessions of BiH:

- *when the concession property is located on the interstate border*
- *when the concession property extends to both entities*

- Law on the establishment of the electricity transmission company in BiH

Establishment of:

- Electricity Transmission Company

- Law on the establishment of an independent transmission system operator in BiH

Establishment of:

- Independent Transmission System Operator

Legislative Framework in the Power Sector (2)

Laws in Federation of BiH

- Law on energy and regulation of energy activities
- Law on electricity

Law on concessions of Federation of BiH:

- *use of watercourses and construction of HPP with the capacity of over 5 MW*
- *other resource uses are defined by cantonal laws on concessions*

Laws in Republika Srpska

- Law on energy
- Law on electricity
- Law on energy efficiency

Law on concessions of Republika Srpska:

- *use of resources for energy facilities expect facilities based on biomass, biogas and PVPP, all buliding integrated and PVPP ground mounted with the capacity of up to 250 kW.*

Laws in Brčko District of BiH

- Law on electricity
- Law on renewable energy sources
- Law on energy efficiency

Law on concessions of Brčko District of BiH:

- *use of resources for energy facilities, expect for PHPP connected to the transmission network*



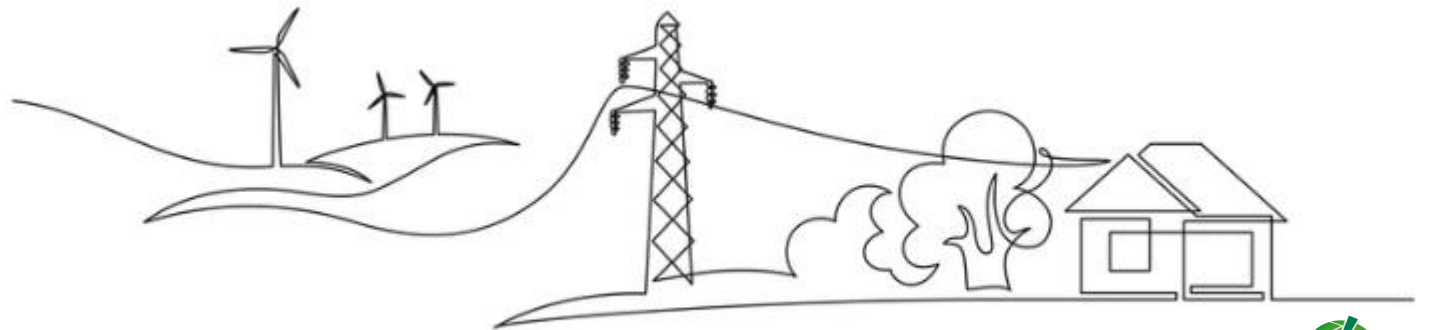
Spatial Planning Issues

Spatial Planning (1)

