MSc Program
Renewable Energy in Central and Eastern Europe

Prospects, Challenges, Barriers and Solutions for Small Hydropower Investments in the SEE- and Energy Community Area

A Master's Thesis submitted for the degree of
"Master of Science"

supervised by
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November 10, 2015, Vienna

Affidavit

I, **Johann HÖFLER**, hereby declare

1. that I am the sole author of the present Master Thesis, "Prospects, Challenges, Barriers and Solutions for Small Hydropower Investments in the SEE- and Energy Community Area", 210 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master Thesis as an examination paper in any form in Austria or abroad.

Vienna, November 10th, 2015 _____

Date Signature

ABSTRACT

The topic of this scientific work "Prospects, Challenges, Barriers and Solutions for Small Hydropower Investments in the SEE- and Energy Community Area. Can small hydropower investments be successful in SEE and Energy Community countries in the face of current economic and administrative challenges and barriers?" is the investigation of opportunities, possibilities, constraints and limits of small hydropower investments within the Balkan (or South Eastern European countries) and Energy Community region in 14 countries selected for the market:

Former Yugoslavia: Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia and Slovenia;

Other South Eastern European and Energy Community countries: Albania, Bulgaria, Georgia, Greece, Moldova, Romania and Ukraine.

The methods chosen in this work:

Identifying the potential of hydropower plants development in the above mentioned countries;

Analyzing their investment possibilities and market chances as well as limits and barriers;

Partially comparing the results with the German-speaking world (Austria, Germany and Switzerland (when data available, as Switzerland is neither a European Community nor an Energy Community member)).

The results show the enormous market chances both in the area of former Yugoslavia and in the other Balkan and Energy Community countries for hydropower investments (small and large).

When considering sustainability as the only investment criterion, the market potential of small hydropower investments would be rather restricted. However, the mix of other barriers, obstacles and constraints has a strong impact on small (and large) hydropower investment activities in nearly all of the selected countries.

Since the Lehman Brothers collapse in September 2008, which severely affected the Balkan (South East Europe) and Energy Community area, banks were more or less unwilling to make loans to support investments and growth of economy. This led to a regional decline in the number of investments in the renewable energy business.

As a solution to close the funding gap, an alternative financing possibility will be structured and analyzed.

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(Remark: letter "s" at the end of abbreviations, e.g. "FIT", "HP", "HPP", "SHP", "LHP", "pp", etc. indicate the plural form as "FITs", "HPs", "HPPs", "SHPs", "pps", etc.)

%	Percentage
€Cent/kWh	Euro cent per kilowatt hour
°C	Celsius (degrees Celsius)
ADB	Asian Development Bank
AEA	Albania Energy Association
AL	Albania
AltFG	Alternative Financing Law (Alternativfinanzierungsgesetz)
BAM	Convertible mark (currency of BiH)
BG	Bulgaria
BGN	Bulgarian currency, Lewa
BiH	Bosnia and Herzegovina
bn	Billion
c€	Euro cent
CEC	Continuing Education Center
CEE	Central Eastern Europe
cEUR	Euro cent
CH	Switzerland
CIF	Climate Investment Funds
CIS	Commonwealth of Independent States
CO_2	Carbon dioxide
CP	Support center (Slovenia)
CTF	Clean Technology Fund
D	Germany
DS	Domestic Supply
DSO	Distribution system operator
e.g.	exempli gratia; for example
EAD	Bulgarian Energy Holding (Bulgarian: Natsionalna Elektricheska Kompania)
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
EBRD	European Bank for Reconstruction and Development
EBT	Earnings before taxes
EC	European Commission
ECHR	European Convention on Human Rights and Fundamental Freedoms
ECM	Energy Community
ECT	Energy Community Treaty
EEC	European Economic Community
EIA	environmental impact assessment
ELSTAT	Greek Statistic Authority (ΕΛΣΤΑΤ)
ENERCE	Energy in Central & Eastern Europe
EPBL	Energy Park Bruck an der Leitha
ERE	Albanian Power Corporation (Korporata Elektroenergjitike Shqiptare sh.a.)
ESHA	European Small Hydropower Association
ESM	European Stability Mechanism
EU	European Union
EUR	Euro

FBiH	Federation Bosnia and Herzegovina
FFG	Austrian Research Promotion Agency (Österreichische Forschungsförderungsgesellschaft)
FIT	Feed-in tariff
FMA	Austrian Financial Market Authority (Finanzmarktaufsicht)
FREN	Foundation of Advanced Economics (Serbia)
GC	Green certificates
GDP	Gross Domestic Product
GE	Georgia
GR	Greece
GW	Gigawatt
GWh	Gigawatt hour
HP	Hydropower
HPP	Hydropower plant
HR	Croatia
HROTE	Croatian Energy Market Operator (HRVATSKI OPERATOR TRŽIŠTA ENERGIJE)
ICPDR	International Commission for the Protection of the Danube River
ICSHP	International Center on Small Hydro Power
IEA	International Energy Agency
IFC	International Finance Corporation
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
IRR	Internal Rate of Return
IUCN	World Commission of Protected Areas
KESH	Albanian Power Corporation (Korporata Elektroenergjitike Shqiptare sh.a.)
KfW	Kreditanstalt für Wiederaufbau (German Bank "Credit Institute for Reconstruction")
KMG	Capital Market Law (Kapitalmarktgesetz)
KPMG	Audit, tax and advisory company; the name "KPMG" was chosen when KMG (Klynveld Main Goerdeler) merged with Peat Marwick
KS	Kosovo
ktoe	Thousand toe (tonnes oil equivalent)
kW	Kilowatt
kWh	kilowatt hour
LEK	Currency Albania
LHP	Large hydropower
LHPP	Large hydropower plant
LRG	Long run generation cost
m	Million
MD	Moldova
MK	Macedonia
MNE	Montenegro
MoSEFF	Moldovan Sustainable Energy Financing Facility
Mtoe	Million toe (tonnes oil equivalent)
MW	Megawatt
MWe	megawatt electrical
MWh	Megawatt hour
N	Norway
NEEAP	National Energy Efficiency Action Plan
NEK	Natsionalna Elektricheska Kompania (English: Bulgarian Energy Holding)
NGO	Nongovernmental Organization
no	Number

NPV	Net present value
NREAP	National Renewable Energy Action Plan (= data from Member States)
ÖH TU	Official Representation of University Students of the Technical University
pp	Power plant
PPP	Public Private Partnership
PPT	Public Power Corporation S.A. Hellas (Greece)
PR	Public relation
REEP	Regional Energy Efficiency Program
RES	Renewable energy sources
RES-E	Renewable energy sources electrical
RO	Romania
ROI	Return on Investment
ROSEFF	Romanian Sustainable Energy Financing Facility
SEE	South East Europe
SEEP	South East European Cooperation Process
SHP	Small hydropower
SHPP	Small hydropower plant
SLO	Slovenia
SME	Small and medium sized enterprises
SPV	special purpose vehicle
SRB	Serbia
SREP	Scaling Up Renewable Energy Program in Low Income Countries
TC	Transaction cost
toe	Tonnes oil equivalent
TP	Total Production
TPES	Total Primary Energy Supply
TR	Turkey
TSO	Transmission system operator
UA	Ukraine
UAH	Ukrainian hrywnja
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USAID	United States Agency for International Development
USD	Currency United States of America (Dollar)
USEFF	Ukraine Sustainable Energy Financing Facility
VAT	Value added tax
VIP	Very important person
VUT	Vienna University of Technology
WBIF	Western Balkan Investment Framework
WeBSEDFF	Western Balkans Sustainable Energy Direct Financing Facility
YU	Yugoslavia

"Energy is, undoubtedly, an important element in the struggle of any country to alleviate poverty, promote economic growth, and foster social development. But as the world consumes more and more energy, stress is placed on current level of energy reserves and the environment at national, regional, and international levels." (Morales Pedraza, 2015 a)

1 INTRODUCTION

"Hydropower is a mature and cost-competitive renewable energy source. It plays an important role in today's electricity mix, contributing to more than 16% of electricity generation worldwide and about 85% of global renewable electricity."[1]

Can regional business mentalities, loopholes in renewable energy laws and challenging negotiations with financing institutions together with the impacts of high feed-in tariffs in comparison with new alternative financing schemes be a driver for enlargement of almost CO_2-free energy small hydropower generators in the SEE and Energy Community area?

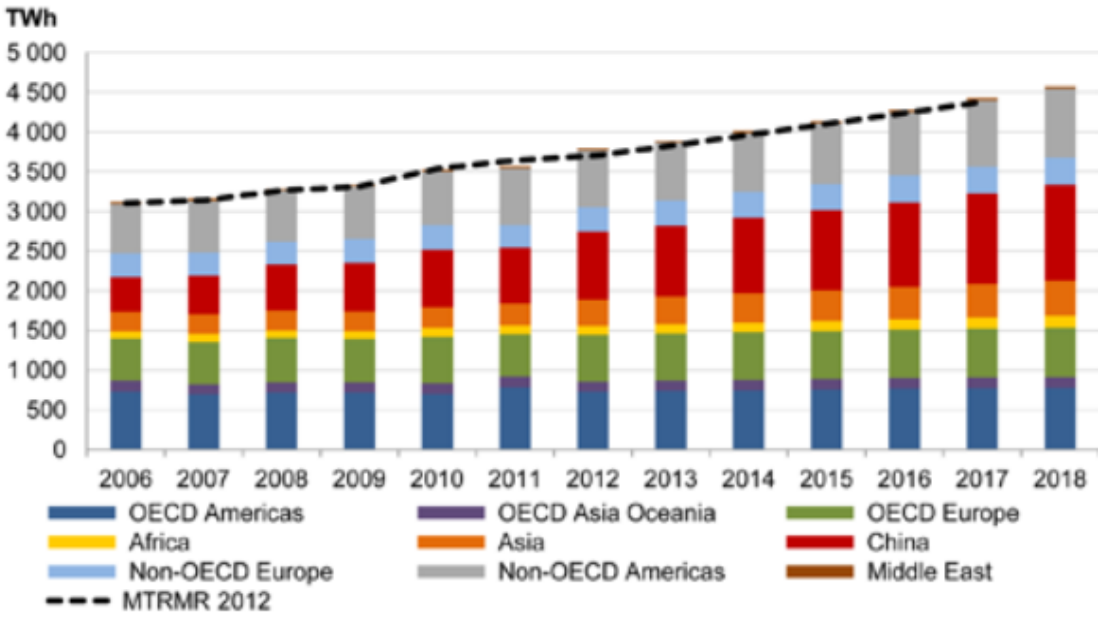

Figure 1: Hydropower generation and medium-term projection by region (IEA, 2013) [2]

How to support investments into small hydropower plants is the main question to be analyzed in this thesis, as hydropower is one of the oldest sustainable power sources

[1] https://www.iea.org/topics/renewables/subtopics/hydropower
[2] https://www.iea.org/topics/renewables/subtopics/hydropower

and currently supplies around 4,000 TWh power per year (figure 1 and see as well the graphical representation of “Global renewable electricity production: Historical data and projected data until 2020” in Appendix A: Overview of energy-related data; figure 15).

1.1 Motivation

The decision to write about this topic was influenced by my personal interest in Central East and South East European and Energy Community countries due to my long career as leasing director in countries such as Slovakia, Croatia, Romania and Serbia and also in my previous function as sales and export manager for electrical investment goods (insulated wires, bare & trolley wires, Roebel bars, continuously transposed conductors for use in heavy generators and transformers) and currently, beside my main job in the paper business, as an independent consultant for financing of environmental and renewable energy business in the said area.

Initially the work was going to be on the topic of small hydropower in the Balkan area and moreover on former Yugoslavian countries. However, as the Balkan area is larger than ex-Yugoslavia and a majority of ex-Yugoslavian countries are members of the Energy Community, the thesis was expanded with an analysis of all South Eastern European countries and Energy Community Members (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Kosovo, Macedonia, Moldova, Montenegro, Romania, Serbia, Slovenia, Ukraine), cross-references to large hydropower and partial comparisons with the German-speaking world. Nevertheless, the focus of this work leans slightly more towards the countries of former Yugoslavia due to their higher small hydropower potential.

Therefore, this work focuses on the investment possibilities in the defined markets. Figures mentioned and strategies described in the countries’ National Renewable Energy Action Plans and, in part, their National Energy Efficiency Action Plans are the basis for the analysis of the market chances and possibilities.

1.2 What is the core objective / the core question?

The core objective of this master thesis is to analyze the market possibilities of small hydropower investments for 14 countries of the Balkan (Balkan countries are more numerous than former Yugoslavian countries) and Energy Community area. The

investment possibilities and business chances (as an investor, as a supplier, as a provider for local services, as a financing institute, as an interested party in sustainable business and energy business, etc.) in these 14 analyzed countries are interesting, however, one should not disregard the difficulties and barriers in the Balkan (or South East European) and Energy Community area. Some kinds of strengths, weaknesses, opportunities and threats, or even better, in the language of the financing institutes, "risks", are investigated in this thesis. The reactions and steps risks are the most important driver for business. Success does not start with business opportunities. It starts with the recognition of weaknesses, threats and risks, and therefore constraints, barriers and obstacles are globally defined.

1.3 Citation of the main literature

In principle there is basically no relevant literature on prospects, challenges and chances as well as obstacles, constraints and barriers in the small hydropower business, especially for markets like Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Kosovo, Macedonia, Moldova, Montenegro, Romania, Serbia, Slovenia and Ukraine (a variety of literature can be found for the small hydropower market in comparison with Austria, Germany and Switzerland).

Jorge Morales Pedraza (Electrical Energy Generation in Europe. The Current Situation and Perspectives in the Use of Renewable Energy Sources and Nuclear Power for Regional Electricity Generation) gives some market information for a couple of countries (Bulgaria, Croatia, Greece and Romania) in the said region.

The "Wolf Theiss Guide to: Generating Electricity from Renewable Sources in Central, Eastern & Southeastern Europe" supports with market and legal information for countries like Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Romania, Serbia, Slovenia and Ukraine.

The report "World Small Hydropower Development Report 2013" (UNIDO, 2013) provides information on the market and some legal information (with mentioning some barriers and constraints) for Albania, Bosnia and Herzegovina, Croatia, Greece, Macedonia, Montenegro, Serbia and Slovenia.

The National Renewable Energy Action Plans of the individual countries are also among the sources used for this thesis.

Bank institutions, business partners and Austrian Trade Commissioners and individual local institutions in the specified regions have been contacted and literature, brochures, information received by email, etc. have been used for this thesis.

Intensive internet research and the analysis of the sources found were necessary to structure and to compile to the chapters in this thesis.

The complete literature references and internet sources can be found within the text (footnotes) and in the subsequent reference list.

1.4 Method of approach

The various publications and internet sources were researched for the small hydropower (including large hydropower) market in the Balkan (South East European) and Energy Community region. The keywords for fact-finding were mainly “prospects, challenges, chances, market volume of small hydropower plants, large hydropower plants, obstacles, constraints, barriers, etc.”

Detailed research was done in the search and analysis of different National Renewable Energy Action Plans and in comparing with the findings in the main literature mentioned in previous chapters and additional hardcopy literature and internet sources.

As the literature provides information which in many cases does not match, all Austrian Trade Commissioners (in the said region) have been contacted and from some of them basic information could be supplied.

Furthermore, all embassies of the defined countries, parliaments, energy-related ministries, electricity regulatory entities, national agencies of national resources, electric energy distribution operators, transmission system operators, power corporations, small hydropower associations, etc. were contacted by email in different local (partially English) languages (Former Yugoslavia: Bosnian: Bosnia and Herzegovina, Croatian: Croatia, Serbian: Serbia and Montenegro, Serbian and English: Macedonia, English: Slovenia and Kosovo; other SEE and Energy Community countries: English: Albania, Georgia and Greece, Bulgarian: Bulgaria, Romanian: Romania and Moldova, Russian: Ukraine). From the majority of the mentioned countries, no information was provided. Some emails were answered with insignificant information.

On the internet, some brochures advertising with good marketing arguments why to invest into the defined countries were found. This information does not match with the reaction to emails concerning small hydropower investments to the mentioned institutions (which were as well researched on the internet).

The theoretical information on the market possibilities of small hydropower investments was compared with the statistical information from the International Energy Agency and some other sources. The information was summed up as hydropower potential for the regions of former Yugoslavia and other Balkan (South East European) and Energy Community countries and compared with Austria and Germany (without Switzerland due to the lack of a National Renewable Energy Action Plan).

The feed-in tariff is an instrument to earn money in small hydropower and the possible negative effects (corruption, bureaucracy, political risk, legal environment (status and authorization process/administration process), environmental questions, other costs defined as “qualitative transaction costs” and the business behavior “local persons against (foreign) investor” have been analyzed and personal market experience with all these mentioned barriers is described in the chapter Administration of small hydropower investments. A short overview (a complete overview of all theoretical financing possibilities would be a topic for another thesis) of missing financing possibilities is given.

As the constraints and barriers are quite significant, a solution approach is portrayed with a description of public-private partnership and a description of crowd financing as a kind of civic participation in the appendix. The portrayed business model is defined as a possible example of a joint stock company between the Continuing Education Center of Vienna University of Technology and the Energy Park Bruck an der Leitha (Lower Austria).

The goal is: The new crowd financing managing company in ownership of the Continuing Education Center and the Energy Park Bruck an der Leitha could earn additional revenues, increase the know-how of the energy business in general in the analyzed markets and their reputation.

1.5 Structure of work

In the chapter “2 Balkan and/or South East Europe and Energy Community – some definitions and an introduction to the small and large hydropower energy business

area" geographical definitions of Balkan versus South East Europe and Energy Community are given. The 14 mentioned countries are divided into 2 groups belonging to the regions "Former Yugoslavia" and "Other Energy Community and Balkan (SEE) countries without countries of former Yugoslavia" (Albania, Bulgaria, Georgia, Greece, Moldova, Romania and Ukraine). Additional basic energy-related information (energy mix, differences in terms of total primary energy supply, volumes of domestic energy production, legally binding target for 2020 for the share of renewable energy, overview of power generation and derived investment potential until 2020, projected increases of energy production from renewable energy by 2020, investment possibilities in the Balkan area, etc.) are worked out for countries when information was available and partially compared with German-speaking countries (Austria, Germany and Switzerland).

In the chapter "3 Prospects, challenges, chances and barriers for small hydropower investments in the South East European and Energy Community area", statistical data of energy production and energy net imports, total primary energy supply, electricity consumption and CO_2-emissions, expected renewable energy production in 2020, estimation of total contribution (installed capacity, gross electricity generation) expected from hydropower to meet the binding 2020 targets, etc. are calculated and characterized. The National Renewable Action Plans of the two regions – as far as delivered to the Energy Community with its seat in Vienna – are analyzed and the gross final energy consumption and electricity consumption for 2020 are calculated (kiloton of oil equivalent and terawatt hours) in order to get an approximate calculation of investment potential for small hydropower plants. As far as found in the literature, technical potential and economical viabilities of small hydropower investments are specified in chapters 3.2 and 3.3.

Chapter 3.4 describes barriers, obstacles and challenges for small hydropower investments in both mentioned regions.

In the appendices additional graphs and calculations relating to previous chapters are given as further information.

For better understanding of barriers and obstacles, a case study "Experience report of court procedures in Croatia & Serbia" – a personal experience report – in the Appendix should illustrate a part of the obstacles encountered when doing business in the SEE region (which could be applicable as well in all examined regions).

A description of the market potential for small hydropower investments and its challenges to be mastered cannot be complete without an illustration of a new

financing alternative – a case study "Challenges in investments and financing and solution" can be found in the appendix as well.

2 BALKAN AND/OR SOUTH EAST EUROPE AND ENERGY COMUMNITY – SOME DEFINITIONS AND AN INTRODUCTION TO THE SMALL AND LARGE HYDROPOWER ENERGY BUSINESS AREA

> *"Every country should realize that its turn at world domination, domination because its rights coincided more or less with the character of progress of the epoch, must terminate with the change brought about by this progress." Juan Ramón Jiménez (1881-1958, Spanish poet; Nobel Prize in literature 1956)*

The Western Balkan countries *(Remark: The Balkans are usually characterized as comprising Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania, Serbia, and Slovenia including Greece and the European part of Turkey):*[3]

Figure 2: Definition of South East Europe according to definition of South East European Cooperation Process (SEECP) [4]

- Albania ("AL"; application for EU membership in 2009);[5]
- Bosnia and Herzegovina ("BiH"; identified as a potential candidate for EU membership in 2003);[6]

[3] http://www.britannica.com/EBchecked/topic/50325/Balkans
http://geography.about.com/library/faq/blqzbalkan.htm
http://www.nationalstereotype.com/balkan-stereotypes
[4] http://www.mfa.gov.tr/south-east-european-countries-cooperation-process-_seecp_.en.mfa
[5] http://ec.europa.eu/enlargement/countries/detailed-country-information/albania/index_en.htm
[6] http://ec.europa.eu/enlargement/countries/detailed-country-information/bosnia-herzegovina/index_en.htm

- Bulgaria ("BG"; EU member since January 1st, 2007);[7]
- Croatia ("HR"; EU member since July 1st, 2013);[8]
- Greece ("GR"; EU member since January 1st, 1981, member of Schengen area since January 1st, 2000 and EURO zone member since January 1st, 2001);[9]
- Kosovo ("KS"; February 17th, 2008 declaration of independence from Serbia, identified as a potential candidate for EU membership in 2008);[10]
- Macedonia ("MK"; application for EU membership in March 2004);[11]
- Montenegro ("MNE"; application for EU membership in 2008);[12]
- Romania ("RO"; EU member since January 1st, 2007);[13]
- Serbia ("SRB"; application for EU membership in 2009)[14] and
- Slovenia ("SLO"; EU member since May 1st, 2004; Euro zone member since January 1st, 2007; Schengen area member since December 21st, 2007);[15]

In other literature it is sometimes also mentioned that Slovenia and Croatia should not be considered as Balkan countries,[16] [*but they will be considered in this thesis as members of the Balkan area*]. On the other hand, according to the South East Europe Transnational Cooperation Program, Austria, Slovakia, Hungary, Moldova and some regions of Italy and Ukraine are as well "members of South East Europe" (SEE) area[17] [*but Austria, Slovakia, Hungary and Italy are not part of this thesis*] and instead of the term "Balkan" (which usually has a "negative connotation"[18]) in this thesis the acronym "SEE" will be used as well.

The non-EU members among above mentioned countries (AL, BiH, KS, MK, MNE, SRB) are members of the Energy Community (ECM)[19] (see map below: figure 3) with its seat in Vienna (Austria) and therefore all these SEE countries (AL, BiH, KS, MK, MNE, SRB) had to outline the energy scenarios and policies[20] according to the Energy

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[7] http://europa.eu/about-eu/countries/member-countries/bulgaria/index_en.htm
[8] http://europa.eu/about-eu/countries/member-countries/croatia/index_en.htm
[9] http://europa.eu/about-eu/countries/member-countries/greece/index_en.htm
[10] http://ec.europa.eu/enlargement/countries/detailed-country-information/kosovo/index_en.htm
[11] http://ec.europa.eu/enlargement/countries/detailed-country-information/former-yugoslav-republic-of-macedonia/index_en.htm
[12] http://ec.europa.eu/enlargement/countries/detailed-country-information/montenegro/index_en.htm
[13] http://europa.eu/about-eu/countries/member-countries/romania/index_en.htm
[14] http://ec.europa.eu/enlargement/countries/detailed-country-information/serbia/index_en.htm
[15] https://www.energy-community.org/pls/portal/docs/1284180.PDF http://europa.eu/about-eu/countries/member-countries/slovenia/index_en.htm
http://www.nationalstereotype.com/balkan-stereotypes/
[16] http://www.cotf.edu/earthinfo/balkans/bkdef.html
[17] http://www.southeast-europe.net/en/about_see/participating_countries/
[18] http://www.ce-review.org/99/23/cvijetic23.html
https://www.causes.com/causes/43383-balkan-pact/updates/11369-etymology-and-evolving-meaning-of-the-balkan
http://www.nationalstereotype.com/balkan-stereotypes/
[19] https://www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY/Legal/Treaty
[20] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

Community Treaty (ECT) of 2005 and had to submit (like the SEE EU-countries: BG, HR, GR, RO, SLO) the National Renewable Energy Action Plans (NREAPs) and to implement the EU Renewable Energy Directive ("RES Directive", 2009/28/EC) as well as to adopt national binding standards, which are based on the following formula (which is a relative renewable energy sources (RES) target for each ECM country that can be reached by a combination of RES capacity expansion with reduction of final energy demand):

$$RES_{TargetShare} = \frac{RES_{electricity} + RES_{heating\ -\ cooling} + RES_{transport}}{Gross\text{-}Final\text{-}Energy\text{-}Consumption}$$

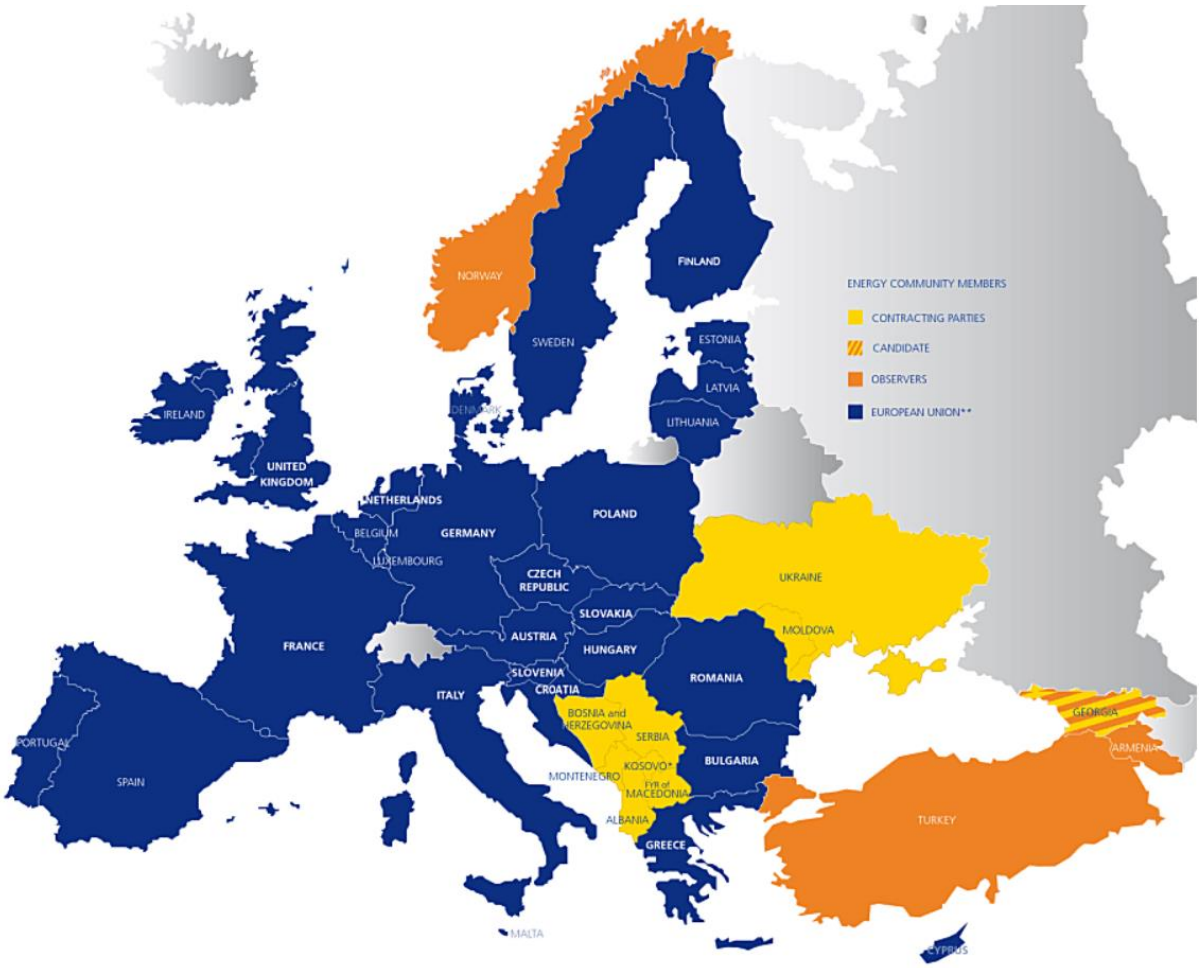


Figure 3: Energy Community Members[21]

[21] https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS

The national targets are based not only on physical potentials but also on already existing RES production and Gross Domestic Product (GDP). There is a mandatory target of a 20% total share of RES in the EU's energy mix by 2020.[22]

According to the ECT, the member states have long experience with hydropower (HP) and HP is considered to contribute higher shares of energy from RES in this area.[23]

Ukraine and Moldova generally do not belong to the SEE area *(except definition of South East Europe Transnational Cooperation Program)* but have signed the ECT of 2005 (Ukraine: 2011 and Moldova: 2010) and "neighboring" (on the Black Sea) Georgia (GE) has a status of a candidate to the ECM[24] (visible in the figure above (figure 3): ECM-members: AL, BiH, KS, MD, MK, MNE, SRB, UA; status of candidate: GE, observer status: Norway (N) and Turkey (TR)).

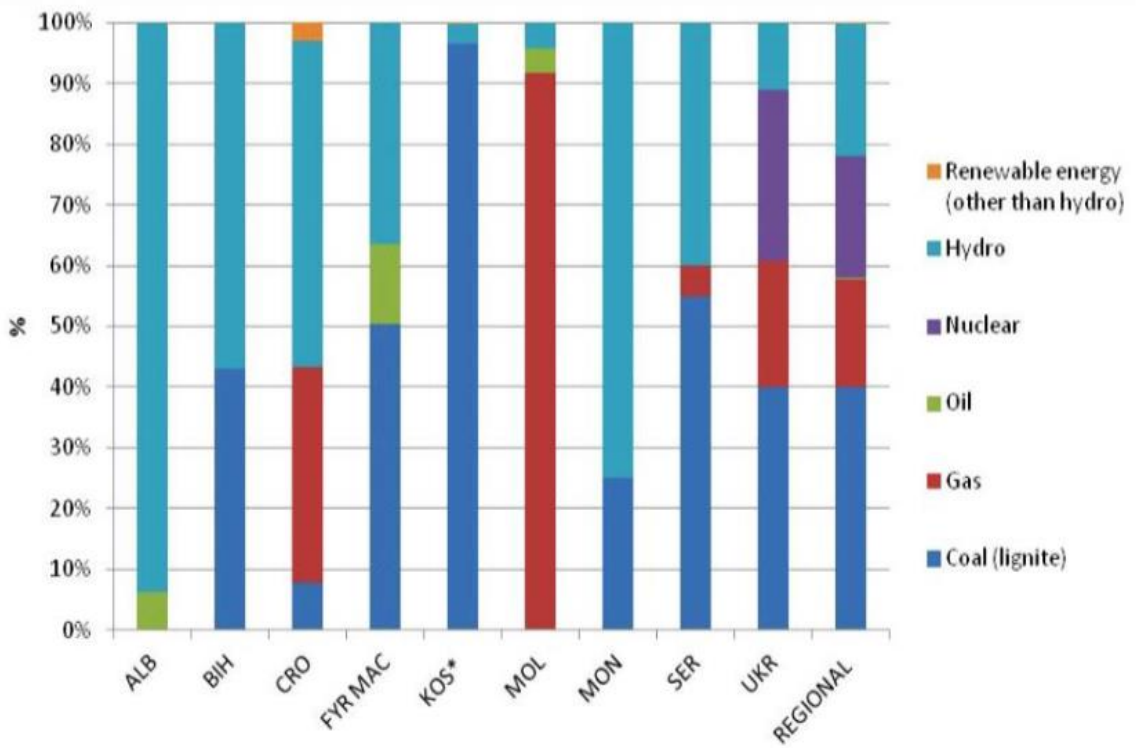


Figure 4: Differences in energy mix among selected South Eastern European and Energy Community countries (Energy Community countries, 2012)[25]

The common indicator of all members of the ECM is the great unexploited potential for development of RES, and therefore the common energy (generating) challenges are:

- *"Significant dependence on oil and coal for electricity generation;*
- *Consequent environmental impacts from carbon and other emissions;*

[22] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[23] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[24] https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS
[25] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

- *Consequent high dependency on oil and gas imports leading to strategic risks;*
- *High energy intensity of the economy;*
- *Under development of the renewable energy sector;*
- *Lack of electricity and gas market integration across the region and with the EU."*[26]

Table 1: RES shares and targets in South East Europe and the Energy Community area (own compilation)[27]

Share of RES in 2009, 2011, 2012, 2013 and target 2020					
Contracting Party	**2009**	**2011**	**2012**	**2013**	**target 2020**
Other Balkan countries					
Albania	31.20%				38.00%
Bulgaria		13.80%	16.00%	19.00%	16.00%
Greece	6.90%	11.60%	9.10%		18.00%
Romania		21.40%	22.60%		24.00%
Former Yugoslavia					
Bosnia and Herzegovina	34.00%				40.00%
Croatia	12.60%	15,70% (10,90%)	13.40%	15.00%	20.00%
Kosovo	18.90%				25.00%
Macedonia	21.90%				28.00%
Montenegro	26.30%				33.00%
Serbia	21.20%				27.00%
Slovenia	16.00%	18,80% (19,40%)	20.20%	21.50%	25.00%
Additional Energy Community Members					
Moldova	11.90%				17.00%
Ukraine	5.50%				11.00%
Georgia	(Candidate for Energy Community membership)				
As for comparison					
Austria		30.90%	32.10%	32.60%	34.00%
Germany		12.30% (11.40%)	12.10%	12.40%	18.00%

(Remark: Overview of share of RES in different SEE/ECM countries in 2009, 2011, 2012, 2013 and individual binding targets 2020 according to Renewable Energy Directive 2009/28/EC for EU-28 members (total 20%).

The energy situation within the ECM is very complex and expressed as:

- *"Complex subsidy system for fossil fuels have brought the countries to – in the meantime – unwilling political and economic dependency of fossil fuel supplying countries;*

[26] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[27] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/3a8c018d-3d9f-4f1d-95ad-832ed3a20a6b http://www.rehva.eu/eu-regulations/renewable-energy-sources-directive-res http://ec.europa.eu/europe2020/pdf/themes/16_energy_and_ghg.pdf http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=t2020_31 http://www.stat.ee/57169 https://www.energy-community.org/pls/portal/docs/2144185.PDF https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3552157/Progress_Report_on_implementation_of_NREAP_2014.pdf http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/3a8c018d-3d9f-4f1d-95ad-832ed3a20a6b

- *Major thermal pps have been built in the 60s to 70s of the former century in combination with inadequate maintenance and these pps are over-aged and inefficient in energy generating;*
- *The fall of Yugoslavia (YU) has caused lack of cooperation with successor states;*
- Different energy mix of ECM members *(see the energy mix on above figure 4 for countries Albania (ALB), Bosnia and Herzegovina (BiH), Croatia (CRO), Macedonia (FYRMAC), Kosovo (KOS), Moldova (MOL), Montenegro (MON), Serbia (SER), Ukraine (UKR) [Remark: Abbreviations for countries mentioned in above figure differ from the standard abbreviations]; "*
- See as well above table 1 of RES shares and targets (energy mix) some of the SEE (ECM) countries as of 2012.[28]

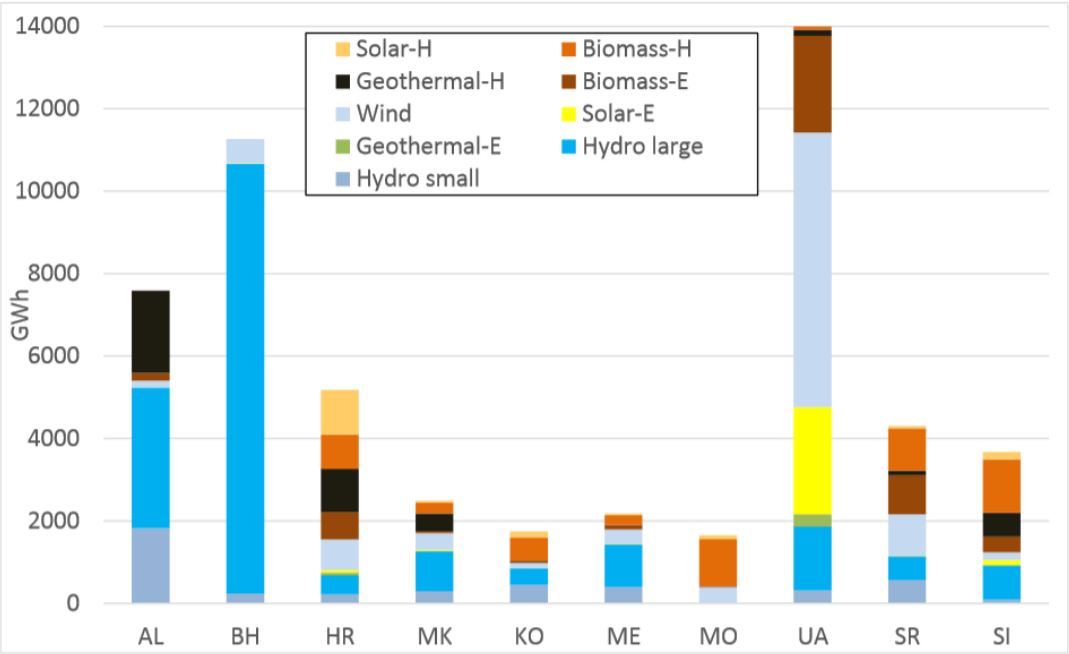


Figure 5: Projected increases of energy production from RES by 2020 by technology[29]

Analyzing the above table 1 with the share of RES and target of RES in 2020, Slovenia as a Balkan country had a share of RES of 19.30% in 2010 and has to reach a share of RES of 25% in 2020 (Greece in 2010: 9.80% and target for 2020: 18%)[30] and Bulgaria has reached (together with Sweden und Estonia)[31] the level required to meet the binding national 2020 target of RES use (16.30%)[32] already in 2012[33].

[28] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[29] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[30] http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/3a8c018d-3d9f-4f1d-95ad-832ed3a20a6b
[31] http://wirtschaftsblatt.at/home/nachrichten/europa/1572839/Erneuerbare-Energie_Bulgarien-Estland-und-Schweden-schon-am-Ziel
[32] http://wirtschaftsblatt.at/home/nachrichten/europa/1572839/Erneuerbare-Energie_Bulgarien-Estland-und-Schweden-schon-am-Ziel
[33] http://blueandgreentomorrow.com/2014/03/12/bulgaria-estonia-and-sweden-met-their-2020-renewables-targets-eight-years-early/

According to information of the Austrian Trade Commissioner the RES share of Kosovo is projected to be 29%[34] (other sources inform of 25%) by the end of 2020 (see above table 1).

(Remark: some countries have double inputs for share of RES, which deviations are results of different reports in; e.g.: Looking at http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/3a8c018d-3d9f-4f1d-95ad-832ed3a20a6b and http://ec.europa.eu/europe2020/pdf/themes/16_energy_and_ghg.pdf we see differences in data (for SLO share of RES of 18.8% in 2011 and for GR: 11.6% in 2011) in both documents provided from the EU).

Depending on the fuels (of RES) existing in the ECM member states there are different scenarios shown to reach the energy targets by 2020 (analyzed from a positions paper of IRENA Executive Strategy Workshop on Renewable Energy in SEE (Renewable Energy Action Plans and Regulations to Harmonize with EU Directives; Revised Draft 20131201)):

- Increasing RES;
- Increasing energy efficiency;
- Reducing the energy demand.

(Remark: See above figure 5 "Projected increases of energy production from RES by 2020 by technology" of the strategies for Albania (AL), Bosnia and Herzegovina (BH), Croatia (HR), Macedonia (MK), Kosovo (KO), Montenegro (ME), Moldavia (MO), Ukraine (UA), Serbia (SR) and Slovenia (SI) [in order of countries in the figure]).

In the following tables 2 - 7, the planned RES increases for all ECM member states (including EU countries HR and SLO) are shown in absolute terms (GWh) and in percent (for small hydropower (SHP), large hydropower (LHP), geothermal, solar, wind and biomass).

The main investments (of estimated investments into 42,638 GWh energy generation) are expected for LHP (46.22%). SHP ranks on place 4 (10.22% with 4,359 GWh per year) behind LHP (19,708 GWh per year), wind and biomass in the region. Albania is the absolute leader in terms of expected SHP investments (1,823 GWh) and Bosnia and Herzegovina is number one in expected LHP investments (10,429 GWh).

Nearly 93% (= 4,049 GWh) of the calculated SHP investments can be expected in the SEE region (AL and former YU) and the result for LHP investments is nearly 92% as well (18,135 GWh) which can be seen in the table 2 [calculation: minus share of UA] (BG, GE, GR, RO excluded). *(Remark: Calculation: Final (expected) result minus status of 2009).*

[34] Austrian Trade Commissioner, email Prishtina@advantageaustria.org, June, 11th, 2015

Table 2: POWER GENERATION ∆ GWh: RES increase of Energy Community member (incl. HR + SLO) states between 2009 and 2020 (GWh and percentage; own calculation)[35]

POWER GENERATION ∆ GWh: RES increase of Energy Community member states between 2009 and 2020 (GWh (in bold numbers), percentage)													
Country	SHP	%	LHP	%	Geothermal	%	Solar	%	Wind	%	Biomass	%	∑ total
AL	1 823	32.62%	3 414	61.10%	0	0.00%	0	0.00%	165	2.95%	186	3.33%	5 588
BIH	234	2.08%	10 429	92.58%	0	0.00%	10	0.09%	591	5.25%	no information		11 264
HR	219	9.90%	459	20.70%	72	3.25%	60	2.70%	741	33.45%	665	30.00%	2 215
KS	446	44.12%	398	39.35%	0	0.00%	5	0.49%	125	12.38%	37	3.66%	1 011
MD	0	0.00%	23	5.40%	0	0.00%	0	0.00%	372	87.32%	31	7.28%	426
MK	290	16.60%	980	56.10%	0	0.00%	33	1.89%	400	22.90%	44	2.52%	1 747
MNE	393	20.73%	1 037	54.69%	0	0.00%	17	0.90%	348	18.35%	101	5.33%	1 896
SLO	86	5.32%	837	51.76%	0	0.00%	127	7.85%	189	11.69%	378	23.38%	1 617
SRB	558	17.98%	581	18.72%	7	0.23%	13	0.42%	1 000	32.22%	945	30.44%	3 104
UA	310	2.25%	1 550	11.26%	300	2.18%	2 600	18.88%	6 659	48.36%	2 350	17.07%	13 769
∑ total	4 359		19 708		379		2 865		10 590		4 737		42 638
%	10.22%		46.22%		0.89%		6.72%		24.84%		11.11%		100.00%

Table 3: POWER GENERATION: Estimation of energy capacity in the region of the Energy Community (incl. HR and SLO) in 2009 (GWh) and increase through investments (percentage; own calculation)[36]

POWER GENERATION ∆ GWh: RES estimation of Energy Community (incl. HR and SLO) members in 2009 and increasing in % until 2020 (GWh (in bold numbers), percentage)													
Country	SHP	Start	LHP	Start	Geothermal	Start	Solar	Start	Wind	Start	Biomass	Start	∑ total
AL	1161%	157	88%	3 877	0%	0	0%	0	0%	0	0%	0	4 034
BIH	433%	54	194%	5 375	0%	0	0%	0	0%	0	0%	0	5 429
HR	222%	99	8%	5 903	NO INF	0	NO INF	0	533%	139	2014%	33	6 174
KS	372%	120	0%		NO INF	0	NO INF	0	NO INF	0	NO INF	0	120
MD	0%	0	40%	58	0%	0	0%	0	NO INF	0	NO INF	0	58
MK	181%	160	69%	1 420	0%	0	330%	10	NO INF	0	733%	6	1 597
MNE	1360%	29	61%	1 696	0%	0	NO INF	0	NO INF	0	NO INF	0	1 725
SLO	19%	454	22%	3 744	0%	0	1058%	12	9450%	2	127%	298	4 510
SRB	1329%	42	6%	10 234	NO INF	0	NO INF	0	NO INF	0	NO INF	0	10 276
UA	1033%	30	14%	11 400	NO INF	0	NO INF	0	16241%	41	NO INF	0	11 471
∑ total		1 145		43 707		0		10		182		337	45 393
%		2.52%		96.29%		0.00%		0.02%		0.40%		0.74%	99.97%

(Remark: status 2009 = 100%, calculation of increase up to expected level in %age).

The energy production status of 2009 is calculated and reported as 1,145 GWh power production per year for SHP (LHP 43,707 GWh per year) and low figures for solar (10

[35] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[36] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

GWh per year), wind (182 GWh per year) and biomass (337 GWh per year) which makes altogether 45,393 GWh per year. Obviously the figures in the above two tables 2 and 3 (estimation of investments into RES producing energy generators) are provided from local governments and/or institutions to the EU.

The total energy production capacity (in AL, BiH, HR, KS, MD, MK, MNE, SLO, SRB, UA) of 2020 is calculated as *"if e.g. in Albania the investment into SHP increases by 1,161% (from value 2009), there will in total be an increase of 1,823 GWh (value 2009*1,161%) and a total production capacity of 1,980 GWh (value 2009 + increase) is expected in 2020 (numbers in below table 4 are rounded)."*

SHP makes 5,505 GWh power generation per year in 2020 (6.25%) and LHP makes 63,413 GWh per year (72.03%). Together with other RES like thermal energy (379 GWh; 0.43%), solar energy (2,887 GWh per year; 3.28%), wind (10,773%; 12.24%) and biomass (5,084 GWh per year; 5.77%), a total energy production capacity of 88,040 GWh per year is expected in 2020.

Table 4: POWER GENERATION: Final stage (and share) of investments in the region of the Energy Community (including HR and SLO) by 2020 (GWh, percentage, own calculation)[37]

POWER GENERATION Δ GWh: share of RES of Energy Community member (including HR and SLO) states by 2020 (GWh (in bold numbers), percentage)														
Country	SHP	%	LHP	%	Geo-thermal	%	Solar	%	Wind	%	Bio-mass	%	∑ total	%
AL	**1 980**	20.58%	**7 291**	75.77%	**0**	0.00%	**0**	0.00%	**165**	NO INF	186	NO INF	**9 622**	10.93%
BIH	**288**	1.72%	**15 803**	94.62%	**0**	0.00%	**10**	0.06%	**591**	3.54%	10	0.06%	**16 702**	18.97%
HR	**319**	3.80%	**6 361**	75.82%	**72**	0.86%	**60**	0.71%	**880**	10.49%	698	8.32%	**8 389**	9.53%
KS	**566**	50.04%	**398**	35.18%	**0**	0.00%	**5**	0.44%	**125**	11.07%	37	3.27%	**1 131**	1.29%
MD	**0**	0.00%	**81**	16.65%	**0**	0.00%	**0**	0.00%	**372**	76.94%	31	6.41%	**484**	0.55%
MK	**450**	13.47%	**2 400**	71.79%	**0**	0.00%	**43**	1.29%	**400**	11.96%	50	1.50%	**3 344**	3.80%
MNE	**422**	11.65%	**2 733**	75.48%	**0**	0.00%	**17**	0.47%	**348**	9.61%	101	2.79%	**3 621**	4.11%
SLO	**540**	8.82%	**4 581**	74.76%	**0**	0.00%	**139**	2.27%	**191**	3.12%	676	11.03%	**6 127**	6.96%
SRB	**600**	4.48%	**10 815**	80.83%	**7**	0.05%	**13**	0.10%	**1 000**	7.47%	945	7.06%	**13 380**	15.20%
UA	**340**	1.35%	**12 950**	51.31%	**300**	1.19%	**2 600**	10.30%	**6 700**	26.55%	2 350	9.31%	**25 240**	28.67%
∑ total	**5 505**		**63 412**		**379**		**2 887**		**10 773**		**5 084**		**88 040**	100.00%
%	6.25%		72.03%		0.43%		3.28%		12.24%		5.77%		100.00%	

(Remark: Figures taken from position paper of IRENA Executive Strategy Workshop on Renewable Energy in SEE (Renewable Energy Action Plans and Regulations to Harmonize with EU Directives; Revised Draft 20131201)).[38]

[37] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[38] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

In table 5, in terms of SHP in 2009, SLO was ranked first with 454 GWh power generation per year, followed by MK (160 GWh), AL (157 GWh), KS (120 GWh), etc.

In 2020 Albania moves from rank 3 in 2009 to rank 1 (1,980 GWh per year) followed by Serbia (rank 7 in 2009) with 600 GWh, KS with 566 GWh, SLO with 540 GWh, etc. Albania has the highest potential within the examined region (without BG, GE, GR and RO).

Table 5: Calculated Small Hydropower Generation 2009 versus 2020 (GWh, ranking, %age; own calculation) [39]

Small Hydropower potential (calculation) ersus 2020 (GWh (in bold letters), ranking, percentage)						
Countries	year 2009			year 2020		
	SHP GWh	Ranking	%age	SHP GWh	Ranking	%age
AL	157	3	13.70%	1 980	1	35.96%
BIH	54	6	4.72%	288	9	5.23%
HR	100	5	8.69%	319	8	5.79%
KS	120	4	10.47%	566	3	10.28%
MD	0	10	0.00%	0	10	0.00%
MK	160	2	13.98%	450	5	8.18%
MNE	29	9	2.53%	422	6	7.67%
SLO	454	1	39.64%	540	4	9.81%
SRB	42	7	3.66%	600	2	10.90%
UA	30	8	2.62%	340	7	6.18%
∑ total	1 146		100.00%	5 505		100.00%

In terms of LHP in 2009, UA was rank 1 with 11,400 GWh power generation per year (see table 6 below), followed by SRB (10,234 GWh), HR (5,903 GWh), BiH (5,375 GWh), etc. BiH is number 1 in 2020 with 15,803 GWh per year. BiH has the largest increase from 5,375 GWh to 15,803 GWh per year! UA as rank 2 increases its power generation from 11,400 GWh to 12,950 GWh per year followed by SRB (10,815 GWh) and Albania (7,291 GWh), etc.

In terms of total installed capacity (another consideration beside power generation in GWh per year): The table 7 below shows that Albania is the most interesting country for SHP investments within the ECM (including HR and SLO) area with an estimated 208 MW total capacity installed by 2020 (a share of nearly 42%).

[39] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

Table 6: Calculated Large Hydropower Generation 2009 versus 2020 (GWh, ranking %age; own calculation)[40]

Large Hydropower potential (calculation) versus 2020 (GWh (in bold letters), ranking, percentage)						
Countries	year 2009			year 2020		
	LHP GWh	Ranking	%age	LHP GWh	Ranking	%age
AL	3 877	5	8.87%	7 291	4	11.50%
BIH	5 374	4	12.29%	15 803	1	24.92%
HR	5 903	3	13.51%	6 361	5	10.03%
KS	0	10	0.00%	398	9	0.63%
MD	58	9	0.13%	81	10	0.13%
MK	1 420	8	3.25%	2 400	8	3.79%
MNE	1 696	7	3.88%	2 733	7	4.31%
SLO	3 744	6	8.57%	4 581	6	7.22%
SRB	10 234	2	23.42%	10 815	3	17.06%
UA	11 400	1	26.08%	12 950	2	20.42%
∑ total	43 705		100.00%	63 412		100.00%

Table 7: Theoretical total installed capacity of SHP/LHP 2009 versus 2020 (24 hours times 365 days; own calculation) [41]

POWER GENERATION Δ GWh / Δ MW : share of RES of Energy Community member (including HR and SLO) states by 2020 (GWh,percentage)														
Country	SHP Investments						LHP Investments						HP Investments	
	GWh (2009)	MW (2009)	GWh (2020)	MW (2020)	Δ MW	Share %	GWh (2009)	MW (2009)	GWh (2020)	MW (2020)	Δ MW	Share %	∑ HP	Share HP %
AL	157	18	1 980	226	208	41.82%	3 877	443	7 291	832	390	17.33%	598	21.76%
BIH	54	6	288	33	27	5.37%	5 375	614	15 803	1 804	1 190	52.92%	1 217	44.30%
HR	100	11	319	36	25	5.03%	5 903	674	6 361	726	52	2.32%	77	2.81%
KS	120	14	566	65	51	10.24%	0	0	398	45	45	2.02%	96	3.51%
MD	0	0	0	0	0	0.00%	1 420	162	81	9	-153	-6.80%	-153	-5.57%
MK	160	18	450	51	33	6.65%	58	7	2 400	274	267	11.89%	301	10.94%
MNE	29	3	422	48	45	9.01%	1 696	194	2 733	312	118	5.26%	163	5.94%
SLO	454	52	540	62	10	1.97%	3 744	427	4 581	523	96	4.25%	105	3.84%
SRB	42	5	600	68	64	12.80%	10 234	1 168	10 815	1 235	66	2.95%	130	4.73%
UA	30	3	340	39	35	7.11%	11 400	1 301	12 950	1 478	177	7.87%	212	7.73%
∑ total	1 146	131	5 505	628	498	100.00%	43 707	4 989	63 412	7 239	2 249	100.00%	2 747	100.00%

(Remark: Calculation as theoretical optimum cases with 100% workload: 365 days and 24 hours)

For comparison, in LHP investments (which will be 10 times larger (in terms of total calculated installed capacity in MW) than for SHPs) Albania still has a market share

[40] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[41] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

of nearly 9% and is on the level of investments into LHPs in Slovenia and its investment is larger than in Montenegro, Moldavia, Kosovo and Macedonia.

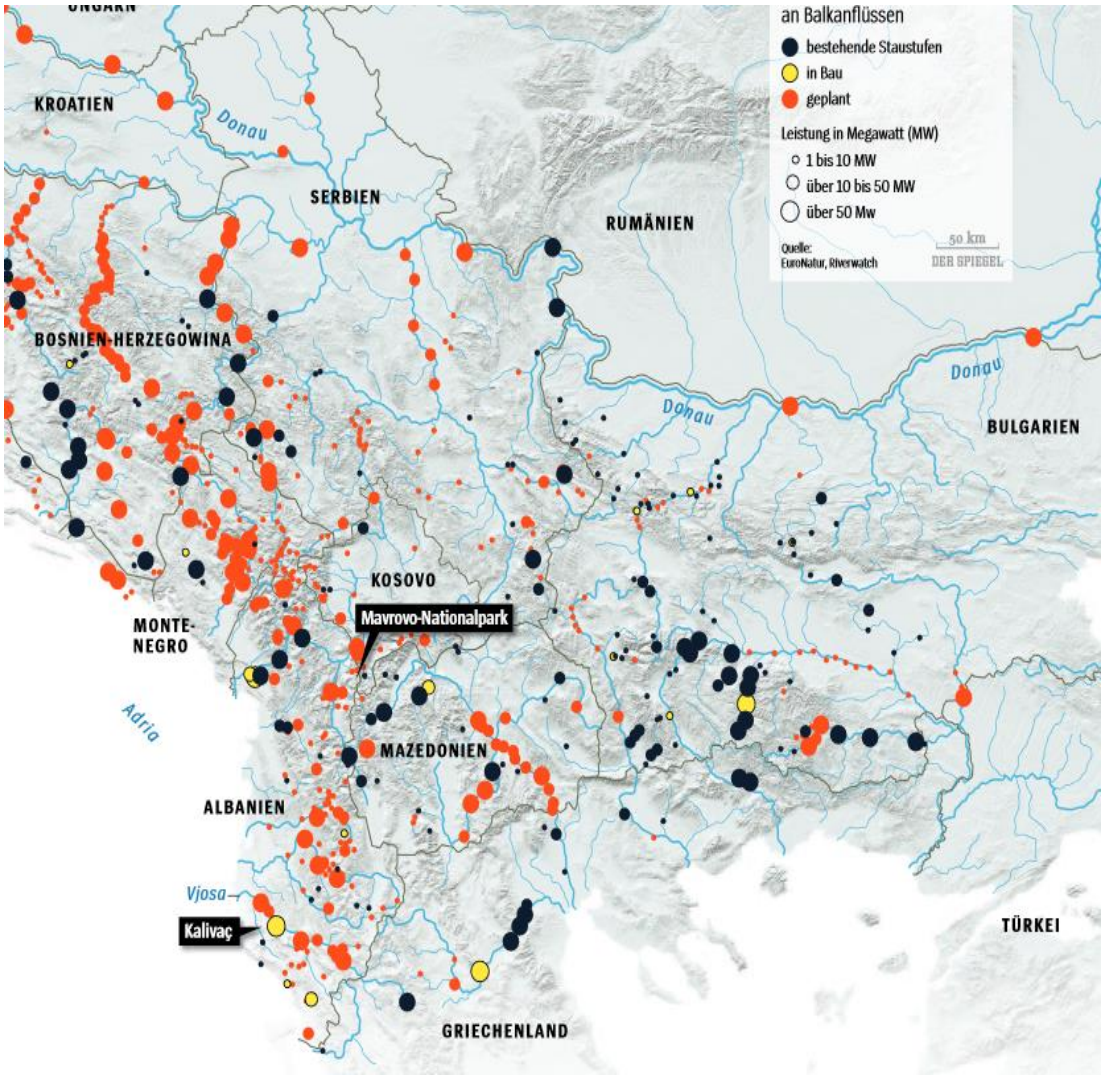
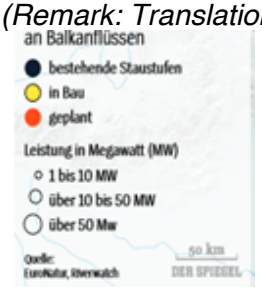


Figure 6: Bosnia & Herzegovina, Montenegro and Albania are the future HP electricity generators and providers[42]

(Remark: Translation of the legend



Balkan rivers
Existing weirs
In construction
Planned
Power in megawatt (MW)
1 to 10 MW
More than 10 to 50 MW
Above 50 MW)

It is very difficult to get reliable numbers and data for energy generation, consumption, investments, etc. for the researched SEE and/or ECM area. Other references report that Albania should be the top listed with 70,000 GWh of final energy production by

[42] http://magazin.spiegel.de/EpubDelivery/spiegel/pdf/124381335

applying a mix of large hydro, bio-energy and onshore wind power possibility by 2020, followed by Bosnia and Herzegovina, Montenegro and Serbia.[43] The chronological order of investment power or calculated investment possibility behind Albania is hard to believe, especially when taking into consideration the geographical sizes of Bosnia and Herzegovina and/or Serbia compared with Albania (see figure 6 above).

HP is not only a positive contribution to energy generation and reaching the binding 2020 target (see as well chapter 3.4.6 Nature - Environment). According to EuroNatur and Riverwatch, 570 larger HPP shall be constructed in the region between Slovenia and Albania, many of these HP projects are in contradiction to EU energy directives and shall be constructed even in national parks, which is surely not a sustainable contribution. At that point, according to Riverwatch, HP is not green energy, especially when 30% of the rivers in SEE are in natural condition and further 50% in structure near-natural condition. Moreover, in Albania and Montenegro more than 60% of the rivers are still "untouched" (in comparison: Germany: 10%; Austria: 6%). EuroNatur and Riverwatch fight against several planned HP projects and especially against two HP projects which shall be constructed in the Mavrovo (one of the oldest natural parks in Europe) national park (Macedonia) and financed by the IMF and the EBRD.[44]

Despite the warnings of EuroNatur and Riverwatch, the German RWE Innogy has won tenders for four HPPs in Bosnia & Herzegovina and some others in Serbia[45] and the first HPP project shall be opened in Republic Srpska (Bosnia & Herzegovina) in 2019[46], and the Norwegian Statkraft is also very active in Albania.[47] At the moment – most likely due to the economic crisis in the Euro zone – the interest in the construction of 570 HP projects seems to be reduced and the Albanian government was forced to withdraw some licenses for building of HP projects (further detailed in chapter 3.4.6 Nature - Environment).

Whatever the future development is, the investment potential in the SEE area (with ex-YU and AL) is enormous in comparison to the rest of the SEE (BG, GR, RO) and ECM (GE) region. It is just a question of the environment protection philosophy of the society, the financing and legal support in this region. These parameters will be presented in the following chapters of this thesis.

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[43] http://energytransition.de/2014/02/western-balkans-new-desertec/
[44] http://www.focus.de/wissen/natur/erschreckende-zahlen-anlaesslich-des-un-weltwassertags-570-weitere-kraftwerke-auf-dem-balkan-geplant_id_3798626.html
[45] http://www.handelsblatt.com/unternehmen/industrie/oekostromgeschaeft-rwe-baut-vier-wasserkraftwerke-in-serbenrepublik/7184812.html
[46] http://www.iwr.de/news.php?id=22131
[47] http://www.spiegel.de/spiegel/print/d-124381335.html

3 PROSPECTS, CHALLENGES, CHANCES AND BARRIERS FOR SHP INVESTMENTS IN THE SEE AND ENERGY COMMUNITY AREA

> *"Small hydropower is one of the most suitable renewable energy solutions for productive use and rural electrification. Small hydropower is a mature technology that can be easily constructed, operated and maintained locally. A great share of the small hydropower value chain benefits local economies. It has the lowest electricity generation prices of all off-grid technologies, and has the flexibility to be adapted to various geographical and infrastructural circumstances."*[48]

After the definition of SEE and ECM countries with a general information on energy investments, it should be questioned whether all HPPs – as they are producing power from renewable potential or kinetic energy of flowing water – are renewable. However, power produced in pumped storage units is according to the literature not considered as power produced from RES. In addition, there are additional aspects to be analyzed (depending on the national regulations) in different countries to count /not to count power generated in large HPPs as renewable energy because of

- *"Disruption of aquatic ecosystems and birdlife;*
- *Adverse impacts on the river environment;*
- *Release of significant amounts of GHG at construction and the initial flooding of the reservoir;*
- *Dislocation of people living in the reservoir area;*
- *Potential risks of sabotage and terrorism and*
- *In rare cases catastrophic failure of a dam wall as good reasons for handling LHP separated from other RES."*[49]

The literature and numbers analyzed in this thesis do not point out the above mentioned aspects concerning power generation as a sustainable energy generation or not. As such figures provided depend on the national regulations of sustainable or not sustainable renewable energy generation, the following analyzed figures may be mixed:

- Energy production (Mtoe per year);
- Energy net imports (Mtoe per year);
- Total Primary Energy Supply (Mtoe per Year);
- Electricity Consumption (TWh per Year);
- CO_2-emissions (Mt per Year);
- Total Primary Energy per population (toe/capita);
- Electricity Consumption Population (MWh/capita);
- CO_2/TPES (t CO_2/toe);
- CO_2/ (t CO_2/capita).

[48] http://wbi.worldbank.org/energy/small-hydropower-technology
[49] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

3.1 Overview of energy-related data

Energy Production:

Within the following analysis, energy-related data of the SEE area (EU-countries and ECM countries: AL, BiH, BG, GR, HR, KS, MK, MNE, RO, SLO, SRB) and additional (non-SEE) Energy Community countries (GE (candidate to be a member of ECM), MD, UA) are partially compared with "German" speaking countries of Austria, Germany and Switzerland *(Switzerland: 4 official languages).* All numbers (energy production in Mtoe per year) for single years in 1990, 1995, 2000 (deviations between time periods of 1990 and 1995, 1995 and 2000, 2000 and 2005 are not shown) and the period from 2005 to 2012 (for each year) are shown.

Table 8: Energy Production of SEE/ECM countries (in comparison with A, CH, D) (Mtoe per Year, own compilation) [50]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	8.12	8.77	9.78	9.99	10.15	10.92	11.24	11.61	12.11	11.58	12.80
Germany	186.11	144.84	135.17	136.56	138.47	136.14	132.53	126.26	129.28	122.90	123.38
Switzerland	10.29	11.25	12.02	11.00	12.27	12.66	12.80	12.78	12.63	12.33	12.73
Albania	2.46	1.24	0.99	1.13	1.22	1.05	1.15	1.25	1.62	1.48	1.67
Bosnia & Herzegovina	4.60	0.82	3.08	3.64	3.91	3.68	4.23	4.42	4.37	4.62	4.52
Bulgaria	9.61	10.30	9.92	10.65	11.04	9.97	10.26	9.84	10.59	12.37	11.78
Croatia	5.13	1.18	3.58	3.80	4.15	4.06	3.96	4.07	4.22	3.79	3.45
Greece	9.20	9.30	9.99	10.31	10.07	10.17	9.86	10.08	9.44	9.63	10.43
Kosovo	0.00	0.00	1.10	1.40	1.42	1.43	1.68	1.85	1.86	1.80	1.75
Macedonia	1.26	1.60	1.53	1.52	1.62	1.50	1.62	1.61	1.62	1.74	1.52
Montenegro	0.00	0.00	0.00	0.65	0.69	0.59	0.73	0.61	0.89	0.73	0.71
Romania	40.83	32.48	28.32	27.91	27.95	27.72	28.98	28.34	27.47	27.57	27.19
Serbia	13.77	12.40	11.87	10.29	10.56	10.53	10.75	10.21	10.55	11.17	10.78
Slovenia	3.07	2.97	3.10	3.51	3.44	3.46	3.67	3.66	3.70	3.80	3.56
Georgia	2.02	1.19	1.32	0.98	0.93	1.07	1.08	1.18	1.31	1.12	1.10
Moldavia	0.08	0.09	0.09	0.11	0.11	0.11	0.13	0.13	0.11	0.12	0.12
Ukraine	135.79	81.61	76.44	80.97	83.01	81.60	84.38	79.51	78.92	85.67	85.42

(Remark: Source: e.g. for Albania:
Year 1990:
http://www.iea.org/statistics/statisticssearch/report/?country=albania&product=Indicators&year=1990;
Year 2000:
http://www.iea.org/statistics/statisticssearch/report/?country=ALBANIA&product=indicators&year=2000
Year 2012:
http://www.iea.org/statistics/statisticssearch/report/?country=ALBANIA&product=indicators&year=2012
Instead of Albania other country names can be filled in, all years starting from 1990 to 2012 can be filled in, etc.)

[50] http://www.iea.org/statistics/statisticssearch/report

Germany as the largest economy in Europe (82 million inhabitants) is at the top of the energy production followed by Ukraine (46 million inhabitants) and Romania (20 million inhabitants), and the energy production is not proportional to the number of inhabitants (it depends on additional parameters like GDP as economic power, industrialization, etc.). All other countries (including A and CH for the purpose of comparison) are below 14 Mtoe (162.82 TWh) energy production per year.
See as well figures 16 and 17 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy-related data:

- Energy Production in Countries of former Yugoslavia (Mtoe per Year);
- Energy Production in other SEE Countries (excluding former Yugoslavia) and Energy Community countries (Mtoe per Year).

The table 8 above shows the data of all ex-Yugoslavian countries (= 7 countries) and 3 additional EU-countries (BG, GR, RO) together with another ECM countries (AL, GE as candidate, MD and UA) in comparison with 3 German-speaking countries.

In the early 90s of the last century, Yugoslavia split into different countries with the latest independences of Montenegro in 2006 (referendum) and Kosovo in 2008 (declaration), which makes it easier to compare the results from 2005 on (this approach is used for all tables and figures in this chapter/appendix A). Serbia (2012: 7.22 million inhabitants) is at the top of energy production followed by Bosnia and Herzegovina (2012: 3.83 million inhabitants), Croatia (2012: 4.27 million inhabitants) and Slovenia (2012: 2.06 million inhabitants).

Energy import:

Germany, followed by Ukraine, is the main importer of energy (table 9 below). All other countries (including A and CH for purpose of comparison) are below 25 Mtoe/year (290.75 TWh) energy net imports. Concerning the countries of former Yugoslavia (Figures 18 and 19 in Appendix A: Overview of energy related data), the main importers of energy are the larger national economies of Serbia, Croatia and Slovenia. The low imports of the 90s can be explained by the war time in former Yugoslavia. Comparing Serbia, Croatia and Slovenia with other countries of former Yugoslavia and analyzing the net energy import per million inhabitants, Slovenia is most dependent on energy import (1,767 toe), followed by Croatia (1,028 toe) and Macedonia (682 toe) in 2012.
See as well figures 18 and 19 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- Energy Net Imports of countries of Former Yugoslavia (Mtoe per Year);

- Energy Net Imports of other SEE Countries (excluding former Yugoslavia) and Energy Community countries (Mtoe per Year).