National level

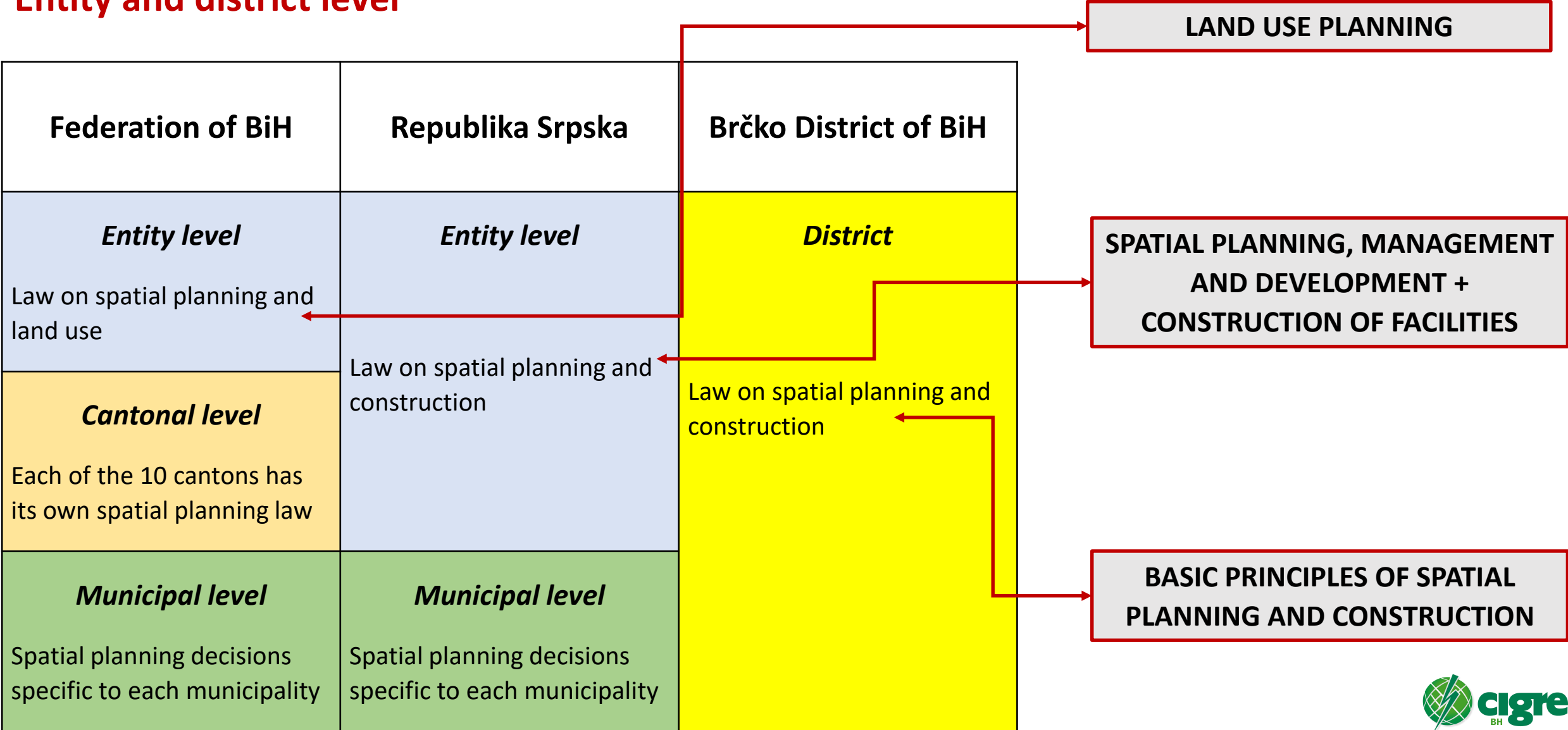
Spatial planning and development is not treated as an explicit state competence:

- no state law nor a state strategy for spatial development
- problems in creation and implementation of large projects:
 - road and energy corridors,
 - protected areas of cultural, historical and natural heritage, ect.



Spatial Planning (2)