Table 9: Energy Net Imports of SEE/ECM countries (in comparison with A, CH, D) (Mtoe per Year, own compilation) [51]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	17.32	18.10	19.08	24.59	24.98	23.54	23.67	21.21	21.78	23.85	21.57
Germany	167.27	195.54	205.66	211.48	218.79	199.89	210.15	197.60	204.50	199.67	199.56
Switzerland	14.98	13.76	14.12	16.27	16.13	14.14	15.44	15.64	14.95	14.38	14.59
Albania	0.17	0.09	0.82	1.09	0.82	0.99	1.01	0.93	0.60	0.77	0.39
Bosnia & Herzegovina	2.44	0.72	1.26	1.38	1.40	1.63	1.72	1.84	1.99	2.36	2.21
Bulgaria	17.85	13.50	8.79	9.56	9.56	10.46	10.52	8.07	7.27	7.14	6.83
Croatia	3.90	2.91	4.16	5.25	4.88	5.33	5.51	4.50	4.52	4.68	4.39
Greece	15.32	18.00	21.78	23.14	24.49	24.38	25.16	22.18	21.30	19.59	19.44
Kosovo	0.00	0.00	0.42	0.55	0.58	0.59	0.60	0.63	0.61	0.70	0.65
Macedonia	1.21	1.05	1.10	1.25	1.33	1.46	1.41	1.27	1.27	1.43	1.44
Montenegro	0.00	0.00	0.00	0.43	0.50	0.61	0.56	0.41	0.29	0.41	0.37
Romania	21.92	14.33	7.84	10.65	11.72	12.59	11.04	6.99	7.56	7.63	7.93
Serbia	6.09	1.43	1.88	5.87	6.52	6.04	6.35	4.89	5.20	4.86	3.98
Slovenia	2.62	3.09	3.38	3.83	3.83	3.88	4.31	3.44	3.58	3.52	3.64
Georgia	10.57	2.80	1.56	1.90	2.14	2.32	1.96	1.95	1.85	2.46	2.65
Moldavia	9.89	4.69	2.82	3.40	3.33	3.29	3.25	3.08	3.25	3.23	3.16
Ukraine	120.92	82.25	57.62	59.74	56.20	59.61	57.24	41.37	41.90	47.69	38.51

Total Primary Energy Supply:

When analyzing the total primary energy supply (TPES) per country and per year Germany and Ukraine are at the top (followed by Romania above 50 Mtoe (62.25 Mtoe) in 1990). All other countries (including A and CH for purpose of comparison) are below 35 Mtoe/year (407.05 TWh) TPES (table 10 below).

The TPES as an indicator of the sum of production and imports minus exports and storage changes (in former Yugoslavia) shows Serbia on top, followed by Croatia, Slovenia and Bosnia and Herzegovina, but when calculating on the basis per 1 million inhabitants, Slovenia leads with 3,398 toe, followed by Serbia (2,003 toe), Croatia (1,855 toe) and Bosnia and Herzegovina (1,742 toe) in 2012.

See as well figures 20 and 21 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- Total Primary Energy Supply in countries of Former Yugoslavia (Mtoe per Year);
- Total Primary Energy Supply in other SEE Countries (excluding former Yugoslavia) and Energy Community countries (Mtoe per Year).

[51] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

Table 10: Total Primary Energy Supply of SEE/ECM countries (in comparison with A, CH, D) (Mtoe per Year, own compilation)[52]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	24.83	26.76	28.54	33.77	33.83	33.43	33.63	31.70	34.12	33.15	33.11
Germany	351.09	336.33	336.40	336.83	346.21	327.74	331.32	310.31	327.46	310.92	312.53
Switzerland	24.36	24.10	25.00	25.94	27.08	25.76	26.77	26.97	26.20	25.37	25.61
Albania	2.67	1.33	1.76	2.17	2.06	2.02	2.05	2.12	2.11	2.24	2.07
Bosnia & Herzegovina	7.02	1.49	4.35	5.04	5.30	5.30	5.95	6.15	6.44	7.09	6.67
Bulgaria	28.22	23.03	18.69	19.90	20.46	20.12	19.81	17.51	17.90	19.21	18.35
Croatia	9.03	7.05	7.79	8.90	8.94	9.33	9.08	8.72	8.56	8.44	7.92
Greece	21.44	22.68	27.09	30.25	30.22	30.22	30.42	29.43	27.61	26.75	26.55
Kosovo	0.00	0.00	1.54	1.95	1.97	2.04	2.22	2.44	2.50	2.53	2.37
Macedonia	2.48	2.50	2.67	2.84	2.92	3.04	3.01	2.81	2.88	3.11	2.97
Montenegro	0.00	0.00	0.00	1.07	1.18	1.19	1.28	1.02	1.18	1.13	1.06
Romania	62.25	46.59	36.23	38.60	39.94	39.76	39.62	34.88	35.03	36.79	34.92
Serbia	19.71	13.76	13.73	16.05	17.06	16.60	16.81	15.18	15.54	16.19	14.46
Slovenia	5.71	6.07	6.41	7.29	7.32	7.32	7.74	7.04	7.24	7.28	7.00
Georgia	12.42	3.73	2.87	2.84	3.03	3.34	3.00	3.10	3.12	3.54	3.71
Moldavia	9.89	4.72	2.88	3.50	3.45	3.36	3.35	3.18	3.41	3.32	3.28
Ukraine	251.98	163.70	133.79	142.88	137.33	137.34	123.64	114.54	132.43	126.56	122.66

Electricity consumption:

Table 11: Electricity Consumption of SEE/ECM countries (in comparison with A, CH, D) (TWh per Year; own compilation)[53]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	46.92	50.43	56.69	65.64	68.00	47.90	68.29	66.56	69.81	70.40	71.72
Germany	527.41	516.84	545.51	588.69	594.14	594.71	590.19	558.34	594.05	584.50	584.71
Switzerland	50.00	51.28	56.36	61.77	62.57	61.64	63.52	62.11	63.97	62.73	63.06
Albania	1.72	2.06	4.44	5.19	3.65	3.60	4.77	5.38	5.67	6.38	6.14
Bosnia & Herzegovina	13.11	3.67	7.62	9.00	8.98	8.97	11.21	10.80	11.69	12.24	12.54
Bulgaria	41.49	35.40	30.01	31.90	33.19	34.13	35.02	33.38	33.73	35.74	34.79
Croatia	14.17	10.69	12.64	15.44	16.14	16.58	17.20	16.44	16.85	16.70	16.30
Greece	32.85	39.18	49.56	58.20	59.89	62.99	64.31	62.51	59.32	59.85	61.13
Kosovo	0.00	0.00	2.65	3.70	3.83	4.15	4.62	4.51	4.71	5.28	5.17
Macedonia	5.33	5.55	5.89	6.95	7.12	7.48	7.60	7.08	7.40	8.05	7.64
Montenegro	0.00	0.00	0.00	3.88	3.97	4.04	3.88	3.10	3.36	3.57	3.36
Romania	67.86	52.83	44.61	50.43	51.85	52.83	53.52	48.69	51.65	53.17	52.24
Serbia	35.11	28.90	31.56	29.18	29.95	30.73	31.55	30.93	31.78	32.48	31.58
Slovenia	10.66	10.57	11.49	13.84	14.30	14.41	13.99	12.45	13.36	13.97	13.94
Georgia	14.59	6.95	6.42	7.48	6.87	7.06	7.24	6.99	7.76	8.60	8.69
Moldavia	11.96	7.70	5.96	7.36	7.76	7.14	7.24	6.21	6.14	5.23	5.39
Ukraine	248.43	172.51	136.63	152.91	159.06	164.13	163.49	148.66	162.83	167.40	165.99

[52] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22
[53] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

The above table 11 of electricity consumption (TWH per year) reflects the same perception as all other tables before in this chapter (and figures related to this chapter in Appendix A: Overview of energy related data).

Slovenia is the largest energy consumer per 1 million inhabitants with a consumption of 6,767 GWh in 2012, followed by Montenegro (5,419 GWh), Serbia (4,374 GWh), Croatia (3,817 GWh) and Macedonia (3,621 GWh).

See as well figures 22 and 23 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- Electricity Consumption in countries of former Yugoslavia (TWh per Year);
- Electricity Consumption in other SEE Countries (excluding former Yugoslavia) and Energy Community countries (TWh per Year).

CO_2 emissions:

The CO_2 emissions are declining in all countries (in the smaller countries slightly). Ukraine, Romania and Bulgaria show a dramatic decrease of CO_2 emissions which can be explained as a consequence of the fall of communism and the transformation of the economy to the capitalistic system (closing down or bankruptcies of energy-intensive industries (below table 12).

Table 12: CO_2-emissions of SEE/ECM countries (in comparison with A, CH, D) (Mt per Year; own compilation)[54]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	56.41	59.35	61.66	75.63	72.47	70.03	70.48	63.96	69.40	67.68	64.73
Germany	949.66	867.81	825.04	799.62	811.75	779.33	786.20	730.42	769.89	742.23	755.27
Switzerland	41.50	41.84	42.45	44.62	44.26	42.26	43.80	42.36	43.83	39.86	41.26
Albania	6.25	1.86	3.05	3.97	3.87	3.85	3.78	3.64	3.90	4.13	3.83
Bosnia & Herzegovina	23.65	3.24	13.51	15.63	17.23	18.16	19.92	19.74	20.05	22.81	21.22
Bulgaria	74.94	53.27	42.36	46.30	47.56	50.84	48.64	42.19	44.23	49.12	44.30
Croatia	21.51	15.80	17.66	20.73	20.76	22.05	20.97	19.76	19.01	18.77	17.19
Greece	70.13	75.82	87.43	95.04	94.10	97.84	94.26	90.22	84.17	82.84	77.51
Kosovo	0.00	0.00	5.03	6.54	6.60	6.93	7.46	8.27	8.57	8.48	8.00
Macedonia	8.52	8.18	8.41	8.78	8.78	9.22	9.01	8.40	8.22	9.27	8.69
Montenegro	0.00	0.00	0.00	1.95	2.22	2.08	2.67	1.70	2.48	2.50	2.30
Romania	167.50	117.49	87.04	94.47	96.70	94.06	92.57	78.56	75.42	81.64	78.97
Serbia	61.40	43.99	42.51	49.15	51.59	49.65	48.45	45.33	45.78	49.78	44.09
Slovenia	13.35	14.03	14.09	15.59	15.90	15.83	16.74	15.00	15.40	15.25	14.63
Georgia	33.26	8.08	4.61	4.33	4.79	5.54	4.77	5.36	4.90	6.27	6.81
Moldavia	30.18	11.81	6.50	7.68	7.48	7.35	7.32	7.31	7.89	7.88	7.20
Ukraine	687.86	392.78	291.96	305.50	310.28	313.93	305.04	252.50	271.66	285.39	281.07

[54] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

In 2012 Serbia and Bosnia and Herzegovina are the largest emitters of CO_2. However, per 1 million inhabitants it is Slovenia (7.10 Mt of CO_2 emissions), followed by Serbia (6.11 Mt of CO_2 emissions) and Bosnia and Herzegovina (5.54 Mt of CO_2 emissions). See as well figures 24 and 25 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- CO_2 emissions of countries of former Yugoslavia (Mt per Year);
- CO_2 emissions of other SEE Countries (excluding former Yugoslavia) and Energy Community countries (Mt per Year).

TPES (toe/capita):

The higher the industrialization, the higher the TPES (toe/capita) is. This statement is valid for Germany, Austria, Switzerland and Slovenia (all of these countries show a mean value of TPES (toe/capita) higher than 3 toe/capita per year (below table 13).

Ukraine could be considered as a highly industrialized country (mean value as well above 3) as well, but most likely the high value of TPES comes from low energy efficiency in the production.

Table 13: TPES Population of SEE/ECM countries (in comparison with A, CH, D) (toe/capita; own compilation)[55]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	3.23	3.37	3.56	4.11	4.09	4.03	4.04	3.81	4.08	3.95	3.93
Germany	4.42	4.12	4.09	4.08	4.20	3.98	4.09	3.79	4.01	3.80	3.82
Switzerland	3.58	3.40	3.47	3.46	3.58	3.38	3.47	3.46	3.36	3.22	3.23
Albania	0.78	0.40	0.53	0.68	0.65	0.64	0.65	0.67	0.67	0.71	0.66
Bosnia & Herzegovina	1.55	0.42	1.13	1.30	1.37	1.37	1.54	1.60	1.68	1.85	1.74
Bulgaria	3.24	2.74	2.29	2.57	2.66	2.67	2.64	2.35	2.42	2.61	2.51
Croatia	1.89	1.51	1.76	2.00	2.01	2.10	2.05	1.97	1.94	1.97	1.85
Greece	2.07	2.13	2.48	2.73	2.72	2.71	2.72	2.63	2.48	2.40	2.30
Kosovo	0.00	0.00	0.91	1.14	1.14	1.18	1.27	1.38	1.41	1.41	1.31
Macedonia	1.32	1.27	1.30	1.36	1.40	1.45	1.43	1.34	1.37	1.48	1.41
Montenegro	0.00	0.00	0.00	1.74	1.91	1.92	2.06	1.64	1.90	1.81	1.71
Romania	2.68	2.05	1.61	1.81	1.88	1.90	1.93	1.71	1.73	1.78	1.74
Serbia	1.96	1.33	1.69	2.16	2.30	2.25	2.29	2.07	2.13	2.23	2.00
Slovenia	2.86	3.05	3.22	3.64	3.65	3.63	3.83	3.45	3.53	3.55	3.40
Georgia	2.59	0.79	0.65	0.65	0.69	0.76	0.69	0.70	0.70	0.79	0.83
Moldavia	2.68	1.28	0.79	0.97	0.96	0.94	0.94	0.89	0.96	0.93	0.92
Ukraine	4.86	3.18	2.72	3.03	2.94	2.95	2.91	2.49	2.89	2.77	2.96

The lowest TPES (toe/capita) show on the other side the poorest countries defined as Albania, Moldovia and Georgia (TPES (toe/capita) below 1 toe/capita per year). The figures for Montenegro are available since 2005 (declaration of independence

[55] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

from Serbia in 2006). Kosovo was declared as independent in 2008 and figures are even partially available since 2000).

See as well figures 26 and 27 – for better visible understanding –– for purpose of comparison in Appendix A: Overview of energy related data:

- TPES Population of countries of former Yugoslavia (toe/capita);
- TPES Population of other SEE Countries (excluding former Yugoslavia) and Energy Community countries (toe/capita).

Electricity consumption population (per one million inhabitants):

The decline in energy consumption in 2009 for the majority of the countries is the consequence of the fall of US investment bank Lehman Brothers in 2008, which caused an economic crisis in the researched area. The conclusion of the electricity consumption can be compared with the previous table concerning TPES (below table 14).

Table 14: Electricity Consumption Population (MWh/capita; per one million inhabitants) of SEE/ECM countries (in comparison with A, CH, D) (MWh/capita; own compilation) [56]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	6.11	6.34	7.08	7.98	8.22	8.19	8.21	7.98	8.35	8.39	8.51
Germany	6.65	6.33	6.64	7.14	7.21	7.23	7.19	6.82	7.27	7.15	7.14
Switzerland	7.36	7.24	7.82	8.32	8.28	8.09	8.24	6.96	8.22	7.97	7.95
Albania	0.50	0.61	1.34	1.62	1.15	1.14	1.51	1.71	1.80	2.02	1.94
Bosnia & Herzegovina	2.90	1.04	1.99	2.32	2.32	2.32	2.90	2.80	3.04	3.19	3.27
Bulgaria	4.76	4.21	3.67	4.12	4.31	4.52	4.67	4.48	4.56	4.86	4.76
Croatia	2.96	2.29	2.86	3.48	3.64	3.74	3.88	3.71	3.81	3.90	3.82
Greece	3.18	3.68	4.54	5.25	5.38	5.64	5.75	5.59	5.32	5.38	5.51
Kosovo	0.00	0.00	1.56	2.17	2.22	2.40	2.65	2.56	2.65	2.95	2.86
Macedonia	2.65	2.82	2.87	3.33	3.40	3.57	3.62	3.37	3.52	3.82	3.63
Montenegro	0.00	0.00	0.00	6.30	6.43	6.54	6.27	5.00	5.41	5.74	5.41
Romania	2.92	2.33	1.99	2.37	2.45	2.53	2.61	2.39	2.55	2.64	2.60
Serbia	3.49	2.78	3.88	3.92	4.04	4.16	4.29	4.22	4.36	4.47	4.37
Slovenia	5.34	5.32	5.78	6.92	7.12	7.13	6.92	6.10	6.52	6.81	6.78
Georgia	3.04	1.47	1.45	1.71	1.56	1.61	1.65	1.59	1.74	1.92	1.93
Moldavia	3.24	2.09	1.64	2.05	2.16	2.00	2.03	1.74	1.72	1.47	1.51
Ukraine	4.79	3.35	2.78	3.25	3.40	3.53	3.53	3.23	3.55	3.66	3.64

See as well figures 28 and 29 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

[56] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

- Electricity Consumption Population of countries of former Yugoslavia (MWh/capita);
- Electricity Consumption Population of other SEE Countries (excluding former Yugoslavia) and Energy Community countries (MWh/capita).

CO_2/TPES:

In accordance with the table 15 below, this statement could be made: The less developed the country, the higher the CO_2 emission in tons per toe:

The maximum values of t CO_2/TPES above 3 t CO_2/toe are shown in the following countries: Bosnia and Herzegovina, Greece, Kosovo, Macedonia, Serbia and Moldavia.

Austria, Germany and Switzerland in comparison have as their highest values 2.27, 2.70 and 1.74 t CO_2/toe, respectively.

See as well figures 30 and 31 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- CO_2/TPES in Countries of Former Yugoslavia (t CO_2/toe);
- CO_2/TPES in other SEE Countries (excluding former Yugoslavia) and Energy Community countries (t CO_2/toe).

Table 15: CO_2/TPES of SEE/ECM (t CO_2/toe) countries (in comparison with A, CH, D) (t CO2/toe; own compilation) [57]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	2.27	2.22	2.16	2.21	2.14	2.10	2.11	2.01	2.03	2.04	1.96
Germany	2.70	2.58	2.45	2.37	2.32	2.38	2.37	2.35	2.35	2.39	2.42
Switzerland	1.71	1.74	1.70	1.72	1.36	1.64	1.64	1.57	1.67	1.57	1.61
Albania	2.34	1.40	1.73	1.83	1.87	1.91	1.84	1.72	1.85	1.85	1.84
Bosnia & Herzegovina	3.37	2.17	3.11	3.10	3.25	3.42	3.35	3.21	3.11	3.22	3.18
Bulgaria	2.66	2.31	2.27	2.33	2.32	2.53	2.46	2.41	2.47	2.56	2.41
Croatia	2.38	2.24	2.27	2.33	2.32	2.36	2.31	2.27	2.22	2.22	2.17
Greece	3.27	3.34	3.23	3.14	3.11	3.24	3.10	3.07	3.05	3.10	2.97
Kosovo	0.00	0.00	3.26	3.36	3.36	3.39	3.37	3.40	3.43	3.35	3.38
Macedonia	3.44	3.27	3.15	3.09	3.00	3.03	2.99	2.99	2.85	2.98	2.93
Montenegro	0.00	0.00	0.00	1.82	1.88	1.75	2.09	1.67	2.11	2.22	2.16
Romania	2.69	2.52	2.40	2.45	2.42	2.37	2.34	2.25	2.15	2.28	2.26
Serbia	3.11	3.19	3.10	3.06	3.02	2.99	2.88	2.99	2.95	3.08	3.05
Slovenia	2.34	2.31	2.20	2.14	2.17	2.16	2.16	2.13	2.13	2.09	2.09
Georgia	2.68	2.17	1.61	1.53	1.58	1.67	1.59	1.73	1.57	1.77	1.84
Moldavia	3.05	2.50	2.25	2.20	2.17	2.19	2.19	2.30	2.32	2.37	2.33
Ukraine	2.73	2.40	2.18	2.14	2.26	2.29	2.27	2.20	2.05	2.26	2.29

[57] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

CO_2/population:

The poorer the countries, the lower the CO_2 emission/population is (below or slightly above 2 t CO_2/capita per year are Albania, Moldova and Georgia. On the top (average CO_2/population in t of CO_2/capita (above 7)) are Germany, Austria (but not Switzerland), Greece, Slovenia and Ukraine). Ukraine is considered to be a developing country (rank 103 in terms of purchasing power, human development index: rank 76)[58] and therefore the values of CO_2/population of Ukraine should be comparable with countries like Serbia, Bosnia and Herzegovina, Romania and Bulgaria. The high CO_2 emission of Ukraine can be explained primarily by the low efficiency of energy usage. Montenegro seems to be the best in 2009 regarding CO_2/population emission (below table 16).

See as well figures 32 and 33 – for better visible understanding – for purpose of comparison in Appendix A: Overview of energy related data:

- CO_2/Population in countries of former Yugoslavia (t CO_2/capita);
- CO_2/Population in other SEE Countries (excluding former Yugoslavia) and Energy Community countries (T CO_2/capita).

Table 16: CO_2/population (t CO_2/capita) of SEE/ECM countries (in comparison with A, CH, D) (t CO_2/capital; own compilation)[59]

Country	Yr '90	Yr '95	Yr '00	Yr '05	Yr'06	Yr'07	Yr'08	Yr'09	Yr '10	Yr'11	Yr '12
Austria	7.35	7.47	7.70	9.07	8.77	8.44	8.51	7.67	8.30	8.07	7.68
Germany	11.97	10.63	10.04	9.70	9.86	9.47	9.57	8.92	9.42	9.08	9.22
Switzerland	6.12	5.91	5.89	5.95	5.86	5.55	5.68	5.43	5.63	5.06	5.20
Albania	1.81	0.55	0.92	1.24	1.22	1.22	1.20	1.50	1.24	1.31	1.21
Bosnia & Herzegovina	5.22	0.92	3.52	4.03	4.45	4.69	5.16	5.12	5.21	5.94	5.54
Bulgaria	8.60	6.34	5.18	5.98	6.18	6.74	6.49	5.67	5.98	6.69	6.06
Croatia	4.50	3.38	3.99	4.67	4.68	4.97	4.73	4.46	4.31	4.39	4.03
Greece	6.78	7.13	8.01	8.57	8.46	8.76	8.43	8.06	7.55	7.45	6.99
Kosovo	0.00	0.00	2.96	3.83	3.84	4.00	4.27	4.70	4.82	4.73	4.43
Macedonia	4.24	4.16	4.10	4.20	4.19	4.39	4.29	4.00	3.91	4.41	4.13
Montenegro	0.00	0.00	0.00	3.17	3.60	3.37	4.32	2.75	4.01	4.02	3.70
Romania	7.22	5.18	3.88	4.43	4.56	4.50	4.51	3.86	3.72	4.05	3.93
Serbia	6.10	4.24	5.23	6.61	6.96	6.73	6.59	6.19	6.28	6.86	6.10
Slovenia	6.68	7.06	7.08	7.79	7.92	7.84	8.28	7.32	7.51	7.43	7.11
Georgia	6.93	1.71	1.04	0.99	1.09	1.26	1.09	1.22	1.10	1.40	1.52
Moldavia	8.17	3.21	1.79	2.14	2.09	2.06	2.05	2.05	2.21	2.21	2.14
Ukraine	13.26	7.36	5.94	6.49	6.63	6.75	6.59	5.48	5.92	6.24	6.16

[58] http://www.globalisierung-fakten.de/globalisierung-informationen/laender/globalisierung-in-der-ukraine

[59] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

3.1.1 Analysis of National Renewable Energy Action Plans and expected final energy consumption in countries of former Yugoslavia in 2020

NREAPs of different countries are analyzed (and considered as true and fair) in numbers and compared with NREAPs of Germany and Austria (Switzerland as non-EU-country is without NREAP and therefore there is no possibility of comparison with the final gross energy market/consumption in the area of SEE and/or ECM).

In table 17 below all former Yugoslavian countries (which have submitted NREAPs) are considered.[60] Numbers of 2015 and 2020 are forecasted estimations (however, it is assumed that numbers of 2015 are reached in order to calculate the investment potential (= expected increase in energy consumption) expressed in ktoe and TWh). The differences of the energy figures in 2020 and 2015 show the deviations of expected energy consumptions (total figures, percentage and conversion from ktoe to TWh) in different countries (and as well as total sum). In this area, the total electricity market will increase within the next five years from today's (estimation for 2015) consumption of 7,306 ktoe to 7,962 ktoe in 2020 (gross final energy consumption from present 24,838 ktoe to 25,976 ktoe or from 289 TWh to 302 TWh in 2020).

Croatia and Slovenia as EU members show as well detailed information to sectoral targets and trajectories (heating and cooling, electricity and traffic) in 2020. The assumed (forecasted) electricity consumption (in ktoe) is converted as well to GWh for years 2015 and 2020 for all countries which have submitted their NREAPs (just for comparison: Wien Energie has sold 9,349 GWh power (4,448 GWh in own production, 20% of sold energy from RES) in 2014.[61] This means Wien Energie has sold more power in 2014 than Kosovo might consume in 2020 (Kosovo and Vienna both have 1.8 million inhabitants). Moreover Wien Energie produces more power than Montenegro is consuming).

Research on different sites and literature provide different numbers concerning final energy consumption in the SEE and/or ECM region for 2020. Therefore only numbers from different NREAPs are used as true and fair.

As Bosnia and Herzegovina and Macedonia as members of ECM (from former Yugoslavian countries) did not supply their NREAPs, the effect is that there are:

[60] Remark: Energy Community members compare in their NREAPs status 2009 for the pathway to 2020. EU countries usually compare in their NREAPs status 2005. For the purpose of easier comparison the figures 2010 were used (due to missing statistics for 2009).
[61] http://diepresse.com/home/panorama/wien/4802640/Wien_Forderung-fur-ETaxis

Table 17: Expected gross final energy consumption of countries of former Yugoslavia in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures (own analysis) [62]

Expected gross final energy consumption (ktoe) in former Yugoslavia in 2020						Share of RES in gross final consumption in		Sectoral targets and trajectories in 2020		
								Heating / Cooling	Electricity	Transport
Bosnia & Herzegovina										
NREAP still pending - no official figures (however NREAP of 2 entities already in Parliament)										
Croatia	2010	2015	2020	2020/2015	Change %	2005	2020			
heating and cooling	2 977	3 029	3 205	176	5.81%	12.80%	20%	19.60%	39.00%	10.00%
electricity	1 620	1 739	2 004	265	15.24%	electricity consumption 2015 (GWh):			20 225	
transport	2 010	2 073	2 230	157	7.57%	expected electricity consump. 2020 (GWh):			23 307	
gross final energy consumption	6 607	6 841	7 439	598	8.74%					
Kosovo	2009	2015	2020	2020/2015	Change %	2009	2020			
heating and cooling	486	609	719	109	17.97%	18.90%	25.00%	45.65%	25.64%	10.00%
electricity	465	616	751	135	21.94%	electricity consumption 2015 (GWh):			7 166	
transport	327	352	400	47	13.39%	expected electricity consump. 2020 (GWh):			8 738	
gross final energy consumption	1 279	1 578	1 870	292	18.50%					
Macedonia										
NREAP still pending - no official figures from the government										
Montenegro	2009	2015	2020	2020/2015	Change %	2009	2020			
heating and cooling	152	310	333	24	7.62%	26.30%	33.00%	51.40%	38.20%	10.20%
electricity	329	351	440	89	25.32%	electricity consumption 2015 (GWh):			4 079	
transport	237	198	240	41	20.77%	expected electricity consump. 2020 (GWh):			5 111	
gross final energy consumption	791	901	1 080	179	19.89%					
Serbia	2009	2015	2020	2020/2015	Change %	2009	2020			
heating and cooling	4 144	4 724	4 231	-493	-10.44%	21.20%	27%			
electricity	3 079	3 307	3 425	118	3.57%	electricity consumption 2015 (GWh):			38 460	
transport	1 926	2 343	2 675	332	14.17%	expected electricity consump. 2020 (GWh):			39 833	
gross final energy consumption	9 149	10 374	10 331	-43	-0.41%					
Slovenia	2010	2015	2020	2020/2015	Change %	2005	2020			
heating and cooling	1 996	2 054	2 029	-25	-1.22%	16.20%	25.00%	30.80%	39.30%	10.50%
electricity	1 196	1 293	1 342	49	3.79%	electricity consumption 2015 (GWh):			15 038	
transport	1 735	1 839	1 953	114	6.20%	expected electricity consump. 2020 (GWh):			15 607	
gross final energy consumption	4 927	5 186	5 324	138	2.66%					
	2009/10	ktoe	ktoe	ktoe	ktoe	TWh				
∑Total		2 015	2 020	2020/2015	Change %	2 015	2 020			
heating and cooling	9 755	10 726	10 517	-209	-1.95%	125	122			
electricity	6 689	7 306	7 962	656	8.98%	85	93			
transport	6 235	6 806	7 497	691	10.16%	79	87			
gross final energy consumption	22 679	24 838	25 976	1 138	4.58%	289	302			

[62] http://renewables.seenews.com/news/albania-bosnia-macedonia-to-adopt-natl-renewable-energy-action-plans-without-delay-energy-community-465065
https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2570177/NREAP_18.11.2013-_engl..pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2144185/NREAP_OF_REPUBLIC_OF_SERBIA_28_June_2013.pdf

- No cooperation mechanism between AL, BiH, MK, (GE) and Energy Community members or EU members transposed;
- AL, BiH and MK, (GE) did not submit Directive 2009/28/EC and therefore there are no benefits to investors;
- No transparency of transmission and distribution system operators in terms of the costs of connection to the grid and grid reinforcements;
- No compliance with guaranty of origin given;[63]
- And no figures (in above table 17) available and therefore no calculation of investment potential.

According to "In-Depth Review of Energy Efficiency Policies and Programmes: Bosnia and Herzegovina" (2012)[64] the energy consumption was very high in Bosnia and Herzegovina during the times of being a republic of former Yugoslavia.
The fall of Yugoslavia has caused a dramatic decrease of energy consumption due to de-industrialization because of lost markets and inefficient production. Considering the industrialization of former Yugoslavia, there is a potential to reach the same level of electricity production/consumption (without consideration of energy efficiency measures; see as well chapter 2 "Balkan and/or South East Europe and Energy Community – some definitions and an introduction to the small and large hydropower energy business area" with the described currently unused potential of SHPPs (288 GWh expected by 2020) and LHPPs (15,803 GWh expected by 2020)) in Bosnia and Herzegovina.

Considering the level of gross final energy consumption the estimation for 2020 could be around 5,000 ktoe (energy production 2012: 4.52 Mtoe)[65]. As electricity consumption for Bosnia and Herzegovina 12,620 GWh were estimated for the year 2012.[66]

Concerning Macedonia as the second country without an NREAP, the base line for final energy consumption was 2,810 ktoe in 2006 and the expectation of final energy consumption in 2020 is 4,210 ktoe.[67] In electricity consumption the estimation for 2013 is 6,989 GWh.[68]

[63] https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation/Albania/Renewable_Energy
[64] http://www.encharter.org/fileadmin/user_upload/Publications/BiH_EE_2012_ENG.pdf
[65] http://www.iea.org/policiesandmeasures/renewableenergy/?country=Bosnia%20and%20Herzegovina
[66] http://www.indexmundi.com/bosnia_and_herzegovina/electricity_consumption.html
[67] http://weg.ge/wp-content/uploads/2013/05/Macedonia-Energy-Strategy-2010-2030.pdf
[68] http://www.indexmundi.com/macedonia/electricity_consumption.html

Therefore the gross final energy consumption can be estimated as 34,000 (395,420 GWh) to 36,000 ktoe (418,680 GWh) by 2020.

The analysis of the share of RES for the selected countries (evaluated in chapter 2; see table 4, page 15) shows a production of power from RES of 88,000 GWh in 2020. Electricity consumption as evaluated in this chapter for Croatia, Kosovo, Montenegro, Serbia and Slovenia (missing data of AL and MK due to non-delivery of NREAPs) is 7,962 ktoe (92,598 GWh).

The following table 18 shows the calculated power production from RES of selected countries of former Yugoslavia (share of SHP, LHP and other RES) together with the calculated power consumption and its shares of RES coverage. Furthermore, the table shows the share of SHP, LHP and other RES for each country as a percentage of the country's total power production (e.g.: BiH: SHP = 1.72% of 16,702 GWh total power production (LHP: 94.62%, other RES 3.66%), but 16,702 GWh of total power production of BiH is 31.70% of total power production of former Yugoslavia 52,693 GWh). As no comparable NREAP figures were available for BiH and MK, the total calculated RES power production of HR, KS, MNE, SLO and SRB is 32,648 GWh per year in comparison with total calculated power consumption of 92,596 GWh per year (= 35.26% RES power coverage).

Table 18: Calculated power consumption/production of selected countries of former Yugoslavia and RES coverage (GWh, %age; own calculation)[69]

Calculated power consumption/production of selected countries of former Yugoslavia and RES coverage (GWh (bold numbers), %age)										
Countries	SHP	%age	LHP	%age	other RES	%age	∑ Produc-tion	%age	∑ electricity consump-tion	RES Coverage %age
BiH	**288**	1.72%	**15 803**	94.62%	**611**	3.66%	**16 702**	31.70%	**x**	x
HR	**318**	3.79%	**6 361**	75.83%	**1 710**	20.38%	**8 389**	15.92%	**23 307**	35.99%
KS	**566**	50.04%	**398**	35.19%	**167**	14.77%	**1 131**	2.15%	**8 738**	12.94%
MK	**450**	13.46%	**2 400**	71.79%	**493**	14.75%	**3 343**	6.34%	**x**	x
MNE	**422**	11.65%	**2 733**	75.48%	**466**	12.87%	**3 621**	6.87%	**5 111**	70.85%
SLO	**540**	8.81%	**4 581**	74.77%	**1 006**	16.42%	**6 127**	11.63%	**39 833**	15.38%
SRB	**600**	4.48%	**10 815**	80.83%	**1 965**	14.69%	**13 380**	25.39%	**15 607**	85.73%
∑ total	**3 184**		**43 091**		**6 418**		**52 693**		**92 596**	56.91%

[69] evaluated data (chapter 2)

3.1.2 Analysis of National Renewable Energy Action Plans and expected final energy consumption in SEE countries (excluding countries of former Yugoslavia) and Energy Community countries in 2020

Concerning the explanation of research on different sites and literature see chapter 3.1.1. In the below table 19 all Balkan countries (except countries of former Yugoslavia) and ECM members (which have submitted their NREAPs) are considered.[70] Numbers of 2015 and 2020 are forecasted estimations (however it is assumed that numbers of 2015 are reached).

The differences of the energy numbers in 2020 and 2015 show the deviations of expected energy consumptions (total numbers, percentage and conversion from ktoe to TWh). In this area the total electricity market will increase within the next five years from today's consumption of 33,274 ktoe to 38,337 ktoe (387 TWh to 446 TWh) in 2020 (gross final energy consumption from present 142,920 ktoe to 159,766 ktoe (1,662 TWh to 1,858 TWh) in 2020).

Albania as a member of ECM did not submit its NREAP up to the present time (Georgia having a candidate status is not obliged to submit any strategies and numbers to the ECM seat in Vienna). It must be mentioned that in the National Energy Efficiency Action Plan (NEEAP) of Albania the gross final energy consumption is calculated as 2,234 ktoe in 2015 (2018: 2,947 ktoe)[71] (electricity consumption in 2013: 4,551 GWh).[72]

In the case of Georgia (electricity consumption in 2012: 9,379 Gwh)[73] the gross final energy consumption was 3,217 ktoe in 2012.[74]

(Just for comparison (see as well chapter 3.1.1.: Wien Energie has sold more power in 2014 than Moldova might consume in 2020 (Moldova: 3.56 million inhabitants; Vienna: 1.8 million inhabitants.)

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[70] Remark: Energy Community members compare in their NREAPs status 2009 for the pathway to 2020. EU countries usually compare in their NREAPs status 2005. For the purpose of easier comparison the figures 2010 were used (due to missing statistics for 2009).

[71] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/1138177/NEEAP_of_the_Republic_of_Albania_2010-2018.pdf

[72] http://www.indexmundi.com/albania/electricity_consumption.html
http://knoema.de/EIAIES2015Jun/international-energy-statistics-june-2015

[73] http://www.indexmundi.com/albania/electricity_consumption.html
http://knoema.de/EIAIES2015Jun/international-energy-statistics-june-2015
https://www.energy-community.org/pls/portal/docs/1910181.PDF

[74] http://www.ener2i.eu/page/34/attach/0_Georgia_Country_Report.pdf

Table 19: Expected gross final energy consumption of SEE countries (excluding countries of former Yugoslavia) and Energy Community countries in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures (own analysis) [75]

Expected gross final energy consumption (ktoe) in SEE and Energy Community countries (without former Yugoslavia) in 2020						Share of RES in gross final consumption in		Sectoral targets and trajectories in 2020		
								Heating / Cooling	Electricity	Transport
Albania										
NREAP still pending - no official figures										
Bulgaria	2010	2015	2020	2020/2015	Change %	2005	2020			
heating and cooling	4 851	5 640	6 193	553	9.80%	9.40%	16%	23.80%	20.80%	10.80%
electricity	3 130	3 355	3 597	242	7.21%	electricity consumption 2015 (GWh):			39 019	
transport	2 830	3 191	3 473	282	8.84%	expected electricity consump. 2020 (GWh):			41 833	
gross final energy consumption	10 811	12 186	13 263	1 077	8.84%					
Georgia										
no NREP, observer status for joining the Energy Community										
Greece	2010	2015	2020	2020/2015	Change %	2005	2020			
heating and cooling	8 644	8 743	9 600	857	9.80%	6.90%	18%	19.70%	39.80%	10.10%
electricity	5 061	5 480	6 179	699	12.76%	electricity consumption 2015 (GWh):			63 732	
transport	6 774	6 864	7 257	393	5.73%	expected electricity consump. 2020 (GWh):			71 862	
gross final energy consumption	20 479	21 087	23 036	1 949	9.24%					
Moldova	2009	2015	2020	2020/2015	Change %	2009	2020			
heating and cooling	1 224	1 485	1 676	191	12.86%	11.90%	17.00%	27.19%	10.00%	10.00%
electricity	286	360	412	52	14.44%	electricity consumption 2015 (GWh):			4 187	
transport	561	525	605	80	15.24%	expected electricity consump. 2020 (GWh):			4 792	
gross final energy consumption	2 071	2 370	2 693	323	13.63%					
Romania	2010	2015	2020	2020/2015	Change %	2005	2020			
heating and cooling	16 056	18 943	20 696	1 753	9.25%	17.80%	24%	22.05%	42.62%	10.00%
electricity	5 350	6 189	7 439	1 250	20.20%	electricity consumption 2015 (GWh):			71 978	
transport	4 856	5 707	6 239	532	9.32%	expected electricity consump. 2020 (GWh):			86 516	
gross final energy consumption	26 262	30 839	34 374	3 535	11.46%					
Ukraine	2009	2015	2020	2020/2015	Change %	2009	2020			
heating and cooling	43 640	48 620	53 780	5 160	10.61%	3.80%	11.00%	12.40%	11.00%	10.00%
electricity	13 791	17 890	20 710	2 820	15.76%	electricity consumption 2015 (GWh):			208 061	
transport	8 943	9 950	11 910	1 960	19.70%	expected electricity consump. 2020 (GWh):			240 857	
gross final energy consumption	66 374	76 460	86 400	9 940	13.00%					
	2009/10	ktoe	ktoe	ktoe	ktoe	TWh				
∑Total		2 015	2 020	2020/2015	Change %	2 015	2 020			
heating and cooling	74 415	83 431	91 945	8 514	10.20%	970	1 069			
electricity	27 618	33 274	38 337	5 063	15.22%	387	446			
transport	23 964	26 237	29 484	3 247	12.38%	305	343			
gross final energy consumption	125 997	142 942	159 766	16 824	11.77%	1 662	1 858			

[75] https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation/Albania/Renewable_Energy
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3044025/Final_NREAP_EN_Dec_2013.pdf
https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3044025/Final_NREAP_EN_Dec_2013.pdf
http://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_romania_en.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3430146/Ukraine_NREAP_adopted_1Oct2014_ENG.pdf

The analysis of the share of RES for selected countries (evaluated in chapter 2 and characterized in chapter 3.1.2) shows a production of power from RES of 88,000 GWh in 2020. RES power production is evaluated in this chapter for Albania, Moldova and Ukraine (calculated according to data of IRENA Executive Strategy Workshop on Renewable Energy in South East Europe Background Paper Topic A Renewable Energy Action Plans and Regulations to Harmonize with EU Directives; missing data for BG, GE, GR and RO).

The following table 20 shows the calculated power production from RES of selected countries of other ECM countries (share of SHP, LHP and other RES) together with the calculated power consumption and its shares of RES coverage. Furthermore, the table shows the share of SHP, LHP and other RES for each country as a percentage of the country's total power production (e.g.: UA: SHP = 1.35% of 25,240 GWh total power production (LHP: 51.31%, other RES 47.35%), but 25,240 GWh of total power production of UA is 71.41% of total power production of former AL, MD and UA together as 35,346 GWh). As no comparable NREAP data were available for AL, the total calculated RES power production of MD and UA is 25,724 GWh per year in comparison with total calculated power consumption of 245,649 GWh per year (= 10.47% RES power coverage).

Table 20: Calculated power consumption/production of selected countries (AL, MD, UA) and RES coverage (GWh, %age; own calculation)[76]

Calculated power consumption/production of selected countries of former Yugoslavia and RES coverage (GWh (bold numbers), %age)										
Countries	**SHP**	**%age**	**LHP**	**%age**	**other RES**	**%age**	**∑ Pro-duction**	**%age**	**∑ electricy consumption**	**%age**
AL	**1 980**	20.58%	**7 291**	75.77%	**351**	3.65%	**9 622**	27.22%	**x**	x
MD	**0**	0.00%	**81**	16.74%	**403**	83.26%	**484**	1.37%	**4 792**	10.10%
UA	**340**	1.35%	**12 950**	51.31%	**11 950**	47.35%	**25 240**	71.41%	**240 857**	10.48%
∑ total	**2 320**		**20 322**		**12 704**		**35 346**		**245 649**	14.39%

[76] evaluated data (chapter 2)

3.1.3 Conclusion of National Renewable Energy Action Plans of both regions and comparison with the German-speaking world (excluding Switzerland)

The total gross final energy consumption (31,005 ktoe) of Austria is higher than the predicted energy consumption of countries of former Yugoslavia (25,976 ktoe) in 2020.

Table 21: Expected gross final energy consumption of Austria and Germany for purpose of comparison in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures (own analysis)[77]

Expected gross final energy consumption (ktoe) in German spoken world in 2020 (without Switzerland)						Share of RES in gross final consumption in		Sectoral targets and trajectories		
								Heating / Cooling	Electricity	Transport
Austria	**2010**	**2015**	**2020**	**2020/2015**	**Change %**	**2009**	**2020**			
heating and cooling	12 007	13 009	14 274	1 265	9.72%	24.40%	34.00%	32.60%	70.60%	11.40%
electricity	5 634	6 091	6 666	575	9.44%	electricity consumption 2015 (GWh):			70 838	
transport	8 336	9 055	10 065	1 010	11.15%	expected electricity consump. 2020 (GWh):			77 526	
gross final energy consumption	**25 977**	**28 155**	**31 005**	**2 850**	**10.12%**					
Germany	**2010**	**2015**	**2020**	**2020/2015**	**Change %**	**2009**	**2020**			
heating and cooling	111 661	106 215	98 766	-7 449	-7.01%	5.80%	18%	15.50%	38.60%	13.20%
electricity	51 973	52 554	52 627	73	0.14%	electricity consumption 2015 (GWh):			611 203	
transport	52 427	52 187	51 996	-191	-0.37%	expected electricity consump. 2020 (GWh):			612 052	
gross final energy consumption	**216 061**	**210 956**	**203 389**	**-7 567**	**-3.59%**					
Switzerland										
No EU-membership and therefor no NREAP										
	2010	**ktoe**	**ktoe**	**ktoe**	**ktoe**	**TWh**				
∑Total		**2 015**	**2 020**	**2020/2015**	**Change %**	**2 015**	**2 020**			
heating and cooling	123 668	119 224	113 040	-6 184	2.71%	1 387	1 315			
electricity	57 607	58 645	59 293	648	9.58%	682	690			
transport	60 763	61 242	62 061	819	10.79%	712	722			
gross final energy consumption	**242 038**	**239 111**	**234 394**	**-4 717**	**6.54%**	**2 781**	**2 726**			

[77] http://renewables.seenews.com/news/albania-bosnia-macedonia-to-adopt-natl-renewable-energy-action-plans-without-delay-energy-community-465065
https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2570177/NREAP_18.11.2013-_engl..pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2144185/NREAP_OF_REPUBLIC_OF_SERBIA_28_June_2013.pdf

The ratio of predicted (calculated) energy consumption of Austria in comparison with the value of countries of former Yugoslavia (divided by number of inhabitants) shows the following ratios (see as well the table 21 above and tables in 3.1.1 (table 17) and 3.1.2 (table 19)):

- Austria: per 1 million inhabitants: 3,678 ktoe;
- Germany: per 1 million inhabitants: 2,438 ktoe;
- Former Yugoslavia (without BiH, MK): per 1 million inhabitants: 1,626 ktoe;

Table 22: Comparison and analysis of energy consumption (ktoe/million inhabitants) of different countries predicted for 2020 (own analysis) [78]

Country (alphabetic)	ktoe/million inhabitants	GWh/million inhabitants	Country (highest consumption first)	ktoe/million inhabitants	GWh/million inhabitants
Other Balkan countries and Energy Community countries:			**Sorting of countries according to consumption:**		
Albania			Austria	3 678	42 775
Bulgaria	1 814	21 101	Slovenia	2 584	30 057
Georgia			Germany	2 483	28 877
Greece	2 077	24 158	Greece	2 077	24 158
Moldova	756	8 798	Ukraine	1 895	22 041
Romania	1 712	19 909	**Average other Balkan countries**	**1 823**	**21 201**
Ukraine	1 895	22 041	**and Energy Community countries:**		
Average remaining countries:	**1 823**	21 204	Bulgaria	1 814	21 101
Former Yugoslavia:			Croatia	1 742	20 261
Bosnia and Herzegovina			Montenegro	1 742	20 259
Croatia	1 742	20 261	Romania	1 712	19 909
Kosovo	1 033	12 013	**Average former YU**	**1 626**	**18 910**
Macedonia			Serbia	1 431	16 641
Montenegro	1 742	20 259	Kosovo	1 033	12 013
Serbia	1 431	16 641	Moldova	756	8 798
Slovenia	2 584	30 057	Albania	missing data	
Average former YU:	**1 626**	**18 905**	Bosnia and Herzegovina	missing data	
for comparison:			Georgia	missing data	
Austria	3 678	42 774	Macedonia	missing data	
Germany	2 483	28 875			

[78] http://renewables.seenews.com/news/albania-bosnia-macedonia-to-adopt-natl-renewable-energy-action-plans-without-delay-energy-community-465065
https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2570177/NREAP_18.11.2013-_engl..pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2144185/NREAP_OF_REPUBLIC_OF_SERBIA_28_June_2013.pdf

- Remaining SEE and Energy Community countries (without AL, GE): per 1 million inhabitants: 1,823 ktoe;
- Therefore ratio of expected energy consumption per 1 million inhabitants: Austria (Germany) versus former Yugoslavia (without BiH, MK): 2.26 : 1 (Germany: 1.53 : 1);
- Ratio of expected energy consumption per 1 million inhabitants: Austria (Germany) versus remaining SEE countries and Energy Community countries (less AL, GE): 2.02 : 1 (Germany: 1.36 : 1);
- Total calculated power consumption in 2020 (Austria: 6,666 ktoe; Germany: 52,627 ktoe; countries of former Yugoslavia (except BiH and MK): 7,962 ktoe and other SEE and ECM countries (except countries of former YU and AL, GE): 38,337 ktoe).

The table 22 above shows the calculated values (ktoe/million inhabitants and GWh/million inhabitants sorted alphabetically for different regions and as well sorted by consumption (from highest to lowest):

Austria has the highest consumption of 3,678 ktoe/million inhabitants, followed by Slovenia (2,584 ktoe/million inhabitants) and Germany (2,483 ktoe/million inhabitants). By far the lowest energy consumption is in Kosovo (1,033 ktoe/million inhabitants) and Moldova (756 ktoe/million inhabitants). Due to missing NREAPs, no energy consumption numbers are available for 4 countries.

3.2 (Small) hydropower investment potential in countries of former Yugoslavia

According to table 23 below (analysis of different NREAPs of countries of former Yugoslavia), the evaluated investments into SHPPs (SHPPs < 1 MW and SHPPs of 1 MW – 10 MW) should reach, without the countries of Bosnia and Herzegovina and Macedonia, a total investment sum of 308 MW total installed capacity (976 GWh) and a total including LHPPs of 1,453 MW total installed capacity (2,868 GWh).

Analyzing different other sources, there is still a higher potential for investments and according to RiverWatch 570 HPPs are planned to be built in the Balkan region within the next couple of years. The investments could be even higher, as the small Montenegro has announced to build around 400 HPPs *(black spots: existing HPPs, yellow spots: HPPs in construction, red spots: planned HPPs; see figure 6 in chapter 2 (page 18) and figure 14 in chapter 3.4.6 (page 109), Appendix J (page 199)).*[79]

[79] http://riverwatch.eu/balkan-rivers

Table 23: Estimation of total contribution (installed capacity, gross electricity generation) expected from hydropower to meet the binding 2020 targets for former Yugoslavian countries (own analysis)[80]

Estimation of total contribution (installed capacity, gross electricity generation) expected from Hydropower to meet the binding 2020 targets										
Bosnia and Herzegovina	NREAP still pending (but NREAPs of 2 entities already approved)									
Croatia	**base year 2010**		**estimation 2015**		**forecast 2020**		**Difference 2020/2010**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	2 139	6 027	2 167	6 090	2 456	6 679	317	652	289	589
< 1 MW	0	0	0	0	0	0	0	0	0	0
1 MW - 10 MW	31	124	59	188	100	318	69	194	41	130
> 10 MW	2 108	5 903	2 108	5 903	2 356	6 361	248	459	248	459
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)	**2 091**	**6 567**	**2 682**	**7 398**	**3 043**	**8 388**	**952**	**1 821**	**361**	**990**
Kosovo	**base year 2009**		**estimation 2015**		**forecast 2020**		**Difference 2020/2009**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	47	120			448	965	401	846	448	965
< 1 MW	2	0	2	14	9	48	7	48	7	34
1 MW - 10 MW	10	32	49	215	99	442	89	410	50	226
> 10 MW	35	88	35	82	340	476	305	388	305	394
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)	**47**	**120**	**119**	**384**	**520**	**1 138**	**473**	**1 019**	**401**	**755**
Macedonia	NREAP still pending									
Montenegro	**base year 2009**		**estimation 2015**		**forecast 2020**		**Difference 2020/2009**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	636	1 685	661	1 781	826	2 050	190	365	166	269
< 1 MW	0	0	5	14	11	35	11	35	7	21
1 MW - 10 MW	9	19	29	88	86	252	78	233	57	164
> 10 MW	627	1 666	627	1 679	729	1 763	102	97	102	84
of which pumping	0	0			614	0	614	0	614	0
Total (incl. other RES)	**636**	**1 685**	**671**	**1 809**	**1 017**	**2 515**	**381**	**831**	**346**	**707**
Serbia	**2009**		**estimation 2015**		**forecast 2020**		**Difference 2020/2009**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	2 224	10 276	2 271	10 922	2 662	11 415	438	1 139	391	493
< 1 MW	4	11	34	103	164	460	160	449	130	357
1 MW - 10 MW	12	31	29	110	40	140	28	109	11	30
> 10 MW	2 208	10 234	2 208	10 709	2 458	10 815	250	581	250	106
of which pumping	614	603	614	603	614	640	0	37	0	37
Total (incl. other RES)	**2 224**	**10 276**	**2 576**	**11 529**	**3 316**	**13 381**	**1 092**	**3 105**	**740**	**1 852**
Slovenia	**2010**		**estimation 2015**		**forecast 2020**		**Difference 2020/2010**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	1 071	4 198	1 193	4 569	1 353	5 121	282	923	160	552
< 1 MW	118	262	120	270	120	270	2	8	0	0
1 MW - 10 MW	37	192	52	257	57	270	20	78	5	13
> 10 MW	916	3 744	1 021	4 042	1 176	4 581	260	837	155	539
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)	**1 136**	**4 510**	**1 373**	**5 328**	**1 693**	**6 126**	**557**	**1 616**	**320**	**798**
SUM of Hydropower (HR, KS, MNE, SRB, SLO, excluding BiH and MK)										
	base year 2009 or 2010		**estimation 2015**		**forecast 2020**		**Diff. 2020/2009 or 2010**		**Difference 2020/2015**	
	MW	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**	**MW**	**GWh**
∑Hydro Power	**6 116**	**22 305**	**6 292**	**23 362**	**7 745**	**26 231**	**1 628**	**3 925**	**1 453**	**2 868**
< 1 MW	**124**	**273**	**160**	**401**	**304**	**813**	**180**	**540**	**144**	**412**
1 MW - 10 MW	**99**	**398**	**218**	**858**	**382**	**1 421**	**284**	**1 024**	**164**	**564**
> 10 MW	**5 894**	**21 635**	**5 999**	**22 415**	**7 059**	**23 996**	**1 164**	**2 362**	**1 059**	**1 582**
of which pumping	**614**	**603**	**614**	**603**	**1 228**	**640**	**614**	**37**	**614**	**37**
Total (incl. other RES)	**6 133**	**23 158**	**7 421**	**26 448**	**9 588**	**31 549**	**3 456**	**8 391**	**2 168**	**5 101**

[80] http://renewables.seenews.com/news/albania-bosnia-macedonia-to-adopt-natl-renewable-energy-action-plans-without-delay-energy-community-465065
https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2570177/NREAP_18.11.2013-_engl..pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2144185/NREAP_OF_REPUBLIC_OF_SERBIA_28_June_2013.pdf

Principally, the numbers of the analyzed NREAPs, RiverWatch and the information generated on the website of Small Hydropower World (United Nations Industrial Development Organization (UNIDO) and International Center on Small Hydro Power (ICSHP)) do not match (see as well chapter 2). The NREAPs might be the conservative calculation of the EU countries and ECM members obliged to meet the binding 2020 energy targets and there would not be a reason to invest more in SHPPs than necessary to reach the 2020 binding energy target.

The total installed capacity of SHPs (according to Small Hydropower World) is 6,625 MW (with a potential of 12,239 MW) in Southern Europe (including Portugal, Spain, Italy, Former Ex-Yugoslavia, Albania and Greece),[81] deducting the values for Portugal (450 MW)[82], Spain (1,926 MW)[83], Italy (2,735 MW)[84], Albania (37 MW)[85] and Greece (196 MW)[86] there is according to this analysis a total installed SHP capacity of 1,281 MW counted for the countries of Ex-Yugoslavia.

Therefore the investment potential of LHPPs and SHPPs is quite much higher than the predicted investments into LHPPs and SHPPs shown in different NREAPs (see Appendix J: Nature: Hydropower plants in Balkan rivers, page 197).

3.2.1 Bosnia and Herzegovina

BiH is a net exporter of power (see Domestic Supply (DS)/Total Production (TP) of 80.92% (in 2009) and Total Production (TP)/Domestic Supply (DS) of 123.58% (in 2009)) and HP makes depending on hydrological conditions 29% (2011) and 47% (2010) of power production (HP is the only RES for electricity production in BiH up to now) and a total installed HP capacity of 2,464 MW[87] (see table 24 below). Only HP is considered as RES for power production, which makes a total share of 30% to

[81] http://www.smallhydroworld.org/

[82] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Portugal.pdf

[83] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Spain.pdf

[84] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Italy.pdf

[85] http://aea-al.org/wp-content/uploads/2012/04/HYDRO-ENERGY-ALBANIA.pdf

[86] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Greece.pdf

[87] http://www.enercee.net/countries/country-selection/bosnia-herzegovina.html

nearly 50% (depending on weather conditions) of total power production. According to Branchenreport only 39% of HP potential is utilized and the fastest development is in the field of SHPPs (so called mini hydro power plants (pp) up to 5 MW). (Branchenreport Bosnien und Herzegowina, 2014).

According to different studies, the technically feasible potential of hydro energy in BiH amounts to approximately 6,800 MW or approximately 24,000 GWh/year, mostly within the Drina, Neretva and Trebisnjica river basins. The economically feasible potential is 5,600 MW or 19,000 GWh/year. The potential for SHPPs is estimated at approximately 700 MW or 2,600 GWh/year. At present there are 48 SHPPs in operation in BiH (6 SHPPs in Republic Srpska and 5 SHPPs in construction phase, 42 SHPPs are in operation in Federation of BiH and 5 SHPPs in construction phase). Furthermore, 293 potential micro locations are under evaluation. In the Federation of BiH, 200 SHPP concessions were awarded in four cantons with an installation capacity of approximately 180 MW. In Republic Srpska, 106 contracts with 47 concessionaires were concluded for SHPPs with a total installed power capacity of approximately 280 MW and an expected annual production of 1,400 GWh (Branchenreport Bosnien und Herzegowina, 2014).

Table 24: Power production 2009 - 2012: Bosnia and Herzegovina (own evaluation)[88]

Bosnia & Herzegovina / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	9 331	59.55%	Share of RES	8 996	52.53%	Share of RES	10 806	70.72%	Share of RES	9 787	69.50%	Share of RES
Oil	33	0.21%		48	0.28%		38	0.25%		28	0.20%	
Gas	65	0.41%		54	0.32%		49	0.32%		52	0.37%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**6 239**	**39.82%**	**100.00%**	**8 026**	**46.87%**	**100.00%**	**4 387**	**28.71%**	**100.00%**	**4 215**	**29.93%**	**100.00%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**15 668**	**100.00%**	**100.00%**	**17 124**	**100.00%**	**100.00%**	**15 280**	**100.00%**	**100.00%**	**14 082**	**100.00%**	**100.00%**
Share of RES	**6 239**	**39.82%**		**8 026**	**46.87%**		**4 387**	**28.71%**		**4 215**	**29.93%**	
Imports	2 887		DS/TP	3 076		DS/TP	4 171		DS/TP	4 481		DS/TP
Exports	-5 877		TP/DS	-6 905		TP/DS	-5 660		TP/DS	-4 525		TP/DS
Domestic Supply	**12 678**	**ktoe**	**80.92%**	**13 295**	**ktoe**	**77.64%**	**13 791**	**ktoe**	**90.26%**	**14 038**	**ktoe**	**99.69%**
Total Production	**15 668**	**1 347**	**123.58%**	**17 124**	**1 472**	**128.80%**	**15 280**	**1 314**	**110.80%**	**14 082**	**1 211**	**100.31%**
Share of RES	**6 239**	**536**		**8 026**	**690**		**4 387**	**377**		**4 215**	**362**	
Domestic Supply	**12 678**	**1 090**		**13 295**	**1 143**		**13 791**	**1 186**		**14 038**	**1 207**	

[88] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

BiH did not supply their NREAP (even the NREAPs of the two entities of Federation of Bosnia and Herzegovina and Republic of Srpska are approved in the local parliaments), but using the analyzed figures of UNIDO and ICSHP, the economically feasible potential of HP is 19,000 GWh/year (5,600 MW). As the total electricity production in the period 2009 – 2012 was between 15,700 GWh (2009) and 17,100 GWh (2010), investments into SHPPs/LHPPs would replace coal, oil and gas as the energy carrier for electricity generation immediately. The technical potential for SHPP is around 1,000 MW in BiH (compare as well figures of Branchenreport Bosnien und Herzegowina, 2014).

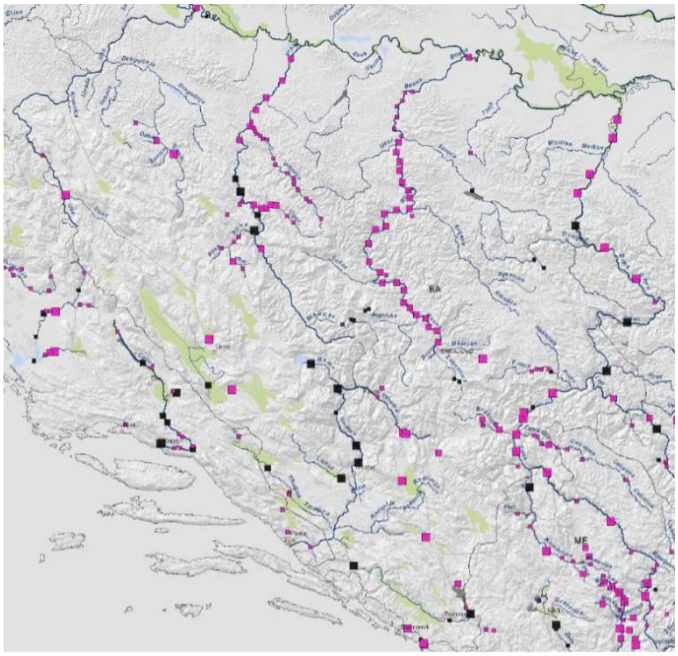

Figure 7: Overview of operating and planned SHPPs/LHPPs in Bosnia and Herzegovina[89]

According to a study of KPMG the utilization rate of the technical hydro potential is a maximum of 19%, which means that under ideal conditions BiH could generate an annual power of 24,000 GWh[90] (compare as well different other sources with deviating information).

There is a small number of SHPPs (25 SHPPs) with a capacity of 36 MW. About 100 concessions with total installed capacity of 200 MW shall be awarded.[91]

See as well in the above figure 7 indications of new HPP investments (SHPPs < 1MW: existing SHPPs: 13, one under construction and in planning: 54; LHPPs above 10 and < 50 MW: existing LHPPs: 4, LHPPs in planning: 46, LHPPs > 50 MW: existing LHHPs: 10, LHPPs in planning: 13 (one of them belongs to the Austrian KELAG

[89] http://www.balkanrivers.net/sites/default/files/BA_CountrySpecial14%5Bsmallpdf.com%5D.pdf
[90] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[91] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_BiH.pdf

Group with a total installed capacity of 50 MW);[92] (*Remark: black spots: existing HPPs, purple spots: planned HPPs).*[93]

Summary and Outlook for Bosnia and Herzegovina:

According to IRENA[94] the following calculations have given these results:

In 2009 SHPs have generated power of 54 GWh per year (total installed capacity of 6 MW) and the expectation for 2020 is 288 GWh per year (total installed capacity of 33 MW). Equivalent for LHP for 2009: (10,429 GWh; 1,191 MW) and for 2020: 15,803 GWh; 1,804 MW) which makes the total for 2009 (10,483 GWh; 1,107 MW) and for 2020 (16,091 GWh; 1,837 MW). When comparing statistical data of the IEA, HP generation for 2009 shows a supply of 6,239 GWh (equivalent 2010: 8,026 GWh; 2011: 4,387 GWh and 2012: 4,215 GWh).

On the other side, the technical feasible potential is reported as 24,000 GWh per year (total installed capacity of 6,800 MW (KPMG and Branchenreport Bosnien und Herzegowina, 2014)) or 19,000 GWh per year (total installed capacity of 5,600 MW (UNIDO, ICSP)). Comparing the data of IRENA, there is still a high potential for SHP investments with total installed capacity of 1,000 MW (Branchenreport Bosnien und Herzegowina, 2014).

3.2.2 Croatia

Croatia is, according to the table 25 below, a net power importer (TP/DS; see explanation of this statement in chapter 3.2.1).

In order to reach the binding 2020 target (the expected electricity consumption of 2020 is between 23,300 GWh (IEA) and 28,000 GWh (UNIDO and ICSHP)) there should be investments into LHPPs of 300 MW. The total installed HP capacity is 1,700 MW (HP storage plants) and 380 MW (run-of-river plants) and SHPP (around 40 MW).[95]

[92] http://www.enercee.net/countries/country-selection/bosnia-herzegovina.html
[93] http://www.balkanrivers.net/sites/default/files/BA_CountrySpecial14%5Bsmallpdf.com%5D.pdf
[94] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[95] http://www.gwp.org/Global/ToolBox/References/World%20small%20hydropower,%20development%20report%202013.pdf

Table 25: Power production 2009 - 2012: Croatia (own evaluation)[96]

Croatia / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	1 658	12.98%	Share of RES	2 385	16.91%	Share of RES	2 582	23.84%	Share of RES	2 238	21.20%	Share of RES
Oil	2 013	15.76%		560	3.97%		752	6.94%		582	5.51%	
Gas	2 211	17.31%		2 553	18.10%		2 621	24.20%		2 511	23.79%	
Biofuels	25	0.20%		33	0.23%		55	0.51%		94	0.89%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	6 815	53.34%	99.21%	8 435	59.80%	98.38%	4 620	42.66%	95.83%	4 801	45.48%	93.55%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	2	0.02%	0.04%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	54	0.42%	0.79%	139	0.99%	1.62%	201	1.86%	4.17%	329	3.12%	6.41%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	12 776	100.00%	100.00%	14 105	100.00%	100.00%	10 831	100.00%	100.00%	10 557	100.00%	100.00%
Share of RES	6 869	53.76%		8 574	60.79%		4 821	44.51%		5 132	48.61%	
Imports	11 892		DS/TP	12 415		DS/TP	13 985		DS/TP	13 174		DS/TP
Exports	-6 210		TP/DS	-7 650		TP/DS	-6 288		TP/DS	-5 545		TP/DS
Domestic Supply	18 458	ktoe	144.47%	18 870	ktoe	133.78%	18 528	ktoe	171.06%	18 186	ktoe	172.26%
Total Production	12 776	1 099	69.22%	14 105	1 213	74.75%	10 831	931	58.46%	10 557	908	58.05%
Share of RES	6 869	591		8 574	737		4 821	415		5 132	441	
Domestic Supply	18 458	1 587		18 870	1 623		18 528	1 593		18 186	1 564	

According to Pedraza the total installed HP capacity is 1,873 MW (HP storage plants: 1,500 MW and 373 MW run-of-river plants) (Morales Pedraza, 2015) and according to Energy in Central and Eastern Europe there should be an installed HP capacity of 2.1 GW[97] (see as well a graphical representation of HP investment possibilities in the figure 8 below). Although Croatia is half owner (together with Slovenia) of the nuclear pp (total installed capacity: 696 MW electrical power, thermal power: 2 GW)[98] in Krsko (Slovenia) there is no data available for nuclear power supplied to Croatia in above table 25. As the nuclear share in Slovenia is around 35% (see table 31 in chapter 3.2.7 for Slovenia) of electricity supply, there is an indicator that imported electricity is energy from the nuclear pp in Krsko (matching of figures of power export of Slovenia with power import of Croatia).

[96] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[97] http://www.enercee.net/countries/country-selection/croatia.html
[98] http://www.nek.si/en/about_nek/production/

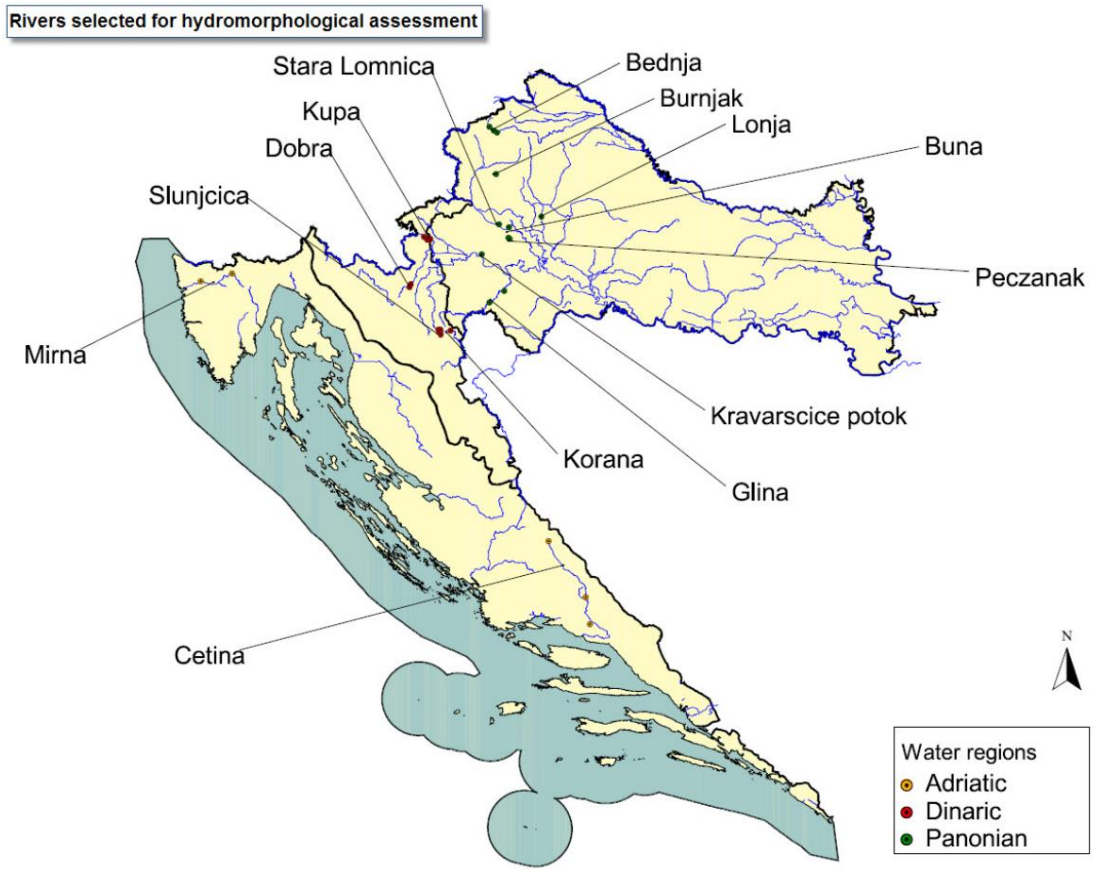

Figure 8: Rivers selected for hydro morphological assessment in Croatia[99]

Summary and Outlook for Croatia:

According to IRENA[100] the following calculations have given these results:

In 2009 SHPs have generated power of 99 GWh per year (total installed capacity of 11 MW) and the expectation for 2020 is 319 GWh per year (total installed capacity of 36 MW). Equivalent for LHP for 2009: (5,903 GWh; 674 MW) and for 2020: 6,361 GWh; 726 MW) which makes the total for 2009 (6,002 GWh; 685 MW) and for 2020 (6,680 GWh; 762 MW) against other information of 1,873 total installed capacity (Morales Pedraza, 2015 a) or 2,100 MW according to Energy in Central and Eastern Europe (ENERCE).