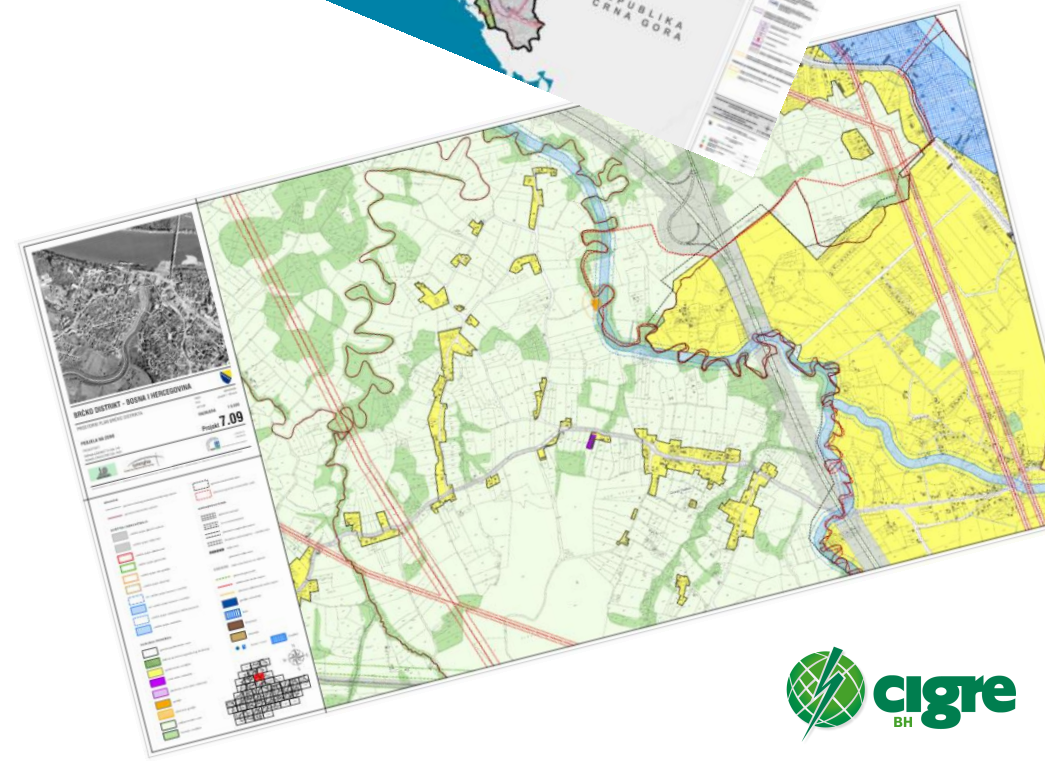
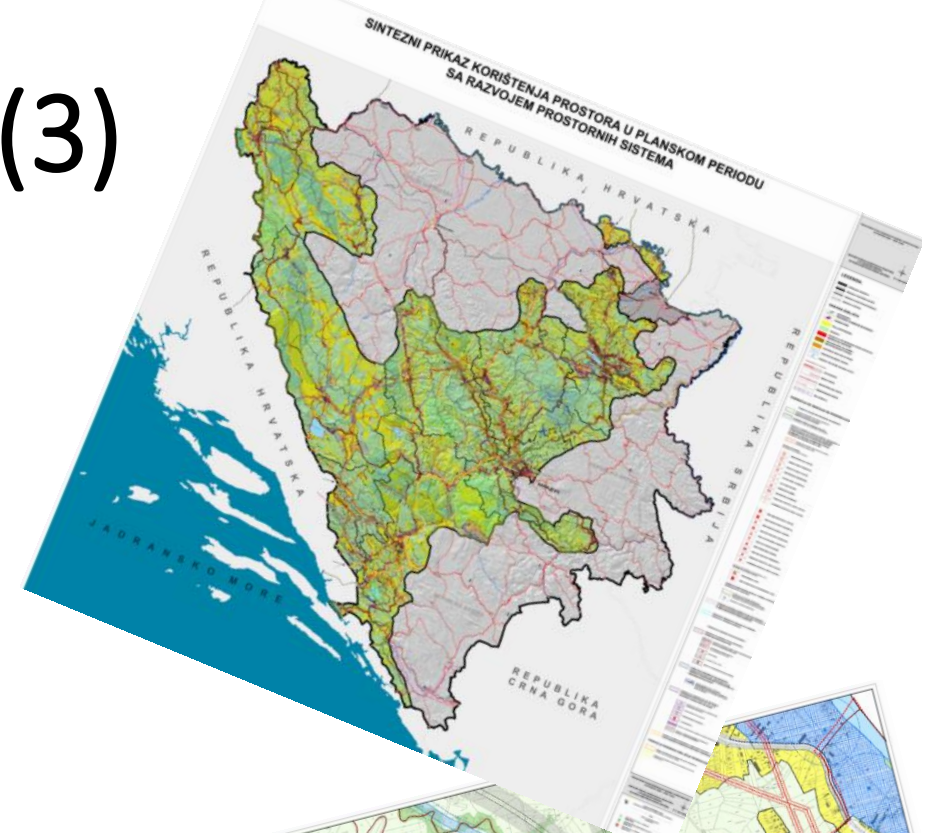
Entity and district level



Spatial Planning (3)

Overview of spatial plans

- Spatial plan of the Republic of BiH for the period 1981-2000
- Spatial plan of the area of special importance for Federation of BiH „Highway on the corridor Vc“, 2017
- Spatial plan of the area of special importance for Federation of BiH „Una River Basin" for a period of 20 years, 2014
- Spatial plan of Federation of BiH for the period 2008-2028, adoption pending
- Spatial plan of Republika Srpska until 2025, 2015
- Spatial plan of Brčko District of BiH for the period 2007-2017, 2007