[99] http://www.wfd-croatia.eu/userfiles/image/photogallery/Students/Hydro_assessment_Croatia_map.jpg
[100] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

3.2.3 Kosovo

Kosovo is a net importer of power (TP/DS; see explanation of this statement in chapter 3.2.1 and table 26 below) and the share of RES (or HP) is on a very low level (1.6% to 3% depending on the level of HP production),the remaining part of power production is generated by coal-fired pps (Coal pp (98%), Kosovo A (construction year 1962/75) with total installed capacity of 800 MW and Kosovo B (construction year 1983/84) with a total installed capacity of 678 MW. Two SHPPs have a total installed capacity of 50 MW (HPP Ujman with a total installed capacity of 35 MW, SHPP Lumbardhi with a total installed capacity of 8.3 MW, SHPP Radavc with a total installed capacity of 0.34 MW)[101])[102]. But (other sources only report! of) 10.84 MW total installed SHP capacity were reported in 2012.[103] According to the NREAP of Kosovo 448 MW installed capacity investment potential shall be reached (SHPPs: 57 MW) by 2020.

Table 26: Power production 2009 - 2012: Kosovo (own evaluation)[104]

Kosovo / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	4 841	97.29%	Share of RES	4 989	96.54%	Share of RES	5 675	97.83%	Share of RES	5 833	98.15%	Share of RES
Oil	15	0.30%		22	0.43%		21	0.36%		14	0.24%	
Gas	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**120**	**2.41%**	**100.00%**	**156**	**3.02%**	**99.36%**	**105**	**1.81%**	**100.00%**	**96**	**1.62%**	**100.00%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	1	0.02%	0.64%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**4 976**	**100.00%**	**100.00%**	**5 168**	**100.00%**	**100.00%**	**5 801**	**100.00%**	**100.00%**	**5 943**	**100.00%**	**100.00%**
Share of RES	**120**	**2.41%**		**157**	**3.04%**		**105**	**1.81%**		**96**	**1.62%**	
Imports	768		DS/TP	819		DS/TP	3 135			2 773		DS/TP
Exports	-274		TP/DS	-353		TP/DS	-2 717			-2 619		TP/DS
Domestic Supply	**5 470**	**ktoe**	**109.93%**	**5 634**	**ktoe**	**109.02%**	**6 219**	**ktoe**		**6 097**	**ktoe**	**102.59%**
Total Production	**4 976**	**428**	**90.97%**	**5 168**	**444**	**91.73%**	**5 801**	**499**		**5 943**	**511**	**97.47%**
Share of RES	**120**	**10**		**157**	**13**		**105**	**9**		**96**	**8**	
Domestic Supply	**5 470**	**470**		**5 634**	**484**		**6 219**	**535**		**6 097**	**524**	

HP currently has no importance in power generation in Kosovo. According to a presentation of the Ministry of Energy and Mining, 80 SHPPs to be invested into with

[101] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[102] Email Austrian Trade Commissioner Laibach@advantageaustria.org; Skopje@advantageaustria.org (June 11th, 2015)
[103] http://www.eurasia.undp.org/content/dam/rbec/docs/Kosovo.pdf
[104] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

a capacity of 128 MW are identified[105] and should reach (from present 2%) a share of 11% on power generation (here in this source expected as TPES 1,728 to 1,903 ktoe; with SHPP investments of total installed capacity of 108-251 MW until 2020 (LHPP investment 305 MW).[106]

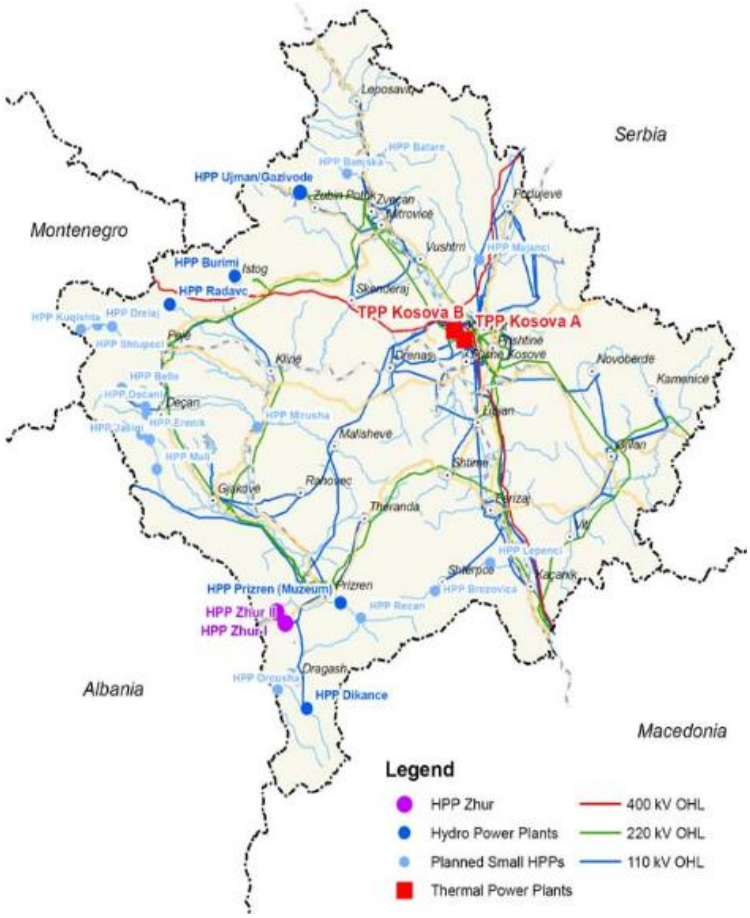

Figure 9: Investment opportunities for SHPP development in Kosovo[107]

The technical potential of HP is 800 GWh that is barely being utilized. According to the Ministry of Energy, existing SHPPs should be revitalized as first steps; 18 technically suitable and economically feasible sites for construction of SHPPs with a total installed capacity of 64 MW are identified. Beside the planned construction of SHPPs there is a possibility of construction of a LHPP with a total installed capacity of 305 MW at the White Drin river.[108] Beside the usage of HP, investment into wind

[105] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/794184/prezentimi_per_daten_29.11._2010.pdf
[106] http://www.gtai.de/GTAI/Navigation/DE/Trade/Maerkte/suche,t=kosovo-will-im-bereich-erneuerbare-energien-staerker-mit-wasser-und-windkraft-punkten,did=1008752.html
[107] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/794184/prezentimi_per_daten_29.11._2010.pdf
[108] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

power with a total installed capacity of 288 MW could be considered (but see also the table 27 below of other sources with different figures).[109]

Table 27: New capacities by RES consumption targets[110]

Capacity of electricity from RES (MW)								
RES (MW)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Photovoltaic	0	3	4	6	7	8	9	10
Biomass	0	2	4	6	8	10	12	14
Wind	1.35	31.35	70	90	110	130	140	150
SHPP	0	60	140	150	160	180	200	240
∑capacity	**1.35**	**96.35**	**218**	**252**	**285**	**328**	**361**	**414**

Summary and Outlook for Kosovo:

According to IRENA[111] the following calculations have given these results:

In 2009 SHPs have generated power of 120 GWh per year (total installed capacity of 14 MW) and the expectation for 2020 is 566 GWh per year (total installed capacity of 65 MW). Equivalent for LHP for 2009: (0 GWh; 0 MW) and for 2020: 398 GWh; 45 MW) which makes the total for 2009 (120 GWh; 14 MW) and for 2020 (964 GWh; 110 MW), against other information according to KPMG that the technical potential of HP should be only 800 GWh.

3.2.4 Macedonia

Macedonia is also one of the net importers of power (TP/DS; see explanation of this statement in chapter 3.2.1, see table 28 below) as a part of former Yugoslavia and like BiH did not submit its NREAP. The share of HP in power production was between 17% (2012) and 33% (2010). In 2011, the Ministry of Economy of Macedonia announced a public tender for 44 SHPPs with a total installed capacity of 28 MW. The technical capacity of these SHPPs should be around 250 to 350 MW[112] and Energy in Central and Eastern Europe reports the number of sites on which pps could be installed as estimated at more than 400 MW (theoretical hydroelectric resources (8.863 TWh)).[113] According to RiverWatch, the majority of new HPPs are planned

[109] Email Austrian Trade Commissioner Laibach@advantageaustria.org; Skopje@advantageaustria.org (June 11th, 2015)
[110] http://ero-ks.org/Vendimet/English/2014/V_673_2014_eng.pdf
[111] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[112] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_FYROM.pdf
[113] http://www.enercee.net/countries/country-selection/macedonia.html

along the largest river Vardar. In total, the number of HPPs should be increased by investments (SHPPs < 10 MW: operating: 13, new planned: 3; LHPPs < 50 MW: operating: 4, under construction: 1 and new planned: 13; LHPPs > 50 MW: operating: 4, planned: 5)[114]

Table 28: Power production 2009 - 2012: Macedonia (own evaluation)[115]

Macedonia / Production from	Electricity 2009			2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	5 305	77.69%	Share of RES	4 743	65.33%	Share of RES	5 169	76.49%	Share of RES	4 832	77.20%	Share of RES
Oil	251	3.68%		61	0.84%		68	1.01%		88	1.41%	
Gas	2	0.03%		25	0.34%		88	1.30%		298	4.76%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	1 270	18.60%	100.00%	2 431	33.48%	100.00%	1 433	21.20%	100.00%	1 041	16.63%	100.00%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	6 828	100.00%	100.00%	7 260	100.00%	100.00%	6 758	100.00%	100.00%	6 259	100.00%	100.00%
Share of RES	1 270	18.60%		2 431	33.48%		1 433	21.20%		1 041	16.63%	
Imports	1 438		DS/TP	1 420		DS/TP	2 749		DS/TP	2 741		DS/TP
Exports	0		TP/DS	0		TP/DS	-73		TP/DS	-72		TP/DS
Domestic Supply	8 266	ktoe	121.06%	8 680	ktoe	119.56%	9 434	ktoe	139.60%	8 928	ktoe	142.64%
Total Production	6 828	587	82.60%	7 260	624	83.64%	6 758	581	71.63%	6 259	538	70.11%
Share of RES	1 270	109		2 431	209		1 433	123		1 041	90	
Domestic Supply	8 266	711		8 680	746		9 434	811		8 928	768	

Summary and Outlook for Macedonia:

According to IRENA[116] the following calculations have given these results:

In 2009 SHPs have generated power of 160 GWh per year (total installed capacity of 18 MW) and the expectation for 2020 is 450 GWh per year (total installed capacity of 51 MW). Equivalent for LHP for 2009: (58 GWh; 7 MW) and for 2020: 2,400 GWh; 274 MW) which makes the total for 2009 (218 GWh; 25 MW) and for 2020 (2,850 GWh; 325 MW), against other information concerning SHP with reported technical capacity as 250 MW to 350 MW (UNIDO and ICSHP) or 400 MW (ENERCE).

[114] http://www.balkanrivers.net/sites/default/files/MK_CountrySpecial14%5Bsmallpdf.com%5D.pdf
[115] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[116] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

3.2.5 Montenegro

The Ministry of Economy of Montenegro is strongly promoting HP and the current potential is tapping only 17% of total HP operation.[117] The share of HP participation in power generation depending on weather conditions (2009-2012) was between 45% (2011) and 75% (2009). Currently Montenegro is a net importer of power (TP/DS; see explanation of this statement in chapter 3.2.1, see table 29 below), but could easily be a net power exporter and as well replace coal as energy carrier for power generation. Furthermore, there are currently 7 SHPPs connected to the power system of licensed manufacturers in Montenegro.[118]

Table 29: Power production 2009 - 2012: Montenegro (own evaluation)[119]

Montenegro / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	689	24.96%	Share of RES	1 272	31.63%	Share of RES	1 452	54.67%	Share of RES	1 367	48.07%	Share of RES
Oil	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Gas	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**2 071**	**75.04%**	**100.00%**	**2 750**	**68.37%**	**100.00%**	**1 204**	**45.33%**	**100.00%**	**1 477**	**51.93%**	**100.00%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**2 760**	**100.00%**	**100.00%**	**4 022**	**100.00%**	**100.00%**	**2 656**	**100.00%**	**100.00%**	**2 844**	**100.00%**	**100.00%**
Share of RES	**2 071**	**75.04%**		**2 750**	**68.37%**		**1 204**	**45.33%**		**1 477**	**51.93%**	
Imports	1 227		DS/TP	732		DS/TP	1 993		DS/TP	1 440		DS/TP
Exports	-172		TP/DS	-730		TP/DS	-431		TP/DS	-228		TP/DS
Domestic Supply	**3 815**	**ktoe**	**138.22%**	**4 024**	**ktoe**	**100.05%**	**4 218**	**ktoe**	**158.81%**	**4 056**	**ktoe**	**142.62%**
Total Production	**2 760**	**237**	**72.35%**	**4 022**	**346**	**99.95%**	**2 656**	**228**	**62.97%**	**2 844**	**245**	**70.12%**
Share of RES	**2 071**	**178**		**2 750**	**236**		**1 204**	**104**		**1 477**	**127**	
Domestic Supply	**3 815**	**328**		**4 024**	**346**		**4 218**	**363**		**4 056**	**349**	

Summary and Outlook for Montenegro:

According to IRENA[120] the following calculations have given these results:

In 2009 SHPs have generated power of 29 GWh per year (total installed capacity of 3 MW) and the expectation for 2020 is 422 GWh per year (total installed capacity of

[117] http://www.enercee.net/countries/country-selection/montenegro/latest-news/detail/artikel/merely-17-of-montenegros-hydropower-potential-has-been-tapped.html?pager[page]=2&cHash=d01060f7e89ed612874c1ad93c7a0903
[118] http://www.enercee.net/countries/country-selection/montenegro.html
[119] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[120] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

48 MW). Equivalent for LHP for 2009: (1,696 GWh; 194 MW) and for 2020: 2,733 GWh; 312 MW) which makes the total for 2009 (1,725 GWh; 197 MW) and for 2020 (3,155 GWh; 360 MW).

3.2.6 Serbia

In principal Serbia is a net power exporter (TP/DS; see explanation of this statement in chapter 3.2.1; exception 2012). For SHPPs – up to 10 MWh – there are roughly 900 locations, with a possible production of 1.800 GWh per year.[121] Presently there is an installed SHP capacity of 50 MW and the total potential is around 409 MW. By using the total energy potential of SHP it is possible to meet 4.7% of total power production and 15% of power from HPP. Serbia has a cadaster (dating from 1987) of possible HPPs, and constructions outside of the cadaster need the consent of different local political authorities (see as well the figure 30 below (map showing the total installed capacity of SHPPs in Serbia; figure 10 below)).[122]

Table 30: Power production 2009 - 2012: Serbia (own evaluation) [123]

Serbia / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	26 902	70.20%	Share of RES	25 094	65.86%	Share of RES	28 785	74.57%	Share of RES	26 334	71.58%	Share of RES
Oil	103	0.27%		111	0.29%		71	0.18%		67	0.18%	
Gas	173	0.45%		327	0.86%		501	1.30%		477	1.30%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	11 144	29.08%	100.00%	12 571	32.99%	100.00%	9 243	23.95%	100.00%	9 914	26.95%	100.00%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	38 322	100.00%	100.00%	38 103	100.00%	100.00%	38 600	100.00%	100.00%	36 792	100.00%	100.00%
Share of RES	11 144	29.08%		12 571	32.99%		9 243	23.95%		9 914	26.95%	
Imports	5 184		DS/TP	5 620		DS/TP	6 701		DS/TP	5 781		DS/TP
Exports	-6 609		TP/DS	-5 917		TP/DS	-6 979		TP/DS	-5 392		TP/DS
Domestic Supply	36 897	ktoe	96.28%	37 806	ktoe	99.22%	38 322	ktoe	99.28%	37 181	ktoe	101.06%
Total Production	38 322	3 295	103.86%	38 103	3 276	100.79%	38 600	3 319	100.73%	36 792	3 164	98.95%
Share of RES	11 144	958		12 571	1 081		9 243	795		9 914	852	
Domestic Supply	36 897	3 173		37 806	3 251		38 322	3 295		37 181	3 197	

[121] http://www.enercee.net/countries/country-selection/serbia.html

[122] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Serbia.pdf

[123] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

Summary and Outlook for Serbia:

According to IRENA[124] the following calculations have given these results:

In 2009 SHPs have generated power of 42 GWh per year (total installed capacity of 5 MW) and the expectation for 2020 is 600 GWh per year (total installed capacity of 68 MW). Equivalent for LHP for 2009: (10,234 GWh; 1,168 MW) and for 2020: 10,815 GWh; 1,235 MW) which makes the total for 2009 (10,276 GWh; 1,173 MW) and for 2020 (11,415 GWh; 1,303 MW). ENERCE reports on the other hand of an energy production possibility of 1,800 GWh/year for SHPPs.

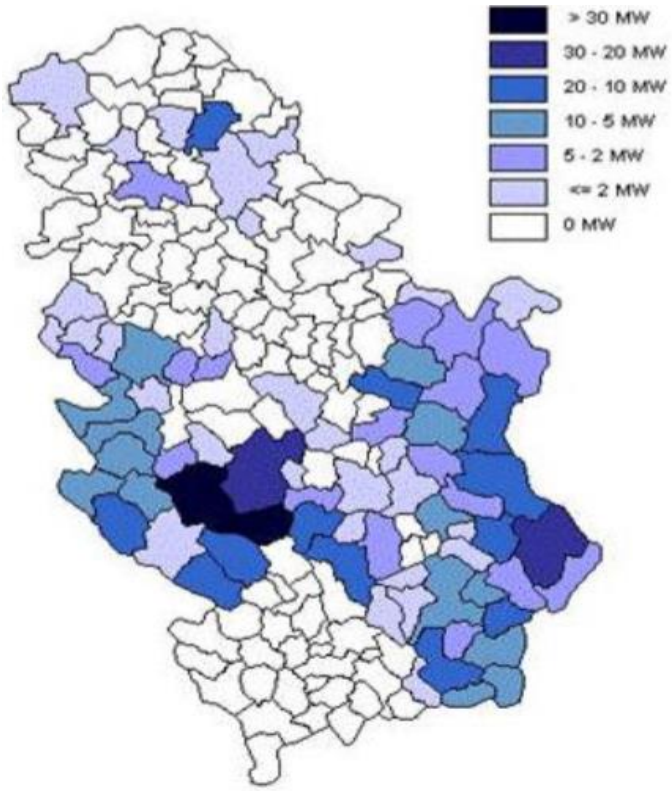

Figure 10: Map showing the total installed capacity of SHPPs in Serbia[125]

[124] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

[125] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Serbia.pdf

3.2.7 Slovenia

The total installed HP capacity is 1.5 GW in Slovenia.[126] 2010 SHPPs had a total installed capacity of 217 MW (465 GWh) and by 2020 568 plants shall be built with a total installed capacity of 192 MW (758 GWh).[127]

Thanks to the nuclear pp, Slovenia is a net exporter of power (TP/DS; see explanation of this statement in chapter 3.2.1, see table 31 below). As already discussed in the chapter of Croatia, their import might be the result of export from the joint nuclear pp in Krsko (the export figures of Slovenia and the import figures of Croatia match in 2009 and 2010).

Table 31: Power production 2009 - 2012: Slovenia (own evaluation) [128]

Slovenia / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	5 132	31.29%	Share of RES	5 288	32.18%	Share of RES	5 307	33.05%	Share of RES	5 145	32.71%	Share of RES
Oil	28	0.17%		8	0.05%		16	0.10%		9	0.06%	
Gas	593	3.62%		548	3.33%		489	3.05%		531	3.38%	
Biofuels	188	1.15%		217	1.32%		254	1.58%		267	1.70%	
Waste	4	0.02%		5	0.03%		8	0.05%		6	0.04%	
Nuclear	5 739	34.99%		5 657	34.42%		6 215	38.71%		5 528	35.15%	
Hydro (incl. Production from pump storage)	**4 713**	**28.74%**	**99.92%**	**4 697**	**28.58%**	**99.72%**	**3 703**	**23.06%**	**98.27%**	**4 080**	**25.94%**	**96.16%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	4	0.02%	0.08%	13	0.08%	0.28%	65	0.40%	1.73%	163	1.04%	3.84%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**16 401**	**100.00%**	**100.00%**	**16 433**	**100.00%**	**100.00%**	**16 057**	**100.00%**	**100.00%**	**15 729**	**100.00%**	**100.00%**
Share of RES	**4 717**	**28.76%**		**4 710**	**28.66%**		**3 768**	**23.47%**		**4 243**	**26.98%**	
Imports	7 780		DS/TP	8 625		DS/TP	7 036		DS/TP	7 452		DS/TP
Exports	-10 839		TP/DS	-10 717		TP/DS	-8 298		TP/DS	-8 363		TP/DS
Domestic Supply	**13 342**	**ktoe**	**81.35%**	**14 341**	**ktoe**	**87.27%**	**14 795**	**ktoe**	**92.14%**	**14 818**	**ktoe**	**94.21%**
Total Production	**16 401**	**1 410**	**122.93%**	**16 433**	**1 413**	**114.59%**	**16 057**	**1 381**	**108.53%**	**15 729**	**1 352**	**106.15%**
Share of RES	**4 717**	**406**		**4 710**	**405**		**3 768**	**324**		**4 243**	**365**	
Domestic Supply	**13 342**	**1 147**		**14 341**	**1 233**		**14 795**	**1 272**		**14 818**	**1 274**	

Summary and Outlook for Slovenia:

According to IRENA[129] the following calculations have given these results:

[126] http://www.enercee.net/countries/country-selection/slovenia.html

[127] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Slovenia.pdf

[128] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

[129] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

In 2009 SHPs have generated power of 454 GWh per year (total installed capacity of 52 MW) and the expectation for 2020 is 540 GWh per year (total installed capacity of 62 MW). Equivalent for LHP for 2009: (3,744 GWh; 427 MW) and for 2020: 4,581 GWh; 523 MW) which makes the total for 2009 (4,198 GWh; 479 MW) and for 2020 (5,121 GWh; 585 MW).

3.2.8 Conclusion and summary of former Yugoslavia

Three of seven successor states are net exporters of power. Yugoslavia in total would be a net importer of power (visible in the table 32 below). The power consumption was slightly covered in 2009 and 2010. 2011 and 2012 there was a non-coverage of power production and consumption of approximately 10%.

Table 32: Power production 2009 - 2012: Sum of countries of former Yugoslavia (own evaluation) [130]

Former Yugoslavia / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	53 858	55.11%	Share of RES	52 767	51.62%	Share of RES	59 776	62.28%	Share of RES	55 536	60.23%	Share of RES
Oil	2 443	2.50%		810	0.79%		966	1.01%		788	0.85%	
Gas	3 044	3.11%		3 507	3.43%		3 748	3.90%		3 869	4.20%	
Biofuels	213	0.22%		250	0.24%		309	0.32%		361	0.39%	
Waste	4	0.00%		5	0.00%		8	0.01%		6	0.01%	
Nuclear	5 739	5.87%		5 657	5.53%		6 215	6.48%		5 528	6.00%	
Hydro (incl. Production from pump storage)	32 372	33.12%	99.82%	39 066	38.22%	99.61%	24 695	25.73%	98.93%	25 624	27.79%	98.11%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	4	0.00%	0.01%	13	0.01%	0.03%	65	0.07%	0.26%	165	0.18%	0.63%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	54	0.06%	0.17%	140	0.14%	0.36%	201	0.21%	0.81%	329	0.36%	1.26%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	97 731	100.00%	100.00%	102 215	100.00%	100.00%	95 983	100.00%	100.00%	92 206	100.00%	100.00%
Share of RES	32 430	33.18%		39 219	38.37%		24 961	26.01%		26 118	28.33%	
Imports	31 176		DS/TP	32 707		DS/TP	39 770		DS/TP	37 842		DS/TP
Exports	-29 981		TP/DS	-32 272		TP/DS	-30 446		TP/DS	-26 744		TP/DS
Domestic Supply	98 926	ktoe	101.22%	102 650	ktoe	100.43%	105 307	ktoe	109.71%	103 304	ktoe	112.04%
Total Production	97 731	8 403	98.79%	102 215	8 789	99.58%	95 983	8 253	91.15%	92 206	7 928	89.26%
Share of RES	32 430	2 788		39 219	3 372		24 961	2 146		26 118	2 246	
Domestic Supply	98 926	8 506		102 650	8 826		105 307	9 055		103 304	8 883	

Using the investment/deployment cost numbers – researched from European Small Hydropower Association (ESHA) – for LHPPs and SHPPs in EU area as EUR 800 - 2,700 per kW (LHPP) and EUR 875 – 4,900 (SHPP),[131] the following results are observable in the table 33 below (calculation as difference of installed capacity of

[130] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[131] https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Hydropower.pdf

2020 minus assumed already invested capacity in 2015 (in the table 34 below), multiplied with deployment cost per kW) *[but calculation with other figures mentioned in chapter 2, 3.1. and 3.2. would lead to deviations. But for purpose of orientation only figures mentioned in chapter 3.2 are used for market calculation]:*

Table 33: Deployment costs estimated for different types of HPPs in Europe[132]

Deployment costs estimated for different types of HPP in Europe		
Type of costs	**LHPP**	**SHPP**
Investment cost (EUR/kW)	730 - 2550	1310 - 5330
Investment cost (EUR/kW)	8 002 700	875 - 4900
LCOE (EUR/MWh)	29 - 58	22 - 80
LCOE EU(EUR/MWh)	51 - 140	66 - 220
Assuming 105 cost of capital and annual O&M costs of 2% of the investment cost		
Original figures in USD(2011) converted to EUR(2012)		

According to analyzed figures in submitted NREAPs (chapter 3.2), the value of the SHPP market in countries of former Yugoslavia is considered of additional investments of 308 MW until 2020 (LHPP 1 GW) in order to reach the binding EU energy target (table 34 below).

The investment volume of SHPP is between EUR 270 million and EUR 1.5 billion and the investment volume of LHPP is between EUR 848 million and EUR 2.86 billion (plus still not published market NREAP figures for Bosnia and Herzegovina and Macedonia).

The investment potential in all countries of former Yugoslavia is enormous when considering and analyzing the technical and/or economical feasible potential (out of written down investments in NREAPs as defined strategy to reach the binding 2020 energy target).

Taking into consideration other figures from other sources it seems that the potential (S)HP market in former Yugoslavia is even higher (see chapter 2 and 3) than calculated from submitted NREAPs, which depends as well on the social and economic development and sensitivity of environment protection of the region.

[132] https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Hydropower.pdf

Table 34: (Small) HP investment potential in countries of former Yugoslavia until 2020 (own calculation)[133]

Country	Capacity	Diff 2020/2015	Minimum	Maximum
Bosnia and Herzegovina	No NREAP			
Croatia	< 1 MW	0	0	0
	1 MW - 10 MW	41	35 875 000	200 900 000
	> 10 MW	248	198 320 000	669 330 000
	∑ SHPP	**41**	**35 875 000**	**200 900 000**
Kosovo	< 1 MW	7	6 125 000	34 300 000
	1 MW - 10 MW	50	43 750 000	245 000 000
	> 10 MW	305	244 000 000	823 500 000
	∑ SHPP	**57**	**49 875 000**	**279 300 000**
Macedonia	No NREAP			
Montenegro	< 1 MW	7	5 862 500	32 830 000
	1 MW - 10 MW	57	50 137 500	280 770 000
	> 10 MW	102	81 200 000	274 050 000
	∑ SHPP	**64**	**56 000 000**	**313 600 000**
Serbia	< 1 MW	130	113 750 000	637 000 000
	1 MW - 10 MW	11	9 625 000	53 900 000
	> 10 MW	250	200 000 000	675 000 000
	∑ SHPP	**141**	**123 375 000**	**690 900 000**
Slovenia	< 1 MW	0	0	0
	1 MW - 10 MW	5	4 375 000	24 500 000
	> 10 MW	155	124 000 000	418 500 000
	∑ SHPP	**5**	**4 375 000**	**24 500 000**
∑ of former Yugoslavia	**∑ LHPP**	1 059	847 520 000	2 860 380 000
	∑ SHPP	**308**	**269 500 000**	**1 509 200 000**

3.3 (Small) hydropower potential in Energy Community and Balkan (SEE) countries (without countries of former Yugoslavia)

According to the table 35 below (analysis of different NREAPs of countries of above mentioned SEE and ECM countries), the evaluated investments into SHPPs (SHPPs < 1 MW and SHPPs of 1 MW – 10 MW) should reach without the countries Albania and Georgia (Albania as member of ECM did not submit her NREAP and Georgia is not obliged to submit any commitments to ECM office in Vienna due to its candidate status) a total investment of approximately 204 MW total installed capacity (490 GWh) and a total including LHPPs of 2,200 MW total installed capacity (3,482 GWh).

[133] See results for different countries multiplied with values from https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Hydropower.pdf

Table 35: Estimation of total contribution (installed capacity, gross electricity generation) expected from hydropower to meet the binding 2020 targets for Energy Community and Balkan (SEE) countries (excluding former Yugoslavian countries) (own analysis)[134]

Estimation of total contribution (installed capacity, gross electricity generation) expected from Hydropower to meet the binding 2020 targets										
Albania	NREAP still pending									
Bulgaria	base year 2010		estimation 2015		forecast 2020		Difference 2020/2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	2 115	3 223	2 230	3 418	2 424	3 712	309	489	194	294
< 1 MW	49	127	48	125	50	130	1	3	2	5
1 MW - 10 MW	214	503	250	588	272	639	58	136	22	51
> 10 MW	1 852	2 593	1 932	2 705	2 102	2 943	250	350	170	238
of which pumping	864	0	864	0	864	0	0	0	0	0
Total (incl. other RES)	**3 324**	**3 840**	**4 766**	**6 856**	**5 189**	**7 604**	**1 865**	**3 764**	**423**	**748**
Georgia	no NREAP (observer status for joining Energy Community									
Greece	base year 2010		estimation 2015		forecast 2020		Difference 2020/2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	3 237	4 588	3 615	5 684	4 531	6 576	1 294	1 988	916	892
< 1 MW	29	112	34	131	39	150	10	38	5	19
1 MW - 10 MW	154	193	185	713	216	833	62	640	31	120
> 10 MW	3 054	4 283	3 396	4 840	4 276	5 593	1 222	1 310	880	753
of which pumping	700	776	700	774	1 580	1 703	880	927	880	929
Total (incl. other RES)	**4 107**	**7 838**	**8 658**	**16 967**	**13 271**	**27 269**	**9 164**	**19 431**	**4 613**	**10 302**
Moldova	base year 2009		estimation 2015		forecast 2020		Difference 2020/2009		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	16	81			16	81	0	0	16	81
< 1 MW										
1 MW - 10 MW										
> 10 MW	16	81	16	81	16	81	0	0	0	0
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)	**18**	**86**			**175**	**484**	**157**	**398**	**175**	**484**
Romania	base year 2010		estimation 2015		forecast 2020		Difference 2020/2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	6 413	16 567	7 287	18 679	7 729	19 769	1 316	3 202	442	1 090
< 1 MW	63	95	90	135	109	164	46	69	19	29
1 MW - 10 MW	324	624	547	1 054	620	1 195	296	571	73	141
> 10 MW	6 026	15 848	6 650	17 490	7 000	18 410	974	2 562	350	920
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)										
Ukraine	base year 2009		estimation 2015		forecast 2020		Difference 2020/2009		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	4 549	11 430	4 898	12 215	5 350	13 340	801	1 910	452	1 125
< 1 MW	19	12	33	75	55	130	36	118	22	55
1 MW - 10 MW	30	18	65	140	95	210	65	192	30	70
> 10 MW	4 500	11 400	4 800	12 000	5 200	13 000	700	1 600	400	1 000
of which pumping	0	0	0	0	0	0	0	0	0	0
Total (incl. other RES)	**4 625**	**11 471**	**6 394**	**14 805**	**10 900**	**26 000**	**6 275**	**14 529**	**4 506**	**11 195**
SUM of Hydropower (BG, GR, MD, RO, UA excluding AL and GE)										
	base year 2009 or 2010		estimation 2015		forecast 2020		Diff. 2020/2009 or 2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	16 330	35 889	18 030	39 996	20 050	43 478	3 720	7 589	2 020	3 482
< 1 MW	160	346	205	466	253	574	93	228	48	108
1 MW - 10 MW	722	1 338	1 047	2 495	1 203	2 877	481	1 539	156	382
> 10 MW	15 448	34 205	16 794	37 116	18 594	40 027	3 146	5 822	1 800	2 911
of which pumping	1 564	776	1 564	774	2 444	1 703	880	927	880	929
Total (incl. other RES)	**12 074**	**23 235**	**19 818**	**38 628**	**29 535**	**61 357**	**17 461**	**38 122**	**9 717**	**22 729**

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http://pvtrin.eu/assets/media/PDF/EU_POLICIES/National%20Renewable%20Energy%20Action%20Plan/203.pdf http://www.ypeka.gr/LinkClick.aspx?fileticket=CEYdUkQ719k%3D&… https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3044025/Final_NREAP_EN_Dec_2013.pdf http://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_romania_en.pdf https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3430146/Ukraine_NREAP_adopted_1Oct2014_ENG.pdf

As total investments into RES a total installed capacity of 9,717 MW (22,729 GWh) is expected in the period 2015 – 2020. The SHP market in this region in total is only two-thirds of the former Yugoslavian SHP market (but the LHP market is 70% larger than in former Yugoslavia).

Analyzing different other sources, there is still a higher potential for (S)HPP-investments into said regions and, as already commented in previous chapters, figures and analyses of different sources do not always match, but provide a feeling for the HP potentials and investment possibilities.

Analyzing different other sources, there is still a higher potential for investments and according to RiverWatch, 570 HPPs (see as well chapter 3.4.6) are planned to be built in the SEE region within the next years (especially in Albania).[135]

3.3.1 Albania

Albania did not submit an NREAP by June 30th, 2013[136], which makes it very difficult to calculate the investment potential of SHPPs for this purpose. Based on the percentage of RES in electricity generation, Albania belongs to the leading countries in Europe (e.g. Norway has a higher share due to export activities of power), but basically 100% of RES (contribution of other RES is on a very low level) is considered as HP. Hydro facilities account for 87% of total generation capacity and up to 100% of power generated (see table 36 below). According to the World Energy Council Albania exploits only one-quarter of its total HP potential.[137]
It should really be discussed whether this kind of RES is really sustainable as Albania's "RES" electricity depends on rainy weather conditions (Zavalani & Spahiu, 2011), whose fluctuations we can see as well in the tables 36 and 37 below.
In principle Albania has to import (TP/DS; see explanation of this statement in chapter 3.2.1) power from neighbor countries with the exception in 2010 (most likely due to

[135] http://riverwatch.eu/balkan-rivers
[136] https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation/Albania/Renewable_Energy
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3712151/ECS-3_14-05-2015_Reasoned_Request_AL.pdf https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Dispute_Settlement/2014/03_07_14
[137] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

rainy weather conditions) when Albania was able to export 949 GWh of surplus power. The overall HP potential in Albania is estimated to be 17 TWh.[138]

Table 36: Power production 2009 - 2012: Albania (own evaluation) [139]

Albania / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES
Oil	6	0.12%		13	0.17%		27	0.65%		0	0.00%	
Gas	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	5 201	99.88%	100.00%	7 567	99.83%	100.00%	4 132	99.35%	100.00%	4 725	100.00%	100.00%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	5 207	100.00%	100.00%	7 580	100.00%	100.00%	4 159	100.00%	100.00%	4 725	100.00%	100.00%
Share of RES	5 201	99.88%		7 567	99.83%		4 132	99.35%		4 725	100.00%	
Imports	1 886		DS/TP	1 986		DS/TP	3 262		DS/TP	2 538		DS/TP
Exports	-487		TP/DS	-2 935		TP/DS	0		TP/DS	0		TP/DS
Domestic Supply	6 606	ktoe	126.87%	6 631	ktoe	87.48%	7 421	ktoe	178.43%	7 263	ktoe	153.71%
Total Production	5 207	448	78.82%	7 580	652	114.31%	4 159	358	56.04%	4 725	406	65.06%
Share of RES	5 201	447		7 567	651		4 132	355		4 725	406	
Domestic Supply	6 606	568		6 631	570		7 421	638		7 263	625	

It is indicated that there are around 90 SHPPs[140] in Albania and only 36 of them are in production due to age and no maintenance conditions. A very small number of SHPPs have been privatized (approximately 2 MW).[141] Around 40 SHPP-investment possibilities have been published with a technical feasible potential of 140 MW.[142]

Table 37: Albania: Total installed capacity and gross electricity generation 2013 and 2012[143]

Electricity generation	2013		2012	
	MW	GWh	MW	GWh
Hydro	1 672	6 959	1 628	4 725
non pumped				
< 1 MW	21	79	16	54
1 MW - 10 MW	171	683	159	464
> 10 MW	1 480	6 197	1 453	4 208

[138] http://aea-al.org/wp-content/uploads/2012/04/HYDRO-ENERGY-ALBANIA.pdf
[139] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22
[140] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[141] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Albania.pdf
[142] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[143] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3618157/CP_RES_Progress_Report_template_E-al-ok.pdf

The hydrographic territory of Albania has an area of 44,000 km^2 (more than 57% of the country's area). The total reserves of HP are about 4,500 MW with an annual production of 16-18 TWh (Çoku, M., 2008).

New projects under construction are: Ashta HPP (48 MW, Drin river; EUR 160 million), Kalivaci HPP (93 MW Vjosa river; EUR 120 million), Devolli River Cascade (3 HPPs in Devolli river (285 MW; EUR 930 million))[144] and for HPP Skavica (350 MW) financing is still missing and many other projects have been postponed due to the financial crisis (according to Austrian Trade Commissioner (e-mail June 22nd, 2015; Tirana@advantageaustria.org).

According to Leskoviku from the National Agency of Natural Resources, there are however only 31 SHPPs in operation (out of 90 SHPPs, 82 have a total installed capacity between 10 kW are 1 MW and the remaining SHPPs lie between 1 MW and 5 MW). The average age is approximately 25 years. At present there are already 50 contracts with a total installed capacity of generation of 170 MW signed (Leskoviku, 2015). Another source shows the capacity in table 37 above:

Mrs. Çoku from AKBN from National Agency of Natural Resources (AKBN) says that:

- 32 HPPs with installed capacity of 24.4 MW have passed the concession issue procedure;
- 16 HPPs with installed capacity of 2 MW are in private ownerships;
- 42 HPPs with installed capacity of 12.5 MW are owned by the state (Çoku, 2008).

In principle the SHPPs have been incorporated into the KESH before the year 2000. And in principle nearly all of them were in very poor conditions due to missing services and maintenances in the past and many of them even could not be upgraded. Due to that bad fact, the government has released 80 concession contracts for SHPPs (defined as up to 15 MW installed capacity) recently (estimated total installed capacity of 400 MW with a yearly estimated power generation of 1,827 GWh and estimated investment costs of EUR 289 million).[145]

The National Agency of Natural Resources monitors 101 concession contracts (276 HPPs with total installed capacity of 1,251 MW).

(*Remark: Difference to above table 37 "Total installed capacity and gross electricity generation 2013 and 2012" is visible.)*

Generally it is very difficult to get matching data (e.g. for an overview of HP in Albania "Water Power & Dam Construction Yearbook 2012" mentions only 3 HPPs, another technical literature "Hydropower and Dams in Europe" mentions only these HPPs

[144] https://www.energy-community.org/pls/portal/docs/794186.PDF
[145] http://www.icrepq.com/icrepq%2713/424-celo.pdf

mentioned in table below). Generally – this goes for the total master thesis –data might not always match.

Summary and Outlook of Albania:

According to IRENA the following calculations have given these results: [146]

In 2009 SHPs have generated power of 157 GWh per year (total installed capacity of 18 MW) and the expectation for 2020 is 1,980 GWh per year (total installed capacity of 226 MW). Equivalent for LHP for 2009: (3,877 GWh; 443 MW) and for 2020: 7,291 GWh; 832 MW) which makes the total for 2009 (4,034 GWh; 461 MW) and for 2020 (9,271 GWh; 1,058 MW). When comparing statistical data of the IEA, HP generation for 2009 shows a supply of 5,201 GWh (equivalent 2010: 7,567 GWh; 2011: 4,132 GWh and 2012: 4,725 GWh).

3.3.2 Bulgaria

Bulgaria is a good example within EU-28, which has already reached the EU target of 16% in 2012 and in 2013 by 19% of the total energy consumption generated from RES. Bulgaria is, together with Sweden and Estonia, within the successful energy club, who have succeeded the EU target in 2012[147] and moreover Bulgaria is a major exporter of electricity to Southeast Europe (Morales Pedraza, 2015 a).

Bulgaria is, together with France and the Czech Republic, one of the biggest net exporters of electricity in the EU. With an installed capacity of over 13 GW the country's power sector covers a substantial part of the energy deficit in the SEE region and eight out of the ten biggest Bulgarian companies operate in the energy sector, which represents 16-20% of GDP.[148]

Bulgaria was a booming renewable energy country and was stopped by the government in 2013 due to overwhelming investments[149]. High supports in FITs have led into a booming market for investors regardless of the existing lower network infrastructure[150] and generous 20-year FITs and purchase obligations increased the

[146] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[147] http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/3a8c018d-3d9f-4f1d-95ad-832ed3a20a6b
[148] http://www.energypost.eu/how-to-turn-bulgaria-into-eastern-europes-energy-hub-and-gateway/
[149] Email Austrian Trade Commissioner Sofia@advantageaustria.org
[150] http://www.climatenewsnetwork.net/bulgarias-micro-hydro-power-surge/

wind capacity from 177 MW in 2009 to 500 MW in 2010, in solar capacity from 6 MW in 2009 to 212 MW in 2011 and more than 1 GW in 2013.[151]

Table 38: Power production 2009 - 2012: Bulgaria (own evaluation) [152]

Bulgaria / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	21 103	49.12%	Share of RES	22 606	48.46%	Share of RES	27 537	54.21%	Share of RES	22 876	48.33%	Share of RES
Oil	328	0.76%		393	0.84%		137	0.27%		220	0.46%	
Gas	1 961	4.56%		1 966	4.21%		2 077	4.09%		2 356	4.98%	
Biofuels	8	0.02%		36	0.08%		56	0.11%		66	0.14%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	15 256	35.51%		15 249	32.69%		16 314	32.12%		15 785	33.35%	
Hydro (incl. Production from pump storage)	4 053	9.43%	94.08%	5 693	12.20%	88.91%	3 691	7.27%	78.93%	3 976	8.40%	65.98%
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	3	0.01%	0.07%	15	0.03%	0.23%	101	0.20%	2.16%	814	1.72%	13.51%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	237	0.55%	5.50%	681	1.46%	10.64%	861	1.69%	18.41%	1 221	2.58%	20.26%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	15	0.03%	0.35%	14	0.03%	0.22%	23	0.05%	0.49%	15	0.03%	0.25%
Total Production	42 964	100.00%	100.00%	46 653	100.00%	100.00%	50 797	100.00%	100.00%	47 329	100.00%	100.00%
Share of RES	4 308	10.03%		6 403	13.72%		4 676	9.21%		6 026	12.73%	
Imports	2 662		DS/TP	1 167		DS/TP	1 449		DS/TP	2 353		DS/TP
Exports	-7 735		TP/DS	-9 613		TP/DS	-12 110		TP/DS	-10 661		TP/DS
Domestic Supply	37 891	ktoe	88.19%	38 207	ktoe	81.90%	40 136	ktoe	79.01%	39 021	ktoe	82.45%
Total Production	42 964	3 694	113.39%	46 653	4 011	122.11%	50 797	4 368	126.56%	47 329	4 070	121.29%
Share of RES	4 308	370		6 403	551		4 676	402		6 026	518	
Domestic Supply	37 891	3 258		38 207	3 285		40 136	3 451		39 021	3 355	

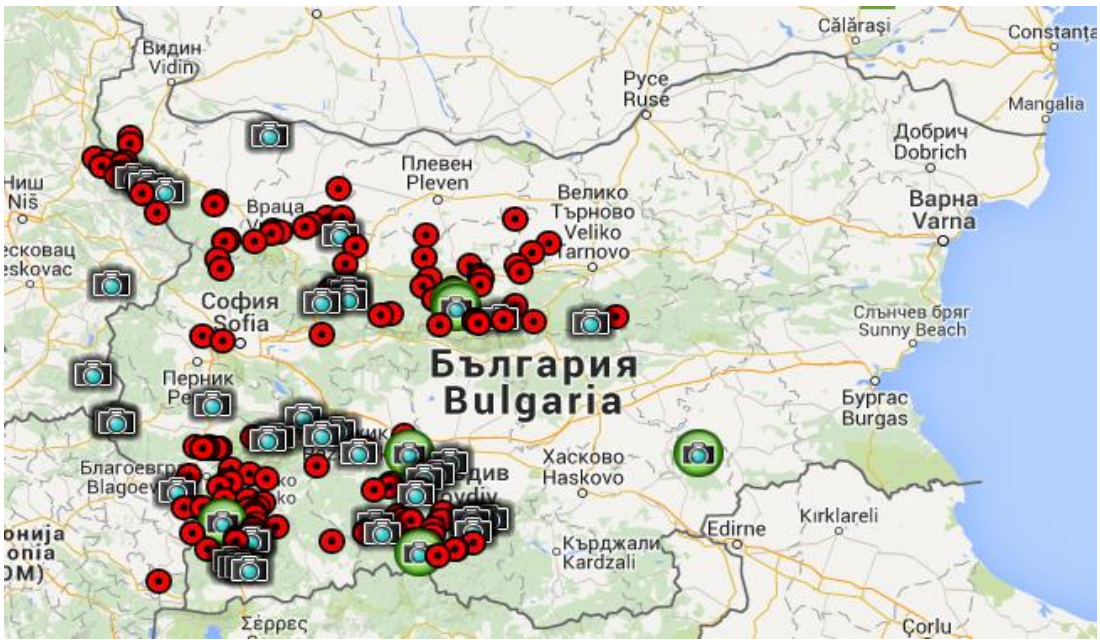

Figure 11: Map of current HPPs in Bulgaria[153]

[151] http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/bulgaria-removes-feed-tariffs-new-renewable-projects_31770.html

[152] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22

[153] http://dams.reki.bg/Dams/Map /

But many HPPs are built very controversially, without proper licenses and monitoring and threaten the environment (see 3.4.6). The boom has brought a species of investors who did not support the country for its development and have built plants without any overall energy plan (e.g. construction of HPPs within national parks).[154] This generous practice has led to € 1.65 billion deficit for Natsionalna Elektricheska Kompania (NEK).[155]

Table 39: Installed Generation Capacity of Power Plants using RES in Bulgaria (Rashev, 2014)

RES	Capacity in MW		more/less (MW)
	Installed Now	Target 2020	
Wind	690	1 440	750
Solar	1 041	303	-738
Biomass	22	158	136
HPP	2 213	2 424	211
SHPP	938	864	-74
∑total	4 904	5 189	285

On the other side the installed capacity of LHPPs is 2.02 GW with a production of 203 ktoe per year (figure 2011).[156]

The estimation of the HP potential is 26,500 GWh annually[157] and the installed HP makes 2,251 MW (compare as well other information in the above table 39) and represents 59.11% of the total renewables capacity in 2012 (Morales Pedraza, 2015 a).

According to RiverWatch the total number of HPPs shall be increased by investments (SHPPs < 10 MW: operating: 60, under implementation: 6, new planned: 39; LHPPs < 50 MW: operating: 14, under construction: 0 and new planned: 1; LHPPs > 50 MW: operating: 13, under construction: 1, planned: 5).[158] The main and most effective location for HPPs is the western half to middle of Bulgaria. There is an estimation of approximately 200 SHPs (without storage facilities) already in operation in Bulgaria and another 280 SHPs are in different stages of implementation (either construction has started or many others are still in the phase of finding financial supports; above figure 11).[159]

[154] http://www.climatenewsnetwork.net/bulgarias-micro-hydro-power-surge/
[155] http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/bulgaria-removes-feed-tariffs-new-renewable-projects_31770.html
[156] https://www.worldenergy.org/data/resources/country/bulgaria/hydropower/
[157] http://www.bulgar-invest.eu/eeqbulgarien/wasserkraft/index.html
[158] http://www.balkanrivers.net/sites/default/files/BG_CountrySpecial14%5Bsmallpdf.com%5D.pdf
[159] http://dams.reki.bg/Dams/List

In 2010, 136 SHPs were operating with a total installed capacity of 263 MW (630 GWh; compare table 39 above) and the technically and as well economically feasible potential is 755 MW (706 GWh) (Morales Pedraza, 2015).

3.3.3 Georgia

HP is the main power generator with a share of 75% (2012) up to 93% (2009). Furthermore, Georgia is a net exporter of power (TP/DS; see explanation of this statement in chapter 3.2.1, table 40).

Table 40: Power production 2009 - 2012: Georgia (own evaluation) [160]

Georgia / Production from	Electricity 2009			Electricity 2009			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES
Oil	39	0.46%		32	0.32%		7	0.07%		0	0.00%	
Gas	1 107	12.94%		725	7.16%		2 297	22.53%		2 472	25.50%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**7 412**	**86.61%**	**100.00%**	**9 367**	**92.52%**	**100.00%**	**7 890**	**77.40%**	**100.00%**	**7 223**	**74.50%**	**100.00%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**8 558**	**100.00%**	**100.00%**	**10 124**	**100.00%**	**100.00%**	**10 194**	**100.00%**	**100.00%**	**9 695**	**100.00%**	**100.00%**
Share of RES	**7 412**	**86.61%**		**9 367**	**92.52%**		**7 890**	**77.40%**		**7 223**	**74.50%**	
Imports	255		DS/TP	232		DS/TP	477		DS/TP	615		DS/TP
Exports	-740		TP/DS	-1 492		TP/DS	-930		TP/DS	-528		TP/DS
Domestic Supply	**8 073**	**ktoe**	**94.33%**	**8 864**	**ktoe**	**87.55%**	**9 741**	**ktoe**	**95.56%**	**9 782**	**ktoe**	**100.90%**
Total Production	**8 558**	**736**	**106.01%**	**10 124**	**871**	**114.21%**	**10 194**	**877**	**104.65%**	**9 695**	**834**	**99.11%**
Share of RES	**7 412**	**637**		**9 367**	**805**		**7 890**	**678**		**7 223**	**621**	
Domestic Supply	**8 073**	**694**		**8 864**	**762**		**9 741**	**838**		**9 782**	**841**	

Georgia belongs to the countries being at the top of water resources per capita and the current power production is covered only by 18% and has a largely unexploited HP potential.[161] Considering the HP operation generating 7,223 GWh (2012) per year as 18% there would be an economically viable power generation of 40,128 GWh per year (and oil and gas as energy carriers would be replaced immediately). Georgia could increase the power export to neighboring Turkey ((2011: TP: 229,393 GWh; DS: 230,304 GWh); (2012: TP: 239,496 GWh, DS: 242,369 GWh)). Neighboring Russia, Armenia and Azerbaijan are net power exporters. But the immense power

[160] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

[161] http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Tavdumadze_InvOp.pdf

potential of Georgia could replace gas and nuclear in Armenia and oil and gas as energy carrier in Azerbaijan. With both countries Georgia is politically in bad relationship and cooperation with Russia has a theoretical character due to unsolved political problems with occupying troops on the territory of Georgia.

Georgia – a country covering a territory of 69,700 km² and having 5 million inhabitants – is in fact a river country (26,000 rivers with a total river length of approximately 60,000 km. Approximately 360 rivers are designated for HP usage. The untapped SHP (definition of SHPP < 13 MW) potential is estimated at 5,000 GWh. LHPPs are defined as 5,217 MW total installed capacity (seasonal regulation dam/reservoir-type plants), 2,397 total installed capacity (run-of-river type) and SHPPs with a total installed capacity of 296 MW (and potential: 350 MW) are in operation (SHPPs (< 10 MW) in operation with 66.71 MW total installed capacity (and potential: 286 MW)).[162]

Other sources define the total HPP installed capacity as 3,500 MW (which is considered as available capacity) and with an annual output of 8.5 TWh. The technical potential capacity is estimated at 80 TWh and the economically viable capacity is considered as 27 TWh[163] or 40 TWh[164] Georgia has only 53 HPPs and 3 thermal pps currently. 45 HPPs are on-going projects with a total installed capacity of 2,213 MW (annual power generation up to 8.2 TWh) and shall be finished by 2020. Reported as potential projects are 67 LHPPs (< 100 MW) on prefeasibility level with financial and technical projections and 10 LHPPs (> 100 MW) on prefeasibility level.[165]

3.3.4 Greece

Greece is a net importer of power (TP/DS; see explanation of this statement in chapter 3.2.1, table 41 below) and usage of HP is on a low level (7% (2011) and 13% (2010)).

According to UNIDO and ICSHP Greece has 98 SHPPs with a total installed capacity of 196 MW (producing 753 GWh of power) in 2010. The total installed capacity of HPPs was 2,439 MW in 2010 (Morales Pedraza, 2015 a).

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162 http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Asia_Western/WSHPDR_2013_Georgia.pdf

163 http://bankwatch.org/our-work/projects/hydropower-development-georgia

164 http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Tavdumadze_InvOp.pdf

165 http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Tavdumadze_InvOp.pdf

The binding target for 2020 is having 175 SHPPs with a total installed capacity of 350 MW (1,148 GWh). The potential for SHPPs is considered with a total installed capacity of 2,000 MW.[166]

According to studies, Greece can produce hydroelectricity up to 21,000 GWh,[167] which would contribute to one-third of total power production (visible in the table 41 below). The low interest in using the potential of HP can be explained as the power production is not a priority for the national water management policy and most Greek HPPs are used mainly to meet the corresponding peak-load demand. (Morales Pedraza, 2015 a). According to RiverWatch, the total number of HPPs shall be increased by investments (SHPPs < 10 MW: operating: 6, under implementation: 0, new planned: 3; LHPPs < 50 MW: operating: 3, under construction: 0 and new planned: 1; LHPPs > 50 MW: operating: 6, under construction: 1, planned: 0).[168]

Table 41: Power production 2009 - 2012: Greece (own evaluation) [169]

Greece / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	34 188	55.71%	Share of RES	30 797	53.66%	Share of RES	31 063	52.26%	Share of RES	31 119	51.05%	Share of RES
Oil	7 679	12.51%		6 089	10.61%		5 915	9.95%		6 080	9.97%	
Gas	11 023	17.96%		9 830	17.13%		13 938	23.45%		13 361	21.92%	
Biofuels	218	0.36%		190	0.33%		207	0.35%		204	0.33%	
Waste	19	0.03%		129	0.22%		113	0.19%		60	0.10%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**5 645**	**9.20%**	**68.52%**	**7 485**	**13.04%**	**72.27%**	**4 275**	**7.19%**	**52.13%**	**4 591**	**7.53%**	**45.30%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	50	0.08%	0.61%	158	0.28%	1.53%	610	1.03%	7.44%	1 694	2.78%	16.71%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	2 543	4.14%	30.87%	2 714	4.73%	26.20%	3 315	5.58%	40.43%	3 850	6.32%	37.99%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**61 365**	**100.00%**	**100.00%**	**57 392**	**100.00%**	**100.00%**	**59 436**	**100.00%**	**100.00%**	**60 959**	**100.00%**	**100.00%**
Share of RES	**8 238**	**13.42%**		**10 357**	**18.05%**		**8 200**	**13.80%**		**10 135**	**16.63%**	
Imports	7 600		DS/TP	8 517		DS/TP	7 180		DS/TP	5 954		DS/TP
Exports	-3 233		TP/DS	-2 811		TP/DS	-3 948		TP/DS	-4 169		TP/DS
Domestic Supply	**65 732**	**ktoe**	**107.12%**	**63 098**	**ktoe**	**109.94%**	**62 668**	**ktoe**	**105.44%**	**62 744**	**ktoe**	**102.93%**
Total Production	**61 365**	**5 276**	**93.36%**	**57 392**	**4 935**	**90.96%**	**59 436**	**5 111**	**94.84%**	**60 959**	**5 242**	**97.16%**
Share of RES	**8 238**	**708**		**10 357**	**891**		**8 200**	**705**		**10 135**	**871**	
Domestic Supply	**65 732**	**5 652**		**63 098**	**5 425**		**62 668**	**5 388**		**62 744**	**5 395**	

166 http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Southern/WSHPDR_2013_Greece.pdf

167 http://www.argotrade.com/hydroelectric

168 http://www.balkanrivers.net/sites/default/files/GR_CountrySpecial14%5Bsmallpdf.com%5D.pdf

169 See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

3.3.5 Moldova

Moldova is a net exporter of power (TP/DS; see explanation of this statement in chapter 3.2.1, table 42) and the usage of HP is on a low level (5% (2012) and 7% (2010)).

Moldova is known for high energy intensity (3 times higher than in the EU)[170] and has only 2 LHPPs (Dubasari HPP (48 MW) and Cotesti HPP (16 MW)). The total installed capacity for SHPPs at present is 0.1 MW and the potential is 1.3 MW of installed capacity (SHPPs on the Dnistr and Prut).[171]

The theoretical potential of HP is 5,233 GWh, the technical potential is 3,489 GWh and the economically viable potential is 2,326 GWh.[172]

Table 42: Power production 2009 - 2012: Moldova (own evaluation) [173]

Moldova / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES	0	0.00%	Share of RES
Oil	48	0.77%		29	0.47%		20	0.35%		16	0.28%	
Gas	5 792	93.45%		5 677	92.87%		5 414	93.57%		5 517	95.09%	
Biofuels	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Hydro (incl. Production from pump storage)	**358**	**5.78%**	**100.00%**	**407**	**6.66%**	**100.00%**	**352**	**6.08%**	**100.00%**	**269**	**4.64%**	**100.00%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**6 198**	**100.00%**	**100.00%**	**6 113**	**100.00%**	**100.00%**	**5 786**	**100.00%**	**100.00%**	**5 802**	**100.00%**	**100.00%**
Share of RES	**358**	**5.78%**		**407**	**6.66%**		**352**	**6.08%**		**269**	**4.64%**	
Imports	1 464		DS/TP	1 464		DS/TP	666		DS/TP	846		DS/TP
Exports	0		TP/DS	0		TP/DS	0		TP/DS	0		TP/DS
Domestic Supply	**7 662**	**ktoe**	**123.62%**	**7 577**	**ktoe**	**123.95%**	**6 452**	**ktoe**	**111.51%**	**6 648**	**ktoe**	**114.58%**
Total Production	**6 198**	**533**	**80.89%**	**6 113**	**526**	**80.68%**	**5 786**	**498**	**89.68%**	**5 802**	**499**	**87.27%**
Share of RES	**358**	**31**		**407**	**35**		**352**	**30**		**269**	**23**	
Domestic Supply	**7 662**	**659**		**7 577**	**652**		**6 452**	**555**		**6 648**	**572**	

[170] http://aerapa.conference.ubbcluj.ro/2011/PDF/dianabraga.pdf

[171] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Eastern/WSHPDR_2013_Moldova.pdf

[172] http://www.ost-ausschuss.de/sites/default/files/pm_pdf/ConsultGroup.pdf

[173] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

3.3.6 Romania

Romania is in principle a net power exporter (TP/DS; see explanation of this statement in chapter 3.2.1, table 43) and the share of HP of power generation is between 21% (2012) and 27% (2009).

Table 43: Power production 2009 - 2012: Romania (own evaluation) [174]

Romania / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	21 773	37.53%	Share of RES	20 742	34.01%	Share of RES	24 803	39.87%	Share of RES	22 912	38.80%	Share of RES
Oil	1 031	1.78%		692	1.13%		769	1.24%		751	1.27%	
Gas	7 632	13.16%		7 262	11.91%		8 365	13.44%		8 719	14.77%	
Biofuels	10	0.02%		111	0.18%		198	0.32%		212	0.36%	
Waste	0	0.00%		0	0.00%		0	0.00%		0	0.00%	
Nuclear	11 752	20.26%		11 623	19.06%		11 747	18.88%		11 466	19.42%	
Hydro (incl. Production from pump storage)	**15 807**	**27.25%**	**99.94%**	**20 243**	**33.20%**	**98.51%**	**14 946**	**24.02%**	**91.50%**	**12 337**	**20.89%**	**82.33%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	0	0.00%	0.00%	1	0.00%	0.01%	8	0.01%	0.05%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	9	0.02%	0.06%	306	0.50%	1.49%	1 388	2.23%	8.50%	2 640	4.47%	17.62%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**58 014**	**100.00%**	**100.00%**	**60 979**	**100.00%**	**100.00%**	**62 217**	**100.00%**	**100.00%**	**59 045**	**100.00%**	**100.00%**
Share of RES	**15 816**	**27.26%**		**20 549**	**33.70%**		**16 335**	**26.25%**		**14 985**	**25.38%**	
Imports	651		DS/TP	767		DS/TP	3 410		DS/TP	3 903		DS/TP
Exports	-2 946		TP/DS	-3 041		TP/DS	-5 316		TP/DS	-3 650		TP/DS
Domestic Supply	**55 719**	**ktoe**	**96.04%**	**58 705**	**ktoe**	**96.27%**	**60 311**	**ktoe**	**96.94%**	**59 298**	**ktoe**	**100.43%**
Total Production	**58 014**	**4 988**	**104.12%**	**60 979**	**5 243**	**103.87%**	**62 217**	**5 350**	**103.16%**	**59 045**	**5 077**	**99.57%**
Share of RES	**15 816**	**1 360**		**20 549**	**1 767**		**16 335**	**1 405**		**14 985**	**1 288**	
Domestic Supply	**55 719**	**4 791**		**58 705**	**5 048**		**60 311**	**5 186**		**59 298**	**5 099**	

Romania has reached the share on RES of 21.4% (2011) and the target for 2020 is a quota of 24% for RES of final consumption of electricity. Romania forecasts as well a quota of 35% (2012: approximately 25% and 2013: approximately 35% already reached) by 2015 and 38% by 2020 for RES generating electricity.[175]

The installed capacity of HP is reported to be approximately 7,000 MW (according to the NREAP 7,287 MW generating 18,679 GWh) and represents approximately one third of the total electricity capacity installed in the meantime.[176]

The HP potential in Romania is 40 TWh/year (large plants) and 6 TWh (SHP) and only half of the potential is used.

[174] See explanation of source in 3.1. Overview of energy related data (table 8), pages 21-22
[175] http://www.pachiu.com/wp-content/uploads/2014/05/Electricity_2014.pdf
[176] http://de.slideshare.net/mrshansen/hydropower-in-romania

In Romania there are approximately 274 SHP plants with a total installed capacity of 387 MW generating 719 GWh per year. In 2020, 550 SHPPs should generate 1,360 GWh per year with a total installed capacity of 730 MW.[177]

Hidroelectrica is the state-owned hydro company and therefore the main player with 150 SHPPs of its own. Started during the communist time, the construction of the Tarnita-Lapustesti HP station in Cluj county should be finished by the end of 2020.[178] This power station has been completed in the meantime and has a capacity of 1,000 MW and will replace the Lotru-Ciunget HPP with an installed generation capacity of 510 MW (Morales Pedraza, 2015 a).

In 2013 less energy was generated in comparison with 2012 (decrease of 1.6% of the total annual electricity generated). The first 6 producers represent a market share of approximately 85.93%. In 2013 the export of electricity was approximately 2,466 GWh (compared to an import of 450 GWh; decreased by 68.9% in comparison with 2012), which is 114.7% higher than in 2012 (National report 2013, 2014).

The total installed electricity capacity in Romania is approximately 21,770 MW (2013)[179], HP (767 HPPs: 621 of them are SHPs with a total installed capacity of 1,125 MW, LHPPs have 5,550 MW) even 6,715 MW (with an estimated additional potential of 9 GW and theoretical HP potential of 70 billion kWh).[180]

The Iron Gate HPP on the Danube river is a joint-HPP together with Serbia and belongs to the largest HPPs in Europe with a generation capacity of 2,216 MW.

The energy strategy of Romania for the period 2007 to 2020 shows the main investments into

- Upgrading of HPPs with an installed power of approximately 2,328 MW;
- In process projects for HPs with an installed power of 759 MW;
- New projects for HPs with an installed power of 209 MW;
- Establishment of HPs of Hidroelectrica with an installed power of 30 MW on Tisa River;
- Establishment of pumped storage HPP Tarnita with a total installed capacity of 1,000 MW;
- Generation of hydro shall reach 20 TWh in 2020.[181]

177 http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Eastern/WSHPDR_2013_Romania.pdf

178 http://govnet.ro/Energy/Economics/The-running-gold-Romania-hydropower-sector

179 http://www.indexmundi.com/romania/electricity_installed_generating_capacity.html

180 http://de.slideshare.net/mrshansen/hydropower-in-romania

181 http://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_romania_en.pdf

3.3.7 Ukraine

Ukraine has around 63,000 small rivers with a total length of 136,000 km and is a net exporter of power (TP/DS; see explanation of this statement in chapter 3.2.1, see as well table 44 below) to Russia, Belarus, Moldova, Hungary, Slovakia and Romania (mainly of fossil fuel and nuclear power). The total installed HP capacity is 4,700 MW (8 LHPPs on Dnipr River with a total installed capacity of 3,907 MW, 1 LHPP on Dnistr River with a total installed capacity of 700 MW). The economically viable potential is 16,300 GWh. In 2011 around 64 SHPPs (< 10 MW) were operating with 104 MW total installed capacity (250 GWh/year) and another 100 LHPPs should be restored. The potential for SHPPs is approximately 2,900 GWh/year. The main potential of construction is the developments of SHPPs on Tissa river.[182]

Table 44: Power production 2009 - 2012: Ukraine (own evaluation) [183]

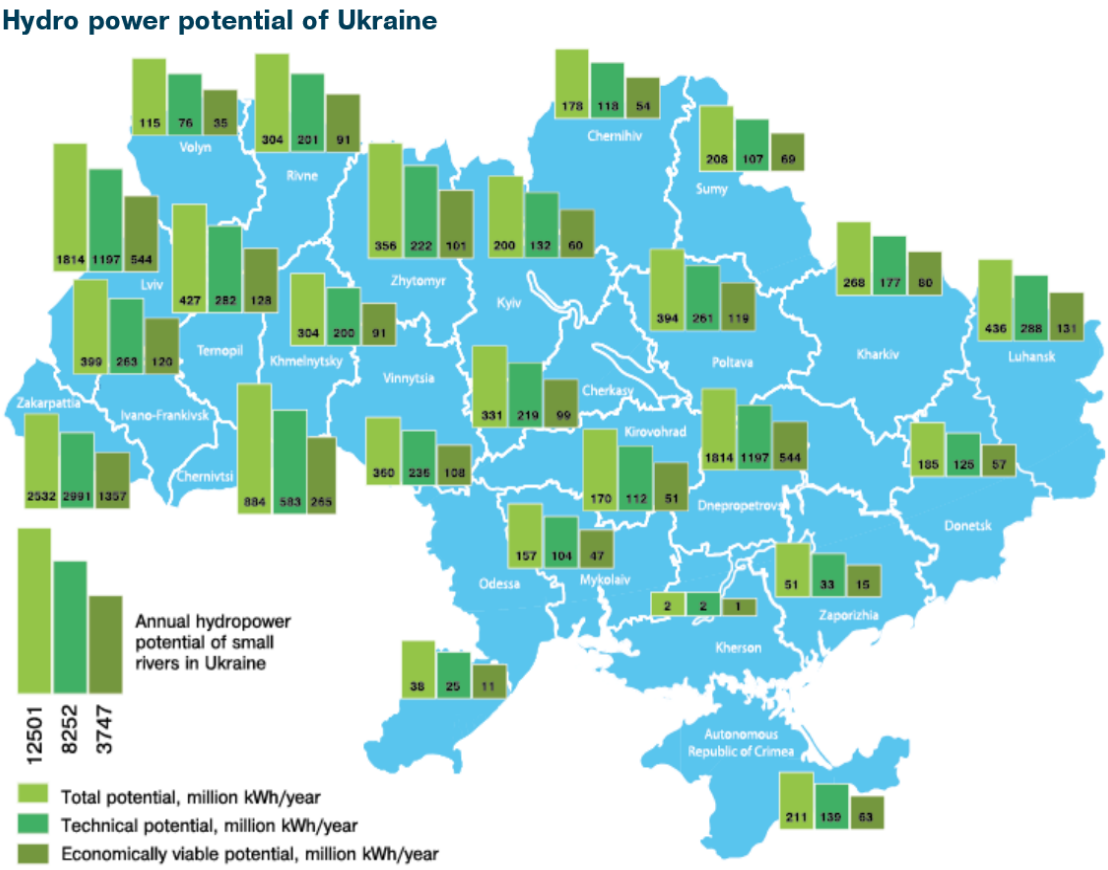
Ukraine / Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	65 195	64.27%	Share of RES	69 516	36.86%	Share of RES	74 494	38.21%	Share of RES	80 418	40.44%	Share of RES
Oil	1 031	1.02%		822	0.44%		555	0.28%		535	0.27%	
Gas	7 632	7.52%		15 703	8.33%		18 451	9.46%		16 039	8.06%	
Biofuels	10	0.01%		188	0.10%		134	0.07%		134	0.07%	
Waste	0	0.00%		0	0.00%		8	0.00%		0	0.00%	
Nuclear	11 752	11.59%		89 152	47.27%		90 248	46.29%		90 137	45.32%	
Hydro (incl. Production from pump storage)	**15 807**	**15.58%**	**99.94%**	**13 152**	**6.97%**	**99.61%**	**10 946**	**5.61%**	**98.92%**	**10 994**	**5.53%**	**94.65%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	0	0.00%	0.00%	1	0.00%	0.01%	30	0.02%	0.27%	333	0.17%	2.87%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	9	0.01%	0.06%	50	0.03%	0.38%	89	0.05%	0.80%	288	0.14%	2.48%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Total Production	**101 436**	**100.00%**	100.00%	**188 584**	**100.00%**	100.00%	**194 955**	**100.00%**	100.00%	**198 878**	**100.00%**	100.00%
Share of RES	**15 816**	**15.59%**		**13 203**	**7.00%**		**11 065**	**5.68%**		**11 615**	**5.84%**	
Imports	651		DS/TP	23		DS/TP	32		DS/TP	89		DS/TP
Exports	-2 946		TP/DS	-4 078		TP/DS	-6 322		TP/DS	-11 561		TP/DS
Domestic Supply	**99 141**	**ktoe**	97.74%	**184 529**	**ktoe**	97.85%	**188 665**	**ktoe**	96.77%	**187 406**	**ktoe**	94.23%
Total Production	**101 436**	**8 722**	102.31%	**188 584**	**16 215**	102.20%	**194 955**	**16 763**	103.33%	**198 878**	**17 100**	106.12%
Share of RES	**15 816**	**1 360**		**13 203**	**1 135**		**11 065**	**951**		**11 615**	**999**	
Domestic Supply	**99 141**	**8 525**		**184 529**	**15 867**		**188 665**	**16 222**		**187 406**	**16 114**	

Another source reports of SHPPs as a total installed capacity of 71 MW with a share of 2% (2011) of power production of the total production of power by HPPs. SHPPs in Ukraine are gradually being bought out to larger companies (e.g. Novosvit operates 14 SHPPs) and another 30 companies invest into SHPPs in Vinnytsia, Cherkasy, Khmelnytsky, Ternopil and Zhytomyr regions (64% of all HPPs are located in these regions, but the technical hydro potential there is only 14% of Ukraine country potential).[184] See as well overview of HP potential of Ukraine in figure 12 below.

182
http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Eastern/WSHPDR_2013_Ukraine.pdf

183 See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

184 http://investukraine.com/wp-content/uploads/2012/06/Renewable-energy-in-Ukraine_230_230_WWW.pdf
http://www.fni.no/doc&pdf/FNI-R1211.pdf



Source: Atlas of Renewable Energy Sources Potential of Ukraine. Institute of Electodynamics of National Academy of Sciences of Ukraine with support of State Committee for Energy Conservation of Ukraine

Figure 12: HP potential of Ukraine[185]

3.3.8 Conclusion and summary of SEE countries (excluding countries of former Yugoslavia) and Energy Community countries

Only Albania, Greece and Moldova are net power importers. All countries added together (including BG, GE, RO and UA) would be a net power exporter (TP/DS).

Using the same investment/deployment cost figures as descripted in chapter 3.2.8 we come to following results (below table 45):

[185] http://investukraine.com/wp-content/uploads/2012/06/Renewable-energy-in-Ukraine_230_230_WWW.pdf
http://www.fni.no/doc&pdf/FNI-R1211.pdf

Table 45: Power production 2009 - 2012: Sum of other SEE and ECM countries excluding countries of former Yugoslavia (own evaluation) [186]

Other Balkan countries including Energy Community countries/ Production from	Electricity 2009			Electricity 2010			Electricity 2011			Electricity 2012		
	GWh	%	%	GWh	%	%	GWh	%	%	GWh	%	%
Coal	142 259	50.14%	Share of RES	143 661	38.06%	Share of RES	157 897	40.74%	Share of RES	157 325	40.71%	Share of RES
Oil	10 162	3.58%		8 070	2.14%		7 430	1.92%		7 602	1.97%	
Gas	35 147	12.39%		41 163	10.91%		50 542	13.04%		48 464	12.54%	
Biofuels	246	0.09%		525	0.14%		595	0.15%		616	0.16%	
Waste	19	0.01%		129	0.03%		121	0.03%		60	0.02%	
Nuclear	38 760	13.66%		116 024	30.74%		118 309	30.53%		117 388	30.38%	
Hydro (incl. Production from pump storage)	**54 283**	**19.13%**	**94.99%**	**63 914**	**16.93%**	**94.19%**	**46 232**	**11.93%**	**87.81%**	**44 115**	**11.42%**	**80.24%**
Geothermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Solar PV	53	0.02%	0.09%	174	0.05%	0.26%	742	0.19%	1.41%	2 849	0.74%	5.18%
Solar Thermal	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Wind	2 798	0.99%	4.90%	3 751	0.99%	5.53%	5 653	1.46%	10.74%	7 999	2.07%	14.55%
Tide	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%	0	0.00%	0.00%
Other sources	15	0.01%	0.03%	14	0.00%	0.02%	23	0.01%	0.04%	15	0.00%	0.03%
Total Production	**283 742**	**100.00%**	**100.00%**	**377 425**	**100.00%**	**100.00%**	**387 544**	**100.00%**	**100.00%**	**386 433**	**100.00%**	**100.00%**
Share of RES	**57 149**	**20.14%**		**67 853**	**17.98%**		**52 650**	**13.59%**		**54 978**	**14.23%**	
Imports	15 169		DS/TP	14 156		DS/TP	16 476		DS/TP	16 298		DS/TP
Exports	-18 087		TP/DS	-23 970		TP/DS	-28 626		TP/DS	-30 569		TP/DS
Domestic Supply	**280 824**	**ktoe**	**98.97%**	**367 611**	**ktoe**	**97.40%**	**375 394**	**ktoe**	**96.86%**	**372 162**	**ktoe**	**96.31%**
Total Production	**283 742**	**24 397**	**101.04%**	**377 425**	**32 453**	**102.67%**	**387 544**	**33 323**	**103.24%**	**386 433**	**33 227**	**103.83%**
Share of RES	**57 149**	**4 914**		**67 853**	**5 834**		**52 650**	**4 527**		**54 978**	**4 727**	
Domestic Supply	**280 824**	**24 147**		**367 611**	**31 609**		**375 394**	**32 278**		**372 162**	**32 000**	

The SHPP market within the next five years has a volume of EUR 178 million to EUR 1 billion. Including LHPP the market makes a value of EUR 1.6 billion to EUR 5.9 billion, depending on the type of HPP investments.

For the purpose of risk evaluation, only the strategic numbers of NREAPs should be used for evaluation of the (S)HP market.

In reality the market has a higher volume as Albania and Georgia are not considered in this analysis and as the economically viable potential is still higher than forecasted investment plans of different countries in order to reach the binding 2020 energy target (see table 46 below).

[186] http://www.iea.org/statistics/statisticssearch/report/?country

Table 46: (Small) HP investment potential in Balkan and Energy Community Countries excluding countries of former Yugoslavia until 2020 (own calculation) [187]

Country	Capacity	Diff 2020/2015	Minimum	Maximum
Albania	No NREAP			
Bulgaria	< 1 MW	2	1 750 000	9 800 000
	1 MW - 10 MW	22	19 250 000	107 800 000
	> 10 MW	170	136 000 000	459 000 000
	∑ SHPP	**24**	**21 000 000**	**117 600 000**
Georgia	No NREAP			
Greece	< 1 MW	5	4 375 000	24 500 000
	1 MW - 10 MW	31	27 125 000	151 900 000
	> 10 MW	880	704 000 000	2 376 000 000
	∑ SHPP	**36**	**31 500 000**	**176 400 000**
Moldova	< 1 MW	0	0	0
	1 MW - 10 MW	0	0	0
	> 10 MW	0	0	0
	∑ SHPP	**0**	**0**	**0**
Romania	< 1 MW	19	16 625 000	93 100 000
	1 MW - 10 MW	73	63 875 000	357 700 000
	> 10 MW	350	280 000 000	945 000 000
	∑ SHPP	**92**	**80 500 000**	**450 800 000**
Ukraine	< 1 MW	22	19 250 000	107 800 000
	1 MW - 10 MW	30	26 250 000	147 000 000
	> 10 MW	400	320 000 000	1 080 000 000
	∑ SHPP	**52**	**45 500 000**	**254 800 000**
∑ Balkan (without former Yugoslavia) & Energy Community	**∑ LHPP**	1 800	1 440 000 000	4 860 000 000
	∑ SHPP	**204**	**178 500 000**	**999 600 000**

3.3.9 Conclusion and comparison with Austria and Germany

In comparison with countries of former Yugoslavia and the remaining SEE and ECM countries Austria & Germany (without Switzerland due to non-existing NREAP) together is the smallest – for further development – (S)HP market (as the HP market is already saturated). See table 47 below.

The area of former Yugoslavia – in terms of economic potential and number of inhabitants – in comparison with all other SEE and ECM countries (AL, BG, GE, MK, RO, UA) – is a huge SHP market, although the total HP market size is bigger in the rest of SEE and ECM countries.

[187] See results for different countries multiplied with values from https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Hydropower.pdf

The written down numbers of investments into (S)HPPs according to NREAPs do not reflect the real market possibility of SHP investment and market chances in some regions. But there is no sense in investing into higher numbers of (S)HPPs in the defined regions. The risks of higher investments (than defined in NREAPs) would be too high with effects of

- Missing legal compliance;
- No permissions for operating, constructions, etc.;
- No grid connections;
- No power sales contracts;
- No approvals of FITs;
- Expecting retroactively changes of FITs, law regulations;
- No financing, etc.

Table 47: SHP and LHP market: Former Yugoslavia and remaining SEE/ECM countries versus Austria and Germany (own calculation) [188]

Country	Capacity	Diff 2020/2015	Minimum	Maximum
∑ of former Yugoslavia	∑ LHPP	1 059	847 520 000	2 860 380 000
	∑ SHPP	308	269 500 000	1 509 200 000
	∑ HPP	1 367	1 117 020 000	4 369 580 000
∑ Balkan (without former Yugoslavia) & Energy Community	∑ LHPP	1 800	1 440 000 000	4 860 000 000
	∑ SHPP	204	178 500 000	999 600 000
	∑ HPP	2 004	1 618 500 000	5 859 600 000
∑ BALKAN and ENERGY COMMUNITY	∑ LHPP	2 859	2 287 520 000	7 720 380 000
	∑ SHPP	512	448 000 000	2 508 800 000
	∑ HPP	3 371	2 735 520 000	10 229 180 000
in comparison				
∑ Austria & Germany	∑ LHPP	574	459 200 000	1 549 800 000
	∑ SHPP	129	112 875 000	632 100 000
	∑ HPP	703	572 075 000	2 181 900 000

Looking to a report of UNIDO and ICSHP Austria had 2,589 SHPPs[189] (according to KPMG report 154 large and 2,400 hydro generators support 60% of the country's electricity needs)[190] and a total installed capacity of 1,109 MW (4,983 GWh). By the 2020 energy target there should be 2,870 SHPPs with a total installed capacity of 1,300 MW (6,050 GWh) in operation.[191]

[188] See results for different countries multiplied with values from https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Hydropower.pdf

[189] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Western/WSHPDR_2013_Austria.pdf

[190] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

[191] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Western/WSHPDR_2013_Austria.pdf

Table 48: Estimation of total contribution (installed capacity, gross electricity generation) expected from hydropower to meet the binding 2020 targets for comparison with Austria and Germany (own analysis) [192]

Estimation of total contribution (installed capacity, gross electricity generation) expected from Hydropower to meet the binding 2020 targets										
Austria	2010		estimation 2015		forecast 2020		Difference 2020/2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	8 234	38 542	8 423	39 198	8 983	42 041	749	3 499	560	2 843
< 1 MW	455	2 129	465	2 178	497	2 326	42	197	32	148
1 MW - 10 MW	726	3 400	743	3 477	779	3 644	53	244	36	167
> 10 MW	7 053	33 013	7 215	33 543	7 707	36 071	654	3 058	492	2 528
of which pumping	4 285	2 732	4 285	2 732	4 285	2 732	0	0	0	0
Total (incl. other RES)	10 547	45 383	11 781	48 200	13 179	52 377	2 632	6 994	1 398	4 177
Estimation of total contribution (installed capacity, gross electricity generation) expected from Hydropower to meet the binding 2020 targets										
Germany	2010		estimation 2015		forecast 2020		Difference 2020/2010		Difference 2020/2015	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
∑Hydro Power	4 052	17 713	4 166	19 000	4 309	20 000	257	2 287	143	1 000
< 1 MW	507	2 013	534	2 450	564	2 550	57	537	30	100
1 MW - 10 MW	987	4 050	1 012	4 250	1 043	4 500	56	450	31	250
> 10 MW	2 558	11 650	2 620	12 300	2 702	12 950	144	1 300	82	650
of which pumping	6 494	6 989	6 494	6 989	7 900	8 395	1 406	1 406	1 406	1 406
Total (incl. other RES)	53 834	104 972	82 891	157 623	110 934	216 935	4 980	12 981	3 402	8 090

These numbers match with the numbers in the table above. Looking to a report of UNIDO and ICSHP, Germany had 7,512 SHPPs and a total installed capacity of 1,732 MW (8,043 GWh)[193]. By the 2020 energy target there should be 7,800 SHPPs with a total installed capacity of 1,830 MW (8,600 GWh) in operation.[194] In the case of Germany there are bigger deviations in comparing the UNIDO and ICSHP report. In order to complete the situation of the German-speaking world (for comparison) in

192
http://pvtrin.eu/assets/media/PDF/EU_POLICIES/National%20Renewable%20Energy%20Action%20Plan/203.pdf
http://www.ypeka.gr/LinkClick.aspx?fileticket=CEYdUkQ719k%3D&… https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3044025/Final_NREAP_EN_Dec_2013.pdf
http://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_romania_en.pdf
https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3430146/Ukraine_NREAP_adopted_1Oct2014_ENG.pdf

193
http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Western/WSHPDR_2013_Austria.pdf

194
http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Western/WSHPDR_2013_Germany.pdf

Switzerland (no NREAP) there are about 1,100 SHPPs which produce about 3,600 GWh power per year. 950 SHPPs (< 1 MW total installed capacity) produce 800 GWh power/year and 750 SHPPs (< 300 kW total installed capacity) produce 270 GWh power/year.[195]

3.4 Administration of small hydropower investments

3.4.1 Corruption and bureaucracy

> *"It has often been said that power corrupts. But it is perhaps equally important to realize that weakness, too, corrupts. Power corrupts the few, while weakness corrupts the many. Hatred, malice, rudeness, intolerance, and suspicion are the faults of weakness. The resentment of the weak does not spring from any injustice done to them but from their sense of inadequacy and impotence. We cannot win the weak by sharing our wealth with them. They feel our generosity as oppression." - Eric Hoffer (1898 – 1983; American moral and social philosopher)*

According to Transparency International corruption can be defined as:

- *"Abuse of entrusted power for private gain ("everyday" corruption in order to have better access to basic goods (hospitals, schools, police departments, etc.));*
- *High level or political corruption at high level of government enabling leaders to high income from lobbyists, status and wealth."*[196]

The consequences of corruption therefore can be:

- *"No trivial offence but is more over a criminal element of an offence (also in case of an involvement of a third intermediary);*
- *Indictable as criminal complicity (if a distribution partner is involved);*
- *The element of offence will be most likely added with embezzlement, fiscal evasion and money laundering;*
- *Responsibilities for this offence: delinquent, for company involved: the managing director in person;*
- *Lapse of export insurance;*
- *Nullity of the contract without possibilities to sue for the debt."*[197]

Corruption is a widespread problem on the Balkan and Energy Community area. According to news of the Austrian Broadcast (April 11th, 2015) the largest Serbian newspaper "Blic" has published a price list of corruption (e.g.) for the Serbian region:

- EUR 300 for better school marks;
- EUR 3,000 for a thesis;

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195 http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Western/WSHPDR_2013_Switzerland.pdf

196 https://www.transparency.org/whoweare/organisation/faqs_on_corruption/2

197 www.icc-austria.org

- EUR 1,000 for a building permit, etc.;[198]
- An illegal Schengen visa could cost also EUR 1,300 in the past time *(since December 19th, 2009 no visa for Serbian citizens when entering to Schengen area is necessary anymore)*[199] at the Austrian embassies in Belgrade and Sarajevo;[200]
- Simple tests cost in Croatia EUR 70 and
- Diploma examinations can cost around EUR 2,000
- and a good number of Greek physicians are reported to have "made" exams at the Medical Faculty in Niš (Serbia);[201]
- Serhyi Leshchenko (deputy of the block of the Ukrainian president Petro Poroshenko) criticizes the low salaries of deputies, public officials and politicians in Ukraine who are invited for bribery, when he was invited to a forum of the newspaper Die Presse in May, 2015. Ukrainian ministers, who earn e.g. EUR 200 per month cannot be watchdogs for decisions of EUR 200 billion and therefore this system supports invitations for bribery and corruption;[202]
- 50,000 people have demonstrated against corruption and theft of EUR 1 billion from national budget in Chișinău (Moldova) in May 2015;[203]
- Romania's former Prime Minister Adrian Nastase (2000-2004) had to explain in front of the court the money transfer of USD 400,000 to the account of his wife. His defense of the sale process from the jewelry of his rich aunt was implausible as she lived poorly in a tiny apartment block in Bucharest;[204]
- Georgia did good steps to reduce corruption (Georgia was at the end of the corruption index in 2003 and is at rank 55 in the meantime) with a mixture of "zero tolerance", intelligent inspections and "removal" of bureaucracy;[205]
- Kosovo and some other countries in this region "try" to take serious steps and to motivate any reports of illegal actions (e.g. damage of rivers, damage of forests, construction without any permission, etc.).[206]

Therefore the law of "giving and taking" seems to be accepted in all social classes in the SEE/ECM area. According to the German newspaper Die Welt it is estimated that e.g. in Serbia alone EUR 1.7 billion are laundered yearly[207]

(Remark: This would mean EUR 226 per person in Serbia (7.5 million inhabitants), which most likely is a figure too high (on first view). As a former leasing director in countries HR, RO and SRB in period 2000 to 2008 and later on as a freelancer in Serbia until 2012 corruption could be observed in all of these countries. At that time it was said that the society is 40% corruptive, which would mean as well that statistically

[198] http://orf.at/stories/2272932
[199] http://www.bmeia.gv.at/botschaft/belgrad/ratgeber/reisen-nach-oesterreich/visumfreie-einreise.html
[200] http://derstandard.at/3191363/Visa-Affaere-Schwindel-auch-an-Botschaft-in-Sarajevo
[201] http://www.welt.de/politik/ausland/article8791606/Auf-dem-Balkan-ist-Bestechung-Teil-des-Alltags.html
[202] http://diepresse.com/home/politik/aussenpolitik/4727303/Korruption-ist-fur-Ukraine-gefaehrlicher-als-russische-Panzer
[203] http://orf.at/stories/2287384/2287335/
[204] http://www.economist.com/blogs/easternapproaches/2012/01/corruption-romania
http://www.bbc.com/news/world-europe-25630091
[205] http://www.zeit.de/2014/12/korruption-bestechlichkeit-protest-weltweit
[206] http://mmph-rks.org/en-us/The-Ministry
[207] http://www.welt.de/politik/ausland/article8791606/Auf-dem-Balkan-ist-Bestechung-Teil-des-Alltags.html

around 40% of my team (100 employees) was corruptive as well, which might be true (due to irregularities discovered in audits). But taking in consideration that in average a person (from baby to very old person) should pay EUR 226 in Serbia per year and putting this number in comparison with average income in Serbia in 2013 as EUR 513 per month (see Macedonia with EUR 505/month, Romania with EUR 489/month, Bulgaria with EUR 415/month, BiH with EUR 650/month, Montenegro 734/month, Croatia with EUR 1,054/month and Slovenia with EUR 1,498/month)[208] this number is hard to believe, but not impossible. There is corruption and most likely in my previous companies also 40% of the employees were corruptive (as their life style did not match with their official incomes of my firm) according to statistics.

In comparison – according to corruption index[209] - Switzerland (behind Denmark, New Zealand, Finland, Sweden) is, together with Norway, rank 5th in 2014. Germany is ranked 12th (equal rank with Iceland) behind the first mentioned 6 countries and Singapore, Netherlands, Luxembourg, Canada and Australia). Austria – historically connected with the Balkan area – is ranked 23rd (behind aforementioned countries and United Kingdom, Belgium, Japan, Barbados, Hong Kong, Ireland, United States, Chile and Uruguay). The ranking of the former Yugoslavian countries is: Slovenia (39/175), Croatia (61/175), Macedonia (64/175), Montenegro (76/175), Serbia (78/175), Bosnia and Herzegovina (80/175), Kosovo (110/175).

The ranking of the other Balkan and Energy Community countries is: Georgia (50/175), Greece, Romania and Bulgaria (all of them ranking 69/175), Moldova (103/175), Albania (110/175) and Ukraine (142/175).[210] On top of the low corruption index are Switzerland, Germany, Austria and Slovenia (as a Balkan country). The most corruptive country seems to be Ukraine; Albania, Kosovo and Moldavia follow as a block as very corruptive. The next block consists of Bosnia and Herzegovina, Serbia, Montenegro, Greece, Romania, Bulgaria and Macedonia. Croatia is between this block and Slovenia (See as well 2 figures in Appendix C: Corruption index).

3.4.1.1 Corruption is a driver for economic growth?

> *"South-eastern Europe is riddled with poor planning and corruption in the energy sector and its governments are proving slow to react to the challenges and opportunities offered by the de-carbonization agenda."*[211]
>
> *"High-level corruption in the energy sector is seriously affecting countries in seven countries in South Eastern Europe (remark former Yugoslavia without Slovenia, but including Albania)*

[208] https://www.gtai.de/GTAI/Navigation/DE/Trade/Maerkte/suche,t=lohn-und-lohnnebenkosten--serbien,did=808380.html
[209] http://www.transparency.org/cpi2014
[210] http://www.transparency.org/cpi2014/infographic
[211] http://bankwatch.org/our-work/south-eastern-europe

> *The EU needs to pay special attention to the goings-on in the energy sector including privatizations and tendering for new projects, as well as oversee government plans for investments which often fail to reflect the needs for a sustainable energy future*
>
> *…high-level corruption cases hitting the energy sectors… illustrating how corruption is a major obstacle to the sustainability of these countries' energy systems"*[212]

Energy is one of the biggest business segments of SEE and a cake of approximately EUR 30 billion into energy investments (see as well chapter 3.3.9.: Calculated possible (small) HP investments according to analysis of NREAPs from EUR 270 million to EUR 1.5 billion in former Yugoslavia and from EUR 448 million to EUR 2.5 billion in other SEE and ECM countries) has to be divided until 2020 and not all of the beneficiaries follow the same unique and ethic strategy of creating sustainable values to become less dependent on energy and as well on fossil fuel imports. None of the EU accessing SEE countries has a functional market economy, which opens the door to non-transparency and gray/black or illegal market (the market in all of these regions is considered as "informal markets"). [213]

(Remark: Without any connections to "informed" persons no access to business, no access to any kind of approvals, etc. Even, when I was Managing Director of a leasing company the collection of open installments was done in a grey zone with so called "consultants" or "black sheriffs" as the official collection of receivables with court involvements were only costly and without any results).

A brochure of the EU "Winners and Losers. Who benefits from high-level corruption in the South East Europe energy sector" outlines and describes as some examples several high-level and high-political corruption cases especially in the Balkan area[214]:

- *According to a survey of EBRD corruption (together with competition with the informal sector, complex tax system and missing loans) in the Balkan area are the most common complaints of managers (survey of 15,000 managers in 24 countries);*[215]
- *Albania: A former Prime Minister is said to have asked the Minister of Economy to step into a tender procedure for a HP concession and as a reward EUR 700,000 and 7% share held out in prospect*[216] *and additional bottlenecks of power supply and unfair gains are the main drawbacks for investments in Albania. Even in the case of building permissions usually gifts or money are*

[212] http://bankwatch.org/publications/winners-and-losers-who-benefits-high-level-corruption-south-east-europe-energy-sector; http://bankwatch.org/SEE-energy-corruption;
[213] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[214] http://bankwatch.org/news-media/for-journalists/press-releases/corruption-serious-barrier-sustainable-energy-system-south
[215] http://www.wirtschaftsblatt-bg.com/index.php?m=17861&lang=3
[216] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf

demanded during the decision processes (and 40% of surveyed companies have confirmed supported corruption);[217]

- *Bosnia and Herzegovina: two state owned electricity companies have been the purpose of enriching two high level politicians. In BiH politicians never have been convicted of corruption and political parties only perceive to control prosecutors;*[218]
- *Croatia: A former prime minister ordered an electricity company to deliver electricity at prices lower than the market prices to preferred selected companies. The same prime minister in other case is indicted in taking EUR 10 million in order to manage a higher market position for a foreign (Hungarian) energy company;*[219]
- *Kosovo: Supporting the Prime Minister in his election was rewarded with very attractive energy contracts. A second case in which a so called VIP has faked his diploma in order to get a management position in an electrical corporation and using his position to switch USD 4.3 million out of the country;*[220] *and additional bottlenecks of power supply and unfair gains are the main drawbacks for investments as well in Kosovo (compare with Albania) and 66% of surveyed companies have confirmed supported corruption; this value of 66% was the highest value in the before said survey;*[221]
- *Macedonia: Bureaucrats seem to be very important in MK as they could file misdemeanor charges against four electricity trading firms and customs officers blackmailed three electricity companies by malicious arguing they had used different methods in order to evade electricity fees;*[222]
- *Montenegro: The government allowed the theft of electricity in favor of an aluminum factory and when discovered the stolen electricity was paid from the government budget;*[223]
- *Serbia: In 2011 Serbian police arrested the former director of the Kolubara mining*[224] *company and 16 others on charges of unlawfully harming the company through improper hire of equipment and falsification.*[225]

Corruption is not only visible in the energy sector. One should consider the

- HYPO Alpe Adria scandal in the Balkan area (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Macedonia, Montenegro (but as well in Bulgaria, Ukraine, Italy beside to Austria and Liechtenstein)): Beside the incompetence of the managers, supervising bodies and politicians in Austria there is no chance to ruin a bank without criminal local managers, criminal business partners, criminal customers in a criminal environment, etc., which can be read almost daily in Austrian newspapers in time of 2009 to present 2015 (but the Austrian media only report about blackening of documents, about the position and inactivity of the FMA and sometimes about the incompetence of “always” “non-responsible” politicians, and nearly daily the figures of losses are getting bigger and bigger, while “normal people” have no idea about such figures
  (Remark: I lived and worked in the Balkan area from 2000 up to 2012 and HYPO Alpe Adria Group was the main competitor. My financing institutions –

[217] http://www.wirtschaftsblatt-bg.com/index.php?m=17861&lang=3
[218] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[219] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[220] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[221] http://www.wirtschaftsblatt-bg.com/index.php?m=17861&lang=3
[222] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[223] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf
[224] http://bankwatch.org/our-work/projects/kolubara-lignite-mine-serbia
[225] http://bankwatch.org/sites/default/files/SEE-energy-corruption.pdf

for which I was working for – were successful and are not reported badly in newspapers);

- HYPO Leasing Steiermark scandal in Croatia *(Remark: No connection with HYPO Alpe Adria scandal).* The official damage is reported in the court proceedings as EUR 43 million and the judge had to read thousands of pages of charge(s) and as well to deal with one corruption case with 208 accused persons. Previously the damage was reported up to EUR 200 million.[226] *(Remark: As a former director in financing business (leasing) and re-development manager of HYPO Leasing Steiermark it is impossible to create such damages. Either the local management and/or the supervisory boards were too stupid or both got greedy to make more and more (e.g. "into the own wallet" – then they were intelligent and criminal) or they were greedy of feeling powerful in making business (without checking the customers) – then they were incompetent and stupid). This is just my opinion due to my long career in the leasing industry (it should not be considered as libel and defamatory statement – other information cannot be published due to a secret agreement with the former employer)).*

> *"Corruption is on every level," … "Even if your attitude is ethical, sometimes you have no choice." Croatians … are not ready for the Union's blizzard of new rules and regulations. "We didn't have time for preparation, and right now it's chaos,"*[227]

These above mentioned examples are large scale examples for sure (and should be just exceptions), but searching other sources it seems that the business mentality in the SEE/ECM area is just connected with bribes, profitable "consultant agreements", high short time money orientation and non-payments of invoices (for electricity). A short selection of examples:

- Bulgaria ranks fourth in the EU in terms of corruption pressure, after Romania, Lithuania and Slovakia in 2011, a Eurobarometer poll showed;[228]
- It seems that fighting corruption is improving[229] but on the other hand officers are slowing down their jobs and decision making procedures being afraid that prosecutors might get attention to their jobs;[230]

[226] http://www.krone.at/Nachrichten/Leasing-Skandal_erschuettert_steirische_Hypo-Bank-Der_Hypo-Knaller-Story-95603
http://www.falter.at/falter/2010/08/17/sie-haetten-etwas-tun-muessen
http://www.kleinezeitung.at/s/steiermark/graz/4155762/Noch-nicht-in-Haft_HypoLeasingManager-fordert-Wiederaufnahme http://www.krone.at/Steiermark/Gutachter_bringt_vier_Ex-Bosse_in_arge_Bedraengnis-Hypo-Paukenschlag-Story-259868
http://www.news.at/a/gerichtsgutachten-hypo-steiermark-178-mio-euro-verlust-192766

[227] http://www.nytimes.com/2013/07/24/world/europe/as-croatia-struggles-some-wonder-if-it-won-entry-to-european-union-too-soon.html?_r=0

[228] http://www.euractiv.com/europes-east/corruption-bulgaria-year-report-news-514996

[229] http://www.wirtschaftsblatt-bg.com/index.php?m=17565&lang=3
https://euobserver.com/justice/127402

[230] http://www.wirtschaftsblatt-bg.com/index.php?m=17842&lang=3

- In Romania, the media is portraying SHP as having a negative impact on the environment, leading to low public support and social acceptance for SHP development;[231]
- Special political connections have brought SHP investments into Natura 2000 sites, on state owned land and violated environmental laws;[232]
- As a result, the authorities temporarily suspended the approval process and created a joint working group of government and civil society experts to develop a set of additional criteria for the development of hydropower. The government also promised to assign "no-go" areas at national level, where SHPP's could not be built or would be very restricted;[233]
- Unfortunately media is presenting SHPP's as having a negative impact on the environment and as people are sensitive on media the public support and social acceptance for SHP development is very low.[234]

3.4.1.2 Bureaucracy and sloppy court system as big business?

> *"Bureaucracy destroys initiative. There is little that bureaucrats hate more than innovation, especially innovation that produces better results than the old routines. Improvements always make those at the top of the heap look inept. Who enjoys appearing inept?" — Frank Patrick Herbert (1920-1986), Heretics of Dune (science fiction novel, the fifth of his Dune series of 6 novels)*

"The farther south the sadder" is a figure of speech in the former Yugoslavia. It describes the images of the Yugoslav nations, which they have for their neighbors. Laziness, corruption, disorder are always seen farther south and finally Kosovo is seen as a Mafia ruled country. In Serbia the mindset of the Slovenes does not belong to them as their behaviors can be considered as one from Austrians and Germans. The Croats do not want to be considered as belonging to the Balkan as they want to be seen as the bulwark of the Christian Western Civilization, but when considering corruption and bureaucracy as characteristic for Balkan feature then Croatia is for sure a part of Balkan (when these stereotypes should be applied). In this sense the Croats look down on their neighbors despite the prejudices are probably most pronounced between Serbs and Albanians, but they are really "popular" in any Slavic nation of the former Yugoslavia.[235] It is typical in the area of SEE/ECM countries that

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231 http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Eastern/WSHPDR_2013_Romania.pdf

232 http://www.theguardian.com/environment/2014/feb/04/romania-hydropower-illegality-claims-green-tariffs

233 http://wwf.panda.org/who_we_are/wwf_offices/bulgaria/?227512/Harmful-small-hydropower-projects-lose-ground-in-Romania-and-Ukraine

234 http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf

235 http://www.wehrschuetz.at/sonstiges/bericht/4324

the economies suffer from bureaucracy, corruption and the concentration of power in a small number of actors that are closely related to the policy.[236]

Usually in SEE/ECM countries it is difficult to receive correct credit information of the business partners which makes the business administration quite impossible. Also, there are no approved agencies for collection of receivables and the court system is slow, corruptive and expensive. Usually banks, leasing and insurance companies have access to agencies (working in grey zones) who understand informal structures in different countries and regions, which can help to reduce risks.

The Balkan court system is usually not independent from politics and as well influenced by business and media interests. Controversial sentences are most likely.[237] Croatia, with 4 to 4.5 million inhabitants, had to prepare and modernize the court system before its joining to EU. In 2001 there were 2.8 million (with about 1.7 newly) filed cases.[238] In the meantime some progress in the efficiency of the judiciary could be observed. In the period 2009 to 2010 the backlog of old cases was reduced from 800,000 down to 786,000 and the backlog of old criminal cases was reduced by around 10.6%.[239] According to the 2014 court practice report there was a backlog of nearly 1 million pending cases in Serbia (713,521 cases pending for five to ten years and cases exceeding more than ten years were counted as 239,000 cases).[240]

In Bosnia and Herzegovina there is a risk of discrimination by law due to the fragmented and non-harmonized system. The adoption of a State-level law on free legal aid is still pending.[241] Another source gives another explanation of the Bosnian and Herzegovinian court system: In 2004 there were 15,625 cases counted per court:

> *"In order to clear the backlog, 64 courts would need to handle 60 cases per day, 7.5 cases per hour, or more than one court case every 10 minutes for a year. In 2004, courts in the region required 501 days on average to process a commercial case, which is an eternity when business funds and financing are tied up during the litigation. In Serbia, 40 procedures and 1,028 days were necessary for a company to enforce a contract through the formal court system. According to the Sarajevo Chamber of Commerce in 2004,*

[236] http://liportal.giz.de/ukraine/
[237] http://www.business-anti-corruption.com/country-profiles/europe-central-asia/croatia/corruption-levels/judicial-system/
[238] http://www.vsrh.hr/EasyWeb.asp?pcpid=348
[239] http://ec.europa.eu/enlargement/pdf/hp/interim_report_hr_ch23_en.pdf
[240] http://inserbia.info/today/2015/05/serbia-situation-in-courts-alarming-backlog-of-cases-nearly-one-million
[241] http://helpcoe.org/news/judicial-system-bosnia-and-herzegovina-2014-european-commission-progress-report

> *a small or midsize company averaged 21 commercial cases pending court decision for more than three years."*[242]

Remark: For Ex-Yugoslavia (except Slovenia and Croatia) the situation still seems to be unchanged. In 2006 the leasing company for which I was responsible has lost EUR 4 million through frauds and embezzlements. Despite involvement of the Austrian Embassy and the Austrian Trade Commission, letters and lobbying to different ministries, etc. none of the employees and persons in charge were invited to lawsuits, none of the employees and persons in charge got in contact with the police and public prosecution departments, even there were more than 200 criminals involved. The investigation is still ongoing in 2015, this means for 9 years no success and no results!

In Greece for example a survey showed the inefficiency of the juridical system: In one random sample it was discovered that 20% of cases had not been settled even after ten years and that 65% of cases were between five and ten years old. Another sample showed even cases which were 26 and 33 years old.[243]

In principle the court system of SEE/ECM countries is still in urgent need of reform stated as well in the blogspot of the European Convention on Human Rights and Fundamental Freedoms (ECHR) on February 6th, 2014 (which is analyzing the backlog of human rights, but might give an impression to other lawsuits out of human rights of the region:

> *"Finally, if one looks at the number of newly allocated cases over 2013 compared to a country's population, many former Yugoslav states as well as Ukraine and Moldova score very high, indicating a relatively large influx of applications from those countries."*[244]

The Coface Handbook of Country Risk analyzes all countries of the SEE/ECM areas (except Kosovo). The result according to Coface for this region (excluding Slovenia) is devastating (see above only the summary (of all other risks to be analyzed in other chapters, see table 49 below). The more research will be done, the more results make less hope, e.g. in Bulgaria consumers are frustrated by tariff hikes and the lack of transparency in the sector, consumers are never sure what they are being charged for, bills do not make essential information understandable, past consumption is not explained and regularly billing cycles are irregular.[245]

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242 http://www.ifc.org/wps/wcm/connect/991f510047e98d59a52ebd6f97fe9d91/PublicationBalkansGivingMediationaChanceADRStory.pdf?MOD=AJPERES

243 https://martindale.cc.lehigh.edu/sites/martindale.cc.lehigh.edu/files/Innefficiencies.pdf

244 http://echrblog.blogspot.co.at/2014/02/court-statistics-over-2013-and-other.html

245 http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/30/000356161_20130530122419/Rendered/PDF/781130WP0Box370essment00May270final.pdf

Table 49: Coface Risk Assessment Map 2014: Corruption and bureaucracy (Coface, 2014)

Coface Risk Assessment Map 2014	
Country	**Corruption and bureaucracy**
Albania	burden of corruption on business and on the judicial system
Bulgaria	insufficient progress governance
Greece	business environment handicapped by red tape
Romania	inadequate institutional and administrative systems
Ukraine	persistent shortcomings on the business environment
Bosnia and Herzegovina	scale of the informal sector

Coface advises as well for debt collection in Romania avoiding taking legal action locally due to the formalism, high cost of legal procedures, slow pace of court procedures. In Romania it is reported to take always three years to obtain an enforcement order because of a lack of judges with adequate training in market economy practices and proper equipment (Coface, 2014). This observation might be valid in the whole SEE/ECM area (excluding Slovenia).

Beside of all these aspects and variations of corruption and bureaucracy, the World Bank has suggested an approach of how to improve public confidence and trust in Bulgaria which is an example for adoptions into other administrations of the SEE/ECM region (see Appendix D: Corruption and bureaucracy: Solution Approach: How to improve public confidence and trust).

3.4.2 Political risk

> *"The risk that a foreign government will significantly alter its policies or other regulations so that it significantly affects one's investment. More broadly, it can apply to the risk that a nation will refuse to comply with an agreement to which it is a party, or that political violence will hurt an investment or business. For example, if one exports goods to a foreign nation, and that nation elects a new government that enacts protectionist tariffs, this will negatively impact the export business." (Farlex Financial Dictionary. 2012)*[246]

Political risk can be defined as the risk of operating or investing in a (not only politically unstable) country where political changes may have an adverse impact on earnings or returns[247] which can be as well in democratic authorized countries where normal democratic procedures may bring negative changes in policy, for example ex post facto changes of energy laws and FITs, (as already happened in Bulgaria and Romania with ex post facto changes of FITs), Greece with a recently agreed 3rd bail-

[246] http://financial-dictionary.thefreedictionary.com/Political+Risk
[247] http://markets.ft.com/research/Lexicon/Term?term=political-risk

out set of EUR 86 billion might be the next country not able to fulfill the imposed conditions for political reforms of EU, IMF and the European Central Bank. There is still a danger of a Grexit (leaving of the Euro-zone and installation of drachma as a national ("second") currency). Nobody can predict the development of the reform progress of Greece and calculate the worst case scenario (related with RES investments and FIT-regulations, etc.).

The end of the 20th century in the Balkan area is known for heavy wars and ethnic conflicts from 1991 to 2001 and the fall of Yugoslavia into 7 successor states. At present there are still border disagreements (bay of Piran) between Slovenia and Croatia, which should be settled by an international arbitration procedure at the end of 2015[248] and according to Slovenian and Croatian media reports the unsettled boundary issues between Slovenia and Croatia were as well reasons for Austrian OMV to withdraw energy investments plans in July 2015.[249]

Currently political risks are mainly visible in the Balkan area in Bosnia and Herzegovina, Kosovo, Macedonia and Greece, which can affect investments into RES. The political situation in Kosovo depends as well on goodwill of Serbia which does not recognize it as a sovereign state. Kosovo is recognized by 24 (out of 29; Cyprus, Greece, Romania, Slovakia and Spain still do not recognize its independency and therefore there is no possibility given of application for EU membership of Kosovo.[250]) EU member states as an independent state from Serbia (from 1963 to 1990 Autonomous Region of Kosovo and Metohija). As Serbia wants to be a member of the EU (start of membership negotiation in January 2014)[251] it has accepted in accordance with the Brussels Agreement to normalize the relationship with Kosovo. Serbia will have to accept the fact of a new neighbor southwest of its territory.[252]

The Global Economy considers Macedonia as political high risky (2014 and 2015 as level 5 (range: 1 = low; 7 = high).[253] Macedonia is on one hand a candidate for EU membership since 2005, but the recent ethnic conflicts between ethnic Albanians and Macedonian Slavs in 2015 alarmed other EU countries. Macedonia is also in conflict with Greece because of the name "Macedonia", which might implicate territorial claims

[248] http://diepresse.com/home/politik/aussenpolitik/4785752/Bucht-von-Piran_Zagreb-steigt-aus-Schiedsprozess-aus
[249] http://diepresse.com/home/wirtschaft/economist/4789126/OMV-versilbert-Nordsee
[250] http://www.zukunfteuropa.at/site/cob__41537/7105/default.aspx
[251] http://ec.europa.eu/enlargement/countries/detailed-country-information/serbia/index_de.htm
[252] http://www.balkanforum.info/f61/laender-kosovo-anerkennen-156465
[253] http://www.theglobaleconomy.com/indicators_data_export.php

against Greece (region of Central Macedonia with its capital Thessaloniki) (Aussenwirtschaft Länderreport Mazedonien, 2014).

The risk situation of Bosnia and Herzegovina, Kosovo and Macedonia might be low in mid-term period. At the moment there are no real signs of dramatic changes into any direction.

Although Greece is forced to implement a massive fiscal consolidation program in order to get financial assistance from ESM and continued IMF support:

- Safeguarding of the full legal independence of ELSTAT (in order to get realistic and non-faked statistic data);
- Adoption of the Code of Civil Procedure, which is a major overhaul of procedures and arrangements for the civil justice system and can significantly accelerate the judicial process and reduce costs, etc.[254]

It can be expected that in midterm the discussions within the EURO-zone of stabilization of Greece might occur once again and the measures and agreements with the EU could be considered as failure to file for insolvency in due time. It must be calculated and considered that Greece might not keep the regulations in energy (related) laws. Due to massive pressure to fulfill the agreement of negotiations with the Eurozone finance ministers and EU-member states and probably due to better controls of the “troika” (a cooperation of European Union, IMF and the European Central Bank) to fulfill the agreed conditions Greece will have to find methods of collecting money.

The risk is quite high that Greece will not be able to fulfill the agreement with the EU and will fail with the solution of solving the financial problems of introduction of the old currency drachma or with debt cut. Therefore there is a high risk for RES investments. Additionally foreign investors will not be able to get foreign bank loans for investments in Greece. Currently (for the past 2 years as well) there are no credit insurance programs (Österreichische Kontrollbank Versicherung, Atradius, Hermes Europe, Coface, Prisma Kreditversicherung, etc.). In comparison to Greece credit insurance programs are available for above mentioned countries (Bosnia and Herzegovina, Kosovo, Macedonia).

Other Energy Community countries such as Ukraine and Moldova (including Georgia: status of a candidate to ECM) – all of them countries of the former Soviet Union and members of Commonwealth of Independent States (CIS) – are not in better positions with their local conflicts with neighboring Russia (e.g. Ukraine and Georgia) and

[254] http://www.consilium.europa.eu/en/press/press-releases/2015/07/12-euro-summit-statement-greece

minorities preferring an annexation with Russia (Moldova with areas of Transnistria with unresolved conflicts since 1990 and the area of Gagauzia) might be problematic as well.

Currently only Moldavia considers as member of CIS as Georgia has given up the membership to CIS in June 2009 after the Russian-Georgian war in South Ossetia (in 2008).[255] After incorporation of Crimean Island to Russia in 2014 Ukraine decided to leave the CIS membership and introduced the visa requirement for Russian citizens.[256]

Table 50: Coface Risk Assessment Map 2014: Political risk (Coface, 2014)

Coface Risk Assessment Map 2014	
Country	**political risk**
Austria	dependance on the German and Central European economic cycles
Germany	highly dependent on world markets, especially European markets
Albania	worrying growth of public debt, commercial dependance on Italy
Bulgaria	social tensions exacerbated by politicla instability
Georgia	uncertain domestic politics and difficult relations with Russia
Greece	social tensions fostered by fiscal austerity and massive unemployment
Moldova	politically instability and social tensions
Romania	politically instability
Ukraine	political instability making it difficult to apply a consistent economic policy
Bosnia and Herzegovina	institutional and ethnic fragmentation
Macedonia	membership of the EU and NATO subject to resolution of the disputes with Greece on the country's name
Montenegro	restrictive business environment

According to demonstrations in September 2015 Moldova (the poorest country in Europe) seems to be ruled by a mafia government and responsible for widespread embezzlement: Three large banks in Moldova have approved loans of USD 1 billion (for comparison: expected GDP in 2015: USD 8 billion)[257] to offshore companies. The money of USD 1 billion together with the fictive debtors are disappeared! Therefore a Moldovan "Maidan uprising"[258] could be expected[259] which would definitely not support RES investments.

[255] http://www.euractiv.de/europa-2020-und-reformen/artikel/georgien-hat-gus-offiziell-verlassen-001961
[256] http://de.sputniknews.com/politik/20140319/268072514.html
http://www.tagesanzeiger.ch/ausland/europa/Ukraine-verlaesst-Gemeinschaft-Unabhaengiger-Staaten/story/10464139
[257] https://www.gfmag.com/global-data/country-data/moldova-gdp-country-report
[258] http://www.amazon.de/Maidan-Uprising-Separatism-Foreign-Intervention/dp/3631654561
[259] http://www.theguardian.com/world/2015/sep/06/moldova-protesters-take-to-streets-criticising-mafia-government

Coface summarizes (in the table 50 above) following political risks for selected countries (in comparison with Austria and Germany) and see as well further graphic representations in Appendix E: Political Risk – Graphic representations (BiH, GE, MD, UA).

3.4.3 Legal Status

> *"Laws are not invented; they grow out of circumstances." Azarius (Goodman, 1999)*
>
> *"Laws and institutions are constantly tending to gravitate. Like clocks, they must be occasionally cleansed, and wound up, and set to true time." Henry Ward Beecher (Goodman, 1999)*

In principle the legal regulations concerning SHP / RES – as far as they could be analyzed – are sufficient. All EU countries and non-EU countries in the SEE/ECM region follow the EC directives and have adopted the standards into their national law constructions. Comprehensive texts and interpretation of laws of "older" EU members with their own Supreme Court decisions, etc. cannot be taken over into the legal status books of SEE/ECM countries. However there are no perfect laws covering all aspects of SHP business life. Missing narrow and strict environmental regulations combined with attractive FITs and existing of some loopholes can cause high incentive in investments of institutional investors (which already happened with HP and solar investments in Romania and Bulgaria)[260]. Such effects can determine retroactive law adoptions (retroactive changes of FITs in Czech Republic, Spain and other countries e.g. in the photovoltaic investments as well)[261] which do not increase business trust

http://derstandard.at/2000021896466/Maidan-in-der-Republik-Moldau

[260] http://www.erneuerbareenergien.de/epia-fordert-rechtliche-schritte/150/436/59415/
http://www.greenpilot.at/pdf/greenpilot_Studie_ErneuerbareEnergie_2014_DE.pdf
http://www.partnerregion-centru-rumaenien.eu/zusammenarbeit/wirtschaft/158-rumaenien-und-sein-ee-gesetz-aktueller-stand.html
http://www.photovoltaik.eu/Archiv/Meldungsarchiv/Bulgarien-kuerzt-Solarfoerderung-rueckwirkend,QUlEPTQ1MzQyMCZNSUQ9MTEwOTQ5JlBBR0U9MQ.html
https://www.wko.at/Content.Node/service/aussenwirtschaft/bg/Bulgarien:-Energie-Regulierungsbehoerde-KEVR-veroeffentlic.html
http://www.solarserver.de/solar-magazin/nachrichten/archiv-2012/2012/kw38/photovoltaik-in-bulgarien-regulierungsbehoerde-kuerzt-solarstrom-einspeiseverguetung-rueckwirkend-um-bis-zu-39-prozent.html

[261] http://www.pv-magazine.de/nachrichten/details/beitrag/proteste-gegen-rckwirkende-krzung-der-solarfrderung-in-italien_100015879/
http://de.blog.milkthesun.com/italienische-regierung-senkt-einspeiseverguetung-rueckwirkend/
https://www.kommunalkredit.at/uploads/KAStudieErneuerbareEnergie2015Online_7307_DE.pdf
http://www.roedl.de/medien/mitteilungen/spanien-reformiert-einspeiseverguetung-radikal--scharfe-einschnitte-fuer-energiebranche

of investors and financing institutions at all (and happened already in different SEE/ECM regions as well).

Due to such similar cases there is no wonder when financing institutions insist of own participation of even 50% and even higher or ask for additional guaranties, warranties, and physical and personal securities, buy back guarantees (if possible) and pledging of the operating company to be financed *(according to my experience).* And a good approach for successful investments is to compare the local (by-)laws with the legal system and Supreme Court decisions of "older"/other EU countries with "more experience in RES business and successful application of their RES laws" or neighboring countries with more RES investments and experience.

There is no reason to make the interpretation of loopholes in favor of the investor in business & finance plans as the legislator's job is to close loopholes and watch law developments and draft laws and political discussions in other "benchmark" countries.

See below description of following example: A financing institution in a SEE country could not agree with regard to German Supreme Court regulation that 3 generators were allocated to 3 different "companies" in order to gain in total higher FITs. According to German RES laws this case would be considered as one business unit in Germany and therefore the lower FIT had to be applied in the business plan (for this investment in an SEE country). Due to secret agreement no further information concerning bank, customer, etc. can be given here:

Due to the more favorable FIT and easier governmental regulation when the power plant is below 1 MWe installed power, we will form three separate companies for electricity production in order to keep below the 1 MWe regulatory maximum. Facilities for power production and everything else except the generators will be built under XXXX d.o.o. (company). Separate land parcels are formed and purchased by three different companies (Alpha Energy d.o.o., Beta Energy d.o.o. and Gamma Energy d.o.o.). Each would then purchase yyyy from XXXX d.o.o. and produce power with it, or they would get the yyyy for a certain fee, and for the rights for CO_2 certificates which they would transfer to XXXX d.o.o.). XXXX d.o.o. was in contact with lawyers in order to find the best corporate structure (three single "project companies", SPV's or one corporate veil). Best case practice concerning legal guaranteed FIT for 1 MWe generator would be 14.224 €Cent/kWh in case of 3 different SPV's. In case of consideration to manage a 3 MWe yyyy plant in one corporate veil the FIT would be 12.0 €Cent/kwh.

Reliable attorneys and consultants should not create business constructions without analyzing RES law developments in other countries within the EU. In above example the business plan had to be adopted and calculated with the lower FIT for the whole FIT period to get a higher security for the business model.

We should be aware that RES laws and by-laws do not always match which causes grey zones and exactly such grey zones are in many cases reasons for careful banks of insisting of higher participations and/or collaterals, so called physical and personal securities. “Smaller” investors who depend on bank financing usually cannot provide additional risk minimizing material collaterals. Providing of party holding real rights to banks/leasing company/other financing institutions do not support their positions in cases of retroactive law changes in disfavor of the investors (lower FITs, higher tax,… would influence on the loan repayment period, but it does/should not mean the impossibility of profit generation). In principal financing institutions are covered when having 30% investors participation (=70% finance volume) and additional guarantees.

The major issue in most of the SEE/ECM countries can be the authorization procedure, when the law conditions do not support the power purchase contract at the beginning of the project starts.

Power purchase contract – the most important contract for financing institutions/investors depending on the operating license (which cannot be given before finalization of the project) – creates uncertainty during the period between the receiving of the operating license and the signing of the power purchase contract, which can take excessive long time and open doors for corruption.

Missing of law governance in SEE/ECM countries, different interpretations and power feeling of persons in charge and decision makers do not increase the trust for investments in this region.

In addition to the above critical remarks usually all SEE/ECM members (with some exceptions described in other chapters) have prepared and signed/approved NREAPs and NEEAPs, so called institutional frameworks, action plans and guidelines for legally binding national 2020 RES targets. Basis for all these action plans are EC directives:

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy:[262] The key issue of the directive is the protection of European waters and to establish a water management system (flood protection, drinking water supply) and to avoid environmental burdens. Unfortunately there is no clear approach towards HP generation in the directive. But environmental protection and related authorization procedures may increase investment costs and/or hinder the realization of some HP projects (which have an impact on project economics in the future).[263]

[262] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32000L0060&from=EN
[263] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from RES in the internal electricity market.[264] All member states adopted national targets for the proportion of electricity consumption from RES.[265]

Table 51: Members of the Kyoto Protocol[266]

Members of Kyoto Protocol			
Participant	Signature	Ratification Acceptance (A) Accession (a) Approval (AA)	Entry into force
Austria*	29.04.1998	31.05.2002	16.02.2005
Germany*	29.04.1998	31.05.2002	16.02.2005
Switzerland*	16.03.1998	09.07.2003	16.02.2005
Albania		01.05.2005 a	30.06.2005
Bulgaria*	18.09.1998	15.08.2002	16.02.2005
Georgia		16.06.1999 a	16.02.2005
Greece*	29.04.1998	31.05.2002	16.02.2005
Moldova			
Romania*	05.01.1999	19.03.2001	16.02.2005
Ukraine*	15.03.1999	12.04.2004	16.02.2005
Bosnia and Herzegovina		15.04.2007 a	15.07.2007
Croatia*	11.03.1999	30.05.2007	28.08.2007
Kosovo			
Macedonia			
Montenegro		04.06.2007 a	02.09.2007
Serbia		19.10.2007 a	17.01.2008
Slovenia*	21.10.1998	02.08.2002	16.02.2005
* indicates an Annex I Party to the United Nations Framework Convention on Climate Change			

- Directive 2009/28/EC on the promotion of the use of energy from RES - 23 April 2009[267] and amending and subsequently repealing Directives 2001/77/EC:[268] This Directive establishes a common framework to promote the use of energy from renewable sources and sets mandatory national targets for the overall share of this energy in gross final consumption of energy. The Directive also establishes rules relating to joint projects between member states and other countries, guarantees of origin, facilitating administrative procedures, and accessing networks.[269]
- The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) was introduced to strengthen the international response to climate change and to prevent the unlimited growth of CO_2 emissions on a global level.[270] The members (only 3 countries of SEE/ECM area are not members) of the Kyoto Protocol are shown in the table 51 above.

[264] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32001L0077&from=DE
[265] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[266] http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php
[267] http://www.buildup.eu/publications/31450
[268] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32001L0077&from=DE
[269] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[270] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

Based on EC directives and the Kyoto protocols nearly all member states of SEE/ECM area have signed NREAPs which are national action plans on renewable energy. The NREAPs describe detailed road map of how the member states of European Community/ECM expect to reach its legally binding 2020 target for the share of renewable energy in their total consumption.

One of the priority tasks of Ukraine, as a country contemplating joining the EU, is to bring its legal system into compliance with EU legal standards. The harmonization of the Ukrainian legal system with EU legislation is being effected primarily through the amendment of existing legislation and the adoption of new laws. Current Ukrainian legislation with respect to renewable energy is still not fully compatible with the applicable EU rules.[271]

The overview of legislations (as far found) will be shown in alphabetic order in Appendix F: Legal Status: Overview of basic legal environment of the countries of SEE and European Community region.

As the literature informs of "one of the priority tasks of Ukraine is to bring its legal system into compliance system with EU legal standards" in "Appendix G: Legal status: Case study: Experience of report of court procedures in Croatia and Serbia" the application of law (debt recovery, initiation of criminal investigations, etc.) in former leasing business is described for illustration and comparison.

3.4.4 Remuneration – Feed-in tariff system

> *"The big challenge for the renewable energy industry has been to make the cost of clean energy competitive with heavily-subsidized conventional energy. Without increased consumer demand and political measures to facilitate access to the market, manufacturers of renewable energy generating systems cannot produce the unit volumes needed to bring prices down and drive technological innovation. The Feed-In Tariff (FIT) has proven to be the most effective policy instrument in overcoming these barriers."*[272]

"As of 2011, 118 countries had either set a target for renewable energy or adopted programs for supporting the development of renewable sources. The IEA estimates that to achieve the goal of halving energy-related CO_2 emissions by 2050, the world

271 http://www.wolftheiss.com/tl_files/wolftheiss/Dokumente/Publications%20Archiv/The_Wolf_Theiss_Guide_to_Generating_Electricity_from_Renewable_Sources_in_CEE_SEE_2014.pdf

272 http://www.worldfuturecouncil.org/fileadmin/user_upload/Maja/Feed-in_Tariffs_WFC.pdf

will have to double renewable generation by 2020".[273] This good number of countries, which make more than half of the number of countries of the world countries, means a good business potential which can be increased and developed only with additional support mechanism called FIT. FIT is a financing system to support active investment in RES or production of RES. The system of FIT should support investors and as well RES financing/supporting banks through long-term fixed contracts in order to minimize the risks. An overview of FIT systems of analyzed countries in the SEE/ECM region is given in alphabetic order of analyzed countries in the following:

3.4.4.1 Albania

Albania currently supports only HP generation through its renewable generation support scheme. A FIT for SHPPs below 15 MW was introduced in 2008.[274] The main scheme supporting RES in Albania is a FIT applied currently only to SHPs <10 MW and 10MW >x> 15 MW based on concession agreements signed for 15 years.[275]

According to Albania & Kosovo Legal Newsletter the FIT for SHPPs has been set at 9.3 lek/kWh (6.55 €cent/kWh).[276] It seems that there is only a FIT regime for SHP in Albania[277] (no other FITs for wind, solar, biomass, etc.).

According to ERE the tariffs set by ERE are cost reflective and valid for HPPs (SHPPs) up to 15 MW and the following formula for FIT-calculation has to be used[278]:

- $PU = (PR - PT) * (1 - LD\ \%)$

Remark:
PU = unique price of producers with installed capacity up to 10 MW (Remark: according to different sources as well 15 MW installed capacity)
PR = average retail price for tariff customers in distribution
PT = transmission tariff approve by ERE
LD = %age of technical losses in the distribution network approved by ERE

[273] http://www.climateinvestmentfunds.org/cif/node/8596
[274] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[275] http://www.res-legal.eu/search-by-country/albania/
[276] http://www.kalo-attorneys.com/upload/documents/news_archive/Newsletter%20winter.pdf
Remark: During the time of writing the master thesis no information on other FIT could be obtained (emails to regular to regulatory and non-governmental bodies have not been answered).
[277] http://de.slideshare.net/undpeuropeandcis/albania1 and http://www.icrepq.com/icrepq%2713/424-celo.pdf
[278] http://idbgbf.org/assets/2012/6/15/pdf/ba9ccefe-d0ce-47a7-9da4-6124546ec563.pdf

The FIT in Albania reflects on the average retail price of electricity in the international market during the last year together with an assumption of the increase of the demand of electricity in the following year.[279]

The calculation of FIT and the missing information on FITs for other RES on internet research, no information available from regularly bodies, no answers to emails to regularly bodies makes the trust into the Albanian energy market difficult. On the homepage of ERE only a press release in English language (date Dec. 15th, 2011!) and retail tariffs of electricity for the third regulatory period 2012 – 2014 (unknown date) are available. Especially, when international investors should be attracted it should be the minimum respect to publish FITs and to highlight why investments in Albania should be done (this request should be addressed to all SEE/ECM countries). The AEA Albania Energy Association provides obviously (even) general information only to members: *(Remark: Answer from the chairman via email, June 8th, 2015: "Dear Johann, Thank you for contacting us, we can supply you all these data. But all this data are for members in our association. Let me know if you have any interest on being part of our association").*

3.4.4.2 Bosnia and Herzegovina

Bosnia and Herzegovina applies different FITs in its 2 entities.

The FIT for SHP for Republic Srpska is valid since October 1st, 2014 according to the Austrian Trade Commissioner, Sarajevo@advantageaustria.org; June 15th, 2015 with following support scheme:

Table 52: Support Scheme Hydropower Bosnia and Herzegovina: Entity: Republic Srpska (Austrian Trade Commissioner, 2015)

Support Scheme Hydropower Bosnia and Herzegovina: Entity Republic Srpska (valid since 2014)					
Type	Purchase with guaranteed price			Market price	
Hydropower	Guaranteed purchase price BAM/kWh	Reference price BAM/kWh	Bonus (in guaranteed price) BAM/kWh	Reference price BAM/kWh	Bonus BAM/kWh
up to 1 MW	0.1541	0.0541	0.1	0.0829	0.0712
over 1 MW up to 5 MW	0.1327	0.0541	0.0786	0.0829	0.0498
over 5 MW up to 10 MW	0.1245	0.0541	0.0704	0.0829	0.0416
Note: EUR 1,00 = BAM 1,95583					

[279] http://www.kalo-attorneys.com/upload/documents/news_archive/Newsletter%20winter.pdf
Remark: During the time of writing the master thesis no information on other FIT could be obtained (emails to regular to regulatory and non-governmental bodies have not been answered)

The FIT for the entity Bosnia and Herzegovina is valid since September 1st, 2014. The formula for the calculation of the price is:

- Guaranteed price = reference price (RC) * tariff coefficient (C)

The reference price for the year 2015 is 0.1226 BAM/kWh (remark: 1 EUR = 1.95583 BAM). The support scheme for SHP therefore is according to the Austrian Trade Commissioner, Sarajevo@advantageaustria.org; June 15th, 2015 as follows:

Table 53: Support Scheme Hydropower Bosnia and Herzegovina: Entity: Bosnia and Herzegovina (Austrian Trade Commissioner, 2015)

Support Scheme Hydropower Bosnia and Herzegovina: Entity Bosnia and Herzegovina (valid since 2014)			
Hydropower type	**Reference price (Rc) BAM/kWh**	**Tariff coefficient (C)**	**Guaranteed price (Gc) BAM/kWh**
Micro plants from 2 kW up to including 23 kW	0.105696	2.7471	0.29036
Mini plants from 23kW up to including 150 kW	0.105696	1.7211	0.18192
Small plants from 150 kW up to including 1MW	0.105696	1.301	0.13751
Middle plants from 1MW	0.105696	1.1706	0.12373
LHP over 10 MW	-	-	-
Note: EUR 1,00 = BAM 1,95583			

Different laws applicable for 2 entities have as well different FIT periods:

- Entity Bosnia and Herzegovina: 12 years;
- Entity Republic Srpska: 15 years.

Concerning additional investment supports there could be a chance to import the equipment without customs. No additional investment support can be expected from the government. Only in some cases communities might be willing to support investments depending on the investment volume and creation of jobs, which cannot be applied for SHP investment (Austrian Trade Commissioner, Sarajevo@advantageaustria.org; June 15th, 2015).[280]

3.4.4.3 Bulgaria:

In order to lower down the investments into RES (due to over-investment of plants into solar energy and SHPs), additional fees for third party network access and a special tax for RES in the amount of 20% have been introduced. Both reactions by the government have been cancelled by the Constitution Court. The additional fees

[280] http://www.energy-community.org/pls/portal/docs/85835.PDF

should support the nationalized power company Natsionalna Elektricheska Kompania (NEK). Including the "over-investments" into the total target there are only 285 MW installed capacity left for other years until 2020.

The duration of secured FIT incomes has been changed from 25 years to 20 years (solar), wind from 15 to 12 years and only the FIT valid at the time of finalization of the project can be applied (instead of FIT application at the time of starting the construction of the project). Any delays during the construction time make the financing of such projects difficult. All grid operators (EAD Natsionalna Elektricheska Kompania, EVN Bulgaria, CEZ Bulgaria and Energo Pro), the electricity system operator, ministry of economics, state commission for energy and water regulation have to cooperate (determination of energy grid and its planning).[281]

In Bulgaria there is a very detailed scheme on FIT for HP:

- Micro HPP with a capacity of up to 200 kW: BGN 193.19/MWh (exchange rate BGN : EUR = 1.9525 : 1);
- Low pressure HP run-of-the-river power plant with a net fall up to 30 m and total installed capacity from 200 kW up to 10,000 kW: BGN 189.31/MWh;
- Low pressure river bed HPP with a fall of up to 15 m without diversion type channel and with total installed capacity from 200 up to 10,000 kW: BGN 236.92/MWh;
- Medium pressure – diversion type HPP, run of the river power plant with a net fall from 30 m up to 100 me and total installed capacity from 200 kW up to 10.000 kW: BGN 159.14/MWh;
- High pressure – diversion type HPP, run of the river power plant with a net fall above 100 me and total installed capacity from 200 kW up to 10.000 kW: BGN 152.36/MWh;
- Tunnel diversion HPP with a compensation reservoir and total installed capacity up to 10,000 kW: BGN 224.37/MWh
- Micro-pumped HP: BGN 93.69/MWh (Austrian Trade commissioner; Sofia@advantageaustria.org, 19th, May 2015)[282]

The Bulgarian Parliament has changed its energy law and removed FITs for new renewable projects in order to cut the energy sector deficit and to reduce their weight on end consumer bills.[283] The new law makes following:

- Clear rules (free grid capacities in the regions have to be published);
- Investors have the possibility to check free grid capacities;
- Preference tariffs will be announced per June 30th;
- Reduction of period of FITs for solar from 25 years to 20 years, for wind from 15 years to 12 years;
- Yearly change of the FITs.

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281 http://www.ulm.ihk24.de/international/Kompetenzzentrum/Laenderinformationen/Bulgarien/Wirtschaft_Bulgarien/Bulgarien_Das_Erneuerbare_Energien_Gesetz/1639082

282 www.dker.bg/files/DOWNLOAD/res_c-13_14.pdf

283 http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/bulgaria-removes-feed-tariffs-new-renewable-projects_31770.html

According to the Austrian Trade Commissioner in Bulgaria there are several problems in the energy sector and FITs. The current problems in Bulgaria make the financing and investments into renewable energy projects very difficult. The energy sector in Bulgaria is located in an extremely precarious situation and it will be in the near future some structural changes to be carried out. Which, since the opinions of the various operators, experts and politicians diverge widely. Forecasts over the medium-term development of the FITs are therefore difficult. Only that FITs will rise strongly, is due to the financial hole in the Bulgarian energy sector probably very unlikely. At the same time a significant increase in consumer prices due to the social situation in Bulgaria is not politically feasible. FITs are fundamentally redefined every year in the summer by the Commission for Energy and Water Regulatory - and this will probably remain so. There are only the annual fixed FITs, tariff subsidies for PV, hydro, wind, or biomass do not exist. The water sector was not as strongly affected in the past by the legislative changes and the prices were therefore less volatile compared to other RES. However, there was also no such boom as in the PV and wind energy. HPP are still for the most part of the national electricity company (Austrian Trade Commissioner, e-mail 19th, May 2015; Sofia@advantageaustria.org).