Spatial Planning (4)

URBAN PLANNING APPROVAL ↔ SPATIAL PLANNING DOCUMENTATION

EXAMPLE: CONSTRUCTING A POWER FACILITY IN THE FEDERATION OF BIH

- NECP BIH
- ENERGY STRATEGY - FBIH
- ENVIRONMENTAL PROTECTION STRATEGY 2022-2032 - FBIH
- SPATIAL PLAN OF THE REPUBLIC OF BIH
- CANTONAL SPATIAL PLAN
- SPATIAL AND URBAN PLAN OF THE MUNICIPALITY
- LAW ON SPATIAL PLANNING AND LAND USE - FBIH
- LAW ON CONSTRUCTION – FBIH
- CANTONAL LAW ON CONSTRUCTION
- LAW ON ENVIRONMENTAL PROTECTION – FBIH
- LAW ON AIR PROTECTION – FBIH
- LAW ON WATER PROTECTION - FBIH

planning
mental

EXAMPLES OF GETTING REJECTED

- Spatial plan includes a WPP with specified capacity, but maps indicate the entire project area as designated for wind potential measurements
- A PVPP included, but no accompanying substation.



Electromagnetic Fields

SAFETY DISTANCES IN THE ENVIRONMENT OF 400 kV OVERHEAD LINES

Safety distances to the ground (heights) and distances for the typical areas:

Voltage (kV)	Safety distance to the ground (height)	Safety distance
	(m)	(m)
Part 100. Inaccessible locations (e.g. ravines, shadows, non-navigable rivers, swamps, etc.)		
400	6,0	5,0
220	4,75	3,75
110	4,0	3,0
Part 101. Locations inaccessible by car		
400	7,0	6,0
220	5,75	4,75
110	5,0	4,0
Part 102. Locations accessible by car (populated areas, over the fields, meadows, plough land, field roads and roads through the woods):		
400	8,0	7,0
220	6,75	5,75
110	6,0	5,0
Part 105. Permanently accessible parts of buildings (terrace, balcony, building constructions ect.)		
400	7,0	6,0
220	5,75	4,75
110	5,0	4,0

Regulation of the technical normative for constructing overhead power lines of rated voltages from 1 kV up to 400 kV, “Official Gazette (SFRY)” number 65/88.

ELECTROMAGNETIC FIELDS AND SAFETY DISTANCES IN THE ENVIRONMENT OF 400 kV OVERHEAD LINES

The width of the area of the safety zone of the horizontal plane for transmission lines of different rated voltage is:

Nominal voltage of the transmission line	The width of the security area
400 kV	40 m
220 kV	30 m
110 kV	20 m

Rulebook on safety zones of overhead power lines with a nominal voltage of 110 kV to 400 kV"
(Official Gazette of Bosnia and Herzegovina No. 23/08)

The task of the ad hoc group BAS/AG 4 of the Institute for Standardization of BiH is:

- to prepare expert working material that would be the basis for the drafting of the Law on protection from non-ionizing radiation or other regulations on protection from electromagnetic fields by the respective entity and/or state ministries

The basic guidelines for the work of the working group BAS/AG 4 (ISBIH) are:

- ICNIRP guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz)", 2010
- Directive (EU) 2013/35/EU of the European Parliament and of the Council of June 26, 2013 on the exposure of workers to EMF
- Experiences from the region
- the technical requirements in both documents (if they are at the entity level) should be identical - the main reason is the transmission company operating in both entities.

ELECTRIC AND MAGNETIC FIELD REFERENCE VALUES – INTERNATIONAL ORGANIZATIONS

Organization	General public exposure		Occupational exposure	
	E (kV/m)	B (μ T)	E (kV/m)	B (μ T)
ICNIRP	5	200	10	1000
2013/35/EU	-	-	10 (LAL)* 20 (HAL)**	1000 (LAL) 6000 (HAL)
1999/519/EC	5	100	-	-
IEEE	5***	904****	20***	2710****

* LAL - Low Action Level

** HAL - High Action Level

*** Whole-body exposure

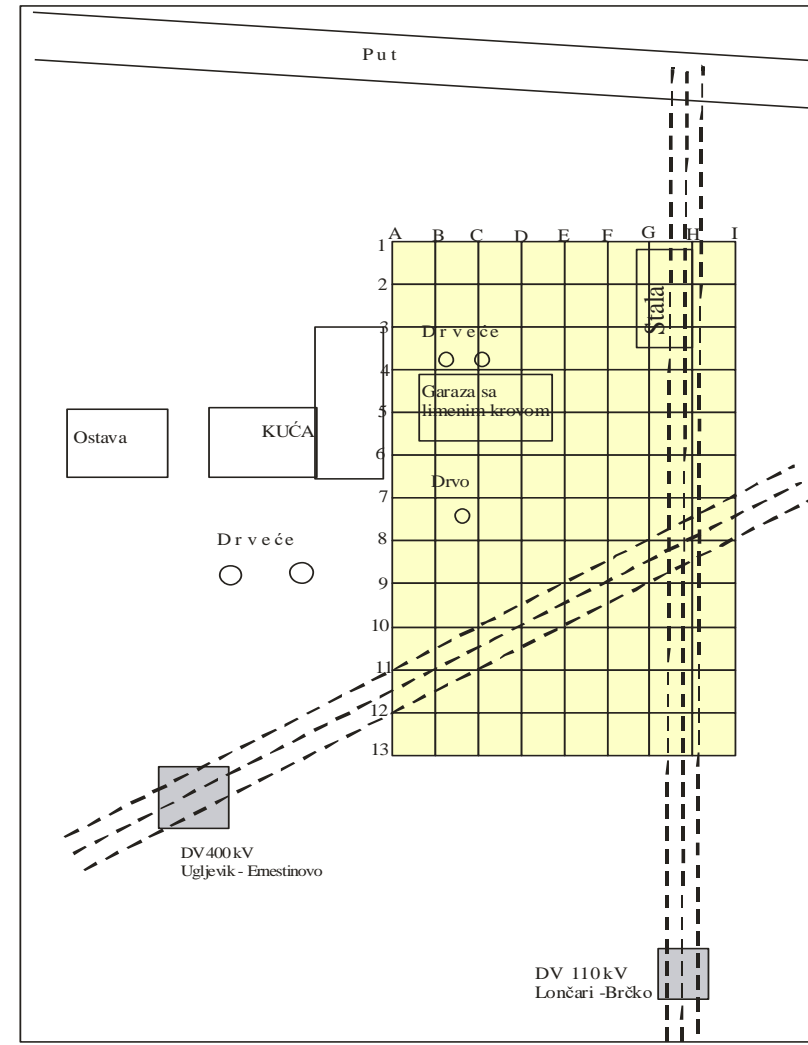
**** Exposure of head and torso

ELECTROMAGNETIC FIELDS

A REVIEW OF LEGAL SOLUTIONS AND REGULATIONS IN B&H

- **The First International Colloquium "Power Frequency Electromagnetic Fields - ELF-EMF" held in Sarajevo in June 2009 and supported by six Study Committees of CIGRE Paris,**
- **The Second International Colloquium "Power Frequency Electromagnetic Fields - ELF-EMF" held in Sarajevo in 2011**
- **Conclusions of the Round Table "Electromagnetic fields EMF - ELF, legislation" Mostar, October 15, 2018**

EFFECT OF ELECTRIC AND MAGNETIC FIELDS ON PEOPLE - EXPERIENCES FROM BOSNIA AND HERZEGOVINA



ELECTRIC AND MAGNETIC FIELD REFERENCE VALUES – BOSNIA AND HERZEGOVINA

- There is no regulation regarding electric and magnetic field reference values on the national level in the Bosnia and Herzegovina.
- There is no regulation regarding electric and magnetic field reference values on the level of entity Federation of the Bosnia and Herzegovina.
- In the entity Republic of Srpska there is regulation regarding electric and magnetic fields in the form of:
 - Law on protection against non-ionizing radiation of the Republic of Srpska 36/19
 - Rulebook on protection against electromagnetic fields up to 300 GHz 99/19