3.4.4.4 Croatia

Every Producer has the right to receive an incentive depending on the type of RES technology and power output of this RES-E plant or PV installation, as it is defined in the Tariff System (§ 3 Tariff System for RES-E).[284]

- Hydropower: Eligible (Art. 5 § 1 points 1b1, 1b2, 1b3 and 2a Tariff System for RES-E)[285]
- With statutory provisions described[286]

The amount of FIT can depend on the generating capacity (usually there is a difference between plants of less than 5 MW and plants of more than 5 MW), the specific technology or the efficiency of the plant. The Croatian Energy Market Operator (HROTE) publishes a list of the reference prices every month:[287]

[284] http://www.res-legal.eu/search-by-country/hungary/single/s/res-e/t/promotion/aid/feed-in-tariff-10/lastp/143/
http://www.res-legal.eu/en/search-by-country/croatia/single/s/res-e/t/promotion/aid/feed-in-tariff/lastp/359/
[285] http://www.res-legal.eu/search-by-country/croatia/single/s/res-e/t/promotion/aid/feed-in-tariff/lastp/359/
[286] http://www.res-legal.eu/search-by-country/croatia/tools-list/c/croatia/s/res-e/t/promotion/sum/358/lpid/359/
[287] http://www.hrote.hr/default.aspx?id=236

Hydropower: For capacities below 5 MW (Art. 5 § 1 point 1b Tariff System for RES-E):

- ≤ 300 kW: HRK 1.07 (approx. €ct 14.0) per kWh (Art. 5 § 1 point 1b1 Tariff System for RES-E)
- > 300 kW and ≤ 2 MW: HRK 0.93 (approx. €ct 12.2) per kWh (Art. 5 § 1 point 1b2 Tariff System for RES-E)
- > 2 MW: HRK 0.88 (approx. €ct 11.5) per kWh (Art. 5 § 1 point 1b3 Tariff System for RES-E)

For capacities above 5 MW the amount of the tariff depends on the reference price (Art. 5 § 1 point 2a Tariff System for RES-E)[288]

This support scheme is addressed to ”qualified producers“ of electricity from RES. The obligated party is the Croatian Energy Market Operator (HROTE). The tariff system does not include a degression mechanism. The contracts have a duration of 14 years (Art. 18 § 1 Tariff system for RES-E). The support scheme is funded by a fee that is charged on each kWh purchased by the final consumers. The fee is subject to the provisions of the RES Fee Regulation and is currently (2014) at HRK 0.035 (€ct 0.46) per kWh (Art. 5 § 1 RES Fee Regulation).[289]

3.4.4.5 Georgia

In Georgia SHP is basically considered as the only RES due to promotion of the government. The Renewable Energy State Program offers HPPs of up to 100 MW power purchase obligations for 10 years and for each HPP project the tariff has to be negotiated. For other RES than HP the legislative support is still lacking. The average FIT in Georgia is approximately USD 0.028/kWh with variation of USD 0.007/kWh for older and USD 0.068/kWh for newer HPPs (date 2012).[290]

3.4.4.6 Greece

The subsidy combined with tax exemption is regulated in

- Law No 3908/2011;
- EEK 83/2011;
- Law No 3468/2006;
- Law No 4146/2013;
- Eligible pursuant to art. 6 Law No 3908/2011 in conjunction with art 2 par. 2a Law No 3468/2006 (Maroulis, 2013)

Greece differentiates between SHPP and LHPP. SHPP with total installed capacity up to 15 MW are defined as RES and since 2014 the FITs are between EUR 80 and

[288] http://www.res-legal.eu/en/search-by-country/croatia/single/s/res-e/t/promotion/aid/feed-in-tariff/lastp/359/
[289] http://www.res-legal.eu/en/search-by-country/croatia/single/s/res-e/t/promotion/aid/feed-in-tariff/lastp/359/
[290] http://www.eurasia.undp.org/content/dam/rbec/docs/Georgia.pdf

105/MWh. For LHPPs, all of which belong to the Public Power Corporation PPC, there are own tariffs applicable.[291] The FIT period is up to 20 years, which can be further extended after the renewal of the operation license and in case of no use of any governmental support the FIT would be increased by 20%.[292]

3.4.4.7 Kosovo

FIT shall apply for generating capacities with new equipment (zero operation), whereas for solar/photovoltaic panels, the equipment must be recyclable. The FIT for solar/photovoltaic energy have been set based on the methodology on calculation of FIT for solar/photovoltaic energy consultation Paper [293] The Level of FIT is defined as:

- SHP (< 10 MW): 63.3 EUR/MWh
- Wind: 85.0 EUR/MWh
- Solar: 136.4 EUR/MWh
- Biogas, biomass: 71.3 EUR/MWh (Austrian Trade Commissioner, Prishtina@advantageaustria.org; June 11th, 2015)

3.4.4.8 Macedonia

The FITs for HP in Macedonia are valid from April 17th, 2014 visible in the following table (Austrian Trade Commissioner, Skopje@advantageaustria.org; June 4th, 2015)

Table 54: Support Scheme Hydropower Macedonia 2015 (Austrian Trade Commissioner)

Support Scheme Hydropower Macedonia (valid from 2015)				
Hydropower Maximum Energy Supply	Feed-in €cent/kWh	Duration of contract	Maximum limit per plant	Governmental
≤ 85 000 kWh	12	20 years	≤ 10 MW	/
> 85 000 and ≤ 170 000 kWh	8	20 years	≤ 10 MW	/
> 170 000 and ≤ 350 000 kWh	6	20 years	≤ 10 MW	/
> 350 000 and ≤ 700 000 kWh	5	20 years	≤ 10 MW	/
> 700 000 kWh	4.5	20 years	≤ 10 MW	/

[291] http://www.gtai.de/GTAI/Navigation/DE/Trade/Maerkte/suche,t=reformen-auf-dem-griechischen-energiemarkt-sorgen-fuer-aufruhr,did=1008728.html http://www.dei.gr

[292] http://www.gwp.org/Global/ToolBox/References/World%20small%20hydropower,%20development%20report%202013.pdf

[293] http://ero-ks.org/Vendimet/English/2014/V_673_2014_eng.pdf

3.4.4.9 Moldova

According to IRENA Executive Strategy Workshop on Renewable Energy in South East Europe end of 2013, the establishment of a FIT is foreseen for wind, solar power and SHP.[294]

3.4.4.10 Montenegro

Montenegro's system follows a scale of power production:

- < 3 GWh: EUR 0.1044/kWh
- > 3 GWh < 15 GWh: EUR 0.0744/kWh
- > 15 GWh: EUR 0.0504/kWh
- SHPP using already existing infrastructure (dam, pipelines) the FIT will be reduced to 80% of the above mentioned FITs.[295]

3.4.4.11 Romania

Romania uses instead of feed-in tariffs the system of green certificates (legal titles and traded and bought by polluting companies in some EU countries; sold by producers of clean and environmental electrical energy). The green energy circulates in the power grid. The producers receive a certificate for each determined unit of electrical energy produced from renewable energy sources which has been put in the grid. The system of green certificates enables the accurate calculation of clean energy which is consumed and that which enters the grid. One MW of electricity from RES has the value of one certificate. With green certificates the end consumer of electrical energy finances the technology of renewable energy sources through the purchase of certificates in the market. [296]

Romania does not use the European support system of FITs and therefore the green certificate system for RES plants with installed capacity of maximum 10 MW is applied, accredited by ANRE and commissioned latest by end of 2016.[297]

The implementation of the green certificates scheme 2011/2012 led to the commissioning of 881 MW in renewable energy power plants and climbed up in 2012 due to attractive promotion system with green certificates (Law No 220/2008, which

[294] http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf
[295] http://www.gtai.de/GTAI/Navigation/DE/Trade/Maerkte/suche,t=montenegro-setzt-auf-die-bewaehrte-mischung-von-wasserkraft-und-braunkohle,did=1022326.html
[296] http://www.globalbusinessinsights.com/content/rben0166m.pdf
http://www.indep.info/documents/39947_INDEP%20-%20Feed-in%20tariffs%20and%20importance%20for%20investments%20in%20Kosovo.pdf
[297] http://www.pachiu.com/wp-content/uploads/2014/05/Electricity_2014.pdf

obliges electricity suppliers and producers to present a certain number of green certificates by the end of each trimester)[298] up to 1623 MW.[299]

The support scheme is built on mandatory quotas combined with tradable green certificates. For the green electricity produced by SHPs, there are three options to be sold; by bilateral contracts at negotiated prices, on the day-ahead market or to distribution companies at a regulated price which is about EUR 31/MWh with prices in the range of EUR 27 to EUR 55 until 2014 and with a minimum guaranteed price of EUR 27 for the period 2015 to 2030.

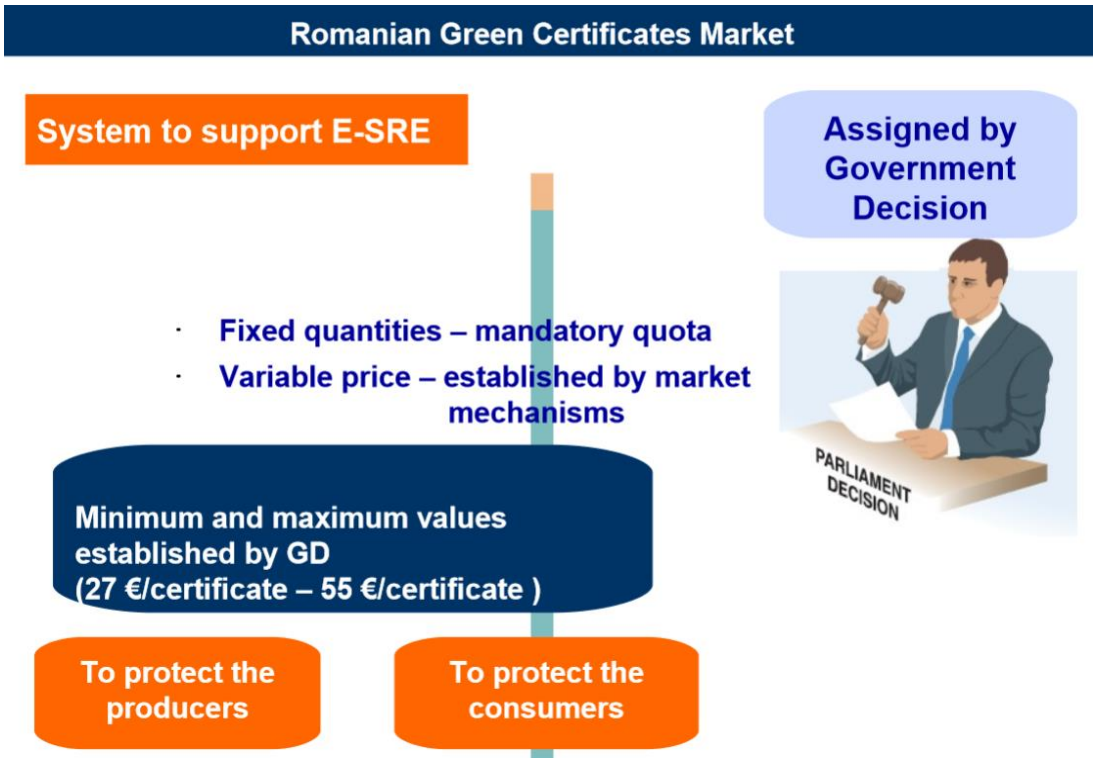

Figure 13: Romanian Green Certificates Market[300]

Small hydropower therefore receives green certificates (GC) according to the following scheme:

- GC/MWh for new plants for 15 years;
- GC/MWh for refurbished plants for 10 years;
- 0.5 GC/MWh for old plants for 3 years[301]

Due to overheated success of RES investments the government has changed the green certificate system which is applied from January 1st, 2014. For HP fed into the

[298] http://ec.europa.eu/clima/policies/g-gas/progress/docs/ro_2013_en.pdf
[299] http://ec.europa.eu/europe2020/pdf/nd/nrp2012_romania_en.pdf
[300] http://greenenergy.thediplomat.ro/docs/OPCOM_Cert.pdf
[301] http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Europe_Eastern/WSHPDR_2013_Romania.pdf

grid the number of green certificates is reduced from 3 green certificates to 2.7 green certificates (Remark: more dramatic is the political intervention for wind and solar technology. The latter one is reduced from 6 green certificates to 3 green certificates).[302]

3.4.4.12 Serbia

In Serbia the FITs are expressed in c€/kWh and rounded up to two decimals. The Decree on Incentives for Privileged Electricity Suppliers sets the formula for a regular annual correction of FITs due to inflation in the euro-zone. The correction is to be carried out in February each year, starting from 2014. The Decree stipulates that the specified FITs are set for each three years and that they can be reconsidered on an annual basis. The Decree itself has a validity period of three years – until 31 December 2015 (Lepotić Kovačević, 2013)

Table 55: Support Scheme Hydropower Serbia 2012 - 2015 (Außenwirtschaftscenter Belgrad, 2013)

Support Scheme Hydropower Serbia 2012 - 2015			
	type	installed capacity (R)	tariff (c€/1 kWh)
1	HP		
1.1	new	< 0.2 MW	12.40
1.2	new	> 0.2 MW < 0.5 MW	13.727 - 6.633*R
1.3	new	> 0.5 MW < 1 MW	10.41
1.4	new	> 1 MW < 10 MW	10.474 - 0.33*R
1.5	new	> 10 MW < 30 MW	7.38
1.6	on existing infrastructure	< 30 MW	5.90
*) R - installed capacity in MW			

3.4.4.13 Slovenia

Slovenia has a new support scheme with 2 types of beneficiaries (production plant with co-production of heat and electrical energy and production plants of renewable energy) and further 2 support types (guaranteed purchase of electrical energy through the support center (CP). On one hand there is a price defined by a power price decree. The CP will pay the announced power price and will cover as well the difference between the announced and realized power production. The additional coverage is to be considered as “company support”.

The CP does not pay for the electrical energy, but pays according to produced net production a “company support”. The second group of plants can decide between the system of guaranteed purchase or “company support”. Larger plants usually do not

[302] http://www.pachiu.com/wp-content/uploads/2014/05/Electricity_2014.pdf

have the option for guaranteed purchase. The price for the "company support" is defined as:

- "company support" = reference cost – (reference market price for electrical energy * factor B);
- Reference market price for electrical energy 2015: = EUR 39,65/MWh (Außenwirtschaftscenter Laibach, 2015)

Table 56: Support Scheme Hydropower Slovenia 2015 (Außenwirtschaftscenter Laibach, 2015)

Support Scheme Hydropower Slovenia 2015					
type	reference cost	guaranteed purchase (EUR/MWh)*	Factor B	Company support (EUR/MWh) 2014	company support (EUR/MWh) 2015
< 50 kW	105.47	105.47	0.86	68.22	71.37
< 1 MW	92.61	92.61	0.86	55.36	58.51
to 10 MW	82.34	82.34	0.90	43.36	46.66
to 125 MW	76.57	-	0.90	37.59	40.89
*) guaranteed purchase 2015 has the same values as in previous years					

3.4.4.14 Ukraine

The Ukrainian Green Tariff Law fixes FITs until 2030 for plants commissioned while the law is in force. The coefficient will be reduced by 10% if plants are commissioned after 2014, by 20% if plants are commissioned after 2019 and by 30 per cent if plants are commissioned after 2024.[303]

The Green Tariff is calculated by applying a certain coefficient (see table below) to the consumer retail tariff set as at 1 January 2009, the latter being 584.6 Ukrainian hrywnja (UAH). [304]

There are different coefficients used depending on the technology. The National Energy and Utilities Regulatory Commission (NERC) sets the tariff on a monthly basis to reflect the fluctuating UAH/Euro exchange rate, but the tariff can never be less than the minimum tariff for the relevant technology (which is for HPPs up to 10 MW EUR 0.0755/kWh with a coefficient of 0.8 and there is peaking coefficient applied for SHP).[305]

[303] http://www.nortonrosefulbright.com/knowledge/publications/66153/european-renewable-energy-incentive-guide-ukraine
[304] http://www.nortonrosefulbright.com/knowledge/publications/66153/european-renewable-energy-incentive-guide-ukraine
[305] http://www.nortonrosefulbright.com/knowledge/publications/66153/european-renewable-energy-incentive-guide-ukraine

3.4.5 Authorization Process/Administrative Procedure Small Hydropower

"Doing little things well is a step toward doing big things better."
Harry F. Banks (Goodman, 1999)

The administrative procedures needed to develop a SHPP are complex (water-use-licensing, Complicated permitting and licensing procedures (land, energy information administration, grid connection, purchase agreement, Natura 2000, environmental requirements) and depending on the status of laws and by-laws in SEE/ECM area (Penche, 1988).

Usually the risks of the authorization process are nearly comparable in all SEE and EC countries: Usually required multi-stage approvals and Inability to sign power purchase agreements at the beginning of the project development (which does not support the financing and banks and investors do not have the guaranty of being able to sell power).[306] There is less trust in the application and interpretation of the laws in the SEE/ECM area.

The Authorization Process (from the bank perspective) is illustrated as following main steps (depends as well on the local (types of) requirements in the SEE/ECM region):[307]

- *Phase 1: Site identification/concept*
  - *Identification of potential site(s);*
  - *Funding of project development;*
  - *Development of rough technical concept;*
- *Phase 2: Pre-Feasibility study*
  - *Assessment of different technical options;*
  - *Approximate cost/benefits;*
  - *Permitting needs;*
  - *Market assessment;*
  - *Legal environment;*
- *Phase 3: Feasibility study (Bank: Bank has first contact with project developer; involvement of financing institutions starts here. Financing institutions will be a part of the whole process)*
  - *Technical and financial evaluation of preferred option;*
  - *Assessment of financing options;*
  - *Initiation of permitting process;*
- *Phase 4: Financing contracts (Bank: Due diligence/Financing concept, term sheet)*
  - *Permitting;*

306 http://www.fni.no/doc&pdf/FNI-R1211.pdf

307 http://www.ifc.org/wps/wcm/connect/06b2df8047420bb4a4f7ec57143498e5/Hydropower_Report.pdf?MOD=AJPERES

- *Contracting strategy;*
- *Supplier selection and contract negotiation;*
- *Financing of project;*

- *Phase 5: Detailed Design (Bank: Loan Agreement)*
  - *Preparation of detailed design for all relevant lots;*
  - *Preparation of project implementation schedule;*
  - *Finalization of permitting process;*
- *Phase 6: Construction (Bank: Independent review of construction)*
  - *Construction supervision;*
- *Phase 7: Commissioning (Ban: Independent review of commissioning)*
  - *Performance testing;*
  - *Preparation of build design*[308]
- *Phase 8: Start of operation*
  - *Back flow of loan and interest*

As additional challenges in the SEE/ECM region to the above structure of authorization and administration process can be considered:

- High cost of borrowing (excluding EU countries);
- High risk of investments due to low country rating (see below table 57: Coface Assessment map 2014);
- Negative investment climate (except EU countries)
- Unstable political environment (especially UA, MD, MK, GR; BiH)
- Announced reform of electricity market with planned transition from effective "single buyer" model to bilateral contracts and balancing market and uncertainty of transition (UA, MK)[309]
- The authorization and administration process depends as well on the country risk (law making process, ambush-style announcing of new laws, retroactive law changes in the un-favor of the banks, investors and other market participants, instable governments, changes of political decision makers, etc.) and on the business climate (business mentality and as well direct influence from the government and strong informal sector in this region).

In most of the SEE/ECM area according to my experience – and as well experience of other market players - enviousness, resentment, wrong market information and evaluation, missing of statistics, different application and interpretation of laws in different stages of authorization procedure (in one district court in Belgrade the clerks did never accept any signature from my side (as a foreigner I was managing director of a local company) on Serbian documents without presence of sworn translators; so I had to switch to another district court) can have severe impact on investment decision. In administration process usually grace periods do not exist and if so other documents and approvals have to be organized. Missing of so called "one stop – one shop departments" causes immense travels to different other public and executive authorities, reduces the awareness of responsibility to investors time and money. It seems that no authority is really in charge.

The process flows for approval steps as far as they could be analyzed do not meet securities for banks and investors in many cases, e.g. the missing of purchase power

308 http://www.ifc.org/wps/wcm/connect/06b2df8047420bb4a4f7ec57143498e5/Hydropower_Report.pdf?MOD=AJPERES

309 http://www.fni.no/doc&pdf/FNI-R1211.pdf

agreement in the stage of decision making for SHP investments and banks approval process for granting of loan is depending on the trust to the authorities (will they do the approvals within acceptable time period?), trust to the investor (is he as well-connected in the informal sector in order to push up decisions and approvals?), etc.

Table 57: Coface Risk Assessment SEE and EC in comparison with A, D, CH (Coface 2014)

Coface Risk Assessment 2014			
Country	**Country risk**	**Business Climate**	**Medium term**
Austria	low	very low	
Germany	low	very low	
Switzerland	very low	very low	
Albania	high	high	high risk
Bulgaria	significant	quite acceptable	moderate risk
Georgia	high	high	high risk
Greece	high	acceptable	
Moldova	very high	high	very high risk
Romania	significant	quite acceptable	moderate risk
Ukraine	very high	high	very high risk
Bosnia and Herzegovina	very high	high	very high risk
Croatia	significant	acceptable	rather high risk
Kosovo	no evaluation	no evaluation	no evalluation
Macedonia	high	significant	rather high risk
Montenegro	high	high	high risk
Serbia	high	high	high risk
Slovenia	quite acceptable	low	

It can be said: “If court decisions must be counted for long periods to be taken, so it will be also with the decisions and approvals of the public authorities for investments into RES projects!” It is hard to believe the following statement (for SHP investments in Georgia) is that simple without any complications (So there is still an open question: If the procedure were that easy, why are there not more investments?):

> *“Although legislative support for renewable energy is currently lacking (other than for small hydropower), support for SHPPs is very investor friendly. The Government of Georgia streamlined permit procedures and application processes, producing a clear set of licenses required for potential small hydropower developers. Since HPPs up to 13 MW are exempt from the license for power generation, the commission of a SHPP requires only a land lease or purchase licenses obtained from local authorities, a water usage permit issued by the Ministry of Environment and Natural*

Resources Protection and a construction permit issued by the Ministry of Environment and Natural Resources.[310]

3.4.6 Nature – Environment

"The cult of nature is a form of patronage by people who have declared their materialistic independence from nature and do not have to struggle with nature every day of their lives." Brooks Atkinson (Goodman, 1999)

"The tree great elemental sounds in nature are the sound of rain, the sound of wind in a primeval wood, and the sound of outer ocean on a beach." Henry Beston (Goodman, 1999)

Figure 14: HPP in Albania threatens the nature[311]

"World Bank Financed Power Plant Threatens Albanian Canyon" is the headline of the electronic medium Balkan insight informing of the Austrian company ENSO which is building a HPP with financing by the IFC at the Lengarica River in southern Albania. The nature is threatened and a famous canyon will be ruined.[312]

With the involvement of a foreign investor in HP business NGO's and other sensitive groups of conservationists are alarmed and bring ideas of natural conservation into the region of SEE/ECM.

Therefore the European Parliament urged the Albanian authorities to develop comprehensive management plans for existing national parks with respect to the

[310] http://www.eurasia.undp.org/content/dam/rbec/docs/Georgia.pdf
[311] http://www.theguardian.com/environment/2015/feb/20/balkan-dam-boom-threatens-europes-last-wild-waterways
[312] http://www.balkaninsight.com/en/article/world-bank-financed-power-plant-threatens-albanian-canyon

IUCN World Commission of Protected Areas quality and management guidelines for protected area category II. This critical remark is very important as all these countries in SEE/ECM (even Greece as well) do not have long tradition in "Western" law development. [313] After the fall of communism in the early 90ies of the last century, the law system had to be changed from communistic dictatorial constitution, justice, legislation and law to the modern continental European system without living and experience of the new copied and adopted laws from other countries or going back to the history (e.g. Croatia has introduced the old Austrian Civil Code and replaced the Yugoslav Socialist Law). It is not possible to blindly adopt foreign laws into the own law system as the existing law system with the political and historical background has formed as well the bureaucracy and decision process in the country. The ECM countries are still not members of the EU and have to harmonize their law system with the EU law system. As in all of these countries there is a lack of special laws (due to missing reality of Western (legal) life and due to priority solutions of e.g. poverty, discrimination of Romani people, etc., regional conflicts with Russia (UA, MD, GE), ethnic problems in MK, integration of 2 entities in BiH, etc.) development of "luxury" laws like environmental laws might not have the highest priorities.

Dubious and non-sustainable thinking investors will abuse the regional loopholes in the law system and are interested only in their profit.

All these SEE/ECM countries are economically open countries and foreign investors do not voluntarily bring "green" thinking into the region. It is more the interaction of foreign investors' interest and mass media reporting of the success stories and expansion plans. Such stories will not go unobserved. Also foreign financing institutions with responsible acting risk managers with sustainable business behavior bring additional sensitivity to all these countries. The more sensitivity of today's "luxury" problems in the SEE/ECM region other groups bring into the region, the better the future development of the region. It is absolutely not correct for "greedy" investors to abuse missing local environmental regulations (e.g. no consideration and no investment of a fish ladder due to non-regulation in the relevant local RES laws and by-laws).

According to RiverWatch, there are 435 dams planned in Albania, 400 dams in Macedonia, 400 dams in Bulgaria, 700 in Serbia, 100 in Bosnia (100 in Hungary) 70

[313] http://www.theguardian.com/environment/2015/feb/20/balkan-dam-boom-threatens-europes-last-wild-waterways

dams in Montenegro and 50 in Slovenia.[314]

(Personally – due to my experience and stay in Serbia from 2002 until 2012–I do not believe in these figures as experts in Serbia use to say: "The government has provided a list of 600 possible SHP locations and only 200 of them are somehow serious!" When visiting some locations in Serbia and in Bosnia and Herzegovina I had the impression that only ¼ of the visited possible locations could be interesting for further analyzes).

RiverWatch has analyzed 646 LHPs and about ¼ should be built in national parks and other protected areas, or gold standard environmental sites covered by Natura 2000, Emerald, World Heritage, Ramsar and Biospshere. 20 of these are still slated for Mavrovo (in Macedonia's oldest and largest national park; *"Mavrovo houses more than 1,000 plant species, and provides a sanctuary for bears, wolves, golden eagles and critically endangered species such as the Balkan lynx, less than 50 of which are still thought to be alive")* and a non-sustainable thinking bank manager said to RiverWatch: *"There's a lot of anger from conservationists and that makes work on the ground for our staffers very difficult. It is very likely that we will have to turn around and walk away from it."*[315]

From my point the work of RiverWatch has to be honored as a corrective to non-sustainable business thinking. All problems solved in other part of the world in the meantime, all mistakes made in the other world, should not be moved to weaker economies, should not increase the profits, should not have strong influence on the biosphere, should not force to emigrate local people from their natural living area. The economy and the demand of green power, the reduction of CO_2 emissions should not be the only parameter to fight against conservationists. All partners and as well IFC, World Bank, etc. as financing institutes should insists on sustainable investments and should as well insist on parameters which probably are not as standards written down in the local law systems of SEE/ECM countries. This negative story of RiverWatch about former Yugoslavia should not be considered as the only parameter for this region. The sustainable thinking and area, biosphere worthy of protection has to be applied as well in other regions of SEE/ECM.

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[314] http://www.theguardian.com/environment/2015/feb/20/balkan-dam-boom-threatens-europes-last-wild-waterways
http://www.esiasee.eu/macedonia-ebrd-and-wb-under-pressure-for-two-hpps-projects-green-ngos-argue-the-projects-export-plans/
http://riverwatch.eu/balkan/staudammflut-bedroht-schutzgebiete-auf-dem-balkan
http://derstandard.at/2000017120240/Staudammflut-bedroht-Balkan-Schutzgebiete
http://www.focus.de/wissen/natur/erschreckende-zahlen-anlaesslich-des-un-weltwassertags-flussdelphine-im-mekong-bedroht_id_3798804.html

[315] http://www.theguardian.com/environment/2015/feb/20/balkan-dam-boom-threatens-europes-last-wild-waterways

At the moment the "green movements" and "green preventers" seem to be not strong enough. The future conflicts between the construction and energy lobby and the environmentalists cannot be avoided and the idea of providing 570 licenses for HPP projects seems to be politically unrealistic.

It must be mentioned that environmental conflicts might occur. It seems that fish ladders according to EU-standards will not be applied, e.g. in Albania. The Styrian (Austrian) company Enso Hydro constructs an SHPP (9 MW installed capacity) in Albania, which should be opened by end of 2015 and informs that this SHPP would be erected according to Austrian / EU standard as the Albanian standards were lower. A local attorney was fighting against this project and has organized some demonstrations which led to investigations of abuse of authority.[316]

From the understanding of the common practices of the EU, the higher Western standards should be adopted and implemented to 100% in this region. It is inacceptable to outsource problems to "less developed" countries, generating higher profits and ruining the nature, habitat and biosphere in South East Europe and/or Energy Community.

See Appendix I: Nature: Protected Areas in the Balkan Region[317] and Appendix J: Nature: Hydropower plants in Balkan rivers[318]

3.4.7 Qualitative Transaction Costs

> *"For example if you are going to buy a television, there may be a small local shop that sells them, but you do not trust their prices, so you travel to a superstore. You still look up prices on the internet beforehand and also check the store's returns policy. At the store, there is a bit of a rigmarole whilst they check your credit and there is a security man on the door who checks your receipt as you leave."*[319]

316 http://www.solidbau.at/home/artikel/Wasserkraftwerke/Ermittlungen_wegen_Bauauftrag_fuer_Wasserkraftwerk_in_Albanien/aid/26625?analytics_from=thema_single

317 http://balkanrivers.net/sites/default/files/Protected%20areas%20and%20hydropower%20dams%20in%20the%20Balkan1915.pdf

318 http://balkanrivers.net/sites/default/files/Protected%20areas%20and%20hydropower%20dams%20in%20the%20Balkan1915.pdf

319 http://changingminds.org/explanations/trust/transaction_cost.htm

As transaction costs (TC) all cost up to the moment of investment decisions (positive or negative) should be considered (Reutz, 2011):

- Information collection cost (creating ideas to invest in one of the countries of SEE and/or ECM: search and information collection);
- Negotiation costs with involved partners (who are the partners, "consultants" with close contacts to political decision makers, communities, land owners, mediation costs, press releases, public relations to "neighbors" and local NGO's, establishing the agreements, etc.);
- Land acquisition costs

All costs created up to the moment of a negative decision might be considered as lost costs and non-depreciable (depending on local tax regulations).

But in case of a positive decision it is not sure that TC can be written off in one of the SEE/ECM countries. International larger operating investment companies can therefore find economically advantageous cross-border solutions.

In all of these countries it is observed that many consultants try to sell their "connections" to decision makers and quasi many nonsense and lost negotiations are necessary to get success at the end.

The same goes for the collection of official information: As an Austrian citizen and as managing director of a trade registered company in Vienna the Austrian Trade Commission in all SEE/ECM countries have supplied me with information for investments. It is not sure if these offices would also provide to non-registered persons with the same information quality (e.g. foreign physicians, who are not member of the chamber of commerce willing and interested to do investments in SEE/ECM countries). As there is also experience in working with the Austrian Trade Commissioners in selected African countries concerning RES investments without any reaction it might be that there could be a different quality of providing of information.

All Austrian, German and Swiss organizations – when contacted – have reacted and provided me with information.

But when contacting parliaments, energy ministries, DSO's, TSO's, SHP associations, embassies, etc. even in local languages (Ukrainian, Romanian (MD and RO), Bulgarian, Bosnian-Croatian-Serbian and English in Slovenia, Albania, Kosovo and Georgia and Greece; MK: Serbian and English) there is no guarantee of getting any information. No information has been received from Ukraine, Georgia, Moldova, Montenegro and Kosovo. In Bosnia no information has been received from the Federation of Bosnia and Herzegovina. Partial information has been received from

Republic Srpska. Even ESHA did not answer to any emails. Contacting them per phone was impossible. The seat of Energy Community in Vienna can be reached, but no information can be delivered (except information on the homepage).

None of the SEE/ECM institutions have delivered full information (either one or two agencies have answered partially), while some asked money for information (in Albania and Romania). Embassies or Trade Commissioners have partially given list of contact persons: None of the mentioned contacted persons were reachable via phone nor have they answered their received emails).

The TC before starting with the construction of SHPPs cannot be calculated due to bad performing experience with information holder and agencies for promoting investments into the named countries. There is even a lack of and/or mismatching information on energy investments. There is no “one-stop shop center” to get all concentrated information. There is no trust of banks of delivered information: Whatever feasibility studies, business plans were provided especially in countries of former Yugoslavia all of the banks have asked additional legal opinions (to be paid additionally from the demanders for financing) and technical opinions from third parties, which prolongs the decision period enormous. There is no reason to believe to any bank which is doing decisions for RES investments in a time period of e.g. 4 weeks. Whatever information concerning decision periods found on banks websites should be minimum doubled, tripled, quadrupled and even quintupled.

Banks usually have enormous problems of accepting the conditions of giving financing decisions/approvals without the final power offtake agreements, which usually will be/should be provided after receiving of the operating permit.

In principle banks and investors are sure when starting the investments/construction works that they have just the construction permits. Due to instable governments and changes of decision makers, sometimes overnight amendments of legislations there is no security of really receiving of final operating agreements and consequently power offtake agreements. This non-security opens the abuses and chances of illegal additional payments through consultants.

Even if projects are very bankable banks usually would like to get a security of 130% and more of the investment sum due to risks of retroactive legislation amendments and/or non-receiving of any final approvals for power generation. Smaller investors usually cannot provide with additional securities as they usually hardly manage to provide even 20% own investment/capital participations.

Whenever banks' official decision periods have to be multiplied, it is the same with operating permits, power offtake agreements, etc. In no country is there a trust that official/public decisions will be made at the latest within the defined period, etc. On the way to decision making it can happen that documents are still missing or even already documents are lost or are aged or the law is changed in the meantime. This unacceptable procedure opens once again doors for illegal payments through consultants.

3.4.8 Foreign Anonymity versus Local Acquaintance

> *"The long span of the bridge of your life is supported by countless cables called habits, attitudes, and desires. What you do in life depends upon what you are and what you want. What you get from life depends upon how much you want it – how much you are willing to work and plan and co-operate and use your resources. The long span of the bridge of your life is supported by countless cables that you are spinning now, and that is why today is such an important day. Make the cables strong!" L.G. Elliott (Goodman, 1999)*

It is said usually in the region that so called "businessmen" usually defraud their (own) companies by taking loans from banks, and then transferring the money to the accounts of other companies in and outside of the country[320] and then running away. There is less reliance to so called wannabe or pseudo investors you have to find out. The missing of trust into business behavior of the business partners does not support serious willingness of investments.

There is a high risk of stranded investments due to lack of information and any information must be called into questions, e.g. a large biomass project with a total investment sum should be finished in one country of the EC area (due to still actual case no other information regarding name, place, type of investments, banks and institutions involved can be given here (due to non-disclosure agreement)):

The investor has already invested into land and first excavating works, has ordered machines and equipment in expectation of positive financing decision (after analyzing of legal and technical due diligences, etc.).

The term sheet of the bank contained additional requirements and conditions for granting the loan. Finally the loan and investment (pre-investment is already stranded) failed when discovered the purchase of additional land already agreed with different partners was not able. Even involved attorneys, the risk manager of the financing institutions were not able to find this impossibility as the land to be purchased was in realty a mortgage more than ten times (EUR 5.10/m²) overvalued! to another bank

[320] http://www.telegraf.rs/english/1555065-serbian-businessman-arrested-he-defrauded-his-company-for-30-million-euros

and therefore the business plan was totally wrong (the agricultural land to be purchased and agreed with the purchaser was around EUR 0.3 to EUR 0.5/m² in 2011/2012..

There was no sense in following such a project with wrong figures and overvalued prices which never could have earned. As this ECM country was considered a developing country, additional income on CO_2 certificates could be earned, which has made the investment project very profitable.

Different partners, many analyzes, "collection of all documentation", involvement of several attorneys and consultants could not find these discrepancies of values of the land to be purchased. Obviously the foreign investor was too starry-eyed. None of the partners and attorneys could expect that all land of the serious vendor was overvalued as a mortgage more than 1,000%. Serious banks usually want to get securities in amount of 100% (minimum) to 130% of the investment sums. In this case, the vendor's bank has accepted (or overvalued) a price level which was by far not the market price. There are many questions to the vendor's bank still open! Who was involved in the mortgage evaluation who paid to whom "additional income"? The RES investor was a foreign company.

Another case of project price overvaluing is not concerned with RES business, but is a symbol of doing business with "foreign anonymity":

A foreign bank has financed a local fish factory at a price level of EUR 6 million.[321] *According to our reorganization procedures we found out that the same factory in e.g. Lesachtal (Austria) would cost around EUR 1.6 million and in Norway (at any place) around EUR 1.8 million. Greedy foreign bank manager and local businessmen have created a "Serbian business". There is no discussion that the reorganization mandate had to be resigned, as the local lower salary cost for the fish processing would never compensate the factory's overvalued price.*

Usually foreigners seem to be very welcome for investments into any kind of business. It seems there is a lack of real price estimations (e.g. for land for investments into RES projects), a lack of business information and understanding of ROI philosophy of investors. As many local companies suffer on financial liquidity and due to missing of controlling instruments, cost calculations in many companies there is a lack of understanding of budgeting and "foreign investors should pay more as they are rich" mentality does not support further investment plans currently.

"Shady fortune hunter" offered (during the time of writing the master thesis) some packages from different brokers 30 SHP's to be "sold for "tricky" developments and refurbishments and to be re-sold to "innocent" speculators. Without knowing the background of Romanian support scheme, political interventions, without clear checking of proper channels of authorities (and in case of financing through financing institutions) challenges and surprises can be expected.

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[321] http://www.rating.rs/sr/bonitet/RIBOPRODUKT
http://www.kontakti.biz/firma/100592/Riboprodukt
http://www.vibilia.rs/dokument_new.php?s=tenderi&ID=3398170&lang=sr
http://www.ekapija.com/website/sr/page/972606/PRODAJA-IMOVINE-STE%C4%8CAJNOG-DU%C5%BDNIKA-Riboprodukt-doo-u-ste%C4%8Daju-Po%C5%BEega

3.4.9 Financing

"There is a need for financial reform along ethical lines that would produce in its turn an economic reform to benefit everyone. This would nevertheless require a courageous change of attitude on the part of political leaders." Pope Francis

3.4.9.1 Institutional Financing

The World Bank could be a partner for financing of SHPPs in SEE and Energy Community area, however it is mostly involved in financing of other RES technologies. 67 MW of financed SHPP projects are in total 6.70% of all financed RES projects in the region SEE/ECM area (see table below). There are another 240 MW SHPP (515 MW LHPP) in the pipeline. The share of SHPP makes only 1.93% of total 12,419 MW of RES projects in the pipeline (LHPP: 4.15%).

Table 58: Total pipeline and financed HPP projects (MW; USD), 2012[322]

Total Pipeline and Financed HPP Projects (MW; USD), 2012								
Country	SHPP (MW)			LHPP (MW)		∑ total	∑ total	∑
	closed	pipeline	Financed mill USD	closed	pipeline	(MW)	(mill USD)	(MW)
Albania	55	133	4	0	340	55	59	943
Bulgaria	0	0	35	0	0	108	370	1 758
Georgia	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0
Moldova	0	0	0	0	0	0	0	0
Romania	10	0	0	0	0	703	1 480	4 900
Ukraine	0	0	0	0	0	131	482	2 225
Bosnia & Herzegovina	0	72	0	0	117	0	0	189
Croatia	0	0	0	0	0	0	0	0
Kosovo	0	20	0	0	0	0	0	20
Macedonia	0	15	0	0	0	0	0	213
Montenegro	0	0	0	0	0	0	0	118
Serbia	2	0	0	0	58	3	11	2 053
Slovenia	0	0	0	0	0	0	0	0
∑ total	**67**	**240**	**39**	**0**	**515**	**1 000**	**2 402**	**12 419**

The most active sponsor in RES is EVN AG with 340 MW in pipeline (LHPP) and wind totaling 470 MW. Wind power is the most active technology with 1,651 MW in pipeline in Bulgaria. In Romania wind power is also very active with 4,737 MW in pipeline and 609 MW in financed projects. Also in Ukraine wind power is very active with 1,793 MW in pipeline and already 9 MW in financed projects. In SEE wind is also the driver (Bosnia and Herzegovina: LHHP: 117 MW in pipeline, Kosovo: SHPP: 20 MW in

[322] http://ppi-re.worldbank.org/snapshots/country

pipeline, Macedonia: Wind: 198 MW in pipeline, Montenegro: Wind: 118 MW in pipeline, Serbia: Solar: 1,002 MW and wind: 993 MW in pipeline). [323]

The European Bank for Reconstruction and Development (EBRD) – another intergovernmental financing institution – was founded in 1991 to create a new post-cold war era in CEE and is supporting programs which create market-oriented economies through loans and equity investments in ranges in average from USD 5 million to USD 250 million (smaller projects may be financed through special programs).[324]

In Albania EBRD was supporting the investments into SHPP Korca sh.p.k with EUR 5.2 million loans (installed capacity of 5 MW, power generation: 23 GWh, offset of 17,400 tons of CO_2 annually). Since the beginning of its operations in Albania, the EBRD has invested over EUR 700 million in various sectors of the country's economy, mobilizing additional investments of more than EUR 2 billion from other sources of financing.[325]

Table 59: Selected (S)HPP World Bank projects (financed and in pipeline) by 2012[326]

Country	Plant	MW	Technology	USD million	Development of Stage
AL	Ostrovica Faqekuq I & II SHPPs	14	SHP	9	Financial Closure
AL	ETEA Lapaj SHPP	14	SHP	19	Financial Closure
AL	Ble-Klo-Ar Tervol SHPP	12	SHP	10	Financial Closure
AL	Energo-SAS Sasaj SHPP	9	SHP	11	Financial Closure
AL	Fidia Verbe-Selce 1 & 2 SHPP	5	SHP	8	Financial Closure
AL	Erma Carshova SHPP	2	SHP	2	Financial Closure
AL	Devoll River Hydro power plants	340	LHP	0	Pipeline
AL	Ulez & Shkopet SHPPs	50	SHP	0	Pipeline
AL	Hydroalbania Kukes HPP	35	SHP	0	Pipeline
AL	Euron Kukes HPP	25	SHP	0	Pipeline
AL	Bistrica 1 & 2 SHPPs	23	SHP	0	Pipeline
RO	Espe Sapanta SHPP	10	SHP	28	Financial Closure
BiH	Energoinvest Glavaticevo HPP	117	LHP	0	Pipeline
BiH	Comsar Mrsovo SHPP	37	SHP	0	Pipeline
BiH	EFT Ulog SHPP	35	SHP	0	Pipeline
KS	Kelag Decan SHPP	20	SHP	0	Pipeline
MK	Ka-hydro Bosava SHPPs	11	SHP	0	Pipeline
MK	PCC/DEG Gradecka SHPPs	4	SHP	0	Pipeline
SRB	W&W Crkvina & Recica SHPPs	2	SHP	4	Financial Closure
SRB	Reservior Capital Brodarevo HPPs	58	LHP	0	Pipeline

EBRD should be contacted as well for supporting Georgia with an enormous HP possibility as it has a lot of experience in structuring and financing of projects in this

[323] http://ppi-re.worldbank.org/snapshots/country
[324] http://www.ebrd.com/who-we-are.html
[325] http://www.ebrd.com/news/2012/two-new-hydropower-plants-in-albania.html
[326] http://ppi-re.worldbank.org/snapshots/country

region. Jointly, IFC, a member of the World Bank Group, the Asian Development Bank (ADB), and the EBRD are helping Georgia tap into its HP potential and achieve energy self-sufficiency by investing in the construction and operation of the Shuakhevi HPP (the largest HP investment in Georgia with USD 250 million debt financing; production of 450 GWh per year and reduction of CO_2 emission by more than 200,000 tons per year). [327]

Moreover, the Western Balkans Sustainable Energy Direct Financing Facility (WeBSEDFF) helps the region's transition to RES. WeBSEDFF provides debt financing to companies in Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro and Serbia for renewable energy and industrial energy efficiency small and medium-scale projects with a calculated reduction of CO_2 emissions by 500.000 tons a year.[328]

In Serbia the EBRD is providing financing the rehabilitation of 15 existing SHPPs, which will reduce CO_2 emissions by approximate 61,000 tons per year. The project costs are estimated as EUR 54 million which is financed with a EUR 45 million sovereign guaranteed loan.[329]

The Regional Energy Efficiency Program (REEP) for the Western Balkans contain the WeBSEFF, WeBSEDFF and the EBRD loan programs.

The WeBSEFF-program of the EBRD is a small size investment facility established by the EBRD to provide debt financing for energy efficiency projects and small RES projects implemented by private companies in Bosnia and Herzegovina (partner bank: Raiffeisen Bank, UniCredit Bank), Croatia (partner bank: Erste Bank, PBZ Banka, Zagrebacka Banka), Kosovo, Macedonia (partner bank: NLB Banka, Ohridska Banka), Montenegro and Serbia (partner bank: Banca Intesa, Kommercialna Banka). The program is only for financially viable projects with limitation of EUR 2 million for private investors and EUR 2.5 million for public sector investors.[330]

EBRD medium sized projects run as WeBSEDFF in the same countries and area.[331]

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[327] http://www.ebrd.com/news/2015/ebrd-pioneers-private-sector-investment-in-georgias-hydropower-.html
http://www.ebrd.com/news/2015/ifc-adb-ebrd-tata-power-and-clean-energy-help-georgia-achieve-energy-selfsufficiency-.html
[328] http://www.ebrd.com/news/2013/sustainable-energy-in-kosovo-and-fyr-macedonia.html
[329] http://www.ebrd.com/work-with-us/projects/psd/eps-hydropower-plants.html
[330] http://www.webseff.com
[331] http://www.wb-reep.org/eng/financing/WebSEDFF

Other SEFFS are Ukraine Sustainable Energy Financing Facility (USEFF). The EBRD is considering a framework operation of USD 100 million to support sustainable energy investments in Ukraine,[332] MoSEFF (Moldovan Sustainable Energy Financing Facility) supports the 7 best sustainable energy projects in Moldovia.[333] ROSEFF is an SME energy facility in Romania and many other projects.

The Western Balkan Investment Framework (WBIF) supports infrastructure projects (in energy environment, transport and traffic, etc.) of West Balkan pre-accession countries to EU and has provided grants (in total EUR 279 million and 145 projects). The WBIF counts with a leverage of investments of EUR 13 billion Euro in the West Balkan area.[334]

The German "Kreditanstalt für Wiederaufbau" – KfW – a German Development Bank is also committed to Europe and industrialized countries, encourages the use of renewable energies and supports programs aimed at improving energy efficiency and supports following projects in the SEE/ECM area:

- Albania: The German government has commitments of EUR 268 million. Together with the support of KfW Albania got transmission and distribution stations and could improve the security of hydropower.[335]
- Bosnia and Herzegovina: KfW is promoting the building and reconstruction of HPs[336]
- Georgia (Energy Community candidate status): Thanks to KfW Georgia was able to stabilize its power supply and to export power[337]
- Kosovo: In 2009 a transmission line was financed though KfW[338]
- Macedonia: KfW plans to modernize six HPP and to increase capacity and energy efficiency;[339]

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[332] http://www.ebrd.com/work-with-us/projects/psd/ukraine-sustainable-energy-financing-facility-(useff).html

[333] http://www.ebrd.com/news/2012/ebrd-recognises-best-sustainable-energy-projects-in-moldova.html
http://www.ebrd.com/work-with-us/projects/psd/moseff-ii---moldovan-sustainable-energy-ff-extension.html

[334] http://www.wbif.eu/documents/267
http://www.wbif.eu/WBIF+Steering+Committee
http://www.wbif.eu/uploads/lib_document/attachment/325/WBIF_Newsletter__6_archive.pdf
http://www.ebrd.com/pages/homepage.shtml#&panel1-3
http://www.gtai.de/GTAI/Navigation/DE/Trade/Maerkte/suche,t=western-balkans-investment-framework-ermoeglicht-innovative-projektfinanzierung,did=947522.html

[335] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Albania

[336] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Bosnia-and-Herzegovina

[337] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Georgia

[338] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Kosovo

[339] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Macedonia

- Moldova: KfW supports micro, small and medium-sized enterprises;
- Montenegro: KfW is funding the modernization of two HPP in Perucica (307 MW) and Piva (342 MW)[340]
- Serbia: KfW has initially financed a number of aid programs on behalf of the German Federal Government and there is a promotion of the energy sector to invest EUR 850 million;[341]
- Ukraine: KfW is involved in the modernization of five electric power[342]

Another form of indirect financing is the usage of export credit insurances (e.g. OeKB Versicherung and Prisma Kreditversicherung, Coface, Atradius, etc. The Austrian Exportfonds and Austria Wirtschaftsservice support only Austrian machinery and equipment to be delivered to the said area.[343]

3.4.9.2 Commercial Financing

Beside the institutional "development banks" mostly engaged in financing of LHPPs commercial banks should support the SHP investments.

From the Austrian point of view there are only few banks partner for financing in the SEE/ECM area:

- Bank Austria (No 1 in BiH, BG and HR; No 5 in SRB, SLO; No 10 in RO and UA; representation office in MK and MNE; Not represented in AL, GE, MD, GR, KS, MK, MNE))[344];
- Raiffeisen (AL, BiH, BG, HR, KS, RO, SRB, SLO and UA; Not represented in GE, GR, MD, MK, MNE)[345]
- Erste Bank (only in HR, RO and SRB, Leasing in BiH and MK)[346]
- HYPO Alpe Adria (in question if still a financing partner in BiH, HR, MNE, SRB, SLO)[347]

After reorganization of the above mentioned banks none of them has a "renewable energy investment department" with specialists in their headquarters anymore. In the past the investor could contact and consult experts in the headquarters of above mentioned first 3 banks in Vienna, who supported the local risk managements in the business area where banks. Since the economic crisis of 2008 the banks are not "banks" anymore to support the economy. The local branches in the SEE/ECM area

[340] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Montenegro
[341] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Serbia
[342] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Local-presence/Europe/Ukraine
[343] http://www.cbbh.ba/
[344] http://www.bankaustria.at/ueber-uns-zentral--und-osteuropa-unsere-banken-in-cee.jsp
[345] http://www.raiffeisenbank.at/eBusiness/01_template1/1015018521967-892929229803352086_892935769964806630_892935685139202439-898714530081822173-NA-30-NA.html
[346] https://www.erstegroup.com/de/Presse/ErsteGroup-im-Ueberblick/Unternehmensprofil
[347] http://www.hypo-alpe-adria.com/

could not develop real profit centers with experts in RES business. For banks and leasing companies – it is easier to finance and manage simple products, machinery, etc. which details easily can be checked in internet. Austrian banks suffering from their biogas engagement (according to E-Control Managing Director reported in Der Standard: From estimated 300 biogas plants in Austria in 2012 there were 200 in financial disaster or in bankruptcy procedure)[348] are very sensitive when it comes to financing of RES projects in SEE and/or ECM countries.

Other financing sources have to be found: One possibility can be Crowd Financing (see Appendix H: Financing. Case study: Challenges in investments, financing and solution).

3.4.10 Alternative Financing – Crowd financing a solution for investments in SEE and Energy Community countries

As a solution generating down payments (in case of leasing financing) or equity (in case of classical loan financing) alternative financing should be considered since Austrian government has passed a law avoiding classical bank financing and to support risk financing.

A structure how this "new financing system" could support SHP investments is characterized in Appendix H: Financing: Case study: Challenges in investments and financing and solution.

4 CONCLUSION

There is a huge investment potential in the SEE/ECM business area for HP in general. The challenge is to manage the very sensitive (and partially non-informed) business area.

Investing into this area requires

- Money;
- Patience;
- Long term business mentality;
- Staying power;
- Trust and courage;
- Right partners.

Without money the investor is a "shady fortune hunter", without patience and staying power the investor will give up immediately (as deadlines and promises have different meanings and quality in this business area), usually local "business men" search for

[348] http://derstandard.at/1350259325875/Teurer-Ausflug-in-die-Energiewirtschaft

high profitable short term financing opportunities) and are not interested in any RES financing option.

Last but not least, due to lack of information, different interpretation and application of relevant laws, different business mentality, bureaucracy and corruption, the investor needs the right partners in all business steps.

Many foreign investors, companies and institutions are/were successful in the SEE/ECM business area. But companies and institutions such as Hypo Alpe Adria Group, Hypo Leasing Steiermark, Volksbank, Kommunalkredit, Baumax-Essl-Group, Kika-Leiner Group, etc. have all had the same experience: Their engagements in the CEE/SEE area failed.

In energy business we can summarize: Global international acting energy players have the human resources and enough financial background in order to deal with CEE and ECM governments, which have the obligations to resolve local barriers of energy infrastructure investments.

This power is missing on the level of individual investors and other interested parties with goals of energy investments and a sustainable contribution to the environment. Local and as well foreign individual investors are confronted with a high number of restrictions and risks.

So called high qualitative transaction costs can be considered as marketing or information procurement costs and are usually budgeted. Individual investors in many cases are not aware of these costs and can easily fail.

Investing in an environment with said and reported corruption, with unstable governments and economies, with overnight adoptions of laws without qualitative discussions in parliaments can be challenging.

But with steady integration of SEE countries into the community of shared values of the EU and with the cooperation of ECM countries, most of which have applied for the accession to EU membership, a positive trend of change in climate for investment can be seen (especially as implementations of anti-corruption laws in some SEE and ECM countries will become effective in the long run).

The memberships to the EU or the ECM and the obligation to submit NREAPs in order to define binding energy targets for 2020 can be seen as mid-term and long-term energy (investment/saving) strategies of governments which have to support and implement the philosophy of sustainable energy generation and energy saving to the society and to motivate with incentive schemes.

The investors into sustainable energy generation systems such as SHP investments should have visions and patience when doing SHP business in the SEE and ECM regions.

As in 2014 Austrian investors and banks have reduced their investments in general into Eastern European countries down to EUR 1.5 billion, which is the lowest level since 1999,[349] and do not support – despite all the strengths of the governments to modernize the business environment – investments into SHP projects: It is the chance to implement (from the viewpoints of Austrian investors) the so called alternative financing, to generate equity, etc. for SHP investments in SEE/ECM region. The new business model could be to found public-private partnerships (in order to minimize the risks) with partial or total financing through alternative financing (crowd financing).

A structure how this "new financing system" could support SHP investments is characterized in Appendix H: Financing: Case study: Challenges in investments and financing and solution.

REFERENCES

(Remark: Internet documents have been retrieved within the period between May 1st and September 19th, 2015. Most of the documents have been retrieved several times within the said period.)

ADB (2008): PDF "Public-Private Partnership Handbook", Asian Development Bank, http://www.apec.org.au/docs/adb%20public%20private%20partnership%20handbook.pdf

ADEME (2011): PDF "Towards the hydroelectric plant of the 21st century. A guide for the development of small hydroelectric plants with due respect to the natural environment", http://www.asociatiamhc.ro/wp-content/uploads/2013/11/Guide-PCH-21%C3%A8me-si%C3%A8cle_EN_v2.pdf

AGENŢIA DE MANAGEMENT ENERGETIC MARAMUREŞ (2014): PDF "Analysis of RES & EE Legislation in Romania", http://www.europerspectives.org/images/stories/documents/RES&EE%20Legislation%20Analysis.pdf

AKBN (2008): PPT "Hydroenergy in Albania", National Agency of Natural Resources, https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/760177/Albania.pdf

AKBN (2012): PDF "Albania Progress Reports under Renewable Energy Directive 2009/28/EC as adapted by the Ministerial Council Decision 2012/04/MC – EnC", https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3618157/CP_RES_Progress_Report_template_E-al-ok.pdf

[349] http://derstandard.at/2000001391867/Die-Osteuropa-Fantasie-liegt-auf-Eis

Akintoye, A. and Beck, M. (2009): “Policy, finance and management for public-private partnership”, Blackwell Publishing

Akintoye, A. et. Al. (2003): “Public private partnerships – managing risks and opportunity”, Blackwell Science

Alliance for Rural Electrification (2014): PDF “The Potential of Small Hydro for Rural Electrification. Focus: Latin America”, http://www.esha.be/fileadmin/esha_files/documents/SHP_Environment/ARE_Small_Hydropower_Position_Paper_2014.pdf

Arntzen Løche, L. (2011): PDF ”Small hydro in ukraine: to invest or not to invest?“, Fridtjof Nansen Institute, http://www.fni.no/doc&pdf/FNI-R1211.pdf

AUE (2011): PDF “Beurteilung von Projekten für Kleinwasserkraftwerke (< 10 MW) aus Sicht der Nachhaltigen Entwicklung. Instrument zur Nachhaltigkeitsbeurteilung auf der Stufe Vorprojekt“, http://www.bve.be.ch/bve/de/index/direktion/ueber-die-direktion/dossiers/nachhaltige_entwicklungne/nachhaltigkeitsbeurteilung.assetref/dam/documents/BVE/AUE/de/aue_ne_nhb_wkw_schlussbericht_v1_0_d.PDF

Außenwirtschaftscenter Athen (2015): Außenwirtschaft und Naturressourcen Öl- und Gas. Branche und Marktsituation. Konkurrenzsituation und Updaten zu den Vergabeverfahren. Gesetzliche und sonstige Rahmenbedingungen. Trends und Entwicklungen. Chancen für österreichische Unternehmen“, WKO

Außenwirtschaftscenter Belgrad (2013): “Außenwirtschaft Branchenprofil Serbien. Energiewirtschaft und Naturressourcen. Branche und Marktsituation. Gesetzliche und sonstige Rahmenbedingungen. Konkurrenzsituation. Trends und Entwicklungen. Chancen für österreichische Unternehmen“, WKO

Außenwirtschaftscenter Belgrad (2014): “Außenwirtschaft Fachreport Serbien und Montenegro. Zugang zu EU- und IFI finanzierten Projekten. Finanzierungsmöglichkeiten. Ausschreibungsverfahren. Programme internationaler Finanzinstitutionen“, WKO

Außenwirtschaft Branchenreport Bosnien und Herzegowina (2014): “Energy and Environmental Market. Country and Economy. Energy Profile and Market. Environmental Profile and Market. Business Opportunities, Projects. Key Contacts”, WKO

Außenwirtschaft Branchenprofil Bosnien und Herzegowina (2014): “Erneuerbare Energien: Branche und Marktsituation. Konkurrenzsituation. Gesetzliche und sonstige Rahmenbedingungen. Trends und Entwicklungen. Chancen für österreichische Unternehmen“, WKO

Außenwirtschaftscenter Bukarest (2015): “Newsletter Rumänien. Nationale & EU-Förderungen. Internationale Finanzierungen“, WKO

Außenwirtschaftscenter Laibach (2015): “Außenwirtschaft Fachreport Slowenien. Förderung für erneuerbare Energien und Co-Produktion von Wärme und elektrischer Energie in Slowenien“, WKO

Baeck, P. et al. (2014): “Understanding Alternative Finance. The UK Alternative Finance Industry Report 2014”, Nesta and University of Cambridge

Baque, G. et al. (2014): “Coface Handbook of Country Risk 2014”, Coface

Begolli, B. (2015): PPT “Actual situation of water sector in Kosovo”, IMWC/OPM - Austrian Business Opportunities, transmitted via email Austrian Trade Commissioner, 11th, June 2015, Prishtina@advantageaustria.org

Bislimovski, M. (2013): PPT "Feed-in Tariffs in Republic of Macedonia. Energy Regulatory Commission of the Republic of Macedonia", http://www.erc.org.mk

Boyle, G. (1996): "Renewable Energy. Power for a Sustainable Future", Oxford University Press"

Boscaneanu, A. (2010): PDF The Status of RES Regulation in Moldova", http://www.naruc.org/international/Documents/Tue_21_Sep_13_30_Moldova_RES_Overview_Boscaneanu.pdf

Böttcher, J. (2009): "Finanzierung von Erneuerbare-Energien-Vorhaben", Oldenbourg

Braga, D.: PDF "The dynamic of using the rivers energy from Republic of Moldova Territory", The Tiraspol State University, http://aerapa.conference.ubbcluj.ro/2011/PDF/dianabraga.pdf

Bret, A. (2014): "The Energy-Climate Continuum. Lessons from Basic Science and History", Springer

Cabinet of Ministers of Ukraine (2014): PDF "National Renewable Energy Action Plan up to 2020", https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3430146/Ukraine_NREAP_adopted_1Oct2014_ENG.pdf

Coface (2014): "Coface Handbook of Country Risk 2014", Coface

Coface et KSV 1870 (2014): PDF "Country Report für Investoren und Exporteure. Montenegro", https://www.ksv.at/sites/default/files/assets/documents/924-laenderleitfaden-montenegro.pdf

Çoku, M. (2008): PPT "Hydro energy in Albania", AKBN National Agency of Natural Resources

Colville, M. (2013): PDF "The Inefficiencies of the Greek Legal System", https://martindale.cc.lehigh.edu/sites/martindale.cc.lehigh.edu/files/Innefficiencies.pdf

CSD (2010): "The Energy Sector in Bulgaria. Major Governance Issues", Center for the Study of Democracy

De Buysere, K. et al. (2012): "A Framework for European Crowdfunding", European Crowdfunding

Delia, V. et Remus, E. (2014): PDF "Electricity Regulation in Romania: Overview", Pachiu & Associates, http://www.pachiu.com/wp-content/uploads/2014/05/Electricity_2014.pdf

Doloşcanu, T. (2010): PDF "Renewable Energy in Moldova", Consult Group, http://www.ost-ausschuss.de/sites/default/files/pm_pdf/ConsultGroup.pdf

Doujak, E. (2010): "Reliable Hydropower for a safe and sustainable power production", TU Wien Vienna University of Technology

Dragusha, B. (2012): PPT "Energy Efficiency in Republic of Kosovo", Ministry of Economic Development (PPT delivered Austrian Trade Commissioner, email Prishtina@advantageaustria.org, June 11th, 2015)

ECRB (2011): PDF "Promotion of Electricity produced from Renewable Energy Sources in the Energy Community – Status Quo and Framework", Energy Community Regulatory Board, https://www.energy-community.org/pls/portal/docs/1284180.PDF

Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK (2008): PDF "Vorstudie. Kleinwasserkraftwerk Lavin. Programm Wasserkraftwerke", http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/42/008/42008358.pdf

Energy Community (2007): PDF "Bosnia & Herzegovina. STATEMENT ON SECURITY OF SUPPLY", https://www.energy-community.org/pls/portal/docs/85835.PDF

EPEC (2014): PDF "Market Update. Review of the European PPP Market. First half of 2014", http://www.eib.org/epec/resources/epec_market_update_2014_h1_en.pdf

ERO (2010): PDF "Energy Regulatory Office. Renewable Energy Support Schemes", http://www.naruc.org/international/Documents/119_ERO_RES%20support%20schemes_final.pdf

ESHA (2004): PDF "Handbuch zur Planung und Errichtung von Kleinwasserkraftwerken", http://www.watervortex.net/download/handbuch_erricht_kwk.pdf

ESHA (2012): PDF "Small Hydropower Roadmap. Condensed research data for EU-27". The Stream Map project Year of Implementation: 2009-2012", http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf

Euronatur et RiverWatch (2014): PDF "Outstanding Balkan river landscapes – a basis for wise development decisions", http://www.balkanrivers.net/sites/default/files/BA_CountrySpecial14%5Bsmallpdf.com%5D.pdf

EUROPE 2020 TARGETS, (2013): PDF "EUROPE 2020 TARGETS: climate change and energy", http://ec.europa.eu/europe2020/pdf/themes/16_energy_and_ghg.pdf

Eurostat Newsrelease, (2015): PDF "Renewable Energy in the EU. Share of renewables in energy consumption up to 15% in the EU in 2013. Three Member States already achieved their 2020 target", http://ec.europa.eu/eurostat/documents/2995521/6734513/8-10032015-AP-EN.pdf/

Gide Loyrette Novel (2011): PDF "Bosnia and Herzegovina. Assessment of the Quality of the PPP Legislation and of the Effectiveness of its Implementation", http://www.ebrd.com/documents/legal-reform/bosnia-pppsconcessions-assessment-2012.pdf

Giesecke, J. et Mosonyi, E. (2009): "Wasserkraftanlagen. Planung, Bau und Betrieb", Springer

Glachant, J-M. et Lévêque, F. (2009): "Electricity Reform in Europe. Towards a Single Energy Market", Edward Elgar

Goodman, T. (1999): "The Forbes Book of Business Quotations: 14,173 thoughts on the Business of Life", Könemann

GTAI (2014): PDF "Wirtschaftskonferenz zum Westlichen Balkan", August 28th, 2014, GTAI Berlin, https://www.gtai.de/GTAI/Content/DE/Trade/Fachdaten/PUB/2014/09/pub201409018001_19242_wirtschaftskonferenz-zum-westlichen-balkan--berlin-28-08-2014.pdf

Gvilava, E. et Garibashvili, L. (2014): PDF "Country Report Georgia. Reinforcing cooperation with ENP countries on bridging the gap between energy research and energy innovation", http://ener2i.eu/page/34/attach/0_Georgia_Country_Report.pdf

Habibija, H. (2012): PDF “Master Thesis: An Analysis of Public-Private Partnerships in Bosnia and Herzegovina”, School of Economics and Business University of Sarajevo and Faculty of Economics University of Ljubljana”, http://www.cek.ef.uni-lj.si/magister/habibija777-B.pdf

Hydro Energy in Albania (2012): PDF “Hydro Energy in Albania”, http://aea-al.org/wp-content/uploads/2012/04/HYDRO-ENERGY-ALBANIA.pdf

ICREPQ’13 (2013): PDF “The Impact of Small HPP’s in the Energy Balance of Albanian Power System”, http://www.icrepq.com/icrepq'13/424-celo.pdf

IFC (2015): PDF “Belgrade Waste Treatment and Disposal PPP Project”, http://www.beograd.rs/download.php/documents/BWTDTeaser.pdf

IFC International Finance Corporation/World Bank Group (2011): PPT “IFC & WB energy projects in Kosovo”, BMF Federal Ministry of Finance, transmitted via email Austrian Trade Commissioner, 11th, June 2015, Prishtina@advantageaustria.org

Hanningsvåg at al. (2001): “Hydropower in the New Millenium. Proceedings of the 4th International Conference on Hydropower Development Hydropower ’01 / Bergen / Norway / 20-22 June 2001”, A.A.Bakema Publishers

IEA (2013): “World Energy Outlook 2013”, IEA

INDEP (2012): PDF ”Energy Efficiency in Kosovo. An analysis of the legal framework and its implementation”, http://www.indep.info/documents/47626_INDEP%20-%20Energy%20Efficiency%20in%20Kosovo.pdf

International Business Publications (2013): “Romania Energy Policy, Laws and Regulations Handbook Volume 1 Strategic Information and basic Laws”, International Business Publications

International Business Publications (2013): “Ukraine: Energy Policy, Laws and Regulations Handbook, Volume 1 Strategic Information and basic Laws”, International Business Publications

International Business Publications (2014): “Ukraine: Oil & Gas Sector Energy Policy, Laws and Regulations Handbook”, International Business Publications

IRENA (2005): PDF “Renewable Energy Technologies: Cost Analysis Series. Hydropower”, http://www.irena.org/documentdownloads/publications/re_technologies_cost_analysis-hydropower.pdf

IRENA Executive Strategy Workshop on Renewable Energy in South East Europe (2013) PDF “Background Paper. Topic A. Renewable Energy Action Plans and Regulations to Harmonize with EU Directives”, http://www.irena.org/DocumentDownloads/events/2013/December/Background_Paper-A.pdf

Ivanov, M. et Zig, E. (2014): PDF “Investieren in Erneuerbare Energie 2014. Österreich, Deutschland, sowie Bulgarien, Kroatien, Polen, Rumänien, Slowakei, Slowenien, Tschechien, Ungarn“, Kommunalkredit, https://www.kommunalkredit.at/uploads/KAStudieErneuerbareEnergie2015Online_7307_DE.pdf

Jureković, T. (2013): PDF “energy Regulation in Croatia – Cooperation with Competition Authorities“, Joint ECRB and Energy Community Competition Authorities Network Meeting, https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2106179/Croation_developments_-_Mr_Jurekovic.pdf

Justice & Environment (2011): PDF "Energy Efficiency Legislation and Policies Romania", http://www.justiceandenvironment.org/_files/file/2011%20CC%20RO%20eff%20final.pdf

Kommunalkredit (2014): PDF "Deutschland, sowie Bulgarien, Kroatien, Polen, Rumänien, Slowakei, Slowenien, Tschechien, Ungarn", Kommunalkredit, http://www.greenpilot.at/pdf/greenpilot_Studie_ErneuerbareEnergie_2014_DE.pdf

Kopecek, C. (2009): "Which countries in Central and South Eastern Europe are attractive for Investment in Small Hydro Power Plants?, master thesis, TU Vienna

Köttner, B. et Kayse, K. (2014): PDF "IBBK. Report. Assessment of the framework conditions for biogas production in Serbia",BBK Fachgruppe Biogas GmbH, http://www.bioenergy-serbia.rs/images/documents/studies/Biogas_Market_in_Serbia_Asessement_2014.pdf

KPMG (2010): PDF "Energy and Natural Resources. Central and Eastern European Hydropower Outlook", KPMG, http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

Lepotić Kovačević, B. (2013): "Construction of plants and electricity generation in small hydropower plants in the Republic of Serbia. Guide for Investors", Ministry for Energetic

Leiter, A. (2008): "Kleinwasserkraftswerksbau betriebswirtschaftlich. Grundlage für Investitionsentscheidungen", VDM

Leskoviku, A. (2015): PPT "Projects and Implementation of Renewable Energy", AKBN National Agency of Natural Resources, transmitted via email Austrian Trade Commissioner, 4th, June 2015, tirana@advantageaustria.org

Madir, J. (2012): PDF "Public-private partnerships in Croatia", http://www.ebrd.com/downloads/research/news/lit112c.pdf

Maroulis, G. (2013): "Renewable energy policy database and support – RES-Legal Europe. National profile: Greece", §RES LEGAL

MHyLab et al. (2005): PDF "Checklist on Small Hydropower Pre Feasibility Study on Small Hydro", Network on Small Hydropower (TNSHP), http://www.esha.be/fileadmin/esha_files/documents/publications/publications/checklist_EN_2005.pdf

Michaelides, E. (2012): "Alternative Energy Sources", Springer

Ministry of Economic Development (2007): PDF "Energy Development Strategy of the Republic of Montenegro by 2025. Green Paper. Abstract from the Energy Development Strategy", http://www.gov.me/files/1184765960.pdf

Ministry of Economic Development (2014): PDF " Kosovo Progress Report on promotion and use of energy from Renewable Energy Sources under Directive 2009/28/EC as adapted by the Ministerial Council Decision 2012/04/MC – EnC",Department of Energy – Division of Renewable Energy, Efficiency and Cogeneration, https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3552157/Progress_Report_on_implementation_of_NREAP_2014.pdf

Ministry of Economic Development (2013): PDF "National Renewable Energy Action Plan (NREAP) 2011-2020, https://www.energy-

community.org/portal/page/portal/ENC_HOME/DOCS/2570177/NREAP_18.11.2013_-_engl..pdf

Ministry of Economy (2010): PDF "National Renewable Energy Action Plan (NREAP) of Romania", http://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_romania_en.pdf

Ministry of Economy (2010): PDF "Strategy for Energy Development in the Republic of Macedonia until 2030", http://weg.ge/wp-content/uploads/2013/05/Macedonia-Energy-Strategy-2010-2030.pdf

Ministry of Energy, Development and Environmental Protection (2013): PDF "National Renewable Energy Action Plan of the Republic of Serbia (In accordance with the template forseen in the Directive 2008/29/EC - Decision 2009/548/EC), https://www.energy-community.org/pls/portal/docs/2144185.PDF

Ministry of Energy and Mining (2009): PDF "energy Strategy of the Republic of Kosovo 2009-2018", http://www.mei-ks.net/repository/docs/ANNEX_12_-_Kosovo_Energy_Strategy_2009-2018.pdf

Ministry of Energy of Georgia (2012): PDF "Investment Opportunities in Energy Sector of Georgia", http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Tavdumadze_InvOp.pdf

Ministry of Environment, Energy & Climate Change (2009): PDF "Greece: National Renewable Energy Action Plan in the Scope of Directive 2009/28/EC", http://www.ypeka.gr/LinkClick.aspx?fileticket=CEYdUkQ719k%3D&%E2%80%A6

Morales Pedraza, J. (2015): "Electrical Energy Generation in Europe. The Current and Future Role of Conventional Energy Sources in the Regional Generation of Electricity", Springer

Morales Pedraza, J. (2015 a): "Electrical Energy Generation in Europe. The Current Situation and Perspectives in the Use of Renewable Energy Sources and Nuclear Power for Regional Electricity Generation", Springer

Nachmany et al (2015): PDF "Climate Change Legislation in Greece. An Excerpt from The 2015 Global Climate Legislation Study. A Review of Climate Change Legislation in 99 Countries", http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/05/GREECE.pdf

Nachtnebel, H.P. (2003): PDF "Wasserwirtschaftliche Planungsmethoden. Fallbeispiele zur Wirtschaftlichkeit eines KWKW", https://iwhw.boku.ac.at/LVA816106/PDFs_der%20Praesentationen/3_Beispiel_KWKW.pdf

Narbel, et al. (2014): "Energy Technologies and Economics", Springer

Nationalreport 2013 (2014): "Nationalreport 2013", Romanian Energy Regulatory Authority (ANRE), www.anre.ro

Nelson, V. (2011): "Introduction to Renewable Energy", CRC Press

Newton, D.E. (2013): "World Energy Crisis", Contemporary World Issues, ABC-CLIO

(OeBFA Austrian Treasury, Republic of Austria. Investor Information – June 2015, Presentation).

Peeters, M. et Schomerus, T. (2014): "Renewable Energy Law in the EU. New Horizons in Environmental and Energy Law series. Legal Perspectives in Environmental and Energy Law", EE Elgar

Pehevski, V. (2013): PPT "Investment Opportunities in the Macedonian Energy Sector", Republic of Macedonia

Penche, C. (1988): PDF "Layman's Guidebook on how to develop a small hydro site. A handbook prepared under contract for the Commission of the European communities, Directorate-General for Energy by European Small Hydropower Association (ESHA)", ESHA, http://www.seai.ie/Renewables/Hydro_Energy/EU_layman's_guide_to_small_hydro.pdf

ÖGUT (2011): PDF "Kennzahlen zum Energieverbrauch in Dienstleistungsgebäuden. Bericht über Kennzahlen zum Energieverbrauch in den Bereichen „Lebensmitteleinzelhandel", „Nichtlebensmitteleinzelhandel", „Beherbergung", „Gastronomie", „Bürogebäude" und „Krankenhäuser" im Rahmen des Projektes EV-DLB-Energieverbrauch im Dienstleistungssektor"; http://www.oegut.at/downloads/pdf/e_kennzahlen-ev-dlg_zb.pdf

OPCOM (2011): PDF "Romanian Green Certificates Market", Romanian Electricity Market Operator", http://greenenergy.thediplomat.ro/docs/OPCOM_Cert.pdf

REN 21 (2013): PDF "Renewables 2013. Global Status Report. Renewable Energy Policy Network for the 21st century", http://www.ren21.net/Portals/0/documents/Resources/GSR/2013/GSR2013_lowres.pdf

Renewable Energy Directive 2009/28/EC as adapted by the Ministerial Council Decision 2012/04/MC – EnC", https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3618157/CP_RES_Progress_Report_template_E-al-ok.pdf

Republic of Albania (2009): PDF "National Energy Efficiency Action Plan 2010-2018", https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/1138177/NEEAP_of_the_Republic_of_Albania_2010-2018.pdf

Republic of Bulgaria, (2009): PDF "National Renewable Energy Action Plan", Ministry of Economy, Energy and Tourism, http://pvtrin.eu/assets/media/PDF/EU_POLICIES/National%20Renewable%20Energy%20Action%20Plan/203.pdf

Republic of Moldova (2013): PDF "Moldova Energy Sector Reform and Efficiency Improvements project: National Renewable Energy Action Plan of the Republic of Moldova 2013-20120", https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3044025/Final_NREAP_EN_Dec_2013.pdf

Republic of Montenegro (2011: PDF "National Renewable Energy Action Plan To 2020 Montenegro (pursuant to the template envisaged by the Renewable Energy Directive 2009/28/EC - Decision 2009/548/EC), https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3608173/Montenegro_NREAP_29-12-2014_English.pdf

Reutz, T. (2011): "beware of the transaction costs! – an assessment of transaction costs accruing for independent power producers in small-scale hydropower development in Indonesia", http://brage.bibsys.no/xmlui/bitstream/handle/11250/187281/MASTER%20THESIS%20TIRIL%20REUTZ.pdf?sequence=1

Schlattl, G. (2013): "Umwelttechnik und Erneuerbare Energien in Südosteuropa. Marktinformationen und Chancen für österreichische Unternehmen in Mazedonien", Powerpoint presentation, AWO-Branchenforum – Advantage Austria

Schwarz, U. (2015): PDF "Hydropower Projects in Protected Areas on the Balkans"; Euronatur & RiverWatch, http://balkanrivers.net/sites/default/files/Protected%20areas%20and%20hydropower%20dams%20in%20the%20Balkan190515.pdf

Sørensen, B. (2010): "Renewable Energy. Physics, Engineering, Environmental Impacts, Economics & Planning", Elsevier

Stamm, J. et Graw, K.-U. (2011): "Wasserkraft. Mehr Wirkungsgrad + mehr Ökologie = mehr Zukunft. Waterpower. More Efficiency + more Ecology = more Future", Technische Universität Dresden

Stefanov, R. et al. (2011): "Energy and Good Governance in Bulgaria: Trends and Policy Options", Center for the Study of Democracy

The World Bank, Europe and Central Asia Region (2013): PPT "Republic of Bulgaria. Power Sector Rapid Assessment",

Tomanov, I. (2006): PDF "Current Status of regulation in Bulgaria: Encouraging Investment in and Utilization of Renewable Energy Sources (RES)", State Commission on Energy and Water Regulation (SCEWR)", http://www.naruc.org/international/Documents/SEWRC_Tomanov_Eng.pdf

Tsipouri,L. (2011): PDF "Expert Evaluation Network. Delivering Policy Analysis on the Performance of Cohesion Policy 2007-2013. Task 1: Policy Paper on Renewable Energy and Energy Efficiency of Residential Housing. Greece", National and Kapodistrian University of Athens, http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/expert_innovation/2011_synt_rep_el.pdf

Tushurashvili, G. (2013): PDF "Energy Strategy and Energy Policy. Developments for the Promotion of Clean Power Generation in Georgia", https://www.energy-community.org/pls/portal/docs/1910181.PDF

Uhorakeye, T. et al. (2013): "Energy for Sustainable Development. Theses of German International Masters. Sustainable Energy Planning and Policies", Markgraf

UNIDO et ICSHP (2013): "World Small Hydropower Development Report 2013)", http://www.gwp.org/Global/ToolBox/References/World%20small%20hydropower,%20development%20report%202013.pdf

United Nations (2008): PDF "Guidebook on promoting good governance in public-private partnerships", http://www.unece.org/fileadmin/DAM/ceci/publications/ppp.pdf

van Herpen, G.W.E.B. (2002): "AET Conference: Public private partnerships, the advantages and disadvantages examined", Dutch Ministry of Transport, Public Works and Water Management

Vieira da Rosa, A. (2009): "Fundamentals of Renewable Energy Process", Elsevier

Vujosevic, I. (2007): PDF "A Brief Background Note on the Power Sector Reforms in Montenegro", http://siteresources.worldbank.org/PGLP/Resources/ENERGYSECTOROFMONTENEGRO.pdf

Wagner, H-J. et Mathur, J. (2011): "Introduction to Hydro Energy Systems. Basics, Technology and Operation", Springer

Wardrop, R. et al. (2015): “Moving Mainstream. The European Alternative Finance Benchmarking Report”, University of Cambridge and EY Building a better working world

Waterpowermagazine (2012): “Water Power & Dam Construction. Yearbook 2012”, Waterpowermagazine

WKO Außenwirtschaft Update Rumänien (2015): https://webshop.wko.at/shop/download.php?&id=5345&n=1&hxfile&oeff=0&f=Rum%C3%A4nien_Update%20_07042015.pdf

WKO Wirtschaftskammer Österreich (2015): “Länderprofil Rumänien”; https://webshop.wko.at/shop/download.php?&id=5332&n=1&hxfile&oeff=0&f=lp_ro.pdf

World Energy Council (2011): PDF “UN-Energy. Strengthening Public-Private Partnerships to Accelerate Global Electricity Technology Deployment – Recommendations from the Global Sustainable Electricity Partnership Survey“, http://www.gsep-ppp.org/wp-content/uploads/2014/03/report_-_strengthening_ppp_recommendations.pdf

World Future Council (2007): PDF “Feed-In Tariffs – Boosting Energy for our Future. A guide to one of the world’s best environmental policies”, http://www.worldfuturecouncil.org/fileadmin/user_upload/Maja/Feed-in_Tariffs_WFC.pdf

Wolf Theiss (2014): PDF “The Wolf Theiss Guide to: Generating Electricity from Renewable Sources in Central, Eastern & Southeastern Europe”, http://www.wolftheiss.com/tl_files/wolftheiss/Dokumente/Publications%20Archiv/The_Wolf_Theiss_Guide_to_Generating_Electricity_from_Renewable_Sources_in_CEE_SEE_2014.pdf

Zafirovski, S. (2013): “Feed-in Tariffs: Operational Model of the Renewable Energy Support System in the Republik of Macedonia“, (Powerpoint presentation) www.erc.org.mk

Zobaa, A. F. et Bansal R. C. (2011): “Handbook of Renewable Energy Technology”, World Scientific

APPENDICES

Appendix A: Overview of energy-related data

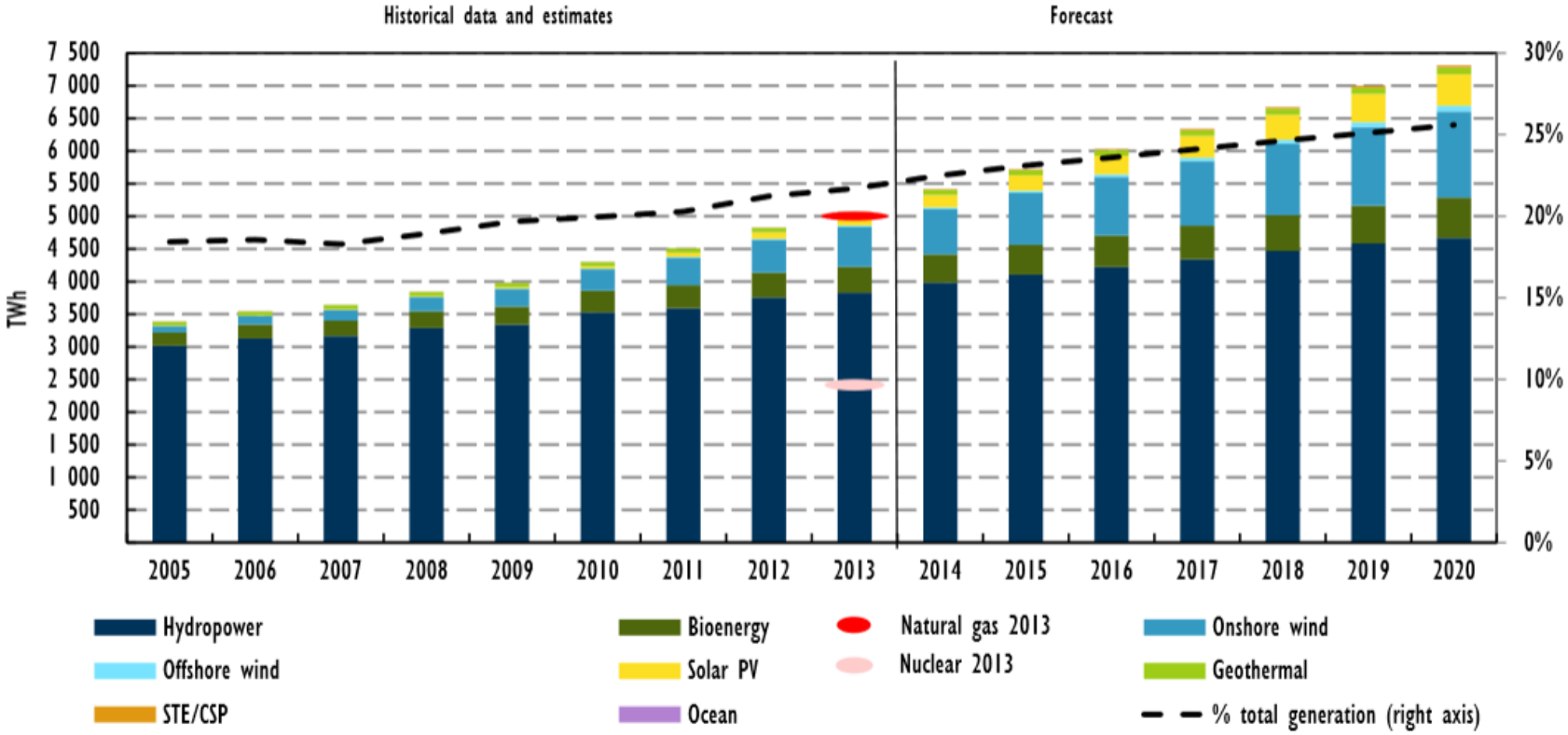

Figure 15: Global renewable electricity production: Historical and projected data[350]

[350] https://www.hydropower.org/sites/default/files/publications-docs/Paolo-Frank-IEA-2050-by-2050-World-Hydropower-Congress.pdf

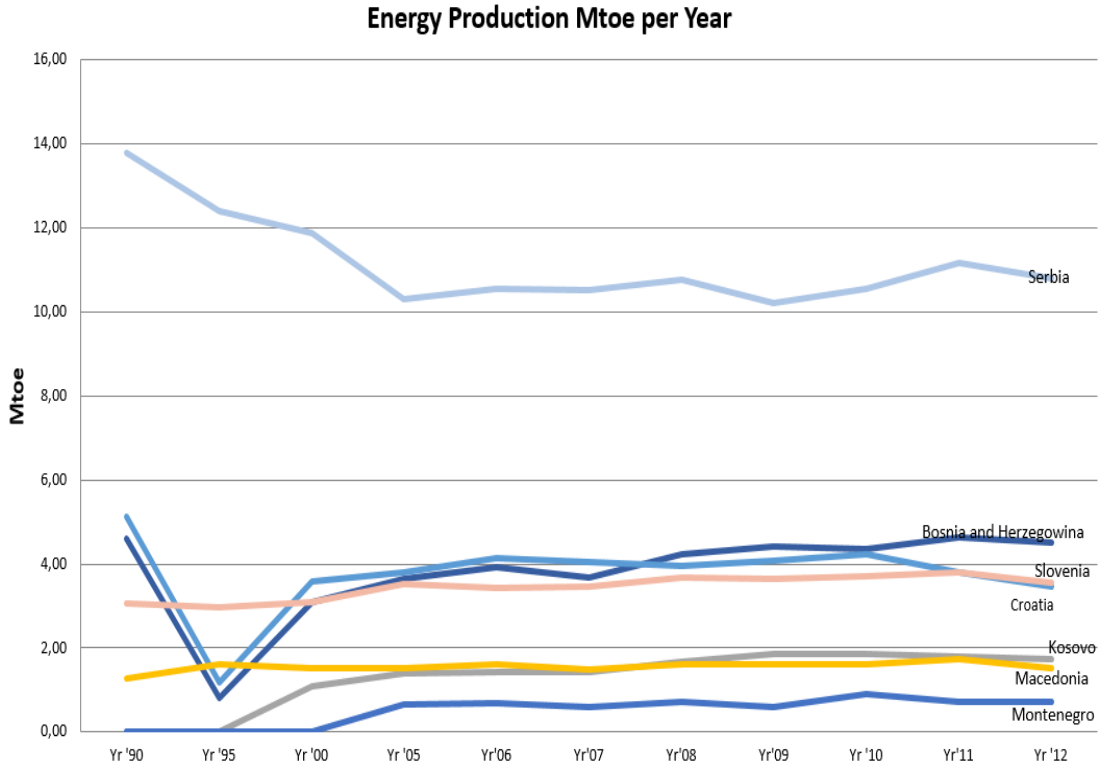

Figure 16: Energy Production in Countries of former Yugoslavia (Mtoe per Year; own analysis)[351]

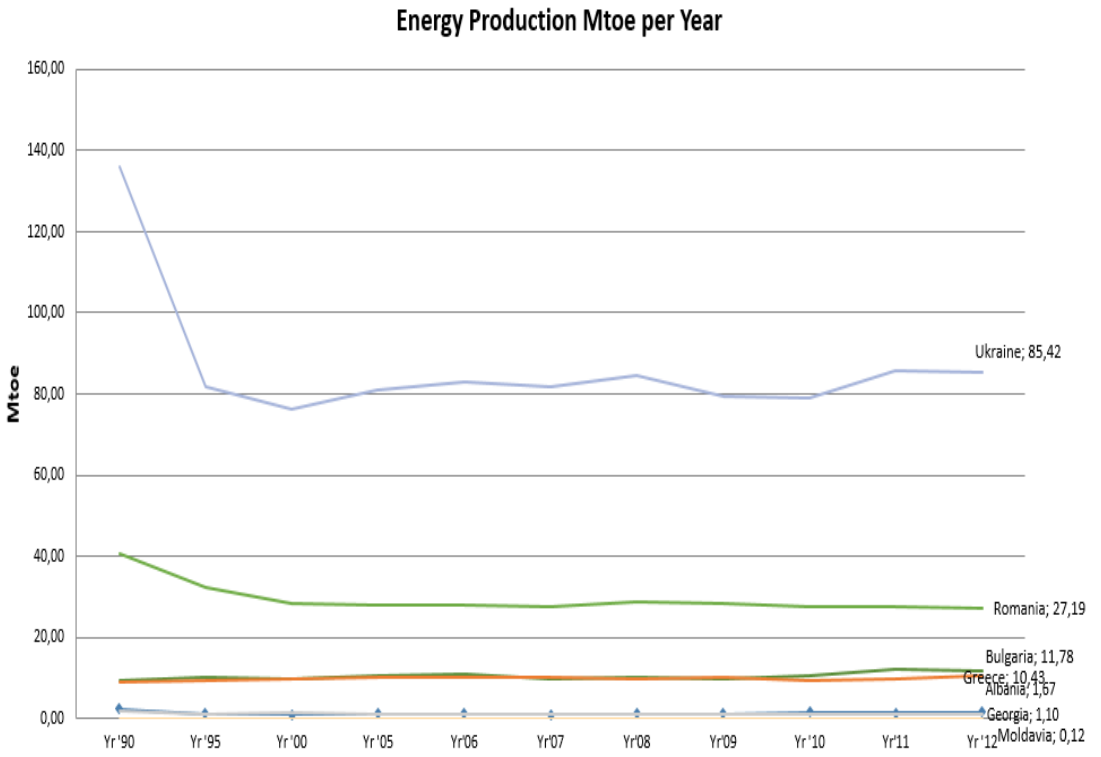

Figure 17: Energy Production in other SEE countries (excluding former Yugoslavia) and Energy Community countries (Mtoe per Year; own analysis) [352]

[351] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[352] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

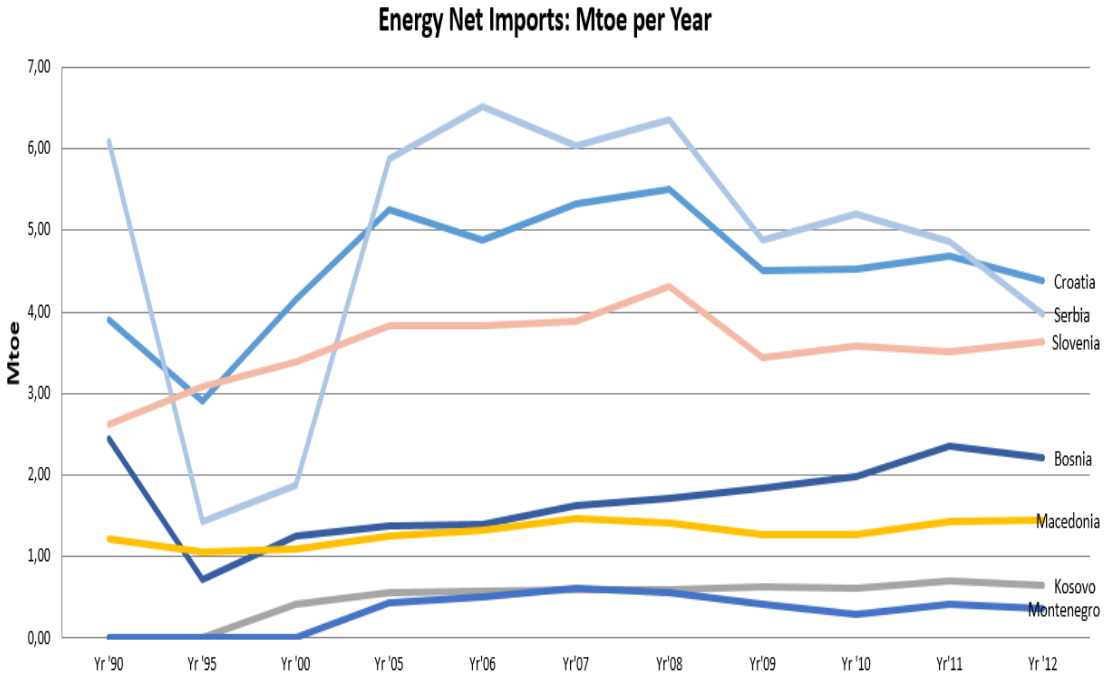

Figure 18: Energy Net Imports of countries of Former Yugoslavia (Mtoe per Year; own analysis) [353]

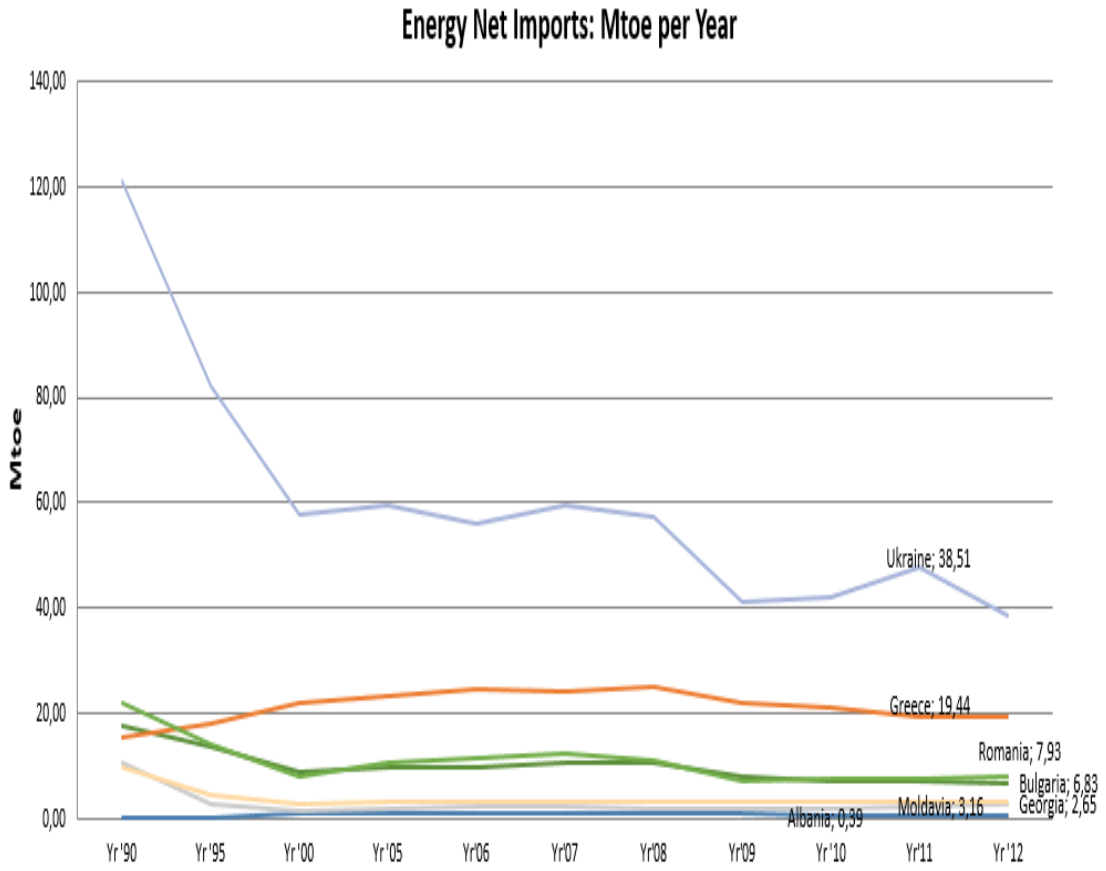

Figure 19: Energy Net Imports in other SEE countries (excluding former Yugoslavia) and Energy Community countries (Mtoe per Year; own analysis) [354]

[353] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[354] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

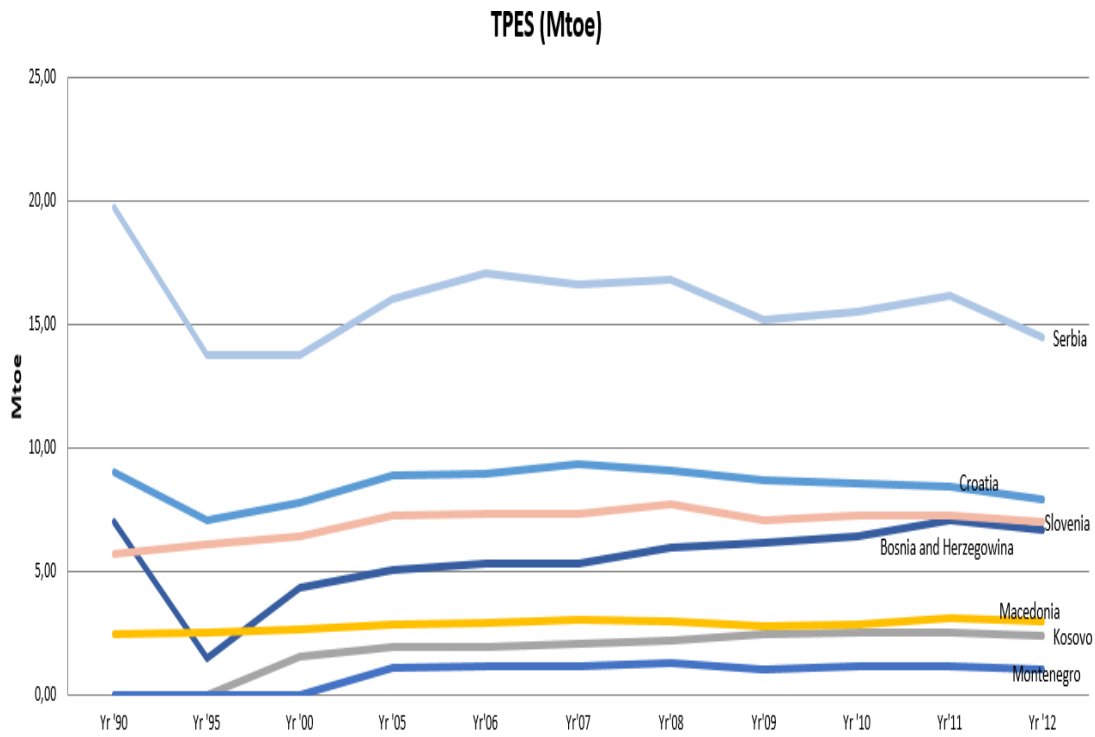

Figure 20: Total Primary Energy Supply in countries of Former Yugoslavia (Mtoe per Year; own analysis)[355]

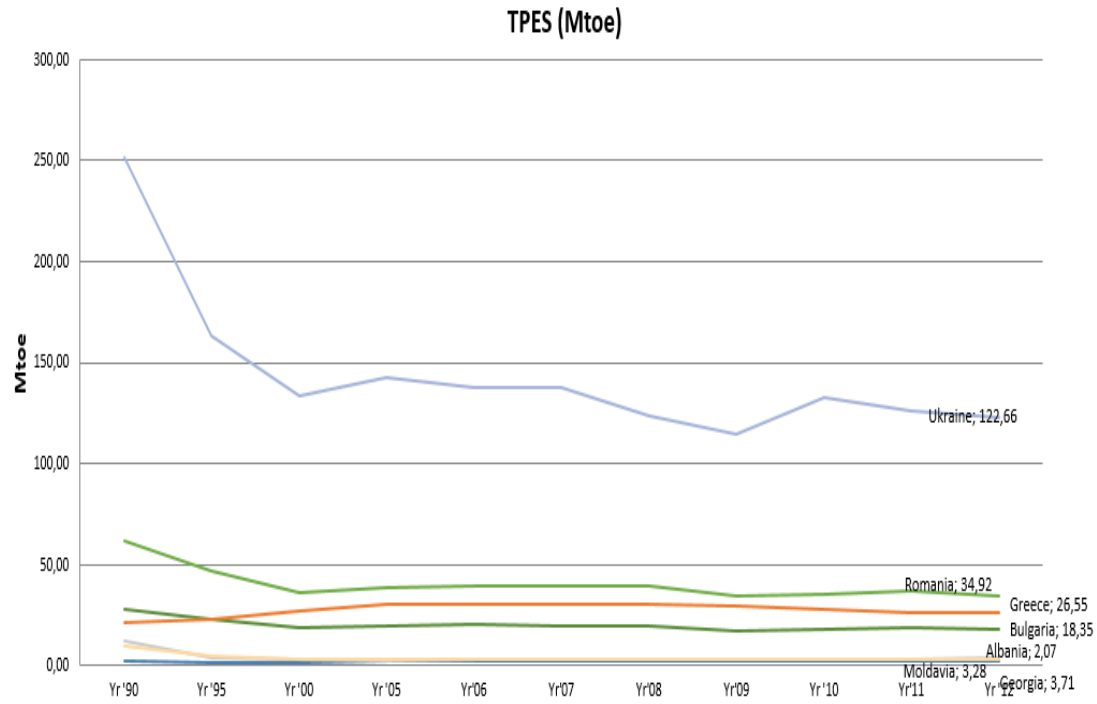

Figure 21: Total Primary Energy Supply in other SEE countries (excluding former Yugoslavia) and Energy Community (Mtoe per Year; own analysis) [356]

[355] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[356] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

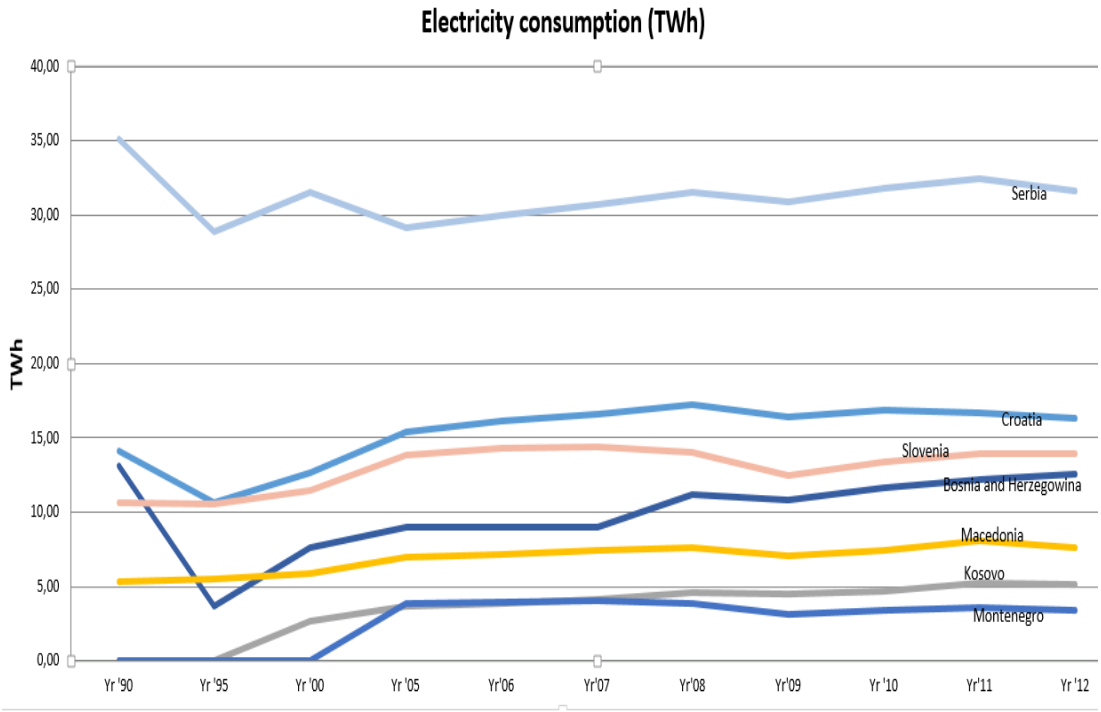

Figure 22: Electricity Consumption in countries of Former Yugoslavia (TWh per Year; own analysis Electricity Consumption (TWh per Year; own analysis)[357]

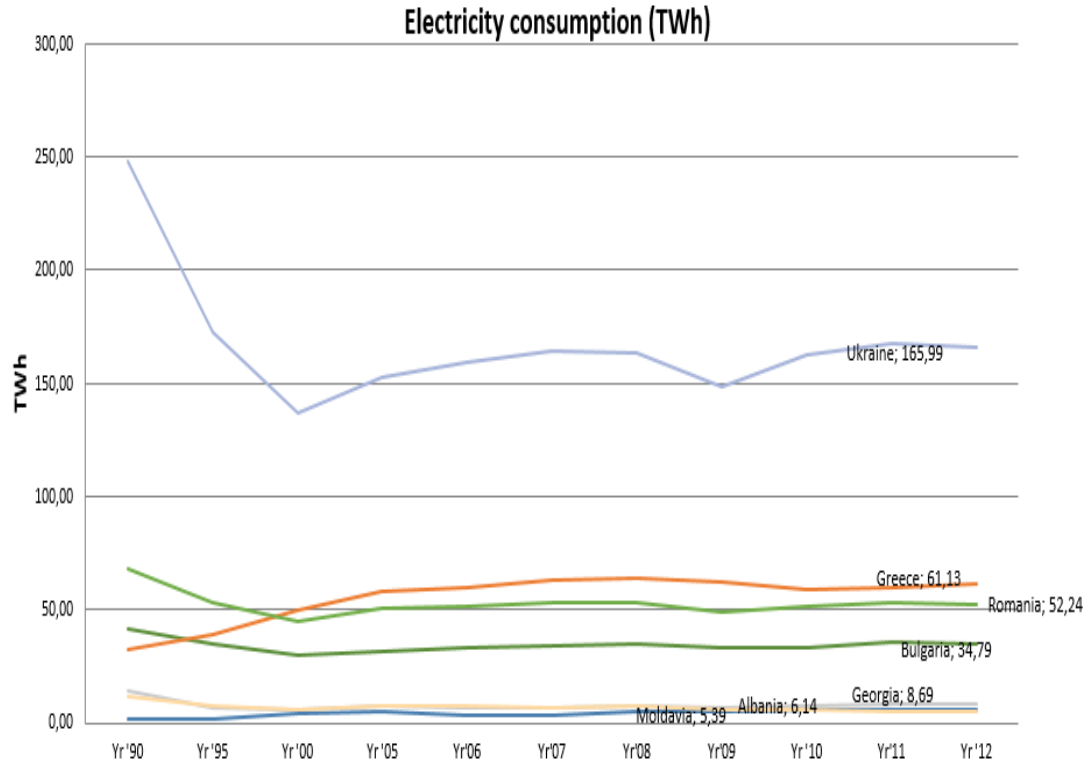

Figure 23: Electricity Consumption in other SEE countries (excluding former Yugoslavia) and Energy Community (TWh per Year; own analysis) [358]

[357] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[358] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

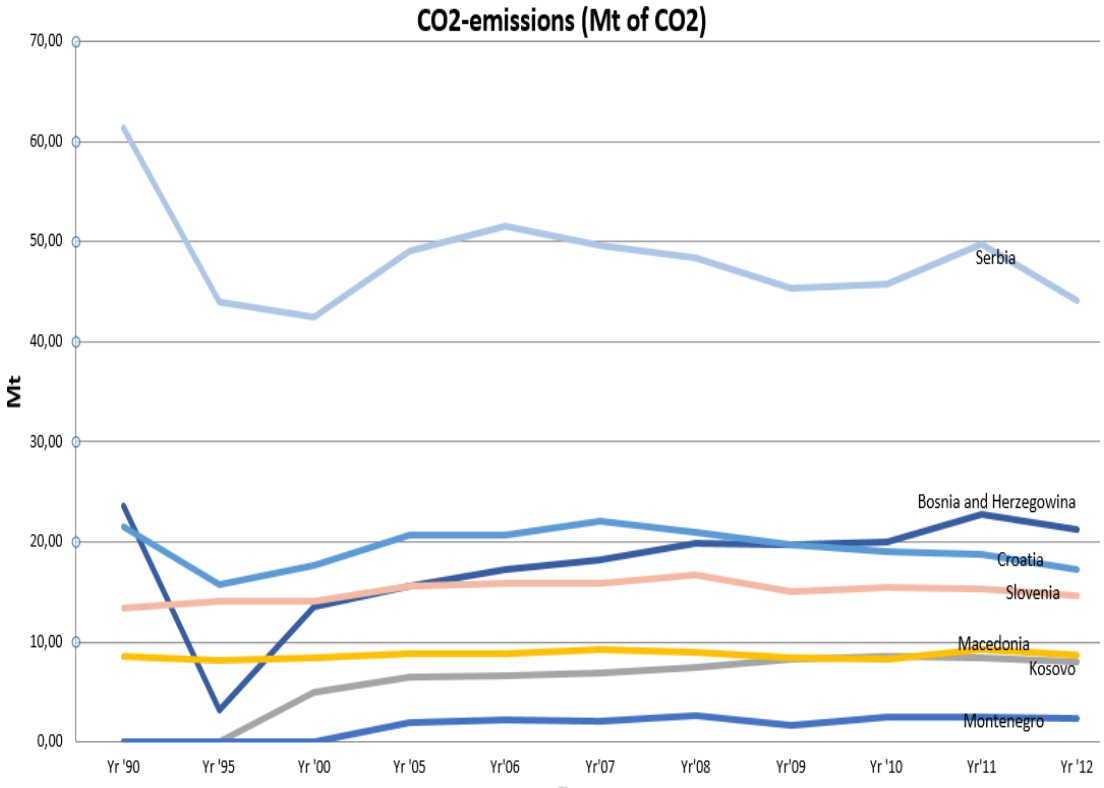

Figure 24: CO_2-emissions of countries of former Yugoslavia (Mt per Year; own analysis)[359]

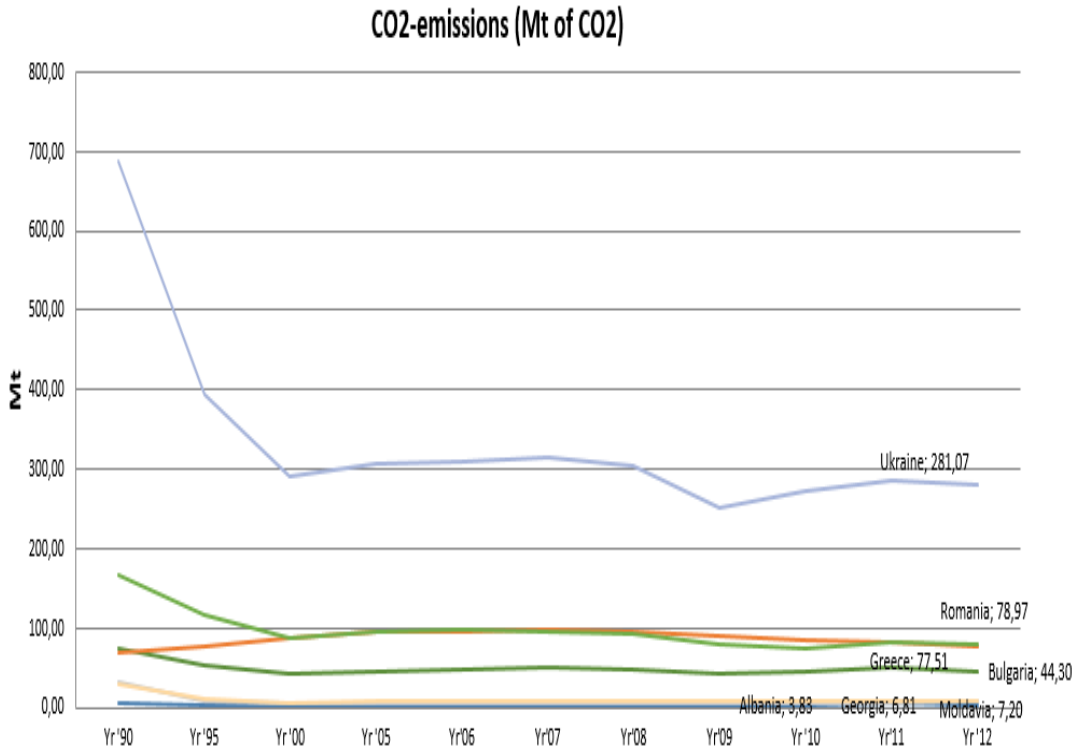

Figure 25: CO_2-emissions of other SEE countries (excluding former Yugoslavia) and Energy Community (Mt per Year; own analysis) [360]

[359] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[360] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

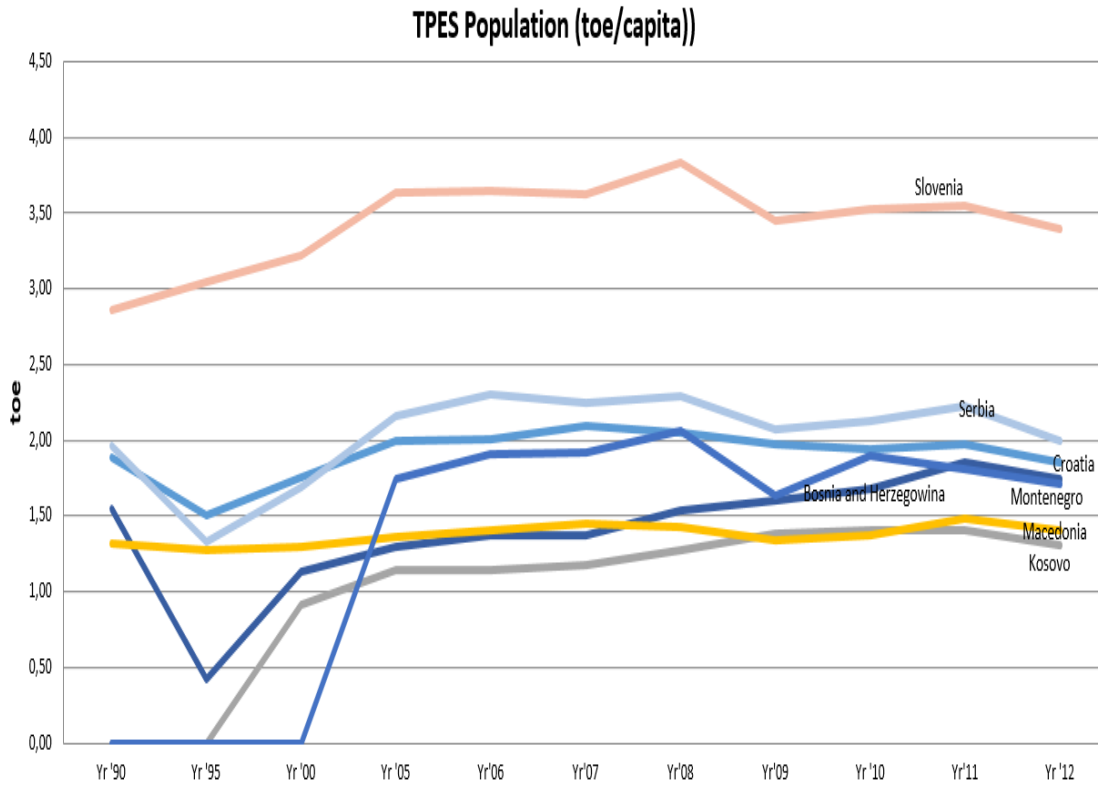

Figure 26: TPES Population of countries of former Yugoslavia (toe/capita; own analysis) [361]

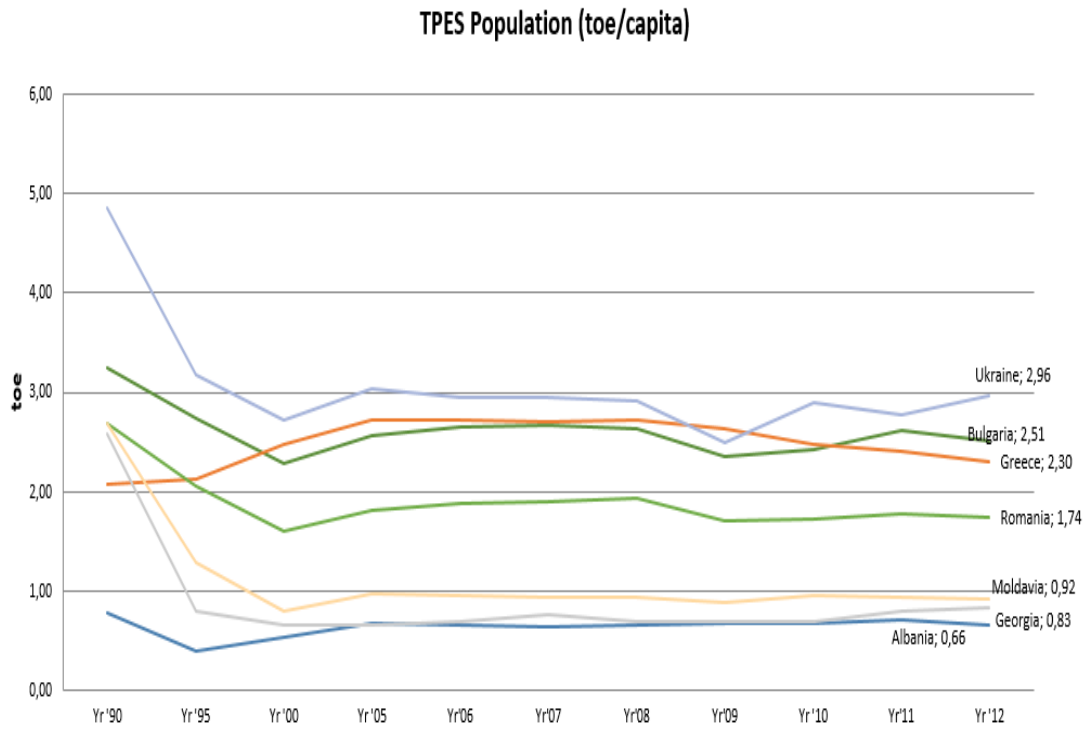

Figure 27: TPES Population of other SEE countries (excluding former Yugoslavia) and Energy Community (toe/capita; own analysis) [362]

[361] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[362] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

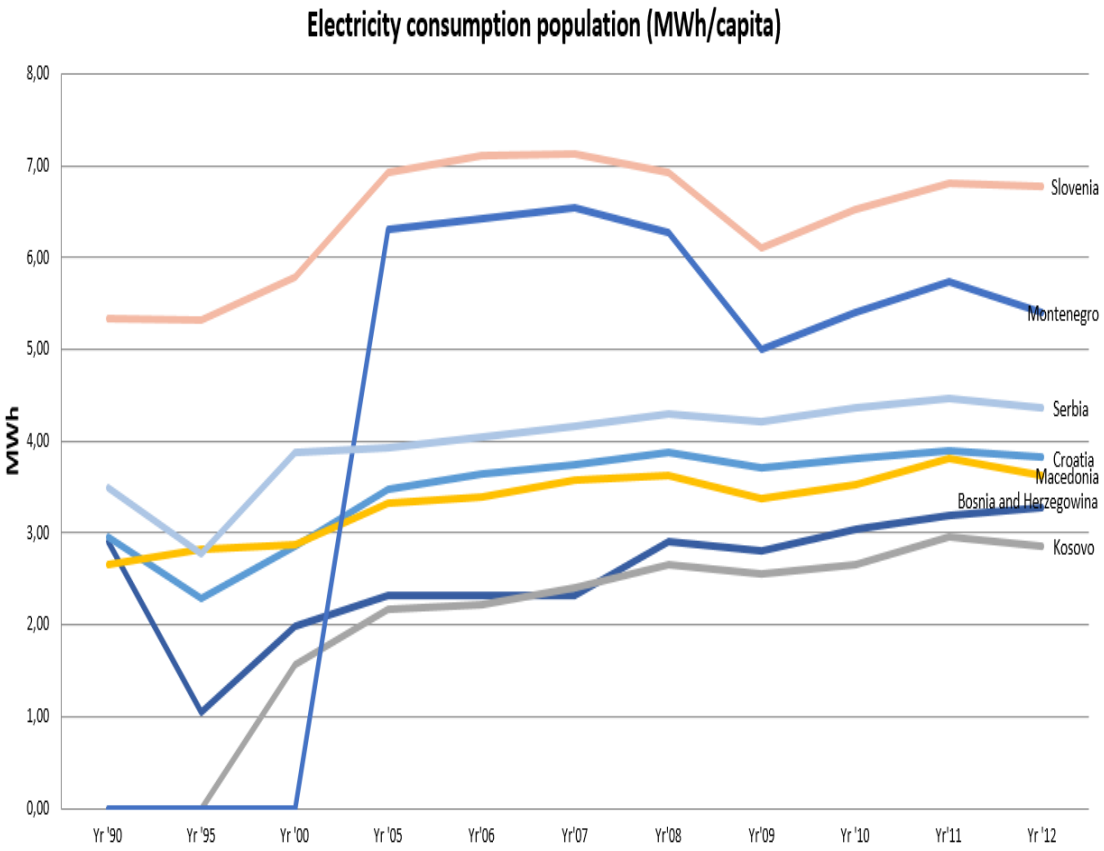

Figure 28: Electricity Consumption Population of countries of former Yugoslavia (MWh/capita; own analysis) [363]

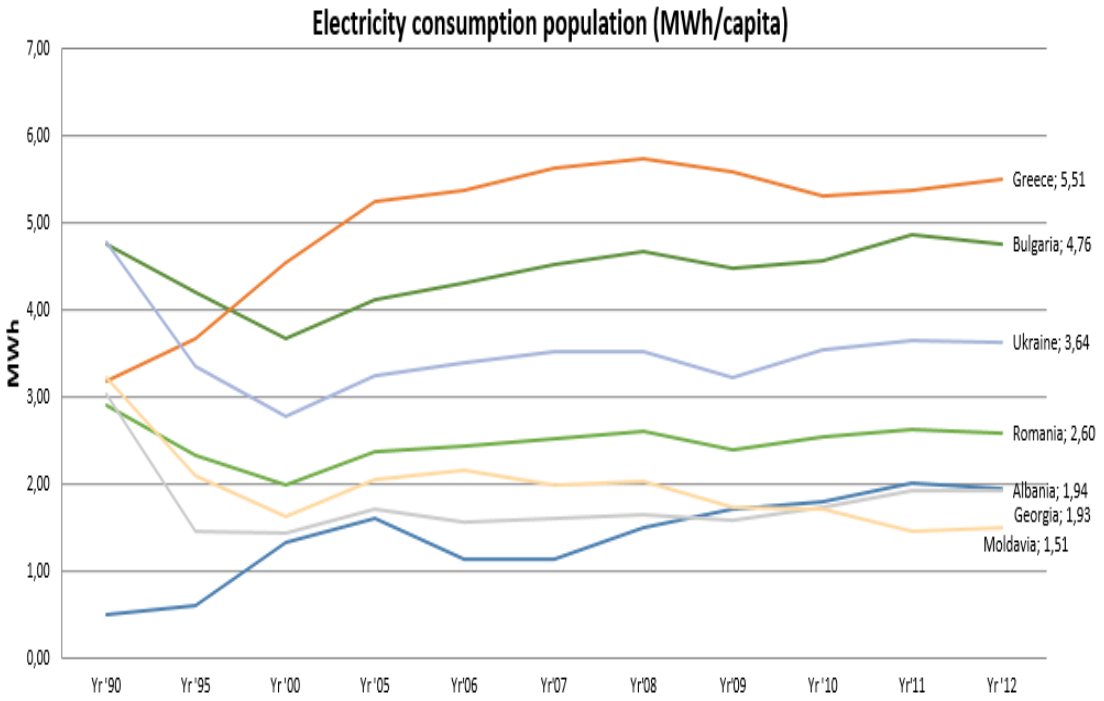

Figure 29: Electricity Consumption Population of other SEE countries (excluding former Yugoslavia) and Energy Community (MWh/capita; own analysis) [364]

[363] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[364] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

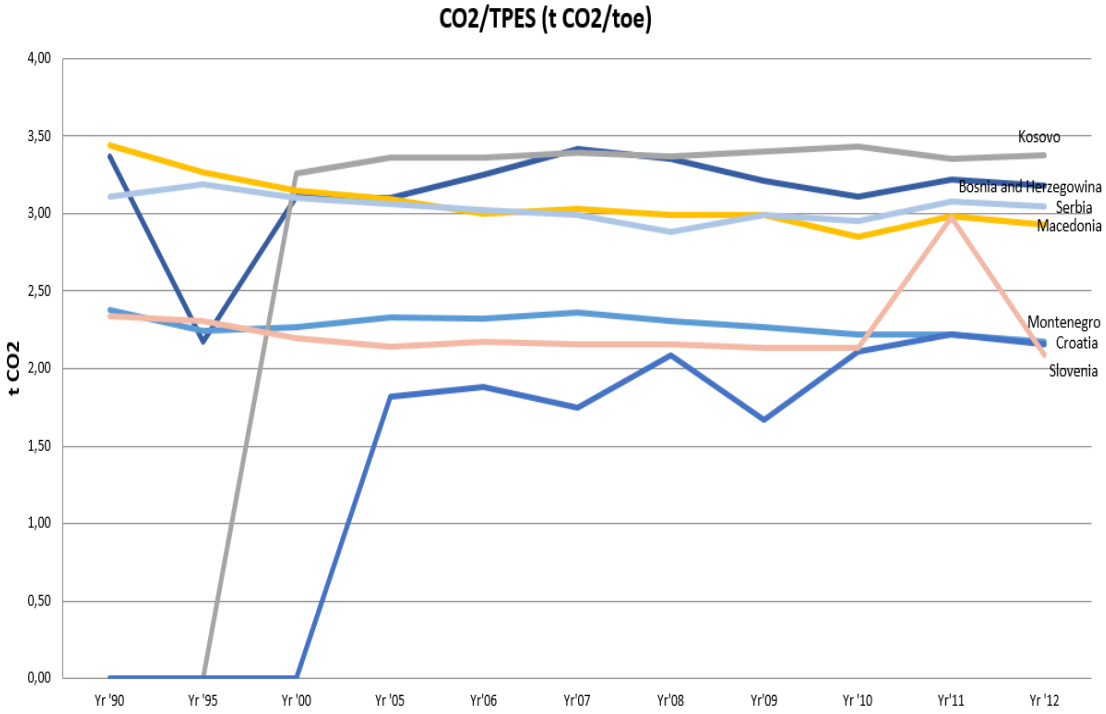

Figure 30: CO_2/TPES in Countries of Former Yugoslavia (t CO_2/toe; own analysis) [365]

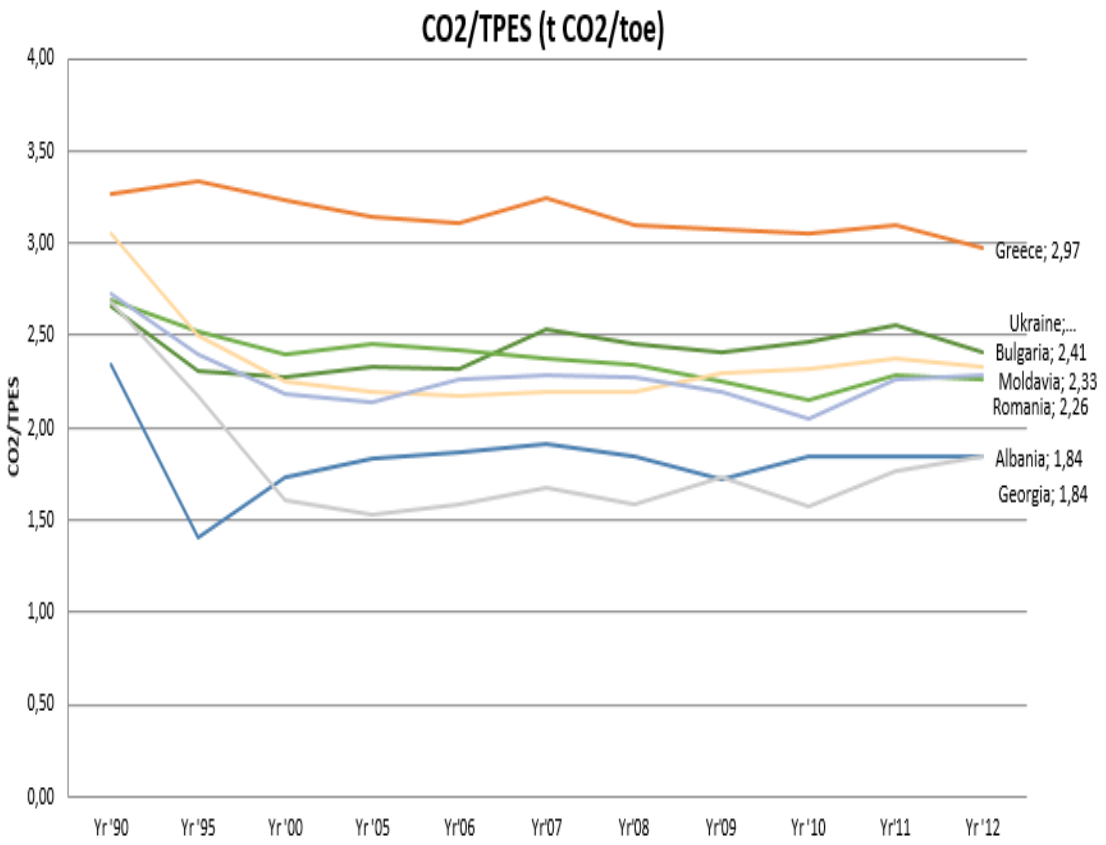

Figure 31: CO_2/TPES in Countries of other SEE countries (excluding former Yugoslavia) and Energy Community (t CO_2/toe; own analysis) [366]

[365] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[366] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

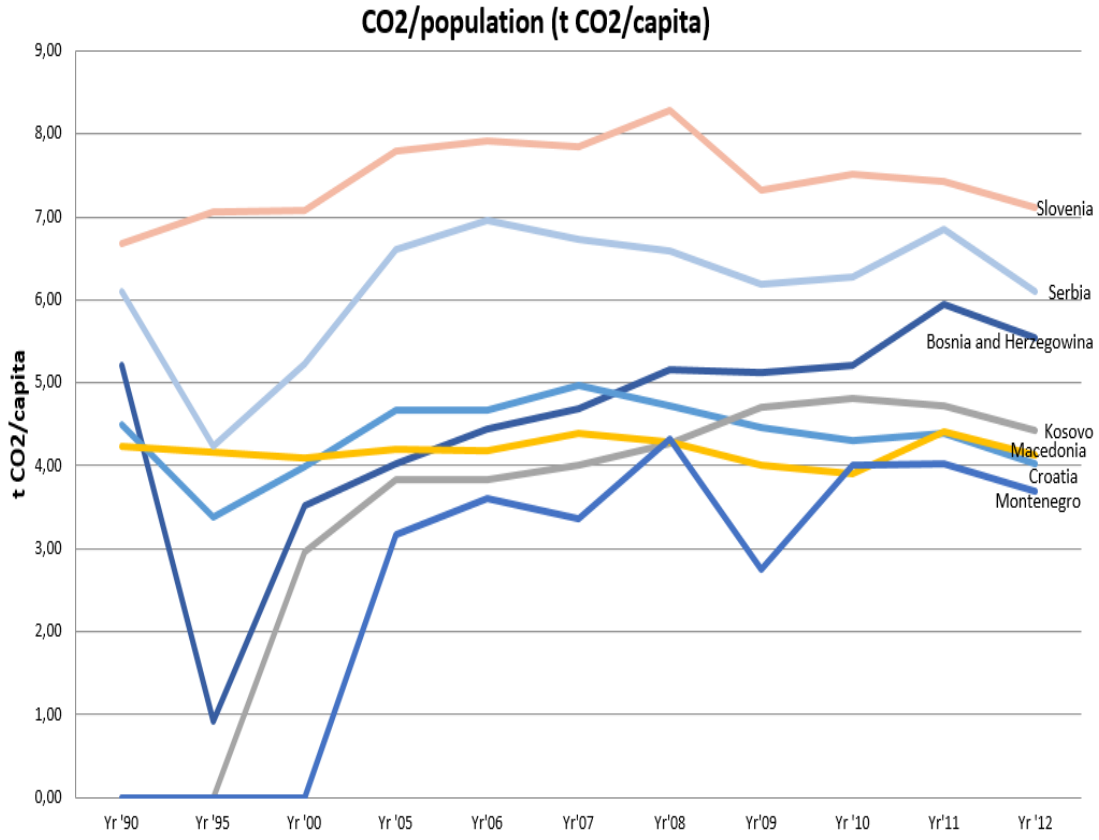

Figure 32: CO_2/Population (t CO_2/capita; own analysis) [367]

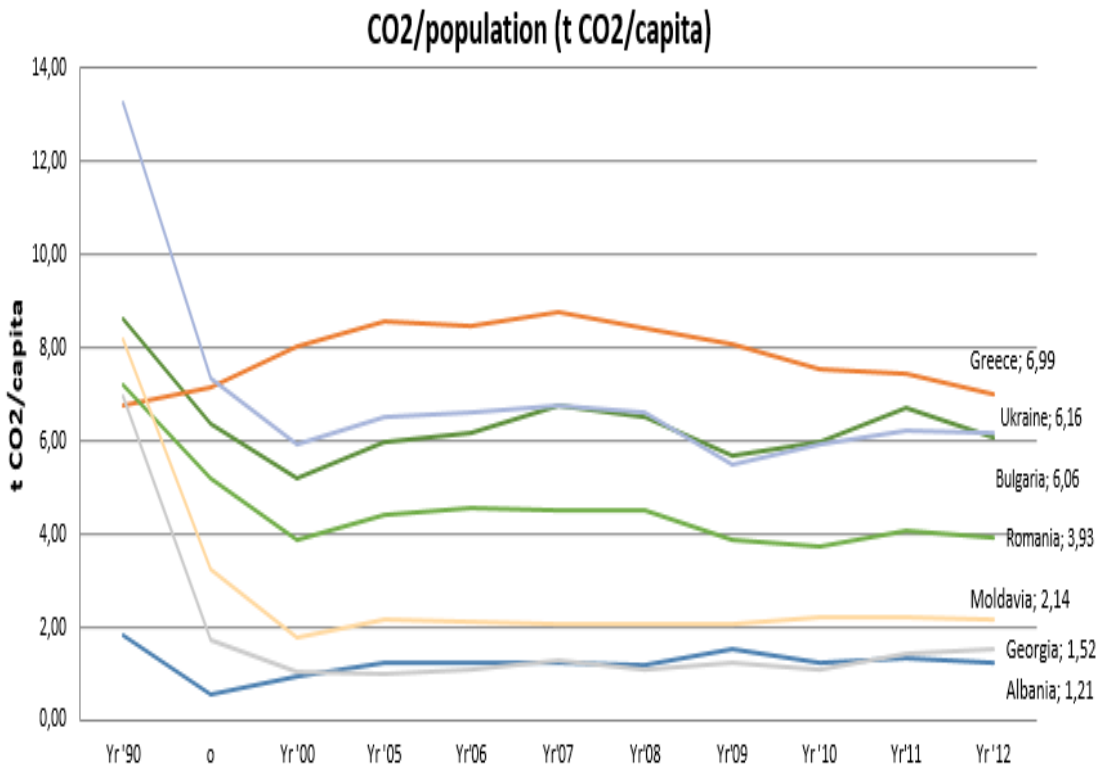

Figure 33: CO_2/Population of other SEE countries (excluding former Yugoslavia) and Energy Community (t CO2/capita; own analysis) [368]

[367] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22
[368] See explanation of source in 3.1. Overview of energy-related data (table 8), pages 21-22

Appendix B: Corruption Index: Switzerland, Germany, Austria, Slovenia

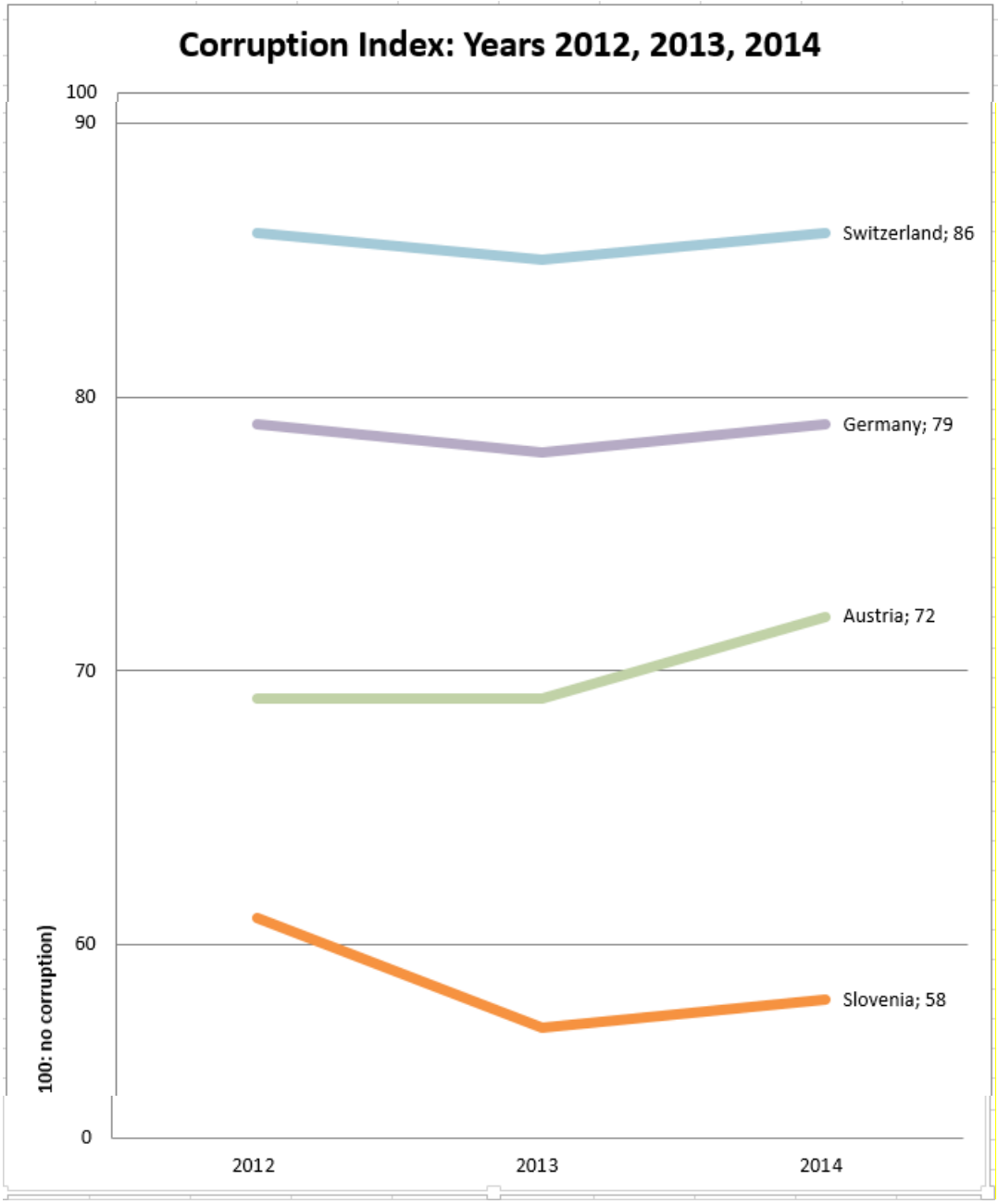

Figure 34: Level of corruption of Switzerland, Germany, Austria and Slovenia[369]

Remark: Corruption Index Values 0 to 100 (0: corruptive, 100: no corruption)

[369] http://www.transparency.org/cpi2014

Appendix C: Corruption Index: All Balkan countries (excluding Slovenia) and Energy Community countries

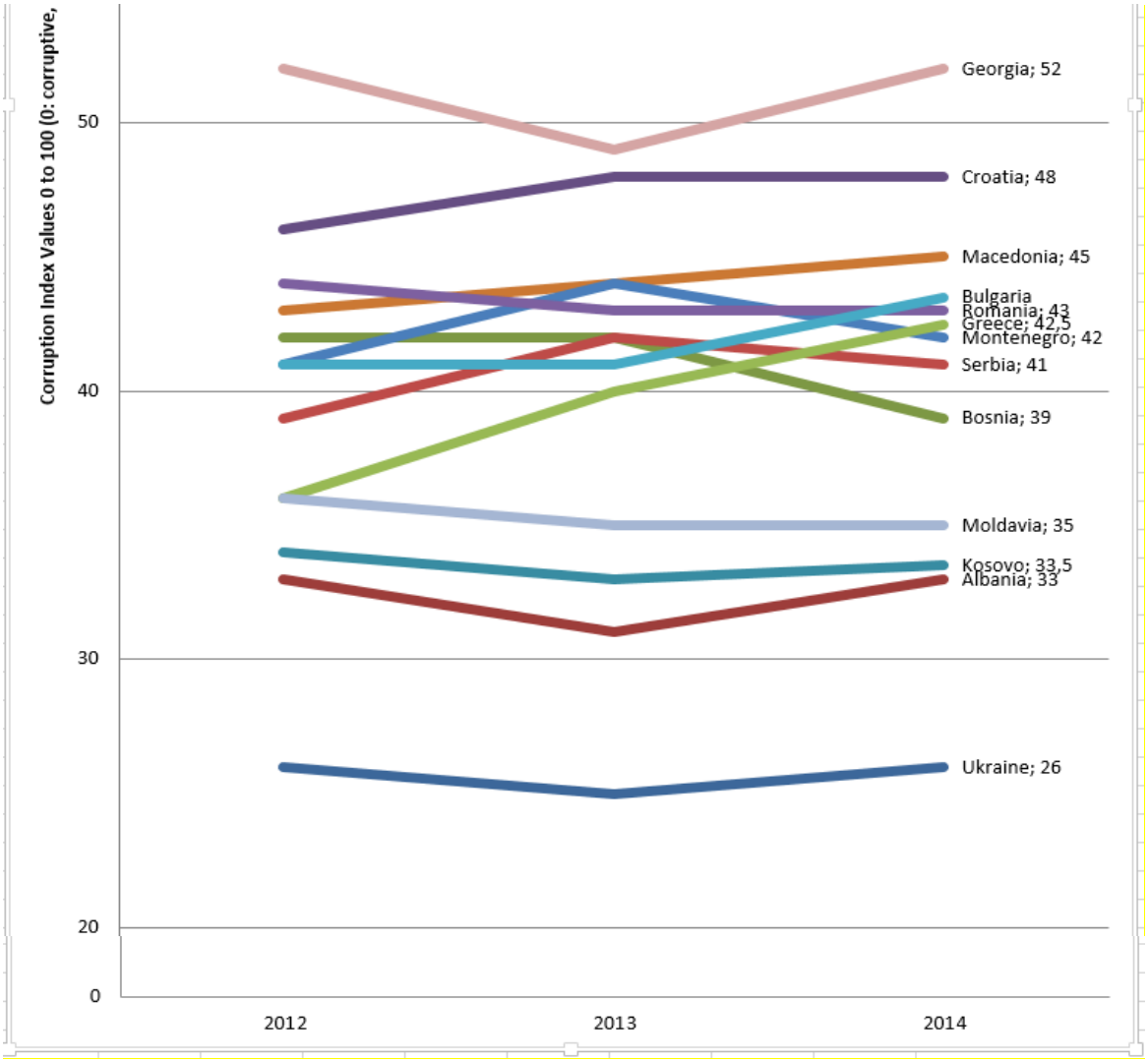

Figure 35: Level of corruption of all Balkan (excluding Slovenia) and Energy Community countries[370]

Remark: Corruption Index Values 0 to 100 (0: corruptive, 100: no corruption)

[370] http://www.transparency.org/cpi2014

Appendix D: Corruption and bureaucracy: Solution Approach: How to improve public confidence and trust!