ELECTRIC AND MAGNETIC FIELD REFERENCE VALUES - BOSNIA AND HERZEGOVINA ENTITY REPUBLIC OF SRPSKA

Areas of increased sensitivity		Occupational exposure	
E (kV/m)	B (μ T)	E (kV/m)	B (μ T)
2	40	5	100

ELECTRIC AND MAGNETIC FIELD MEASUREMENTS – OVERHEAD LINES



ELECTRIC AND MAGNETIC FIELD MEASUREMENTS – SUBSTATIONS

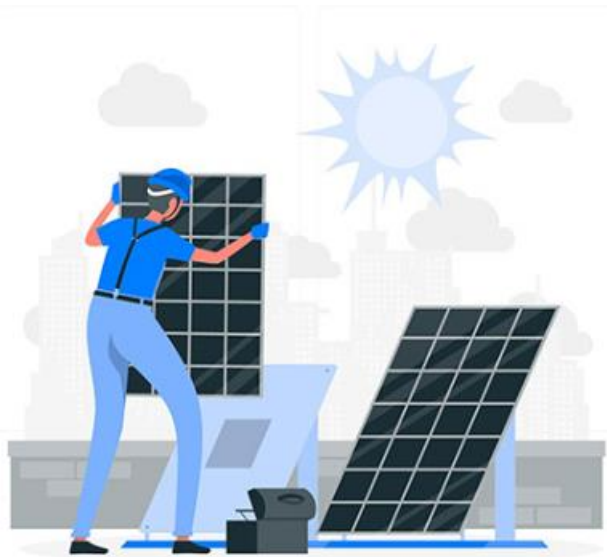




Permitting Issues

Project Development (1)

- The process of constructing an electric power facility revolves around obtaining 3 essential construction permits:



Feasibility study

Preliminary design

Urban permit

Main design

Buliding permit

As built design

Operational permit

- All other permits are acquired through procedures associated with these 3 main permits.

Project Development (2)

Before starting

Basic steps an investor must take before initiating activities related to permitting:

- Identify **competent authorities** for construction
- Determine the **necessity of obtaining a concession** (for power plant construction)
- **Review the spatial planning documentation** to assess any potential barriers to the construction of the facility



Project Development (3)

Grid connection

- **Competent authorities** for grid connection

ETC	EPBiH	EPHZHB	ERS
High voltage level	DSO Bihać	DSO Center	DSO Banja Luka
	DSO Mostar		DSO Bijeljina
	DSO Sarajevo	DSO North	DSO Doboј
	DSO Travnik		DSO Pale
	DSO Tuzla	DSO South	DSO Trebinje
	DSO Zenica		

- Principle Consent for Connection
- Conditions for Connection
- Connection Contract
- Connection Approval

Energy permit

- Only in Federation of BiH

Project Development (4)