> *"Confidence is a thing not to be produced by compulsion. Men cannot be forced into trust." Daniel Webster (1782 - 1852), leading American senator and statesman (Goodman, 1999)*

The World Bank has worked out for Bulgaria a strategy on how to improve public confidence and trust in the governance of the power sector (see as well figure below)

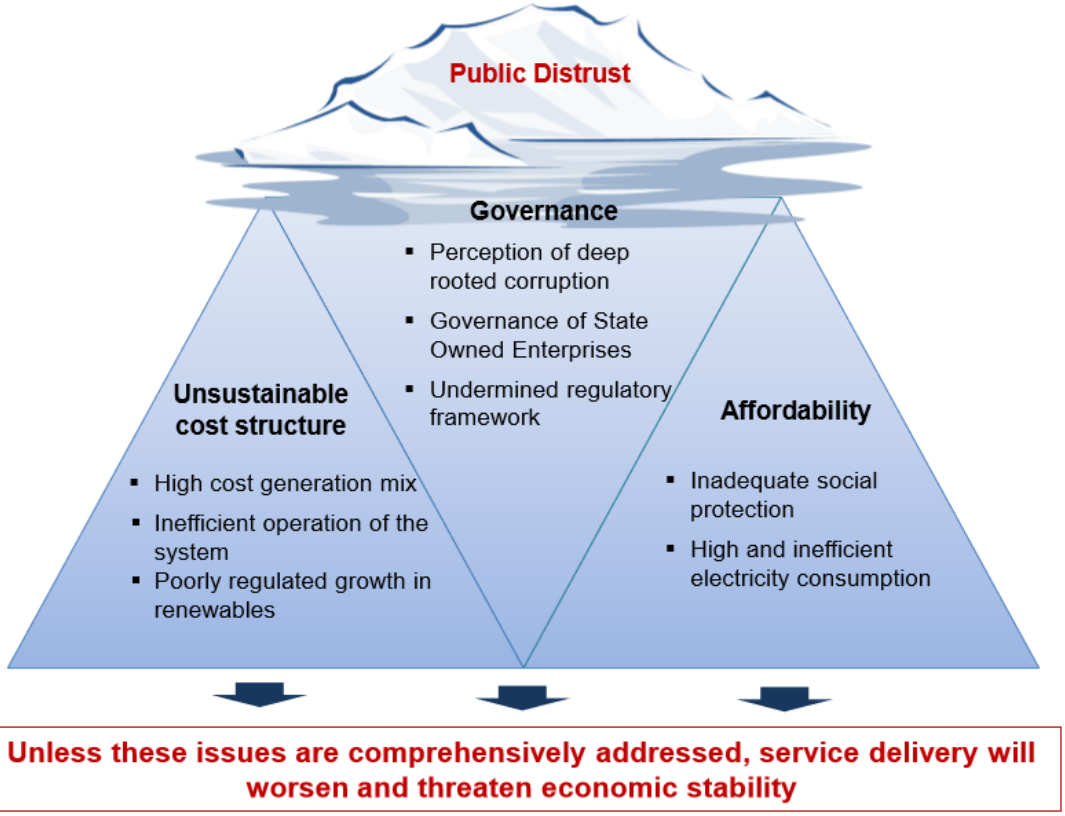

Figure 36: Fact Finding of World Bank for threats of economic stability of Bulgaria[371]

as

- Public has lost confidence and trust in the management of energy companies and the Government's oversight of the power sector. Common believe that some State officials and enterprise managers have investments in the energy sector has compromised public trust;
- Sector has large financial deficits that are increasing contingent liabilities on the State. High cost structure stemming from flat energy demand, poorly regulated growth in renewables, misuse of incentives for cogeneration, long-term contracts, and inefficient trade/export incentives;
- Declining level and coverage of social assistance benefits have made energy unaffordable for the poor. Budget contribution for targeted social safety net programs is a third of levels in 2003;

[371] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/30/000356161_20130530122419/Rendered/PDF/781130WP0Box370essment00May270final.pdf

- Comprehensive package of actions needed to improve public confidence, financial viability and affordability:
  - Enhance credibility, independence, and capacity of energy regulator;
  - Eliminate incentives that lead to inefficient investments and rent-seeking behavior;
  - Address financial liabilities that arise from the off-take of renewable energy, co-generation, long-term power purchase agreements, and failed investments in an equitable manner;
  - Increase budgetary funding to expand level and scope of targeted social assistance benefits for vulnerable consumers;
  - Eliminate conflicts of interest of state officials and senior managers in having personal/family financial interests in the power sector.[372]

Appendix E: Political Risk – Graphic representations (BiH, GE, MD, UA)

Bosnia and Herzegovina

Figure 37: Political map of BiH[373]

Bosnia and Herzegovina is divided into 2 separate governmental entities (with 3 ethnic groups):

- Federation of Bosnia and Herzegovina (grey part on the map) and
- Republic Srpska or Bosnian Serb Republic (yellow-brown part on the map)

and is therefore a country with many unsettled issues, bureaucratic excesses, incompetence and lack of jurisdictions, different application of laws due to 2 different entities.

[372] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/30/000356161_20130530122419/Rendered/PDF/781130WP0Box370essment00May270final.pdf
[373] http://diepresse.com/home/politik/aussenpolitik/506989/Bosnien_Das-europaeische-Stiefkind-auf-dem-Balkan

Georgia

Remark: Georgia with 69,700 km², 4.47 million people[374] has a "Law of Georgia on occupied Territories", which defines the occupied territories by Russia as:

- Territory of the Autonomous Republic of Abkhazia;
- The Tskhinvali Region (territory of the former South Ossetia Autonomous Region);
- and limits the free migration in the occupied territories for foreigners;
- limits the economic activities in the occupied territories[375]

Figure 38: Georgia with occupied territories of Abkhazia and South Ossetia[376]

Moldova

Moldova (33,364 km², 4 million inhabitants (Romanians: 78%, Ukrainians: 8.4%, Russians: 5.9%, Gagausians: 4.4%, Bulgarians: 1.9%). In disloyal Transnistria there are around 500,000 in-habitants. Transnistrians would like to be a part of Russia and further incorporations of Ukr-ainian districts to the area of Odessa would allow the annexation of Transnistria with Russia (WKO Länderreport Moldawien, 2014)

[374] http://wko.at/statistik/laenderprofile/lp-georgien.pdf
[375] https://www.wko.at/Content.Node/service/aussenwirtschaft/ge/Law-Occupied-Territories--English.pdf
[376] http://www.brianmefford.net/analyzing-annexation-targets-ukraine-frozen-conflicts-2

Figure 39: Moldova with Transnistria and Gagauz[377]

Ukraine

Ukraine has lost the Crimean Island to Russia in spring 2014 and currently 2 districts – Luhansk and Donetsk – in the east part of Ukraine are still in conflicts between the Ukrainian army and irregular troops. The question is very simply how long Ukraine is able to finance the "internal" war. What is the position of the EU concerning security and stability of Ukraine? The FITs of Ukrainian RES investments are quite high and under the circumstances of internal conflicts on the territory of Ukraine the risk of non-payment of FIT has to be calculated after careful consideration. Depending on the further development of the districts Luhansk and Donetsk, the keeping/non-keeping of the agreement of Minsk II,[378] there is a risk of implementation of further irregular troops on the territory of Ukraine (especially the area to build a corridor to the Crimean island and as well in the region with a relative high number of Russian speaking minority. Generally speaking Ukraine will not be able to pay for RES investments in the mid-term period.

[377] http://www.brianmefford.net/analyzing-annexation-targets-ukraine-frozen-conflicts-2
[378] http://www.spiegel.de/politik/ausland/ukraine-warum-das-abkommen-von-minsk-nicht-funktioniert-a-1037228.html http://www.faz.net/aktuell/politik/ausland/gipfel-von-minsk-13-punkte-fuer-frieden-in-der-ostukraine-13425247.html

Figure 40: Russian occupation as of March 2015[379]

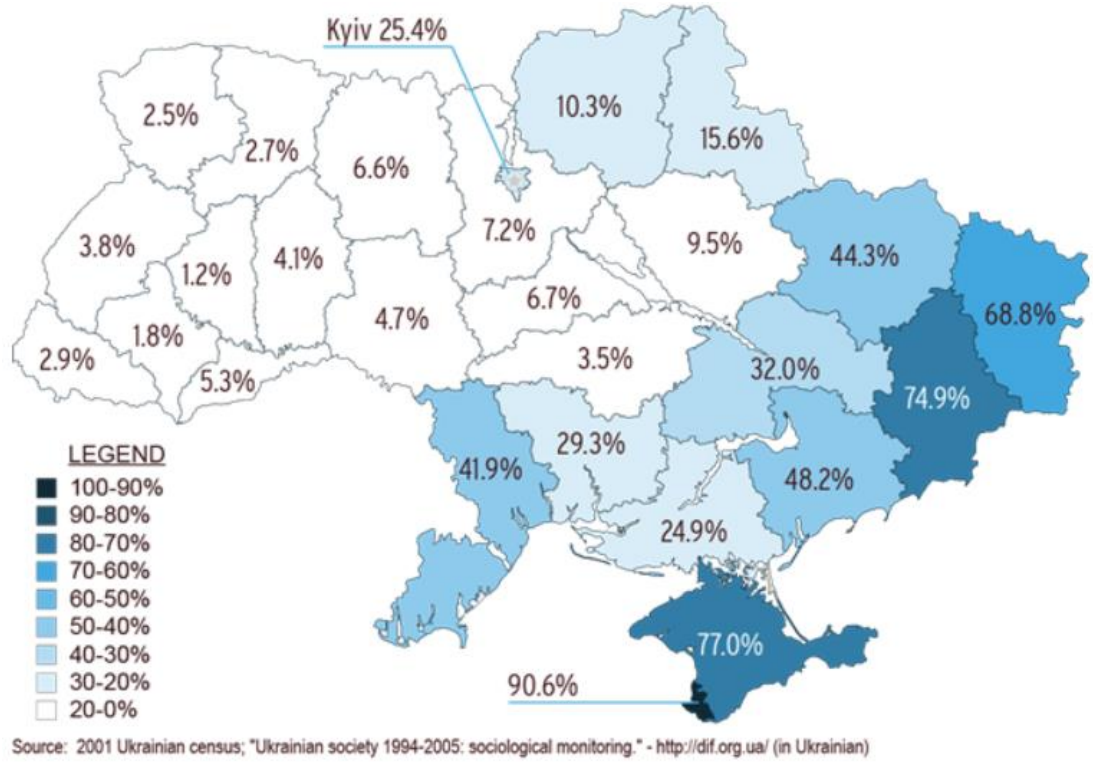

Figure 41: Percentage of Ukrainians who indicate(d) Russian as their mother tongue[380] **in 2001**

[379] http://www.brookings.edu/blogs/brookings-now/posts/2015/05/21-ukraine-maps
[380] http://www.brookings.edu/blogs/brookings-now/posts/2015/05/21-ukraine-maps

Appendix F: Legal Status: Overview of basic legal environment of the countries of the SEE and European Community region

a) Albania

The most relevant legislation for RES in Albania consists of:[381]

- Law No 9663 on concessions (2006);[382]
- Ministers Council Decision No 27 "On approval of rules for evaluation and concession procedures" (2008);[383]
- Ministers Council Decision No 150 "For the organization and function of Concession's Treated Agency" (ATRAKO) (2007);[384]
- Ministerial decision No 536 "On regulations approval for the administration of the documents and requests for concessionary agreements and "Bonus evaluation criteria" (2007);
- South-East European Energy Community Treaty (2006);[385]
- Law No 8987 on 24.12.2002 "On facilitating conditions establishment for new power generation resources construction";
- Law No 7970 on 20.07.1995 "On Arrangement of Electricity Sector";
- Law No. 7764 on 02.11.1993 "On foreign investments"[386]
- Law No 8093 on 21.03.1996 "On water reserves" (AKBN, 2008)[387]

b) Bosnia and Herzegovina

The main legal framework for electric power sector in Bosnia and Herzegovina is defined by the following laws:[388]

- Law on transmission, regulator and system operator of electricity in Bosnia and Herzegovina (2002);[389]
- Law on electricity in the Federation BiH No.41/02) (2005);[390]

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[381] http://www.advantageaustria.org/ks/oesterreich-in-kosovo/news/local/Aktuell/AKBN.ppt
http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

[382] http://faolex.fao.org/docs/pdf/alb85809E.pdf
http://www.wolftheiss.com/tl_files/wolftheiss/Dokumente/Newsletters/Client_Alerts/ClientAlertAlbania_NEW_LAW_ON_PPPs_AND_CONCESSIONS.pdf

[383] http://www.wolftheiss.com/tl_files/wolftheiss/Dokumente/Newsletters/Client_Alerts/ClientAlertAlbania_NEW_LAW_ON_PPPs_AND_CONCESSIONS.pdf

[384] http://www.ekonomia.gov.al/en/the-ministry/dependency-institutions/concession-treatment-agency-atrako

[385] http://www.epsu.org/r/239

[386] http://www.slas.info/legislazione_albanese/law%20_7764_1993_foreign_investments.php

[387] http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=003929&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL

[388] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf and https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/1608181/Prezentacija_za_dan_BiH_-FINALV1.pdf

[389] http://www.derk.ba/DocumentsPDFs/Zakon%20o%20prenosu%20regulatoru%20i%20operateru%20sistema%20el%20energije%2025%2004%202006%20EN.pdf

[390] https://advokat-prnjavorac.com/lawoffice/index-4.html

- Law on electricity in the Republic Srpska (2003); [391]
- Law on establishing Transmission Company in Bosnia and Herzegovina (2004);[392]
- Law on establishing Independent System Operator in Bosnia and Herzegovina (2004);[393]
- South-East European Energy Community Treaty (2006);
- Law on Energy (Official Gazette of RS No 49/09);[394]
- Decree on production and consumption of energy generated from renewable
- and co-generation resources (Official Gazette of RS No 28);
- Decree on use of renewable resources and co-generation (Official Gazette of FBiH No. 36/10);
- Law on Application of Tariff System (Official Gazette of FBiH No 06/04)[395]

c) Bulgaria

Bulgaria's main related domestic energy laws are as follows:[396]

- Renewable and Alternative Energy Sources and Biofuels Act (2007);[397]
- Energy Act (2003);[398]
- Energy Efficiency Act (2004);[399]
- South-East European Energy Community Treaty (2006);
- Ordinance on Setting and Applying Prices and Rates of Electricity (2002);[400]
- Regulation for Certification of the Origin of Electric Power Generated by Renewable and/or Combined Generation Sources;[401]
- Issuance of Green Certificates and Trading (2005).

d) Croatia

Croatia's main relevant legislation is as follows: [402]

- Energy Sector Development Strategy (2002);
- Program of Implementation of the Energy Sector Development Strategy – PROHES (1994);
- National Energy Program (MAHE, 1997); [403]
- Law on Energy (2001);
- Law on Electricity Market (2001);[404]

[391] https://advokat-prnjavorac.com/lawoffice/index-4.html
[392] http://www.mvteo.gov.ba/zakoni/zakoni/default.aspx?id=47&langTag=en-US
[393] https://www.energy-community.org/pls/portal/docs/85835.PDF
[394] https://www.energy-community.org/pls/portal/docs/428190.PDF
[395] http://www.ohr.int/decisions/mo-hncantdec/default.asp?content_id=31487
[396] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[397] http://www.investbulgaria.com/BulgarianRenewableEnergyAct.php
[398] http://old.mee.government.bg/eng/norm/rdocs/mdoc.html?id=187497
[399] http://www.investbulgaria.com/BulgarianEnergyEfficiencyAct.php
[400] http://www.dker.bg/files/DOWNLOAD/ordinance_electro_en.pdf
[401] http://www.naruc.org/international/Documents/SEWRC_Tomanov_Eng.pdf
[402] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[403] http://www.ieabioenergytask43.org/Task_30_Web_Site/croatia.htm
[404] http://www.erranet.org/index.php?name=OE-eLibrary

- Law on Regulation of Energy Activities (2001); [405]
- Environment Protection and Energy Efficiency Fund (2003);[406]
- South-East European Energy Community Treaty (2006);

e) Georgia

Georgia's primary energy legislation is:[407]

- Law on Electricity and Natural Gas;[408]
- Law on Market Rules;
- Resolution of Parliament on "Main Directions of State Policy in the Power Sector of Georgia";
- Renewable Energy Law – first draft already prepared;
- Energy Efficiency Law – does not exist

f) Greece

Greece's main relevant legislation is as follows (Remark: The selection is more climate-change oriented): [409]

- Law 4001/2011 on the "Operation of Electricity and Gas Energy Markets, for Exploration, Production and Transmission Networks of Hydrocarbons and other provisions;[410]
- Law 3889/2010 "Financing Environmental Interventions, Green Fund, Ratification of Forest Maps and other provisions;[411]
- Law 3855/2010 on "Measures to improve energy efficiency in end-use, energy services and other provisions";[412]
- Law 3851/2010 on "Accelerating the development of Renewable Energy Sources to address climate change and other provisions on jurisdiction of the Ministry of Environment, Energy and Climate Change";[413]

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[405] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/2106179/Croation_developments_-_Mr_Jurekovic.pdf

[406] http://www.uncsd2012.org/index.php?page=view&type=99&nr=71&menu=137

[407] https://www.energy-community.org/pls/portal/docs/1910181.PDF

[408] http://www.rec-caucasus.org/cp/wp-content/uploads/2014/07/Law-On-Electricity-Natural-Gas-Ge.pdf

[409] http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/05/GREECE.pdf

[410] http://www.ypeka.gr/LinkClick.aspx?fileticket=l3TNzx1rKsM%3D&tabid=765&language=en-US

[411] http://www.lse.ac.uk/GranthamInstitute/law/law-38892010-financing-environmental-interventions-green-fund-ratification-of-forest-maps-and-other-provisions/

[412] http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/expert_innovation/2011_synt_rep_el.pdf

[413] http://www.lse.ac.uk/GranthamInstitute/law/law-38512010-on-accelerating-the-development-of-renewable-energy-sources-to-address-climate-change-and-other-provisions-on-jurisdiction-of-the-ministry-of-environment-energy-and-climate-ch/

- Law 3831/2010 on "Revision of the vehicle taxes regime for vehicles, abolishment of the vehicles recycling measures (scrappage scheme) and measures for tackling atmospheric pollution";[414]
- Law 3661/2008 on "Measures to reduce energy consumption in buildings and other provisions";
- Law 3661/2008 on "Measures to reduce energy consumption in buildings and other provisions";
- Law 3299/04 on "Private Investment Incentives for Economic Development and Regional Convergence. Ministerial Decision (21906) "Compensation to those carbon intensive industries (sectors and sub-sectors) exposed to carbon leakage caused by the indirect costs of the EU Emissions Trading Scheme" (as it is defined in the Directive 2009/29/EC);
- Law 2244/1994 on "Regulation of power generation issues from renewable energy sources and conventional fuels and other provisions" (Maroulis, 2013)[415]

g) Kosovo

The relevant legislation in Kosovo consists of (Begolli, 2015; Dragusha, 2012):[416]

- Law on Energy (2004);[417]
- Law on Electricity (2004);[418]
- Law on Energy Regulatory (2004);[419]
- Energy Strategy of Kosovo 2005-2015 (2005);[420]
- South-East European Energy Community Treaty (2005);
- Kosovo National Plan on Energy Efficiency (2009-2016) (2009);[421]
- Regulation for establishment of KEEA;[422]
- Regulation for establishment of Certification Commission for Energy Auditors and Managers;
- Provisions of Article 3 of the Rule on Principles of Calculations of Tariffs in the Electricity Sector (Pricing Rule);[423]
- Decision No. D/2012/MC EnC of the Ministerial Council of the Energy Community, setting binding energy consumption from renewable energy sources by 2020;
- Administrative Instruction No. 01/2013 on Targets of Renewable Energy Sources;
- Administrative Instruction No. 02/2013 on Use and Support of Energy Generation from Renewable Energy Sources;[424]

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[414] http://www.lse.ac.uk/GranthamInstitute/law/law-38312010-on-revision-of-the-vehicle-taxes-regime-for-vehicles-abolishment-of-the-vehicles-recycling-measures-scrappage-scheme-and-measures-for-tackling-atmospheric-pollution/
[415] http://www.renewablesb2b.com/.../4thNationalReport.doc
[416] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[417] http://www.unmikonline.org/regulations/2004/re2004_21ale04_08.pdf
[418] http://www.kuvendikosoves.org/common/docs/ligjet/2004_10_en.pdf
[419] http://www.unmikonline.org/regulations/2004/re2004_21ale04_08.pdf
[420] http://www.mei-ks.net/repository/docs/ANNEX_12_-_Kosovo_Energy_Strategy_2009-2018.pdf
[421] http://www.indep.info/documents/47626_INDEP%20-%20Energy%20Efficiency%20in%20Kosovo.pdf
[422] http://www.mzhe-ks.net/repository/docs/EE__Background_Paper_-KEEA%281%29.pdf
[423] www.ero-ks.org
[424] http://ero-ks.org/Vendimet/English/2014/V_673_2014_eng.pdf

- Rule on Authorization Procedure for Construction of New Capacities;[425]
- Rule on Support Scheme [426]

h) Macedonia

Macedonia's main legislation is as follows: [427]

- Law on Energy (2006);
- Strategy for Energy Development in the Republic of Macedonia for the period 2008-2020 with a vision to 2030 (Draft version, 2009);
- South-East European Energy Community Treaty (2006);
- Macedonia applies a feed-in tariff scheme for the promotion of SHPPs among other renewable electricity generation sources. Purchase obligation is defined and the off-take is guaranteed for 20 years.[428]

i) Moldova

The primary legislation of Moldova:[429]

- Renewable Energy Law (160-XVI/12.07.2007);
- Energy Efficiency Law (142/02.08.2010);
- Law on Electricity (124/23.12.2009);
- Law on Energy (152/19.02.1998);
- Law on Regulation Entrepreneurial Activity through Licensing (451/30.07.2001)

j) Montenegro

The main legislation of Montenegro: [430]

- Energy Law of the Republic of Montenegro (2003);[431]
- South-East European Energy Community Treaty (2006);
- Strategy on energy development up to 2025 (2007);[432]
- Montenegro has no renewable support system in place, however the country has been very active in establishing the foundation of an efficient energy market, and thus initial steps have been taken in order to facilitate future renewable energy utilization

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[425] http://ero-ks.org/Vendimet/2015/eng/V_737_2015_eng.pdf
[426] http://ero-ks.org/Vendimet/English/2014/V_673_2014_eng.pdf
http://www.naruc.org/international/Documents/119_ERO_RES%20support%20schemes_final.pdf
[427] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[428] http://www.lexadin.nl/wlg/legis/nofr/eur/lxwemac.htm
[429]
http://www.naruc.org/international/Documents/Tue_21_Sep_13_30_Moldova_RES_Overview_Boscaneanu.pdf
[430] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[431] http://siteresources.worldbank.org/PGLP/Resources/ENERGYSECTOROFMONTENEGRO.pdf
[432] http://www.gov.me/files/1184765960.pdf

k) Romania

Romania's relevant legislation is as follows: [433]

- Energy Law (2007);[434]
- Law on electricity (2007);[435]
- Law on energy efficiency (2006);[436]
- National Strategy for Energy Efficiency (2007-2020) 109 (2007);[437]
- Government Decision regarding the "Strategy for the Promotion of Renewable Sources of Energy" (2003);
- Government Decision regarding the "Promotion of electricity produced from RES (2004);
- South-East European Energy Community Treaty (2006);
- A system of tradable green certificates is in place, including a purchase obligation for distribution companies and the obligation to fulfil an annual quota of purchased green electricity since 2004, available for SHPPs under 10 MW installed capacity[438]

l) Serbia

Serbia has an extensive body of laws addressing energy issues including the following: [439]

- Energy Law (OJ RS 57/2011) is the recently approved law regulating the (Renewable) Energy industry
- Energy Law (OJ RS 84/2004) provides the overall foundation for development of renewable energy sources and energy efficiency
- Amendments to the Program for Implementation of Energy Sector Development Strategy 2007-2012 (OJ 99/2009) elaborate Strategy in more details and define priorities for utilization of renewable energy sources.
- Decree on the Requirements for obtaining the Status of the Privileged Power Producer and the Criteria for Assessing Fulfillment of these Requirements (OJ 72/2009)- defines procedure
- Decree on incentive measures for electricity generation using renewable energy sources and combined heat and power (CHP) generation (OJ 99/2009) - defines feed-in tariffs for RES-E generation
- Construction Law (OJ 72/2009) – defines procedure for obtaining construction permit – key law for investing

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[433] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[434] http://www.schoenherr.eu/de/knowledge/knowledge-detail/romania-new-romanian-energy-law/
[435] http://www.minind.ro/domenii_sectoare/leg_armonizata/energie/EnergyLAW13_2007_27_07.pdf
[436] http://www.justiceandenvironment.org/_files/file/2011%20CC%20RO%20eff%20final.pdf
[437] https://library.e.abb.com/public/1871d038e321e6ab48257a23004c8951/Romania%20Energy%20efficiency%20Report.pdf?filename=Romania%20Energy%20efficiency%20Report.pdf
[438] http://www.europerspectives.org/images/stories/documents/RES&EE%20Legislation%20Analysis.pdf
[439] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
http://www.loc.gov/law/help/guide/nations/serbia.php
http://www.lexadin.nl/wlg/legis/nofr/eur/lxweser.htm

- Law on Environmental Protection (OJ 72/2009)
- Law on Strategic Environmental Assessment (OJ 135/2004)
- Law on Environmental Impact Assessment (OJ 36/2009)
- Integrated Pollution Prevention and Control Law (OJ 135/2004) - IPPC license needed for the biomass installations
- Law on ratification of Kyoto Protocol (OJ 88/2007 and 38/2009) - established DNA; Serbia is non-Annex I country, eligible for CDM projects
- National Energy Efficiency Programs (2002);
- South-East European Energy Community Treaty (2006);
- Ratification of Kyoto Protocol (2007)[440]

m) Slovenia

Relevant legislation in Slovenia includes: [441]

- Law on Energy (1999, amended 2006);
- Regulation on CO2 emission tax (1996, amended 2002);
- National Energy Programme (2004);
- Decree on Prices and Premiums for Purchase of Electricity from Qualified Producers (2004)[442]

n) Ukraine

Ukraine's main laws and regulations are:[443]

- The Law on the Power Industry (No. 575/97_BP, adopted 16 October 1997) (the "Power Industry Act") is the principal legislative act in the area of the power industry. It governs the relationships between the participants of the Ukrainian energy market (i.e., power generating companies, suppliers, distributors, consumers, and state regulatory authorities), electricity pricing, licensing and liability for violation of its provisions;[444]
- The Law on Alternative Energy Sources (No. 555 – IV, adopted 20 February 2003) (the "Alternative Energy Act") defines alternative energy sources (renewable energy sources, including solar radiation, wind energy, geothermal energy, wave power, tidal power, hydro power, energy from biomass, landfill gas and gas of sewage treatment plant, biogas, and secondary energy resources, including blast furnace gas, coke gas, methane from decontamination of coal deposits and landfills) and seeks to promote these by granting financial incentives and encouraging the generation and consumption of energy produced from such alternative energy sources. The necessary mechanisms for implementing these incentives in practice have not yet been adopted[445]
- The Law on Energy Conservation (No. 74/94 BP, adopted 1 July 1994) (the "Energy Conservation Act") sets a state policy regarding energy

[440] http://propisi.pravno-informacioni-sistem.rs/?lang=en
[441] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf
[442] http://www.loc.gov/law/help/guide/nations/slovenia.php
[443] http://www.wolftheiss.com/tl_files/wolftheiss/Dokumente/Publications%20Archiv/The_Wolf_Theiss_Guide_to_Generating_Electricity_from_Renewable_Sources_in_CEE_SEE_2014.pdf
[444] http://www.s-ge.com/de/filefield-private/files/41878/field_blog_public_files/8625
[445] http://kpmg.de/docs/central_and_eastern_european_hydro_power_outlook_web_secured.pdf

conservation based on effective energy use and enhancement of regulatory measures aimed at stimulating energy conservation.

- The Cabinet of Ministers of Ukraine and the National Commission of State Energy Regulation ("NCSER") have also issued numerous bylaws implementing the laws noted above. [446]

Appendix G: Legal Status: Case study: Experience report of court procedures in Croatia & Serbia

An example of unsound bureaucracy is shown in the following situation:

> *There is a typical law joke in Croatia: The son of an attorney graduates at the law faculty and starts his career as an attorney in his father's office. He finishes the cases after a couple of months. His father is horrified when he discovers all files were settled and moans: "Oh my dear son, what do you believe how I could finance your studies when you were absent?"*

Figure 42: Enviousness when business is successful. Gleefulness and negative press reports in Austria and Croatia after failures (own power point slide, presentation: May 2009)

[446] http://www.loc.gov/law/help/guide/nations/ukraine.php#legislative

And envy must be earned when looking at the figure 42 above. You as a (foreign) investor start a business in Croatia (and or Balkan area), you are proud and report your success in social events of expatriates in the SEE/ECM area. You trust your local managers, you trust your team, you trust your business environment, you trust the local laws and it ends up with gleefulness and negative press reports. The damage is yours!

When I was working as Managing Director in finance business in Croatia from beginning of 2000 to end of 2001 and in 2009 I was confronted with the facts, that the criminal law and the law of obligation had a modern standard. But the execution of all laws were somewhat less than perfect (the following examples are true and more dedicated to banks, leasing companies, insurance houses, but show a tendency of the debtor behavior supported of the very slow court procedures, etc.) and can be applied for all business areas (Without political correctness: Maybe it is one of the reason of economically low success in this region):

- *Trusting to a judiciary system in Croatia would have been suicidal and the debtors would just laugh down the foreign investor;*

Send
To...
Cc...
Subject: FW:

From: [redacted]
Sent: Tuesday, May 26, 2009 11:48 AM
To: Johann Hoefler
Cc: [redacted]
Subject: RE: [redacted], etc.

Sehr geehrter Herr Höfler,
Diese Firmen handeln in einer grauen Zone. Mir sind keine ausdrückliche rechtlichen Grundlagen bekannt. Solche Firmen sind sehr oft an der Gränze, dass die Schuldner die entsprechenden Strafanzeigen gegen diese Firmen und/oder dessen Mitarbeitern erstatten.
Für einige Dienstleistungen könnte man die Grundlagen im Detektivgesetz finden, aber meiner Informationen nach sind solche Firmen nicht wie Detektivbüros gegründet.

Für alle weiteren Fragen stehen wir Ihnen sehr gerne zur Verügung.

Mit freundlichen Grüßen,

From: Johann Hoefler [redacted]
Sent: 6. svibanj 2009 13:31
To: [redacted]
Subject: [redacted], etc.

Sehr geehrter Herr [redacted]

Ich lese jetzt einige Artikel von Alan Uzelac (Ihr Professor an der juridischen Fakultät) und verstehe langsam das Systems des kroatischen Rechts. Seine Ansichten sind ganz interessant Können Sie mir schreiben, wo und wie diese sogenannten Forderungseintreibungsfirmen, etc. ihre Berechtigungsgrundlagen haben? Wo ist geschrieben, was und wie sie etwas tun dürfen?

Figure 43: Legal opinion of an attorney of law on operating agencies servicing recovery of outstanding debts working in a grey area.

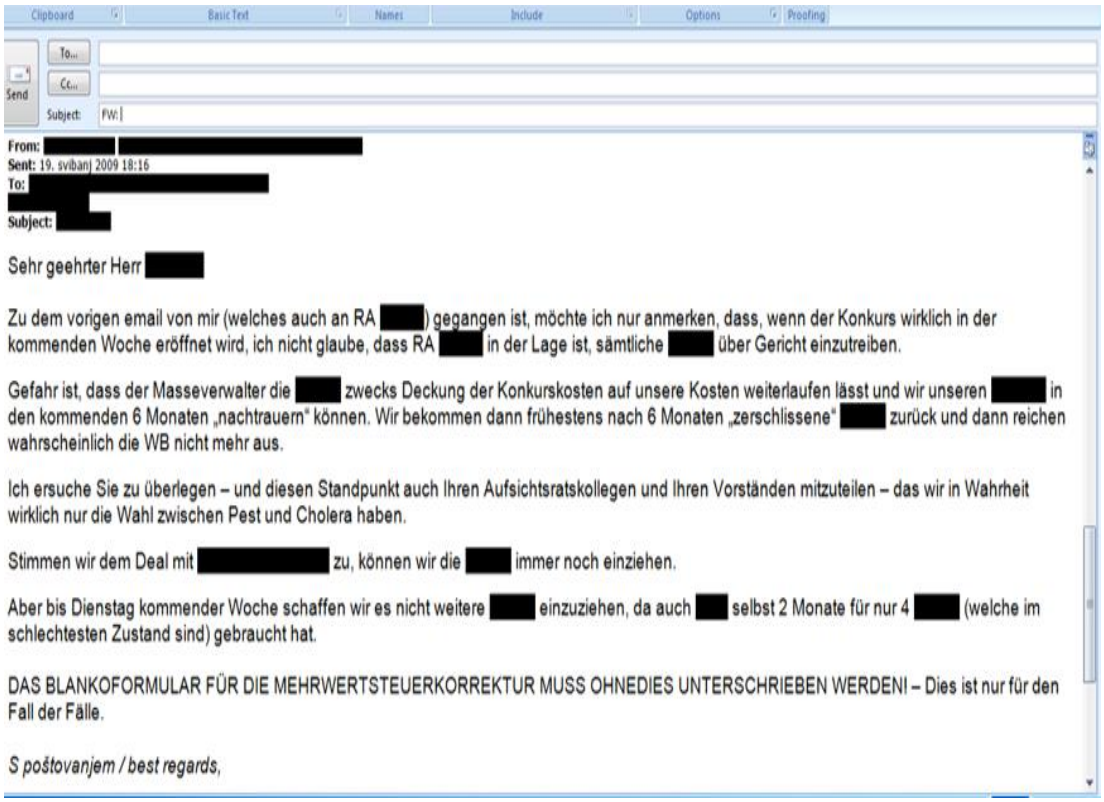
- *You have to help yourself with "half" legal operating agencies who do the recovery of outstanding debts;*
- *There is a mentality "I know I owe you money, I will pay my debt to you one day" [but there is never a deadline mentioned] and a proudness;*
- *The introduction of "mirenje" (introduction of "mediation" system in Croatia, which was one of the conditions to join the EU in 2013) system should help to reduce the backload of non-solved court cases, but how to solve open debts in mediation processes when such cases are unsettled many years on the court?;*

- *One employee of my previous company could not officially register her radio and TV (and therefore she had to be a license dodger) due to the fact that she was paying her rent to a person x (she knew, but he still was not the owner of the flat). This "virtual landlord" was more than 13 years!!!! in legal disputes of the inheritance with his 4 brothers and sisters (he cashed the rent for 13 years and his brothers and sisters were disclaimed from the inheritance since 13 years)*
- *When it finally comes to the repossession of the financed object it does not mean that the bank (leasing company, insurance house) is the owner of the repossessed financed object and can start reselling. Many times banks are confronted with super-elevated appraisals which prevent reselling of the repossessed items with optimized losses. Sometimes repossessed trucks were stored 8 years and even more on such repossession plots. It is obvious that such trucks with old-fashioned and out of legally allowed EURO 3 engines cannot be sold in the Balkan area. The damage is with the bank (or leasing company, insurance house, etc.) and legally there is no chance to get any compensation from the debtor unless the reselling procedure is finalized. There is no solution: It is just to chase one's own tail! This is one of the reasons to understand the HYPO Alpe Adria scandal. It is moreover important to know your business partners!*

Figure 44: Repossession of financed objects in a temporary storage place in Zapresic (near Zagreb) – objects are stored for many years without legal approves for selling

- *Heavy fights of banks, leasing companies and insurance companies with strange excuses of debtors (be so incomprehensible are the excuses from part of the debtors for the banks, leasing companies and insurance companies (and other creditors as well) and judges have seriously to lead the legal procedures, which makes the creditors to believe that judges have a tendency to be on the side of the debtors (rich investor(s), bank, leasing company, insurance company, etc. against the "poor" debtor) – All these sentences I heard many times from debtors in the SEE regions I worked from 2000 until 2012 (there is no reason to be politically correct):*

- *"I didn't know what I was signing – the supplier (in case of a leasing company) did not inform me";*
- *"I didn't get any letter as I was always on business trips";*
- *The leasing company did not inform me to return the leasing object and therefore I just sold it";*
- *"I spoke to somebody (from the leasing company) and this person told me, that I don't have to pay anything as long I don't have money. I never have money!";*
- *"I have handed over the money for the installments to somebody in the street";*
- *"I didn't know that I am not allowed to sell the financed object (in case of a leasing company)";*
- *"I have signed the acceptance protocol as the supplier has asked me to do so. After my signature on the acceptance protocol I have decided differently I rescind from the contract. I didn't know that the leasing company already has paid to the supplier for the car I have ordered"*
- *Some people in the street asked me to transfer to them my leasing car as they could not get a leasing contract. Of course these people told me to pay the leasing installments and I never would have problems. Who the people were and where they live, I have no idea. I have trusted to the people. And what you would like to get from me? I am jobless and I don't know why the leasing company has signed my leasing contract at that time.*
- *"I was never asked to pay the credit"*
- *.....*



Clipboard | Basic Text | Names | Include | Options | Proofing

Send | To... | Cc... | Subject: FW:

From: [redacted]
Sent: 19. svibanj 2009 18:16
To: [redacted]
Subject: [redacted]

Sehr geehrter Herr [redacted]

Zu dem vorigen email von mir (welches auch an RA [redacted]) gegangen ist, möchte ich nur anmerken, dass, wenn der Konkurs wirklich in der kommenden Woche eröffnet wird, ich nicht glaube, dass RA [redacted] in der Lage ist, sämtliche [redacted] über Gericht einzutreiben.

Gefahr ist, dass der Masseverwalter die [redacted] zwecks Deckung der Konkurskosten auf unsere Kosten weiterlaufen lässt und wir unseren [redacted] in den kommenden 6 Monaten „nachtrauern" können. Wir bekommen dann frühestens nach 6 Monaten „zerschlissene" [redacted] zurück und dann reichen wahrscheinlich die WB nicht mehr aus.

Ich ersuche Sie zu überlegen – und diesen Standpunkt auch Ihren Aufsichtsratskollegen und Ihren Vorständen mitzuteilen – das wir in Wahrheit wirklich nur die Wahl zwischen Pest und Cholera haben.

Stimmen wir dem Deal mit [redacted] zu, können wir die [redacted] immer noch einziehen.

Aber bis Dienstag kommender Woche schaffen wir es nicht weitere [redacted] einzuziehen, da auch [redacted] selbst 2 Monate für nur 4 [redacted] (welche im schlechtesten Zustand sind) gebraucht hat.

DAS BLANKOFORMULAR FÜR DIE MEHRWERTSTEUERKORREKTUR MUSS OHNEDIES UNTERSCHRIEBEN WERDEN! – Dies ist nur für den Fall der Fälle.

S poštovanjem / best regards,

Figure 45: This is the truth of how the application of the law works in Croatia (opinion on law on May 19th, 2009 and still (2015) not settled)

The related laws for investors in Croatia are good and fair and the civil code is very close to the Austrian Civil code (introduced after the fall of the former Yugoslavia and due to common historic connecting factor). Just the application and the duration of the related laws are sub-optimal for investors. Investors just have to believe that nothing bad will happen and if they are confronted with a "no" or very slow legal support they should take the "law into their own hands".

In Croatia due to the very high still open court procedures before joining the EU so called "mirenje" had to be introduced due to EU allegations. "Mirenje" can be translated into "mediation". The mediation should help to lower down the court business cases. According to my experience in the Balkan area from 2000 until 2012 I doubt this system might work in classical creditor – debtor relations. Mediation procedures might be successful in majorities of cases of intra-family conflicts, intercultural conflicts, cases and conflicts in environmental impact assessment, conflicts with personal emotions. I cannot imagine to settle with mediation cases like:

- I want to generate power and you don't pay!;
- I (as a bank, leasing company) want to repossess the financed object and you have to pay all damage! (which is a theory)

The experienced situation is not positive as the economic situation is over-ruled and very much depending on the governmental orders (high number of public sector, high number of war veterans, etc.) Even "Die Kronenzeitung" reports of unemployment rate of 20%, high number of premature pensioners, a Kafkaesque bureaucracy and judicial authorities, which make the life of entrepreneurs and investors a living hell.[447] But with the integration of Croatia into the values of the EU the court situation, court procedures are getting fair and faster which makes hope for serious business culture.

The situation in Serbia seems even to be worse:

> *"If the Tax Administration makes a mistake regarding an economic entity, it is that entity's obligation first to discover the mistake, and then to submit a request for it to be corrected, along with the presentation of documentation proving that at issue is the Tax Administration's mistake and that there are grounds for his request. Of course, the correcting process lasts days, and it differs from one branch to another, it can last 10-15 days, so that, if you need a certificate on the settled obligations, it is possible that you may not obtain it in time, through no fault of your own", Violeta Jovanović, executive director of the National Alliance for local economic development".* [448]

[447] http://www.krone.at/Oesterreich/Kroatien_in_der_Krise_Droht_zweites_Griechenland-Praesidentin_in_Wien-Story-458587
[448] http://bif.rs/2013/02/business-in-serbia-bureaucracy-in-ten-examples

> *"Even though a reform of the tax system was announced already two years ago, so far practically nothing has happened, so that people from the economy, apart from the already famous story about the obligation to pay the VAT in advance, also have unbelievable administrative problems because of senseless provisions. The current system of the collection and distribution of the payroll tax in Serbia obliges employers to pay their employees' salaries into special accounts, depending on the municipality where each employer resides. Such a tax collection mechanism creates big administrative costs for employers. "A study carried out by FREN has estimated the total expenditures of employers based on the payment of taxes and contributions on wages on a number of accounts at nearly half a billion dinars in 2009", Nikola Altiparmar-kov, member of the Fiscal Council and one of the authors of FREN*[449]

Bureaucracy and interest rates are still stifling the economy and still 54% of businessmen consider corruption as an important role in Serbian business (The third annual survey carried out by USAID among 1,000 companies in Serbia).[450]

As an example Novoline Slovenia has left Serbia and withdrawn EUR 11 million investments. Court trials last several years, poor legal protection and complicated administration are mostly the reasons for foreign investors to show Serbia the back side. According to Serbian newspaper report Blic the average collection of payment take 125 days and in 2011 Serbia was ranked position 96th (from total 139 countries) in international competitiveness. According to Blic even Montenegro and Macedonia should be on better positions than Serbia.[451]

Due to working experience in Serbia from 2002 to 2012 I can emphasize the reports on bureaucracy in Serbia described in many reports and presentation:

- *Business in different districts have caused different procedures (it happened that quite often that for simple leasing contracts the managing director had to meet the lessee in order to sign the contract in front of the court. Even this procedure was nowhere defined in the law);*
- *Within five years of being leasing director no one court case against non-payers, cheaters, embezzler and other criminals has started;*
- *No reaction to organized crimes (200 IMT tractors (value about EUR 2.5 million never have existed or in best case were embezzled). No single court case against 3 criminal dealers and no court case against 200 criminal peasant farmers. Thanks to the existence of the Serbian Credit Bureau (an*

[449] http://bif.rs/2013/02/business-in-serbia-bureaucracy-in-ten-examples
[450] http://inserbia.info/today/2013/11/bureaucracy-and-interest-rates-still-stifling-serbian-economy-usaid
[451] http://english.blic.rs/In-Focus/7841/Investors-leave-Serbia-because-of-bureaucracy-and-exchange-rate

organization within the Serbian Bank Association, which receives data from all banks and leasing companies and some other service companies) a part of the peasant farmers have paid their obligation as they were clocked for getting credits and other banking services until they have settled their financial troubles with my leasing company. The court(s) did not support the foreign investor. The support was possible only due to private organization of the Serbian Bank Association!;

- *No reaction of Serbian authorities (tax office, ministries, court) in case of Sabac organized crime in 2006: No one of the criminals was even accused. No one of the criminal has paid the VAT (as all of them were entrepreneurs). A criminal dealer found a criminal customer, bribed an insurance agent and sales persons of the bank institution: With 20% down payment (which they collected somehow) they got tractor truck together with a trailer of a value of EUR 100,000 and "earned" EUR 80,000. As clever criminals in order not to be discovered too fast they always have paid the leasing instalment (otherwise the monitoring system would have discovered the "non-payer" too fast) and they did not mediate 4 customers within the next month (EUR 100,000 minus EUR 20,000 down payment in the first deal) would be EUR 80,000 (which could be used for 4 additional customers each for a tractor truck and a trailer. They just have brought between one and 2 customers per month. After 20 such cases (it was plant to ruin the leasing company with EUR 6 million) the cheating was discovered (as the "mediated" truck customers have paid too "punctual". Usually truck customers are due to their business not the best debtors). These criminals were just renting a tractor truck and trailer. The colors of the tractor trucks were always changed with foils and all import documents chassis numbers, engine numbers, trailer identification numbers, etc. were just faked. Even the pressures of the Austrian Embassy in Belgrade and the Austrian Trade Commission to Serbian Officials was without any impression. There is no support to foreign investors!;*
- *In case a court started to assist/help the creditor the bailiffs in some country regions had announced to start the procedure let say in 13 months on day xy as he was fully booked. For a finance institution this information does not help as in 13 months on day xy the bailiff might be sick, the creditor might be on holidays and he would still use the leasing object without any payments (and most likely the leasing object would be on day xy scrapheap, stolen, embezzled, lost, etc. The reaction was once again to use the services of so called "half legal agencies for payment collections";*
- *There was a tender for financing of more than 400 city busses for Belgrade in February 2005. The tender was changed several times. The banks and other financing institutions had to jump into the full risk and finally the busses had to be assembled and shown to the local authorities (and in the meantime due to several changes more than 400 busses already have been produced and delivered to the private companies). After a presentation of all busses to the local authority on November 1st, 2005 only 400 busses went into operation on December 20th, 2005. Some bus companies have shown and invested into busses in time, but were considered as "above 400" and had to settle their problems together with their banks (as the busses were tailor-made according to specification of the tender). I do not want to comment the tender procedure, the changing and the postponing of several times. I do not believe in a close tender procedure;*
- *After September 15th, 2008, the crash of the US investment bank Lehman Brothers no bank in Serbia had to report troubles with their non-payers. No bank was reporting non-performances! None of the "big managers" were willing to report their troubles with non-performing loans, some of them were*

> *still appraising Serbia as the top-investment country. But as a freelancer and a non-performing loan consultant I got from one bank a project to reorganize with my team a fish factory in the south of Serbia. The non-performing loans into this investment were around EUR 6 million. The same factory in Lesachtal in Austria would cost around EUR 1.6 million (in Norway around EUR 1.8 million). There was no chance to be successful. The bank was not willing to write off the debt down to the realistic market value of the investments. The difference from such an investment in Austria and the Serbian investment of EUR 6 million is somewhere. And nobody knows where the money is. This is the same with HYPO ALPE ADRIA Bank. Nobody knows where the money went!*

According to the – for sure – special experience there is no doubt of complicated bureaucracy, law-suits and chaos in organization. Several employees used to say:

> "We Serbs/Yugoslavs are the best car makers. But we are only the best car makers in Germany as we usually work for Mercedes Benz, Porsche, BMW, Audi, Volkswagen and Opel. We are not able to organize Zastava, to bring up Zastava and we need Fiat to support us here in Serbia"

This sentence/saying might be somehow true, but from the scientific point very difficult to prove (and politically very incorrect).

Appendix H: Financing: Case study: Challenges in investments and financing and solution

4.1.1 New business model: PPP and crowd financing as investment solutions!

The documentation of corruption, Kafkaesque bureaucracy and long court procedures and business envies, lack of legal enforcement of contracts,[452] the close interrelations between oligarchs and political power, the abuse of power and nepotism are toxic for the market which were the reasons of de-investments in the Balkan area for the German WAZ group[453]

Such business environment can mean to stop all business activities in the SEE and ECM area, to withdraw the invested money and to return back to the home market. Private business units follow this rule and de-invest their investments due to non-business or less and non-profitable business and as well due to heavy bureaucratic behaviors, etc.

[452] https://www.ksv.at/sites/default/files/assets/documents/924-laenderleitfaden-montenegro.pdf
[453] http://www.handelsblatt.com/unternehmen/it-medien/waz-gruppe-konzernchef-hombach-sagt-dem-balkan-ade/3505254.html

Banks usually do not follow this strategy and see their investments as service to their business customers, who follow them to abroad, as foreign investments will be done only with trustful banks.

In fact doing business in former Yugoslavia it is not that easy anymore as in the meantime there are seven different countries with 7 different law regulations (even they might be similar somehow. But in reality depending on the background of international advisors with different background from different countries and organizations the law developments in all former Yugoslavian countries develop in different ways), minimum four different languages (Slovenian, Bosnian-Croatian-Serbian *(Remark: in principle it is one language with regional deviations, but due to the past Yugoslavian conflict the language is called in alphabetic order: BCS),* Macedonian and Albanian and Montenegro would like to name its language as "Montenegrin" which is still Bosnian-Croatian-Serbian).

On the other hand you could say "You can do all kind of business and earn a hell of a lot of money with risky business when you know and analyze the risks and when you know what to do in order to manage risky situations".

This means if you are able to manage the risks of possible applications and interpretations of the law in a non-constitutional way then do the business. If you don't know how to proceed and to manage such situations you should not enter into the market. *In simple words: You build straw houses in sunny areas without grass and trees as shadow maker around and without extinguishing water in next distance you might be bankruptcy soon as you would not be able to cover the damages which can occur.*

But if you know and analyze the risks that straw houses are flammable solids and you know what to do in order to reduce the risks (measures against flames like building straw houses in shady holts, in each of the straw houses installing of fire extinguishers, in in close distances water resources to be used for leisure (kids) and as well as a fire pond you might be very successful. You have analyzed the risks and you know what to do in order to prevent or to manage when risky situations occur and don't forget to insure such facilities!

Bribing some clerks and officers might be a short and medium term solution. But doing bribes might be dangerous as in midterm the constellation of power and law might be changed as well. According to Austrian Trade Commission and other sources Austrian investors are in the most countries of SEE and ECM in terms of invested capital in the ranking within the first 3. It's not Germany, ten times larger than Austria

in terms of inhabitants and 10 times in terms of GDP (GDP Germany EUR 3,413,888 million[454]; Austria: EUR 327,250 million) (OeBFA Austrian Treasury, Republic of Austria. Investor Information – June 2015, Presentation).

Don't bribe in this business area if you are a foreigner. Don't believe to your network. You will be blackmailed. An example: You never should start with your business unless you have all your documentation for start of your business fulfilled and collected. When you start with your business without all documents necessary to be in the business your bribe fee will arise extremely. Starting your business e.g. without construction permit (but other permissions are with you) is the death of your business![455]

But there are still problems due to the laws and by-laws, when an electricity generation system has to be built first and then the grid connection can be organized. There is a heavy risk that you will not be connected in time. Such laws have a severe impact of financing decisions of banks!

Mainly Austrian and Italian banks and insurance houses have learnt how to move big investment capital into the SEE and ECM area. Austrian leasing companies (Raiffeisen-Leasing, Volksbank-Leasing, Sparkassen-Leasing, UniCredit-Leasing, Porsche-Leasing, Hypo Alpe Adria Leasing) belong in this business area to the largest leasing houses and the market share of all these companies together is for sure more than 50%.

Large construction companies STRABAG, PORR, Soravia Group on one hand and many other small and medium-sized companies are represented in this region. Despite all of the reported problems with missing legal certainty and with dramatic changes of the laws – sometimes as well changed ex post facto there is a know-how of doing business.

How to do business in SHP now? Some large energy companies (e.g. EVN would like to get out from the Bulgarian investment in amount of EUR 271 million and from energy investments in Croatia and Macedonia)[456] suffer.

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[454] http://countryeconomy.com/gdp/germany (recalculated into EUR)
[455] Due to my knowledge of such business cases in the regions and due to a non-disclosure agreement I cannot mention names, areas and business cases which are not public (in different media).
[456] http://www.fpoe-noe.at/fileadmin/Content/Niederoesterreich/Landtagsklub/Antraege/2014/kontrollierter_Ausstieg_der_EVN_aus_den_hochriskanten_Auslandsgeschaeften.pdf

Usually despite the self-made business men ("shady fortune hunter") there is no money for investments (and philosophy of long-term sustainable energy generation) into RES (Remark: The investments should be returned within a short term period. There is no sense of long-term business projects at the moment visible).

On one hand there is no business (or business on a very low level) of collection of valuable substances (in comparison to the German speaking countries) in this region, therefore there is a low level of understanding of sustainability (no or poor separate collection of batteries, no or poor separation of waste into bio-waste, waste paper, no or poor collection of metal and glass, etc.), there are still a lot of buildings without individual measuring systems of energy consumption (nevertheless you heat your flat in winter time higher than 25°C and/or you heat always with open windows, etc. you will not pay a higher energy bill than your neighbor who thinks "green"). With this background of behavior you cannot expect thinking of sustainability on a very high and sophisticated level.

When doing business with this behavior there is no wonder when prices of land are climbing up to heady heights after signals and "rumors" of investment wills in some area. Whenever and wherever local communities have been visited the tenor was always the same "We help you with your investments, but at first you should get the deals with the (greedy) land owner(s). Here we cannot support you".

Also foreign suppliers destroy the business climate. Not knowing the culture in this region and getting greedy of the business possibilities and thinking only of their own advantages some of them come with ideas you can answer only with a shake of the head. When elaborating feasibility studies for investments into biogas plants in South East Europe in 2010 to 2012 the first manufacturers of biogas plants informed the investors the maize silage price as feed stock should be calculated at EUR 12/ton. This was such a ridiculous low price the farmers – even in Serbia - (nevertheless of what kind of binding contracts with them) never would be able to produce at that low price level. I told to the investors and to the manufacturers that banks most likely will not finance this project as farmers would change their maize production to other more favorable food and feed production and they never would be able to produce maize silage at EUR 12/ton (even in South East Europe). Their answer was I should not destroy their business and I should not be on the farmer's side. Within 6 months the situation was changed – due to competition of market participants - as Hungarian prices were mentioned as EUR 24/ton and German prices as EUR 30/ton of maize silage at that time. This dramatic change of prices for maize for biogas production has

destroyed the market for biogas investments and banks were not really willing to do the financing (but only with conditions of 50% down payment and even higher and mortgage on land, etc.). As a fact of miscommunication there is only a small number of biogas plants now in SEE built and commissioned between 2009 and 2012.[457]

What does it mean for SHPP investment? This experience can be compared as well in SHP business. Especially in Serbia and Bosnia and Herzegovina it seems – according to personal experience - you can get SHPP (including generator, transformer, powerhouse, fish ladder, etc.) even at EUR 300/kW and up to EUR 5,000/kW. The price range of reported SHPP investments is that much falling apart that you won't believe in any of these examples. An Austrian[458] firm develops since 2009 a SHPP (3 MW installed capacity at a price level of EUR 6 to 6.5 million and 10 GWh electricity generation), fighting 6 years against bureaucracy, land owners, local service suppliers and changes of the laws. Many other investors are not that patient and would give up at an early stage.

4.1.2 Public Private Partnership

Due to such experiences with land owners and other parties involved in permission procedures there could be a solution to make SHPP investments easier. Public Private Partnerships (PPP) can be seen as means to encourage the private and the public sector to invest in common projects and to get a win-win situation. Private partners usually have the know-how to run the business and communities have influence on permission procedures (see below table of investment in infrastructure projects with PPP).

Table 60: Investment in infrastructure projects with PPP in developing countries (1995-2004; USD billion)[459]

Investment in infrastructure projects with PPP in developing countries (1995-2004; USD billion)										
Sector	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Energy	**21.80**	**30.00**	**46.30**	**29.40**	**21.00**	**27.40**	**15.60**	**19.20**	**17.60**	**12.70**
Electricity	18.20	27.40	43.30	23.30	18.30	24.90	14.10	10.30	14.70	12.10
Natural Gas	3.60	2.60	3.00	6.10	2.70	2.50	1.50	8.90	2.90	0.60

The questions for building a PPP SHP could be as following:

[457] http://www.bioenergy-serbia.rs/images/documents/studies/Biogas_Market_in_Serbia_Asessement_2014.pdf
[458] Due to business secret the name of the company cannot be mentioned
[459] http://www.apec.org.au/docs/adb%20public%20private%20partnership%20handbook.pdf

- Check of all applicable laws and by-laws which must be in line with the projected PPP SHP;
- Check of necessary steps of approval procedure;
- Analyzing the local impacts on nature, water level;
- Social effects on the project: Finding, analyzing and defining local NGO's and groups of interests who might be in favor and in disfavor of the project; who are the land owners (what might be their interest. The communication to land owners who should cede their land should be done only by communities who have to define the persons, who will get in contact with land owners in order to prevent speculations and long-lasting discussions);
- Definition of a marketing strategy/transparent PR strategy;
- Similar projects in terms of size and technology in the region (very important for comparing of offers for services and technical equipment, getting in contact and learning of advantages and disadvantages, etc.);
- Banks usually are very sceptic and especially when it comes to tailor-made projects (without reference prices in internet etc.) feed them with full and transparent information, e.g. hinting to a law that a certain percentage of RES should be a part of the country's energy expansion plan; really choose out from minimum 3 suppliers for main equipment and describe why and how the supplier was chosen, organize reference lists, etc., working out advantages and disadvantages of HP, etc. for risk evaluation of banks, etc.);
- Involve an accredited geologist and a hydrologist for definition of investment area and calculation of RES (water) supply;
- Basic layout, powerhouse plan, etc.;
- Are there any FITs;
- Calculation of average electricity production and calculation of expected turnover and can the cost be paid;
- Definition of cost for using grid, etc.;
- Depending on the previous analyze the type of the SHP technology (impoundment, run-of river, pumped storage);
- Type and definition of turbines depending on the type of SHP technology, fall, etc. (Pelton, Francis, Kaplan);
- Type of SHPP (using weir, kinetic power, diversion canal);
    - Financial plan, project documentation, feasibility study first and then estimation of SHPP investment cost :
    - Hydro technical construction up to 60%;
    - Turbines up to 25%;
    - Building up to 5%;
    - Electrical equipment up to 10%;
    - Cost of exploitation up to 0.5%.[460]
- Definition of responsibilities between the partners;
- Definition of time horizon/mile stone;
- Definition of tender text (if necessary according to local law and size of investment).

460 http://www.esha.be/fileadmin/esha_files/documents/SHP_Environment/ARE_Small_Hydropower_Position_Paper_2014.pdf

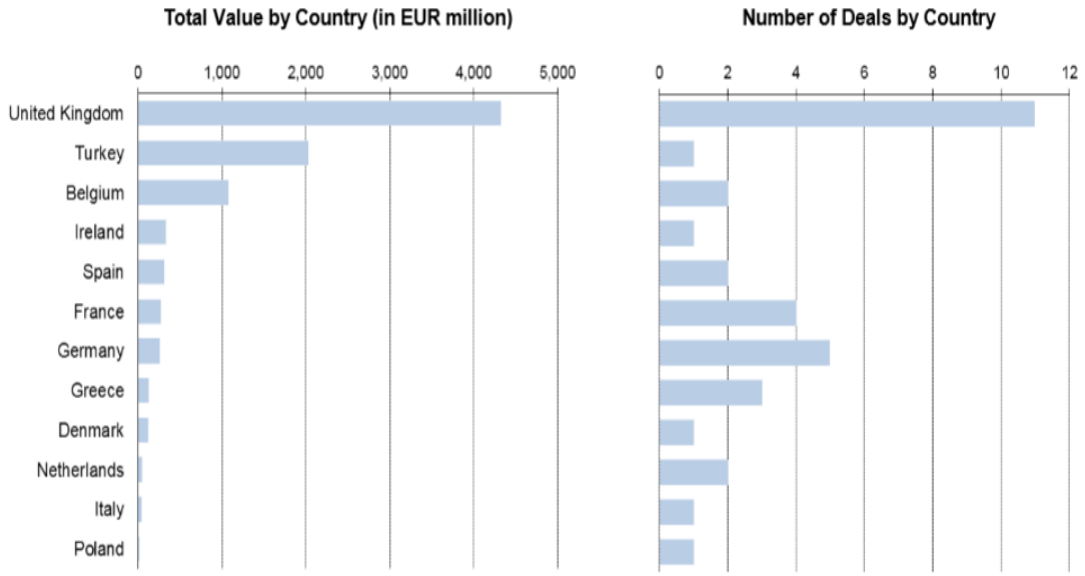


Figure 46: Value and number of PPP[461]

It might be difficult to convince communities to invest into SHP projects as the communities see themselves as service and administrative organization and do not want to be involved into operations, maintenance, etc. of SHPP's. Therefore the communities need hints (why doing/investing/being interest in/etc.) and values (such as being a green and sustainable community, electricity for the community, having lower costs when cooperating with private firms, getting higher level of service and having reduced risks, being one of the contributor to the binding EU target 2020, etc.) created through cooperation with private investors.

In principle according to the European Commission contractual PPPs have strategic importance for European industry and will invest EUR 6 billion (2013) of public investments with each euro of public funding expected to trigger additional investments to develop new technologies, products and services which will give European industry a leading position on world markets.[462]

Usually PPP models are used in education for schools, public transport sectors, etc. and watching the figure above it seems there is no space for SHPP's in combination with PPP financing. But on the other hand, when considering schools and kindergarten to be financed as well with PPP models there should be no reason not running an SHPP (from EUR 1 million and above). What should be considered is simply that the fix cost (tender procedure, etc.) might be higher. This argument might be true, but considering the analysis phase in order to see a project could be

[461] http://www.eib.org/epec/resources/epec_market_update_2014_h1_en.pdf
[462] http://ec.europa.eu/research/industrial_technologies/ppp-in-research_en.html

economically viable there might not be a real cost saving when there are simple investors. Simple investors should also organize minimum 3 offers in order to get bank financing and should explain why and how they came to their decision.