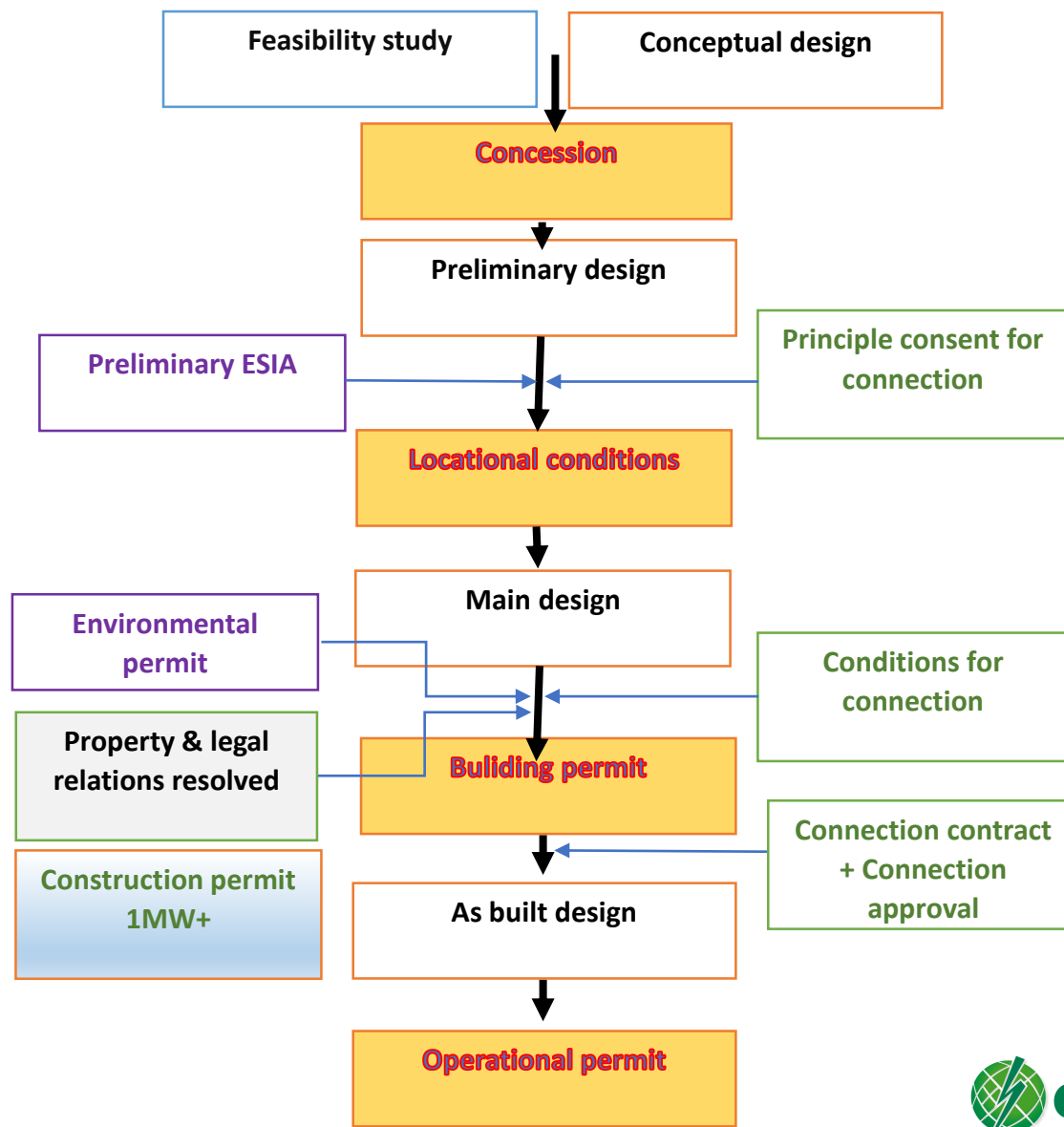
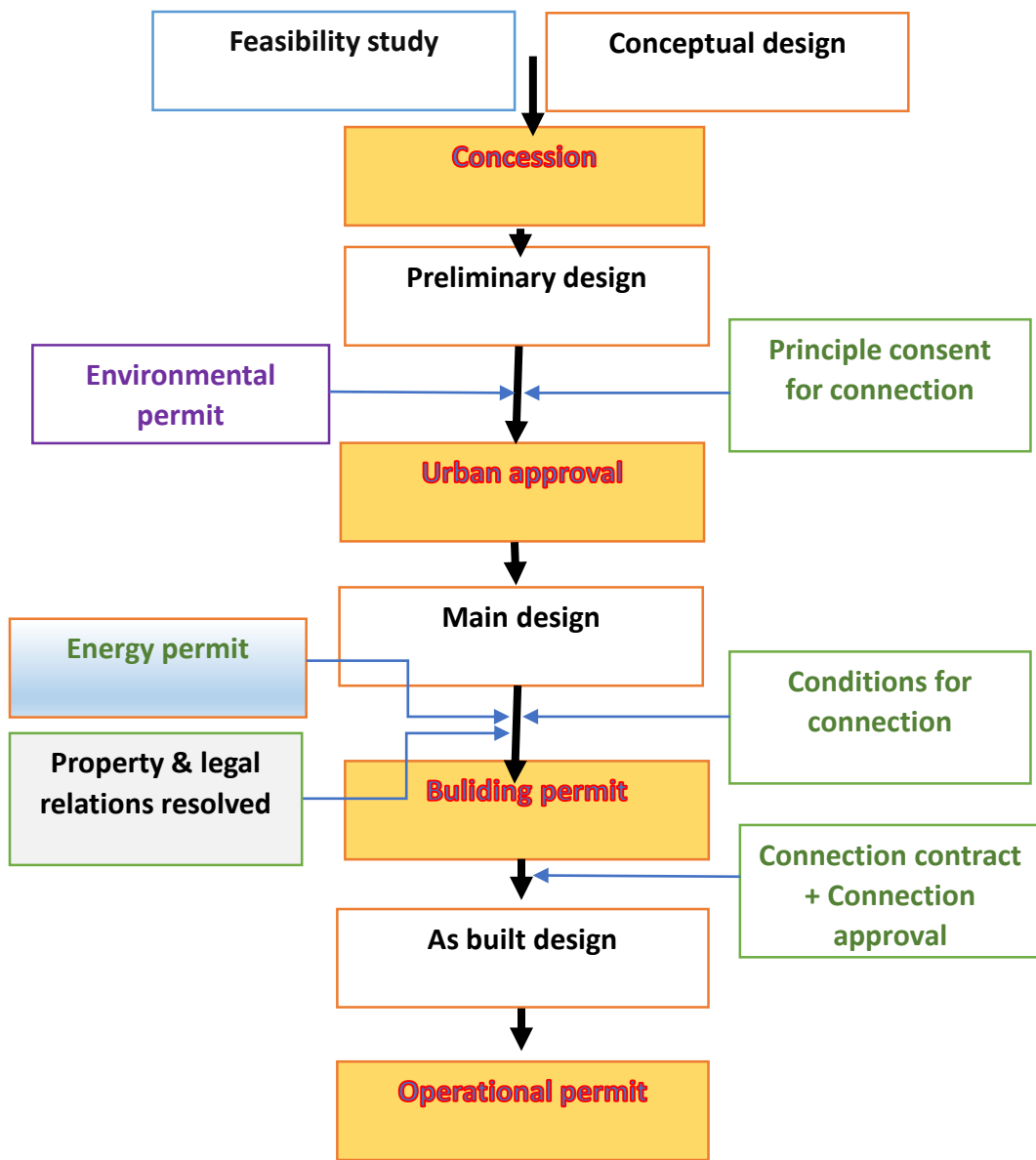
Environmental permit

- **Competent entities**

Federation of BiH	Republika Srpska
HPP - above 1 MW	HPP - above 5 MW
TPP - above 10 MW	TPP - above 50 MW
HVL – above 110 kV	HVL – above 220 kV
NPP	NPP
WPP – above 2 MW	
Cantons	Cities / Municipalities
HPP - below 1 MW	TPP – below 50 MW
TPP – btw 1 MW and 10 MW	No Environmental permit
WPP – below 2 MW	HPP – below 5 MW
PVPP – above 150 kW*	WPP
Lines – btw 10 kV and 110 kV	

**just in few cantons*

Project Development (5)



Instead of a Conclusion (1)

Experiences in constructing the first WPP in BiH

- Over 150 books (studies and design stage of the project.
- Over 330 permits and approval permit.

	Grid connection agreement	Conditions for connection	Request for issuing conditions for connection
No of power plants	6	26	41
Installed capacity [MW]	335.3	1995.9	3480.3

- HPP Mostarsko Blato - 60 MW, 2010
- TPP Stanari - 300 MW, 2016
- WPP Mesihovina – 50.6 MW, 2018
- WPP Jelovaca – 36 MW, 2018
- WPP Podvelezje – 48 MW, 2021
- PVPP Petnjik – 29.9 MW, 2023

Insufficient hosting capacity (distribution and transmission level) for the new power plants.

2010 – 2023
+ 524.5 MW

2024 – 2030
+ 2,200 MW

Instead of a Conclusion (2)

- Adopt the necessary legal framework and strategic documents.
- Rationalize administrative procedures.
- Increase the transparency of the licensing process, by continuing the digital transformation and additional regulatory changes.
- Define all costs and fees.
- Demand high-quality project design documentation (essential for a quicker and more efficient approval process).



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THANK YOU FOR YOUR ATTENTION

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