When searching in internet there are many examples of PPP SHP projects in development countries, e.g. one of them the Nicaragua Wiwili Small Hydro CDM & Rural Electrification Project with 1.48 MW installed capacity[463]

At the time of the research no information on SHPP with PPP in SEE and/or ECM area could be given or found. Especially in Serbia the "Belgrade Waste Treatment and Disposal PPP Project" is known in internet *(but asking around in the business sector no real information could be given)*.[464]

Therefore the investor should work out a list of advantages and disadvantages of PPP-cooperation and to communicate with the community as:

Advantages for building PPP agreements are:

- *"Enhance government's capacity to develop integrated solutions;*
- *Facilitate creative and innovative approaches;*
- *Transfer certain risk to the private project partner;*
- *Job sharing and responsibility sharing;*
- *Access skills, experience and technology;*
- *Speedy, efficient and cost effective delivery of projects;*
- *Value for money for the taxpayer through optimal risk transfer and risk management;*
- *Efficiencies from integrating design and construction of public infrastructure with financing, operation and maintenance/upgrading;*
- *Innovation and diversity in the provision of public services;*
- *Effective utilization of state assets to the benefit of all users of public services".*[465]

On one hand there are advantages and on the other hand as disadvantages should be considered:

- *"High transaction (bidding) costs;*
- *Better interest (finance) conditions when public sector is involved can be expected;*
- *Demanding negotiations;*
- *When developing the contracts, the negotiations associated with PFI schemes are highly complex and very time consuming;*
- *Unusual alliances;*
- *In the early days, the formation of project consortia was sometimes difficult as constituent members had differing objectives;*

[463] http://www.gsep-ppp.org/wp-content/uploads/2014/03/report_-_strengthening_ppp_recommendations.pdf
[464] http://www.beograd.rs/download.php/documents/BWTDTeaser.pdf
[465] http://www.rpa.ie/en/rpa/ppp/Pages/AdvantagesofPPPs.aspx
http://ppp.worldbank.org/public-private-partnership/overview/ppp-objectives

- *An extension of this is the selling of stakes after the construction phase. By doing so, some companies have made profits and walked away from the risks".* [466]

	Public	Public / Private	Private	Private	Private	Private	Private	Public / Private	Public
Identification									
Option Analysis									
Planning & Approval									
Implementation									
Post-Transaction									
	Political risk	Planning risk	Design risk	Construction risk	Maintenance risk	Operational risk	Financial risk	Usage risk	Legal & Regu- latory risk

Figure 47: PPP Risk allocation between private and public sector (van Herpen & AET Conference, 2002)

As very important is the allocation of risks shown in figure 47 above. In principle the risk(s) should be allocated to the party who is able to manage as best as possible. There are different risk allocations for political, planning, design, construction, maintenance, operational financial, usage and legal & regulatory risks sector (van Herpen, G.W.E.B. 2002).

In principle all countries – according to internet research (and as well according to professional experience) - within the EU know the system of PPP, but all non-EU countries of SEE area and as well of ECM area have some know how with PPP (incomplete selection of websites):

- Albania: http://www.ebrd.com/downloads/legal/concessions/albania.pdf
- Bosnia and Herzegovina: http://www.cek.ef.uni-lj.si/magister/habibija777-B.pdf and http://www.ebrd.com/documents/legal-reform/bosnia-pppsconcessions-assessment-2012.pdf
- Bulgaria: http://www.minfin.bg/en/page/750
- Croatia: http://www.ebrd.com/downloads/research/news/lit112c.pdf
- Georgia: http://www.mmmlaw.com/media-room/client-alerts/georgia-passes-expansive-public-private-partnership-p3-legislation
- Greece: http://ppp.worldbank.org/public-private-partnership/library/greece-law-public-private-partnerships-english
- Kosovo: http://ppp.worldbank.org/public-private-partnership/library/kosovo-law-public-private-partnerships-and-concessions-infrastructure

[466] http://www.rpa.ie/en/rpa/ppp/Pages/AdvantagesofPPPs.aspx
http://ppp.worldbank.org/public-private-partnership/overview/ppp-objectives

- Macedonia: http://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/mcedonia_law_concessions_and_ppp_2012.pdf
- Moldavia: http://blacksea.bcnl.org/en/articles/41-moldova-law-on-public-private-partnership.html
- Montenegro: http://documents.worldbank.org/curated/en/2010/02/13246360/public-private-partnership-ppp-options-future-power-generation-montenegro
- Romania: http://www.ppp-romania.eu/legislation/
- Serbia: http://www.ppp.gov.rs/en
- Slovenia: http://www.cesruc.org/uploads/soft/130303/1-130303193242.pdf?hfrgwqgmfbcvxbmf
- Ukraine: http://www.fhi360.org/projects/public%E2%80%93private-partnerships-development-program-ukraine-p3dp

It is really the best to start negotiations with communities in this business area. Larger projects (especially in wind and photovoltaic sector) go to larger (foreign) energy companies and energy funds.

Smaller projects and especially SHP projects are an area for private investors, small institutional investors, etc. But how to manage investments in SEE and ECM area with political crisis (especially Ukraine where nobody knows how the conflict in East Ukraine will end up after the annexation of Crimean Island to Russia in 2014; Moldova with its Transnistria conflict since the early 90ies of the last century, which hinders the economic development for whole Moldova)?

How to invest in high corruption EU countries like Bulgaria and Romania? What is it about investments in Bosnia and Herzegovina with 2 entities (3.8 million people in entity Federation of Bosnia and Herzegovina and 1.8 million people in Republic Srpska divided into 2 regions)?

What's about Greece with very non-active governments (changing basically between socialists and conservatives) since the fall of the military junta in 1974? Since the economic crisis of 2014 Greece seems to be a nightmare for EU, IMF, European Commission and the European Central Bank. The so called Troika (IMF, European Commission, European Central Bank) negotiates with the EU member states of the EURO-zone about the Greek sovereign debt crisis.

Is Kosovo still a part of Serbia or already independent (109/193 member states of the UNO recognize Kosovo as independent state (but the majority of them does not have diplomatic relationships)?

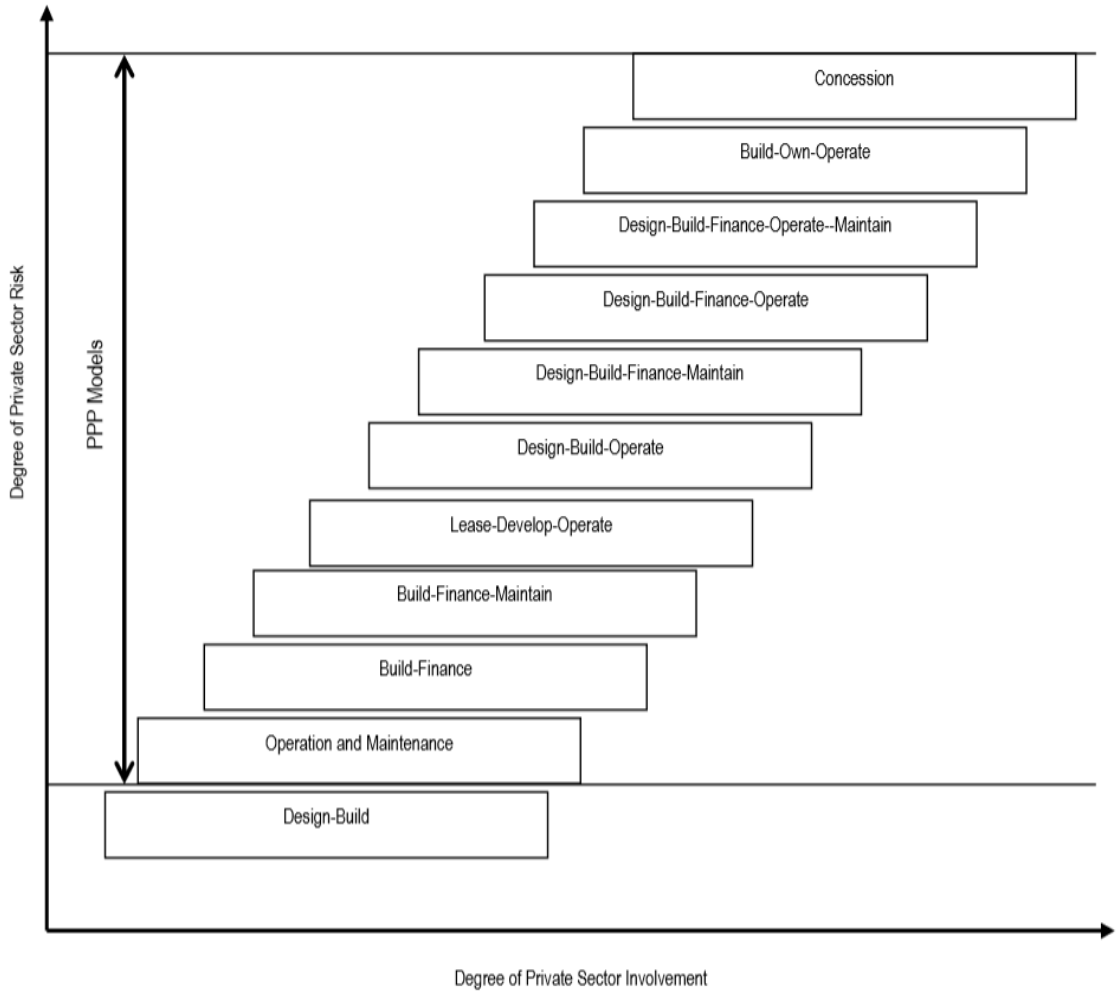


Figure 48: The scale of public private partnerships[467]

The former Yugoslavia area is indeed a very complicated business or investment area. There is no wonder of less trust and fear of losing money!

There is no sense of this work to summarize all the problems and hindering facts for SHPP investments in this business area.

A solution could be to combine SHPP financing and investment with PPP-cooperation and crowd financing.

As the first suggestion (without consideration of all other parameters concerning SHPP investments) Ukraine and Moldova should be split into Ukrainian spoken and Moldovan (Romanian) spoken area. Therefore there are no investments in the eastern part of Ukraine with a majority of Russian speakers (due to current political conflict with Russia). In case Ukraine would lose the Eastern part to Russia, there would be no FIT applicable after (possible) annexation. No investments in part of

[467] http://www.unece.org/fileadmin/DAM/ceci/publications/ppp.pdf

Transnistria as no country in the world recognizes (even not Russia) Transnistria as an independent state!

Greece should be on hold (GREXIT yes or no) and there might be different priorities after the referendum ("Should the agreement plan submitted by the European Commission, the European Central Bank and the IMF to the Euro-Group of June 25th, 2015, and comprised of two parts which make up their joint proposal, be accepted? The first document is titled "Reforms "For the Completion of the Current Program and Beyond" and the second "Preliminary Debt Sustainability Analysis"") hold on July 5th, 2015).

The rest of the countries – EU or non-EU countries – should be considered as good investment places.

4.1.3 Crowd financing (a kind of civic participation?)

Crowdfunding is a form of financing/funding in a group of internet users and was introduced in the Anglo Saxon area in around year 2000 and was mostly used for donations and investment (innovative ideas and projects which would never have financed through "conservative" loans) through social networks, blogs, microblogs and other channels. Business plans were presented, the amount of equity/participation and the "reward" for investments were reported. The equity/participation (money) should be collected within a defined period of time. When the project was successful the equity/participation (money) was handed over to the issuer who could start with his project. Usually special internet platforms administrate such projects and get a fee.[468]

Or another definition: "The power of crowdfunding is by pooling small contributions of money from groups of people who share common interests and the goal is that everyone has the power to achieve financial goals" (unknown internet source).

The crowd in this nexus is a group of people united by a common characteristic (e.g. social network groups, social network followers, "friends of friends", etc.) who might be attracted to invest into innovative projects (see figure 49 below).

[468] http://wirtschaftslexikon.gabler.de/Definition/crowdfunding.html#definition

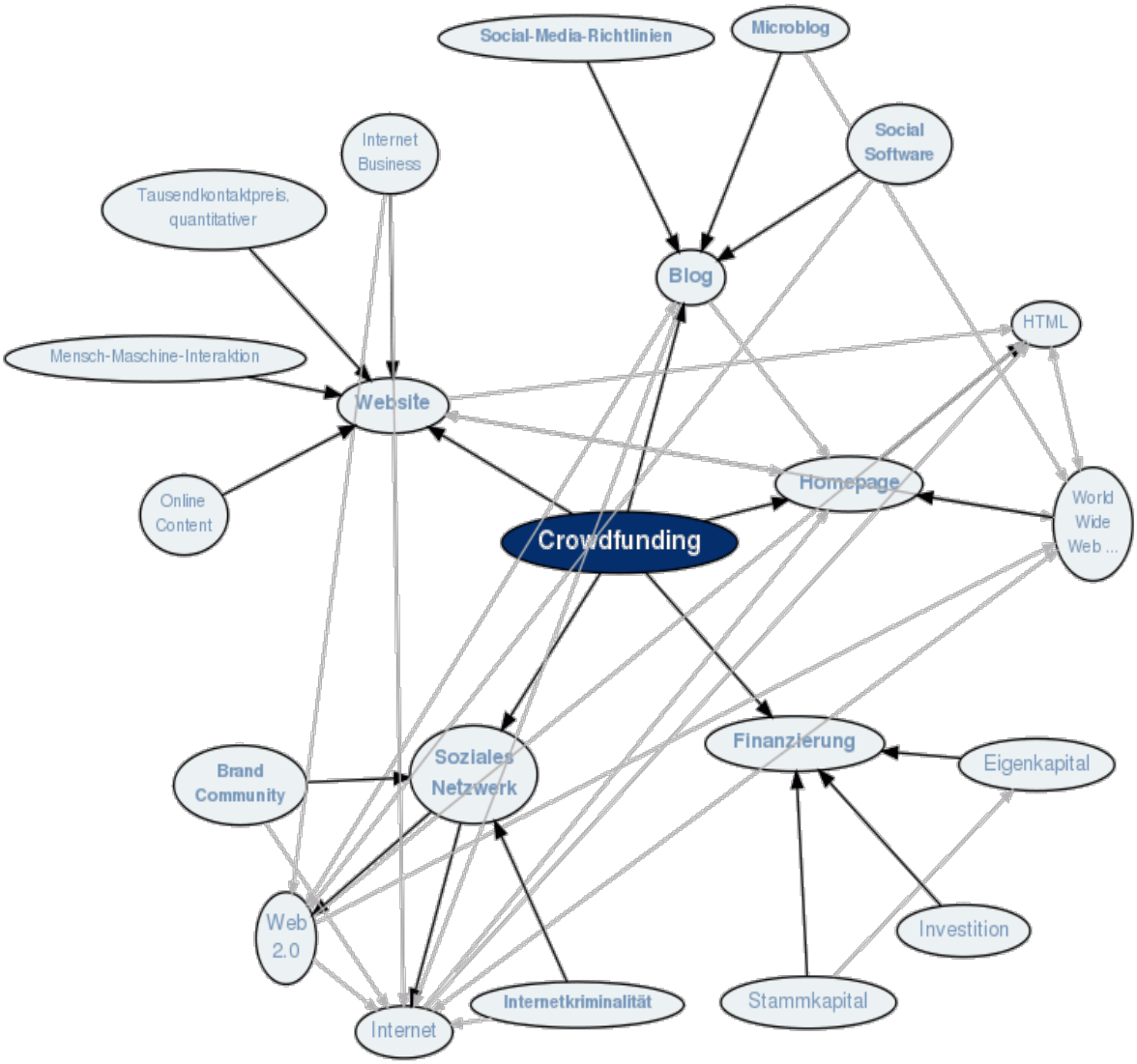


Figure 49: Interactions of crowdfunding[469]

According to "Moving Mainstream. The European Alternative Finance Benchmarking Report", February 2015 the crowd financing market for year 2014 was:

- UK is the absolute leader of alternative financing (figure 50 below);
- Total transaction volume of the online European alternative finance market: EUR 2,957 million;
- Growth of the online European alternative finance market compared with 2013: 144% to nearly EUR 3 billion. For 2015 a funding volume of up to EUR 7 billion could be reached;[470]
- Total transaction volume of the online European alternative finance market excluding the UK: EUR 620 million;
- Early-stage, growth and working capital funding provided to European start-ups and SMEs through alternative finance platforms: EUR 201 million (Wardrop, 2015);

[469] http://wirtschaftslexikon.gabler.de/Definition/crowdfunding.html?extGraphKwId=688938793
[470] http://tech.eu/features/4010/european-online-alternative-finance-market-research/

- In Austria there are currently 3 alternative financing platforms (operating under different laws as the new alternative financing law will be effective from October, 2015);
- Current internet research during the writing process of this master thesis show as well attempts of alternative financing platforms and financing on Balkan respectively SEE area (e.g. Zip start up: Since launching in March, 2015 already successful financing of 7 startups;[471]
- Since 2011 alternative financing projects should exist in Slovenia and several Slovenian startups should have run successful crowdfunding campaigns;[472]
- Crowdfunding in Serbia is known on Facebook.[473]

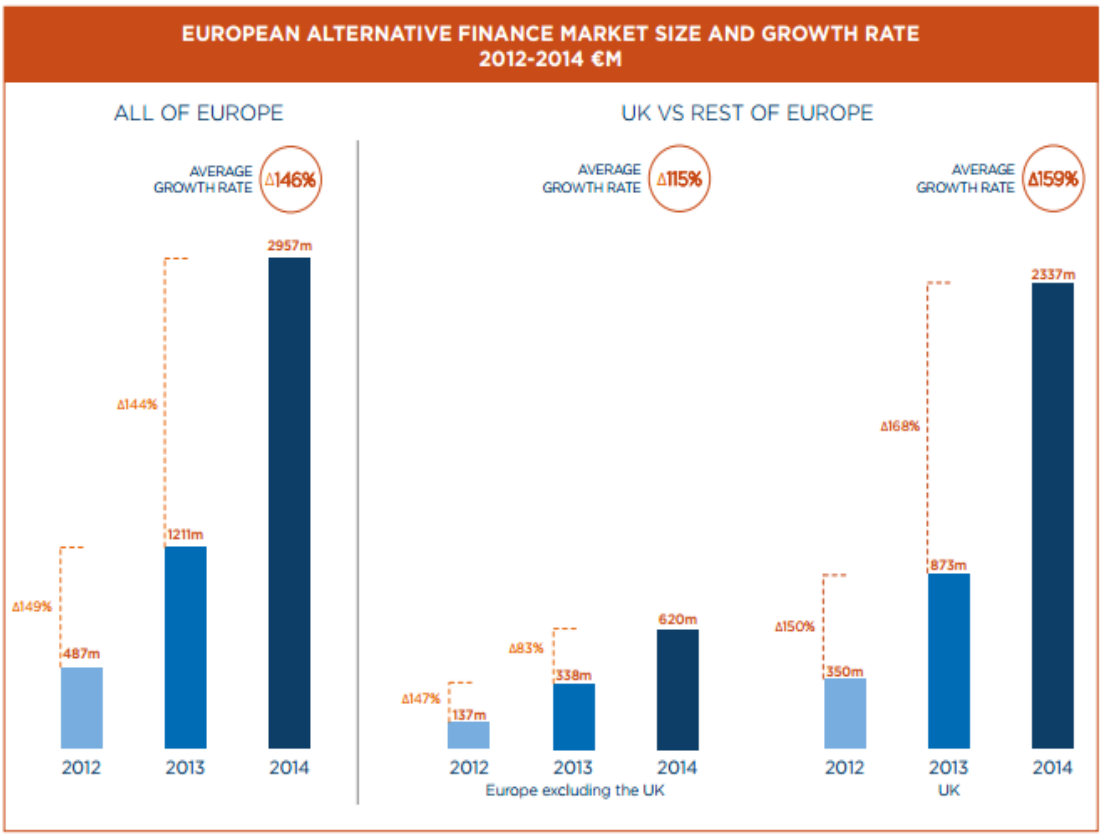


Figure 50: European alternative finance market size/growth rate 2012-2014 (Wardrop, 2015)

At present there are – according to Arbeiterkammer – minimum 6 crowdfunding platforms in Austria working without "full legal regulations". Only one of them is operating with legally defined trade license of financial consultant. 3 of them operate as donation platforms:

- www.respekt.net
- www.inject-power.at
- www.querk.at

The remaining platforms are investment platforms:

- www.conda.at

[471] http://zipzg.com
[472] http://inventures.eu/the-crowdfunding-phenomenon-in-slovenia
[473] https://sr-rs.facebook.com/crowdfundingsrbija

- www.1000x1000.at (will establish a subsidiary in Slovenia)[474]
- www.greenrocket.at).[475]

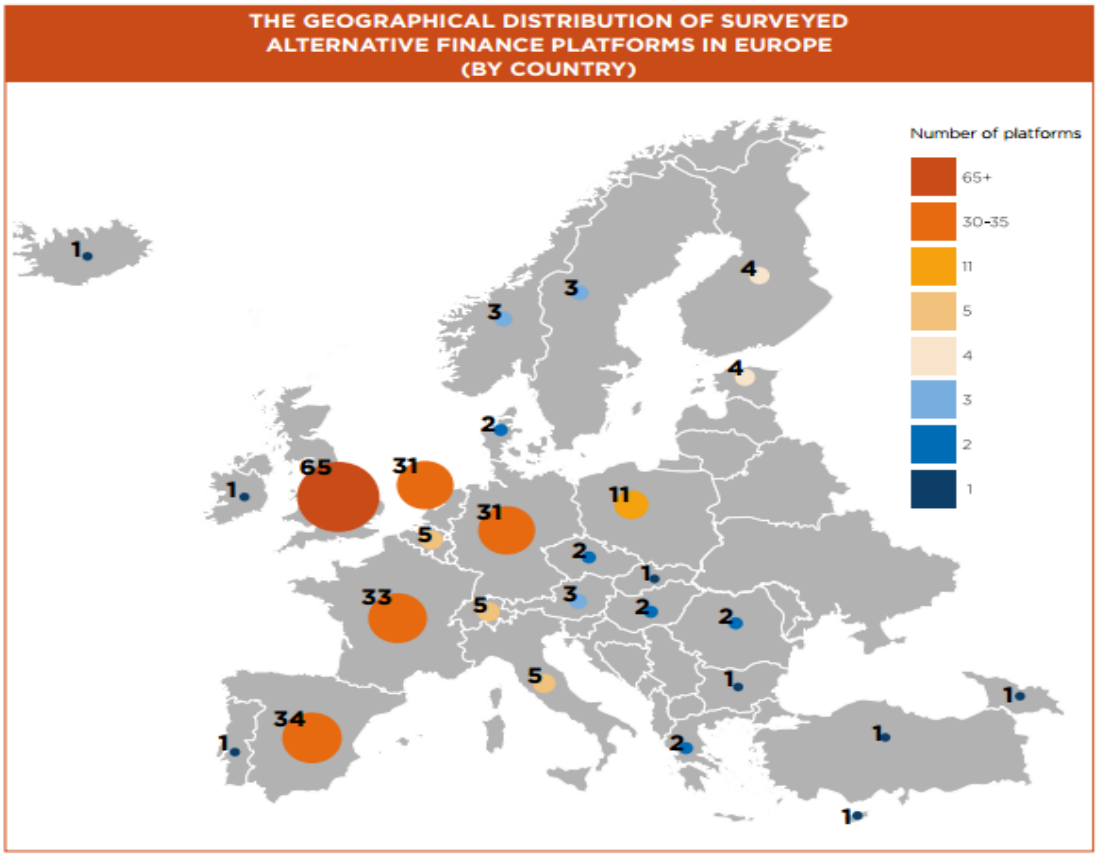


Figure 51: Number of alternative financing platforms in Europe (by country) (Wardrop, 2015)

In Germany the crowdfunding platforms can be found on:

- http://www.crowdfunding.de/plattformen
- http://www.crowdfunding.de/ecocrowd
- http://www.crowdfunding.de/bettervest
- http://www.crowdfunding.de/econeers
- http://www.crowdfunding.de/greenxmoney
- http://www.crowdfunding.de/tamaota
- http://www.crowdfunding.de/greenvesting
- http://www.crowdfunding.de/buergerzins
- www.greencrowding.com
- http://www.crowdfunding.de/leihdeinerumweltgeld

In Switzerland the crowdfunding platforms can be found on:

- http://www.kmu-businessworld.ch/de/content/die-crowdfunding-plattformen-der-schweiz#.VZvK9_ntlBc

From the point of view of active crowdfunding platforms in RES business are:

- http://www.windcentrale.nl (The largest RES platform)

[474] http://wirtschaftsblatt.at/home/life/dossiers/start_up/1555766/CrowdfundingPlattform-1000x1000-geht-nach-Osteuropa
[475] http://www.arbeiterkammer.at/beratung/konsument/Geld/Geldanlage/Crowdfunding-Plattformen_unter_die_Lupe_genommen.html

- https://www.abundancegeneration.com/
- https://joinmosaic.com/
- https://www.trillionfund.com/
- http://www.gen-community.co.uk [476]

The University of Cambridge Judge Business School has a professorial chair of Cambridge Center for Alternative Finance. According to the Cambridge University examples of alternative channels are online "marketplaces" (equity- and reward-based crowdfunding, peer-to-peer consumer/business lending, third-party payment platforms). "*Alternative instruments include SME mini-bonds, private placements and other 'shadow banking' mechanisms, social impact bonds and community shares used by non-profit enterprises, and alternative currencies such as Bitcoin".* [477]

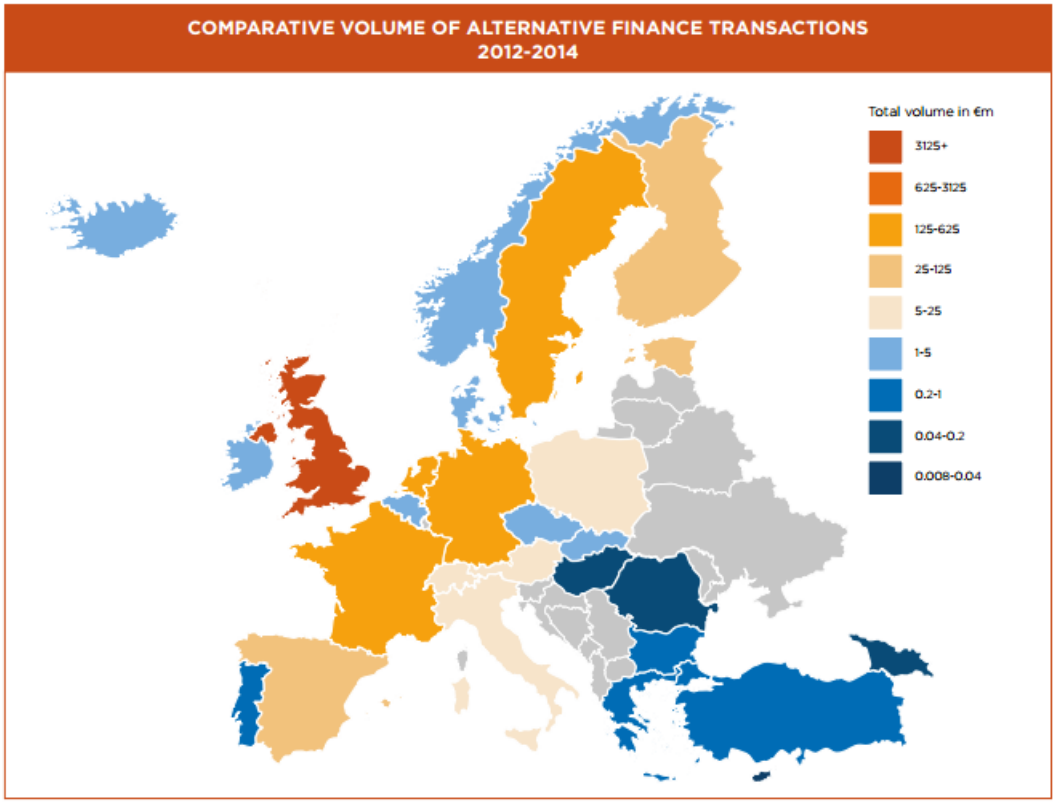


Figure 52: Comparative volume of alternative finance transactions Europe 2012-2014 (Wardrop, 2015)

According to Mr Mayr, professor at the University of Kent, the market growth of crowdfunding in UK from 2012 -2014 is shown as:

- *"P2P business lending (250%)*
- *P2P consumer lending (108%)*
- *Invoice trading (174%)*
- *Equity crowdfunding (410%)*
- *Community shares (95%)*

[476] http://www.solarplaza.com/article/top-5-renewable-energy-crowdfunding-platforms
[477] http://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/

- *Rewards crowdfunding (206%)*
- *Pension led crowdfunding (5%)*
- *Debt based securities (117%)*
- *Donation crowdfunding (77%)"* (Baeck, 2014)
- *UK is the leader of alternative financing and Europe is starting doing so (following figure):*

Alternative Finance – during the time of non-regulation in Austria – was a kind of money raising for the own wallet of criminals!

In Austria in principle crowdfunding or alternative financing was forbidden (generally it is still forbidden, but under certain strict conditions pursuant to KMG there are some "legal" solutions. At the time of the operation of bankless-life and other platforms in 2009 to 2012 the FMG was shutting down all attempts of any form of alternative financing):

Own experience with bankless life (www.bankless-life.at)[478] *(at the time without legal regulation in Austria):*

- *(Millionenbetrug mit Krediten? Spur führt nach Mauerkirchen – Million fraud with loans. Way to Mauerkirchen)*[479]*,*
- *nick2nick*[480]*,*
- *Kredite von Menschen für Menschen („loans from people for people or better translation "Peer-to-peer-Lending")*[481]*, etc.*

All of these platforms were operated from the same group of people and which ended up in an extreme long court procedure with more than 40 victims) in a disaster (046 93 Hv 91/12a – 368, regional court for criminal affairs Vienna). In principle these platforms were one platform (under different names).

The main operator was sentenced for 4 years to jail (but left earlier) and will not be able to repay the caused damage of several 100,000 euros (in comparison to other investors my damage of EUR 10,000 is quite low). It can be expected that a personal bankruptcy procedure will be a solution for him (and once again the victims will fall by the wayside, which is as a consequence of the personal bankruptcy is according to my opinion an officially recognized fraud) to get rid of his "debts" (as he was abusing the good idea and motivation of alternative financing for his own purpose). The group of managers behind bankless-life, nick2nick, Kredite von Menschen für Menschen,

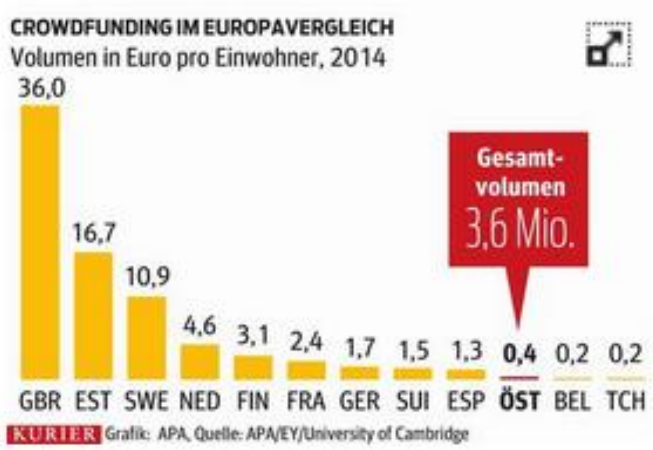
[478] http://derstandard.at/1392688178228/Crowdlending---Ein-Kredit-von-mir-zu-dir
[479] http://www.nachrichten.at/nachrichten/wirtschaft/Millionenbetrug-mit-Krediten-Spur-fuehrt-nach-Mauerkirchen;art15,462523
[480] http://www.meinbezirk.at/scheibbs/chronik/verein-nick2nick-sowie-bankless-life-und-andere-firmen-d26579.html and https://www.fma.gv.at/de/ueber-die-fma/presse/sanktionen/sanktionen-detail/article/sanktion-gegen-den-verein-nick2nick-bankless-life.html
[481] der Verein nick2nick – Kredite für Menschen von Menschen, ZVR-Zahl 072846658, Eglsee 9, 5270 Mauerkirchen (forbidden from FMA)

etc. had a long court procedure in front of the regional court for criminal affairs and all (around) 40 victims were heavily punished as well by the Austrian Financial Market Authority (FMA) for lending money to platforms bankless-life, nick2nick, Menschen für Menschen, etc. (as all of them did bank business without bank licenses).

Such platforms can be used as well for criminal purposes (which should be avoided pursuant to the Austrian Alternative Funding Law (AltFG)).

It must be mentioned that the Austrian public service broadcaster ORF has reported in 2010 (or 2011) very friendly of this alternative funding system of bankless life, etc. but suspicions of fraudulent activities later were never reported (even they got all materials from me). Only Austrian quality papers Der Standard, Oberösterreichische Nachrichten, Die Presse and as well Kurier reported between 2009 and 2014 of the criminal acts behind bankless-life.

Better known in the public is the serious case of the shoe manufacturer Staudinger in Waldviertel (Austria), who has lent EUR 2.8 million (other source: EUR 4.8 million) from private individuals and was several times punished from the FMA.[482]



Austria is a very conservative country in Europe with only EUR 0.4/capita crowd investment pursuant to current law regulations (altogether EUR 3.6 million) and UK is leading.

Figure 53: Crowdfunding Austria and Europe 2014[483]

In the meantime there is a draft of the "Austrian Crowdfunding Law" - Alternativfinanzierungsgesetz (AltFG), which should be confirmed by the Austrian Parliament and will be effective in October 2015. Together with the introduction of the AltFG there should be effected a change of the law on capital market

[482] http://wirtschaftsblatt.at/home/nachrichten/oesterreich/niederoesterreich/4732404/Match-FMA-gegen-Schuhrebell-Staudinger-geht-in-die-naechste-Runde
http://diepresse.com/home/wirtschaft/economist/4751658/Heini-Staudinger_Schlaf-gut-FMA#cxrecs_s

[483] http://kurier.at/wirtschaft/finanzen/was-am-neuen-crowdfunding-missfaellt/133.397.010

(Kapitalmarktgesetz – KMG) as well (curently 3 crowd financing platforms operate somehow legally under the conditions of KMG in Austria).

It is really important to create a good legal framework for the need of newly established and innovative companies and projects and for civic participation models in order to get an easy and economically affordable company/business funding and avoiding the very strict regulations of KMG of publishing of prospects (EUR 250,000 and a maximum invitation of bidders of 150 people).
The new regulation anyhow have to be considered as very good despite the heavy critics of the Austrian Arbeiterkammer (Official Representation of Employees) whose conception of the human being seems to be that the human being is too stupid for small legally regulated (maximum EUR 5,000 within one year and project) investments. Positive reactions of the Austrian Arbeiterkammer (Official Representation of Employees) are their reports of the criminal case bankless-life and nick2nick. Checking other papers and online portals of quality papers there are only hints that bankless life and nick2nick could not cooperate due to forbiddance of FMA (remark: the previous criminal cases of 2009 to 2010/11 seem to be forgotten).

According to the current draft of AltFG the total investment value should not be higher than EUR 1.5 million (§ 3 (1) 1. AltFG). According to Austrian newspaper KURIER (June 4th, 2015), the limit should be EUR 5 million in the meantime.[484]

According to the draft of § 3 81) 2 AltFG the investor should be allowed to invest maximum EUR 5,000 per year and project. The Austrian Official representation of employees is very strict and criticizes the “high” amount of EUR 5,000 (Remark: According to my opinion the Arbeiterkammer (Official Representation of Employees) does not trust their own members who should be able to manage their own money). Other investors (higher than maximum EUR 5,000) will be treated according to § 2 (1) 33 AIFMG).

In case the total amount of collected money for one project amounts higher than EUR 5 million with 7 years the respective issuer is obliged to publish a brochure pursuant to § 2 (1) KMG and § 7 (8) KMG.

Positive is § 3 (3) 1 and 2 AltFG that investors can invest more than EUR 5,000 (only when maximum 2 average net salaries (annual net salary/12) is invested or maximum 10% of his financial assets). The respective issuer is obliged to follow to money laundering rules pursuant to Trade Regulation Act (§ 4 (5) AltFG) and full information

[484] http://kurier.at/wirtschaft/finanzen/was-am-neuen-crowdfunding-missfaellt/133.397.010

obligation to investors: All risks for the proposed investment possibility have to be clearly defined (§ 4 AltFG). Investors according to Consumer Protection Act have clear rights to withdraw from the contract with the respective issuer. All information provided has to be true (Marketing). Identity of the investor must be checked. All information of the investment project must be checked from authorized bodies before selling.

§ 5 AltFG regulates who is allowed to be a provider of the internet platform *(Remark: I fulfill the requirements pursuant to § 94 (74) or § 94 (75) GewO 1994).* The provider is not allowed to be a respective issuer of a project and some other regulations.

From the point of the EU law level we have to consider there might be regulations in directives for different kind of crowd business:

- Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce');
- Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 concerning misleading and comparative advertising;
- Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC;
- Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive');
- Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts.

4.1.4 Joint Venture Continuing Education Center Vienna University of Technology and Energiepark Bruck an der Leitha as a solution for SHP investments

The Continuing Education Center (CEC) at the Vienna University of Technology (VUT) and Energy Park Bruck an der Leitha (EPBL) could be partners for crowd financing of equity for investments into SHPP's (and of course other projects as well) in the SEE and ECM area. *(Remark: This is just my personal idea and is not/never discussed with VUT and EPBL).*

Simple foreign and local non-institutional investors usually are not interested in SEE/ECM SHP investments (they do not have the down payment (= equity of 30%) of several hundred thousand euros for a SHP project, they don't know how to manage such an investment and are not able to follow the development of RES laws in countries (as they live outside of the investment region)). It must be mentioned that

the number of local investors is very small (and more investments should be made in order to reach the target 2020).

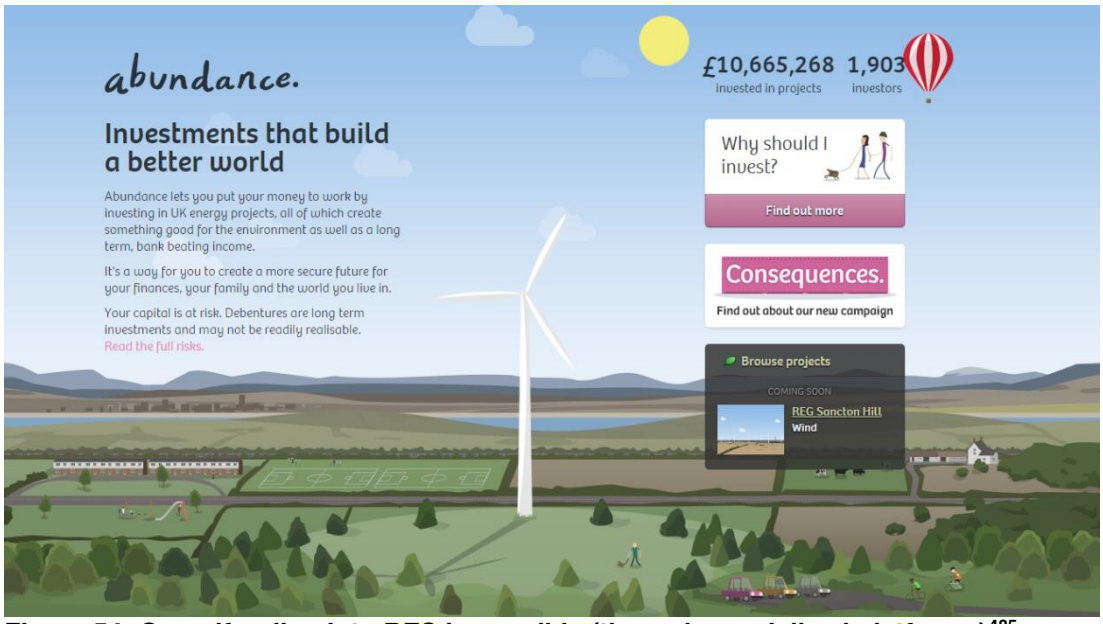


Figure 54: Crowdfunding into RES is possible (through specialized platforms)[485]

Watching the information of AWS Austria Wirtschaftsservice for funding (grant) [486] and/or venture capital funding[487] and The Austrian Research Promotion Agency (FFG)/Die Österreichische Forschungsförderungsgesellschaft FFG[488] will be without any result. There is in principle no place for any SHP investments in Austria. Why these institutions (and who from the Austrians, foreigners and other institutional investors if the local investors don't invest) should support countries like Greece (actually a country with heavy disputes with 18 Finance Ministers of the EURO-zone and 18 (or 27 Heads of State and Government), the very instable country Ukraine and Moldova, further Romania and Bulgaria (all countries having an extreme (ex-) migration problem) or Macedonia (with suppressed ethnic problems) or the poor houses Europe Kosovo, Albania and Moldova, or the poor Serbia still suffering from the bad image of the Yugoslav war?

How is the risk funding and support of innovative SME *(from my point of view the CEC and the EPBL are innovative institutions and/or companies and the power of innovation should be increased).*

[485] https://www.abundancegeneration.com/
[486] www.awsg.at/Content.Node/gruenden/foerderungen/95462.php
[487] www.awsg.at/Content.Node/risikokapital/99684.php
[488] www.ffg.at/foerderangebot

Most likely – for this business idea – there are no Funding opportunities for innovative SMEs in Horizon 2020 (EUREKA and Eurostars seem not to be the right support for the project of CEC and EPBL).[489] Concerning energy and environment projects there are not sufficient information on the web site of The FFG. [490]

Figure 55: Crowdfunding platform connects people who are searching money for making their innovative business ideas run with investors willing to invest in great projects

Even for this project the Erasmus program would not support the CEC.[491]

The CEC is a university educational or training center with 3 main educational programs:

- Engineering School;
- Business School;
- TU College.

The educational programs offer several courses for specialization. The EPBL is a partner of the CEC at the VUT (for university master course program of Renewable Energy in Central & Eastern Europe) and on its homepage visible as specialist for wind, biomass, biogas, photovoltaic/solar and other “new energy” sources.

Both partners (CEC at VUT and EPBL) could cooperate. Both have a crowd:

- CEC at the VUT: all present and previous students of the study programs and courses. Since founding of the university master program “Renewable Energy in Central & Eastern” Europe there must be currently a minimum of 167 masters (according to link to master theses REN);[492]
- Including other programs there are 15 courses:
  - Engineering School (Economics, Engineering Management, Environmental Technology & International Affairs, Real Estate Management & Evaluation, Membrane Lightweight Structures, Renewable Energy in Central & Eastern Europe, Sustainable Constructing);

[489] https://www.ffg.at/europa/h2020/kmu/foerderungen
[490] https://www.ffg.at/en/environment-and-energy
[491] http://www.bildung.erasmusplus.at/
[492] http://aleph.ub.tuwien.ac.at/F?base=tuw01&func=find-c&ccl_term=WIT=992%20179

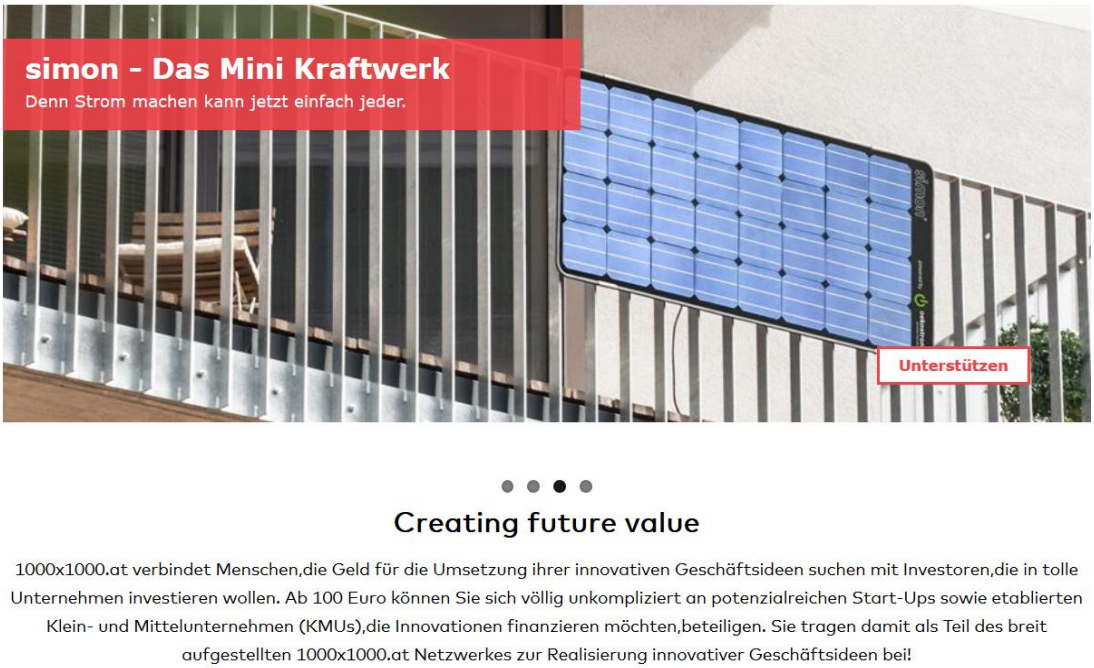


Figure 56: Example of a RES crowdfunding project of ÖKOSTROM AG[493]

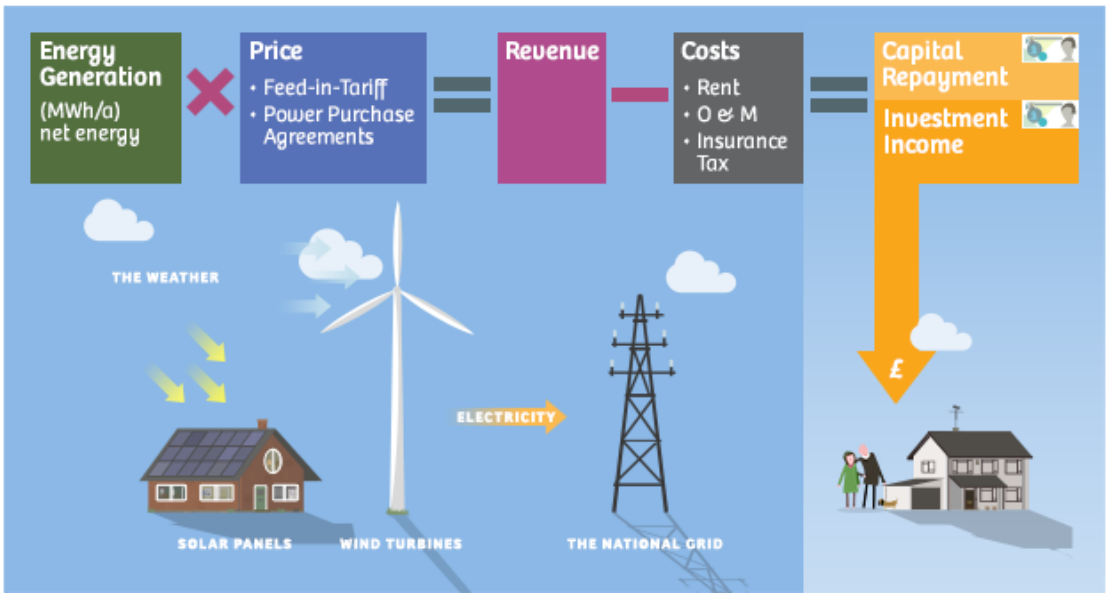


Figure 57: Crowd funding into RES is money generator, which makes ethically a good feeling[494]

- Business School (General Management MBA, Professional MBA Automotive Industry, Professional MBA Entrepreneurship & Innovation, Professional MBA Facility Management);
- TU College (Immobilienwirtschaft & Liegenschaftsmanagement; Nachhaltiges Bauen, Enterprise Risk Management, Industrial Engineering (TU-Wifi College), Energy-College (TU Wifi College);
- (15 courses à 16 students on average makes 240 students per year).

[493] https://1000x1000.at/news
[494] https://www.abundancegeneration.com/why-invest/energy-investment/how-you-get-your-return

Why crowdfunding for Continuing Education Center at the Vienna University of Technology and Energy Park Bruck an der Leitha?

This business model is very simple! It is a business idea to connect know-how, to use the contacts of partners, students and to increase the network, to be in contact with all partners and of course to earn money (e.g. for student projects, for granting scholarships, for student investments, etc.). EPBL would get the chance to be international, to get higher know-how and in principle to risk low/no money.

Regional students from SEE and ECM area of the master course "Renewable Energy in Central & Eastern Europe" are trustful liaison officers and are locally (regionally) connected with their own professional and private network.

We assume there is no money from local authorities and local investors available for investments in the said regions. The local SHPP investments would be economically and technically viable (which could be checked from WeBSEFF for projects in the West Balkan Area; the same service should be researched "SEFFs" for other areas).

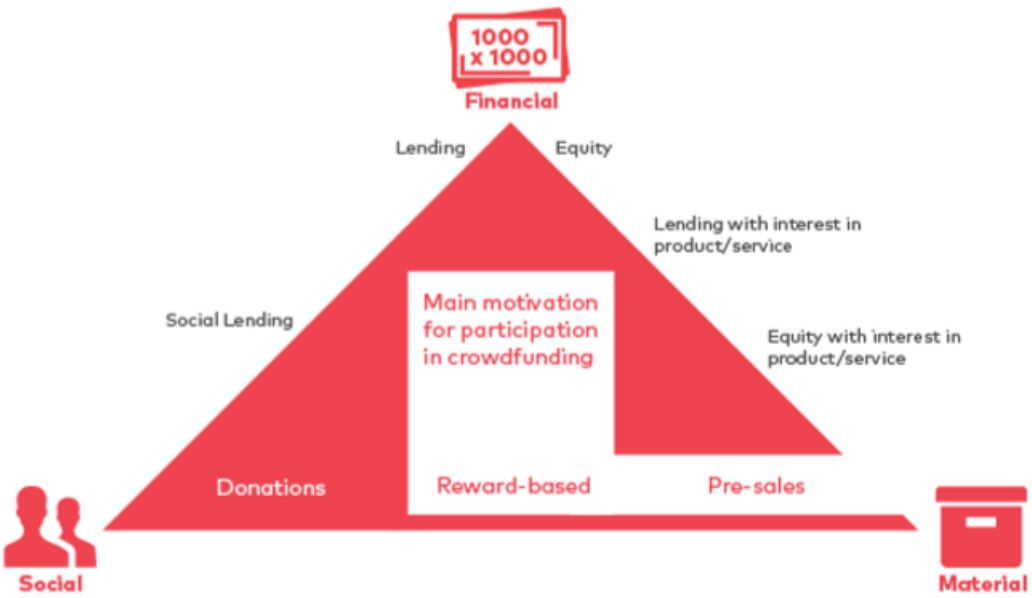


Figure 58: Motivation of the investors (De Buysere, 2012 via Wilfort, 2015)

Usually crowdfunding investors have different motivations for investments (for the majority of them it is not compulsory to get a high return on investments; most of them invest just for being/doing something good (to the nature, for health, etc.). Therefore we can consider:

- Donation based crowdfunding (in Austria known as Respekt.net: probably EUR 1 million in 2010; according to Fundraising Austria the donation market was EUR 510 million (2013) and EUR 550 million (2014));
- Reward based crowdfunding (estimation in Germany for 2014: EUR 20 million)

- Lending based crowdfunding (estimation in Germany for 2014: EUR 150 million; in Austria: Grüne Erde with EUR 7,4 million);[495]
- Equity based crowdfunding (estimation in Germany for 2014: EUR 50 million; according to WKO million 3.6 in 2013/2014) (Wilfort et al, 2015).

How to enter into this business?

Searching on internet (e.g. Facebook, Xing, Linkedin) the CEC and EPBL there are following results:

- Facebook: no results
- Xing: Technische Universität Wien - Continuing Education Center, but no activities (only information of 6 employees)
- Linkedin: Vienna University of Technology - Continuing Education Center, but 714 followers and 11 employees are mentioned.
  Instead of Energiepark Bruck an der Leitha following "Energieparks" are visible: Energiepark.nu; Energiepark Trelder Berg GmbH and Go APE! – Art Park of Energy voorheen Kunstzinnig energiepark

From the marketing point of view both institutions should invest in setting up of a crowd. The crowd of the CEC and EPBL are all students of different study programs (active and registered students and alumni), employees, business partners, investors, owners, professors, teachers, keynote speakers, etc. There might be a base of 2,000 or even higher number of first class contact (all alumni from the last 10 years of all study programs, business partners (active and past), etc.

Building up a website in social media (Facebook, Linkedin, Xing, Twitter, etc.), contacting all partners and asking them for "likes" or recommendations. Starting with interactions and reports of planned future activities, e.g. the idea of investing and operation of SHPP's in SEE and ECM business/investment area!

Contacting local partners from the master course "Renewable Energy in Central & Eastern Europe" as a trustful network (e.g. student XXX: *"I have a company in Serbia. I know many communities and always the same complaints. So many foreign investors have visited us, but they never returned for business. I would like to be a part of this business, but I have limited time capacity"* or another student: *He is well connected with several communities in Zlatibor region (Serbia) and he has additional good contacts to political administration in Serbian Republic (Bosnia and Herzegovina).* Some of the alumni might have good professional record and might be well connected to decision makers,…

- Let's use the synergy potential and network of synergies;

[495] www.grueneerde.com/info/beteiligungsmodell/
http://www.grueneerde.com/info/beteiligungsmodell/darlehensvertrag-anfordern/

- Go with this information on net – all of the first rank contact persons have families and friends and partners;
- Let's use the power of trust "when my friend/my brother invests into a project of CEC/EPBL – so do I, because I trust my friend/brother";
- The CEC has a good name. The image factor has to be used as money and money makes income;

Crowdfunding-Projekt simon: 567.000 EUR Schwelle erreicht!

gepostet am 25. Juni 2015 - 13:51

Am 8. Mai, dem Tag der Sonne, präsentierte die oekostrom AG mit „simon" die erste komplette, steckdosenfertige Photovoltaikanlage. Ziel war es innerhalb von drei Monaten 1.000 Investoren auf der Crowdfunding-Plattform 1000×1000 zu gewinnen.

„Nun haben wir unser Ziel bereits einen Monat vor Ende der Funding-Phase erreicht", freut sich Horst Ebner, Vorstandssprecher der oekostrom AG. „Allen Investoren gilt großer Dank für ihr Vertrauen in unser Projekt! Wir setzen nun alles in Gang, damit simon rasch fertig entwickelt und pünktlich vor Weihnachten geliefert wird."

Figure 59: News to a RES crowdfunding project of ÖKOSTROM AG[496]

- The EPBL is well connected in Lower-Austria and Burgenland, has practical experience of running different RES plants. Why not doing more?;
- Banks and other financing institutions require 20% (best case), 30% (realistic case, 40% and more (worst case scenario) as own contribution or down payment for their projects;
- Let's analyze:
  - Should we start with our own specialized platform on energy generation, energy efficiency (as investment platform), energy research (as donation based platform)?;
  - Should we start with one of the specialized platforms in RES?;
  - Is there a reason to go with a German specialized platform or to use the Austrian platform www.1000x1000.at (successfully launching of Ökostrom energy crowdfunding project "SIMON")?
- Why not making risk sharing with communities?
  - Communities bring in land and area (which has a value of x% and will be considered as part of equity);
  - Can manage tough negotiations with stubborn land owners who in most cases have extreme unrealistic price estimations (when "feeling" a foreign project interest).

[496] https://1000x1000.at/news

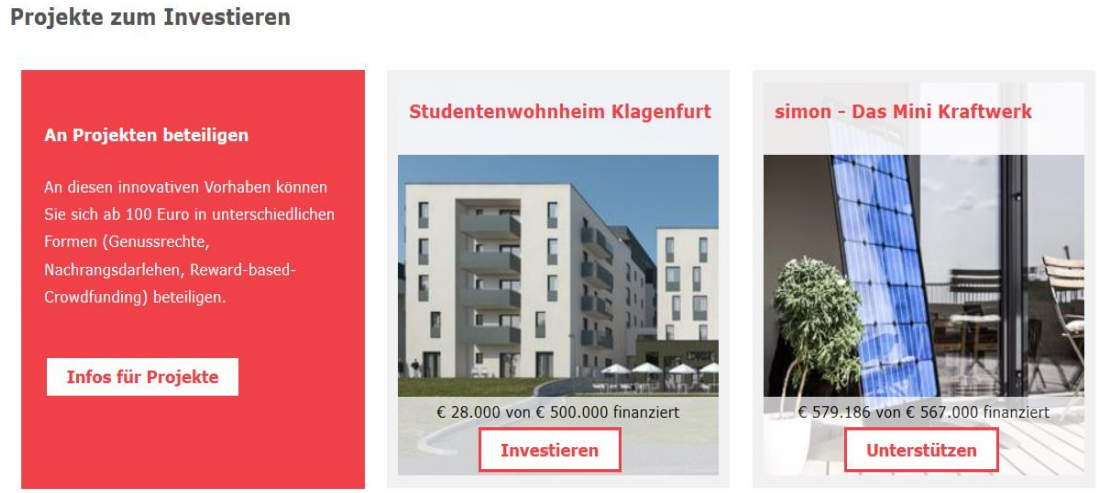


Figure 60: The SIMON RES-project of ÖKOSTROM AG is "over-financed" in the meantime[497]

- Using the power and know-how of communities for all other permissions, documents (remark: it's always taking more time than "theoretical" written in documents, on internet, etc.);
- Collection of money for investment in Austria and use the motivation of donation based crowdfunding:
  - I invest, because SHP is green energy, we have to do something against the climate collapse);
- Reward based crowdfunding:
  - My friend invests, so do I;
  - I trust him. He knows where and what to invest;
  - I support him.
- Lending based crowdfunding (the interest on the saving book, on my current account, etc. is very ridiculous. I trust to CEC and EPBL, because there are experts and they run some RES plants);
- Equity based crowdfunding:
  - I trust to CEC/EPBL;
  - I believe in SHP as a CO_2-free contribution of energy generation;
  - I want support such investments.
- Writing a business plan and to get a clear vision (not only for banks, communities, CEC/EPBL), but a version, which has to be published on net fulfilling the written down criteria in AltFG. A full version of the business plan should be sent after requirement of interested groups;
- Writing down all risks according to criteria of AltFG (in order to be very transparent);
- Getting in contact with people (friends, business partners) you know, presenting them (using all e-mail, phone, social media and PR contacts) the idea of your project and ask the interviewed people to be serious to you (they should criticize the project as much as possible);
- Making a short video of planned investment (see the bench mark for a crowdfunding project: https://www.youtube.com/watch?v=ElTfVxQxjNM (a project of Ökostrom AG: Everybody can make electricity now. There are investors who just make a pre-order in order to get a photovoltaic panel![498]
- Before launching the video and officially announcing collect as much as possible money within your own crowd;

[497] https://1000x1000.at/news
[498] http://www.1000x1000.at/simon

- The best start for official announcing of your project is having collected around 20% to 30% of the total investment sum. This makes crowd investors greedy and interesting into your project;
- Organize webinars and seminars (see figure above)[499]

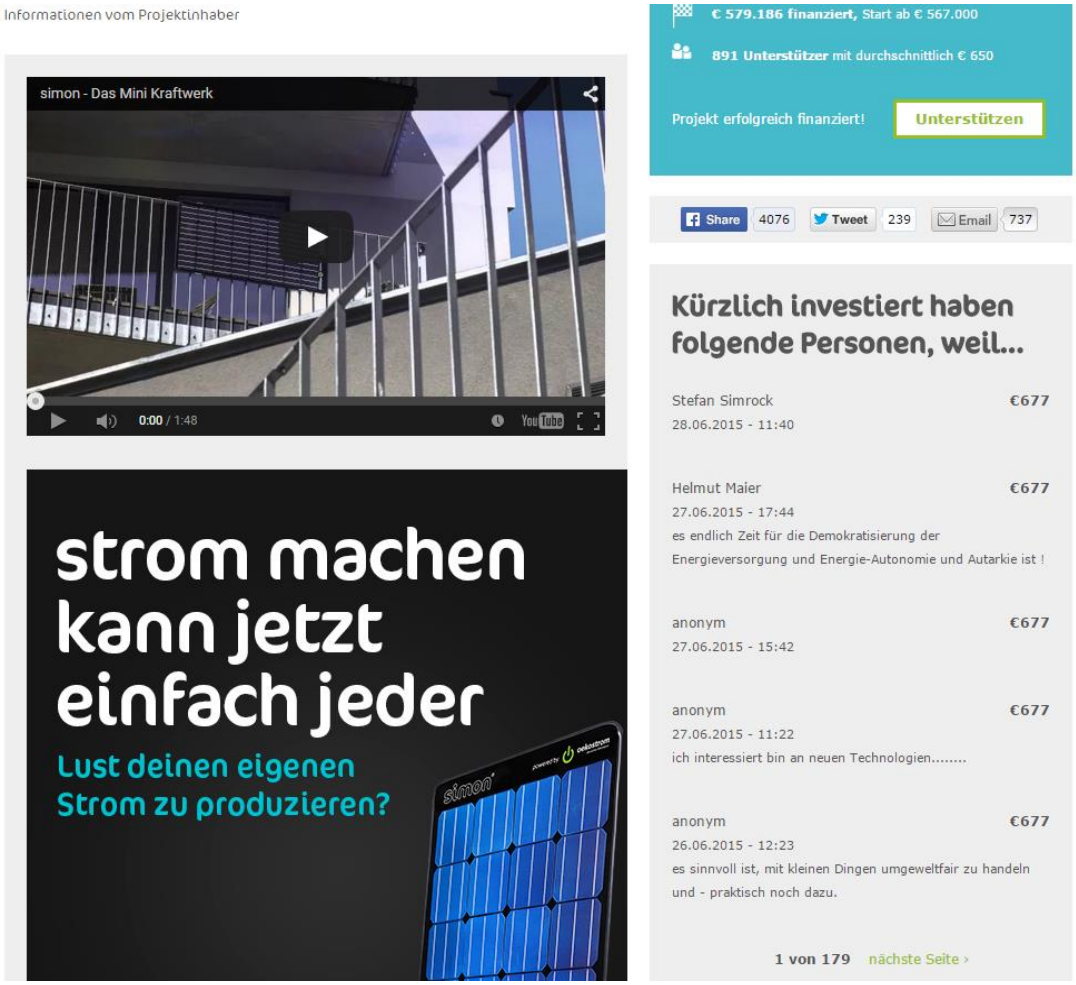


Figure 61: The SIMON RES project of ÖKOSTROM AG is currently "over-financed" (illustration with motives of investors) [500]

- Another projects of www.oekostrom.at is the project "jointly in a new energy world" on https://www.youtube.com/watch?v=g2-7KFwHpdM (just as an image video in comparison to above crowdfunding SIMON video);
- Selected examples of crowdfunding and information on crowdfunding:
  - Blue Freedom "The World's Smallest Hydropower Plant", Crowd funding Video;[501]
  - Solar Energy on Mafia-free Land: Crowd Funding kicks off (project of a German company in Italy);[502]
  - Help to build 50 domestic biogas digesters in rural Haiti – Crowdfunding;[503]

[499] http://www.visionlaunch.com/10-steps-to-crowdfunding-success-2/
http://thecreativeadvisor.com/9-crucial-steps-to-crowdfunding-success/
http://penultimateproductions.weebly.com/5-steps-to-crowdfunding-success.html
[500] https://1000x1000.at/news
[501] https://www.youtube.com/watch?v=O0S5v7GWsok
[502] https://www.youtube.com/watch?v=yoT62BJ2vD4
[503] https://www.youtube.com/watch?v=agp40V1Ba2k

  - Crowd financing for renewable energy projects;[504]
  - Juridical aspects of crowd financing. Crowd Investing in der Switzerland (Oliver Rappold);[505]
  - Crowdfunding for Start-Ups and Small Business;[506]
  - Launching a crowdfunding campaign.[507]
- The first project should be administrated e.g. through the platform www.1000x1000.at (the managing director Reinhard Willfort of this company is lecturer at the Technical University of Graz and the Danube University of Krems) – the investment for start would cost between EUR 10,000 and 15,000 (depending on the services needed (including/excluding movie etc.). The first project is just to get the know-how of running such platforms (samples of contracts, samples of typical documents, registration, getting to know the workflows, etc.
- The following projects should be made as a joint platform of CEC and EPBL (remark: Pursuant to AltFG the platform is not allowed to be investor SHP projects (except a very small part in order to be informed what's going on during the investment period. For that reason the ECEC and EPBL also should not be the owner of the platform. For that reason a solution has to be found as it should be the joint interest of CEC and EPBL);
- The director of the crowdfunding platform must fulfill the requirements pursuant to Pursuant to § 5 (1) AltFG;
- The operator must have following professional requirements according to § 94 Z 74 GewO (Business consulting including company organization) or according to § 94 Z 95 GwO (Commercial Financial Consultant) or a concession according to § 4 (1) WAG 2007 (regulation for investment service companies) *(Remark: I fulfill the requirements pursuant to § 94 Z 74 and Z 75 GewO);*
- Pursuant to § 5 (1) AltFG operators of crowd financing platforms are not allowed to have additional concessions according to BWG, AIFMG, ZaDiG, VAT or E-Geldgesetz 2010. The interpretation of this law obviously means that an operator of a crowd financing platform is not allowed to do additional business according to additional concessions (Remark: it seems there is a partial employment ban);
- Making for each project an SPV (special purpose company) with the seat on the address of the CEC and EPBL (with preference EPBL as a place for operation);
- Pursuant to § 2 Z 2 AltFG as financial instruments can be considered stocks, bonds, shares in corporations and cooperatives, participation rights, silent partnerships, etc.;
- As the SPV would/should be a limited liability company due to difficult handling of shares (costly registration in the company register) other financial instruments have to be offered;
- After collection of the minimum amount of money for participation with a community for an SHP project in the defined region a joint local SPV (Austrian "crowd financed" SPV jointly with the regional community) has to be founded;
- The operation and monitoring of the joint SPV will be done from EPBL and the local student/alumni of the master course "Renewable Energy in Central & Eastern Europe). The local student/alumni will be a consultant in the interest of CEC and EPBL (it should be considered as well if the local student/alumni

[504] https://www.youtube.com/watch?v=20exCNQMTdE
[505] https://www.youtube.com/watch?v=077lTbRMOx8
[506] https://www.youtube.com/watch?v=Es-Lk50W6oU
[507] https://www.youtube.com/watch?v=0452NA7OnzU&list=PLQ_6d8bM83iPHol4fMBIxNFvFTECgS1I8

should/could be as well the local director for the SPV together with the community;

- EPBL and the local managing director have to provide the information (balance sheet, profit, etc.) pursuant to AltFG to the investors;
- The investors will receive the annual interest for their investment on their account (minus local tax, which might be most likely some kind of withholding tax (as the income would leave the specified SEE/ECM country);
- According to the business plan most likely the "crowd financed" equity will be earned in a time horizon of xxx years and will be divided according to defined and negotiated ratios (the earlier the crowd investors will be refunded the better for the local SPV (local community and CEC and EPBL);
- It must be mentioned that according to § 3 (2) AltFG the issuer has to publish a capital market brochure according to § 2 (1) KMG and § 7 (8) KMG in case the total investments minus repayments to investors has reached more than EUR 5 million within 7 years. We assume that this business model would be very successful and as each SHP project would be an SPV such regulation could be avoided. But if such investments into SHP would be that successful and the CEC and EPBL would have such a good name on the market most likely there could be such large wind farm and photovoltaic and/or solar park investments which makes it easy to reach such constraints;
- This business model could be used for all civic participation models into investments in RES (Bürgerbeteiligungsverfahren). The crowd financing platform of CEC and EPBL operates as well civic participation models in Austria (and maybe abroad);
- With students (living in Austria with migration background) of CEC we should consider to reach the Croatian, Bosnian and Serbian Community in Austria. Most likely specific information should be as well written in the local language (advertisements in local newspapers, etc.);
- Further advantage of such platform for CEC and EPBL is the huge number of data to be collected. Each investor has to identify himself. "Rich" investors of more than EUR 5,000 per project investment has to proof his income (not more than the double of his monthly income (annual salary/12) according to § 3 (3) 1 AltFG and/or his project investment makes maximum 10% of his finance investment according to § 3 (3) 2 AltFG. The platform provider has to check the identity of the investor according to § 5 (2) 2 AltFG;
- With the future know-how the Continuing Educational Center and Energiepark could manage other investment projects without risks (see the study programs of the CEC with innovative investment possibilities; maybe there are additional non-known innovative ideas at EPBL);
- Considering risk we really have to ask where is the risk? In the current master course "Renewable Energy in Central & Eastern Europe" there are persons with local market know-how in former Yugoslavia (All of them are somehow connected with information on SHP investments);
- The start might cost some EUR 30,000 to 50,000 (travel cost and negotiations with local communities (serviced from student XXX), preparation of video, feasibility study, founding of an SPV (remark share capital EUR 35,000; respectively the version "GmbH light" with the obligation to pay in within 10 years EUR 17,500);
- As an example: This project should work with the expertise of the CEC and EPBL (with its very important and "good" profound crowd, which can be inflated easily up to 10,000 (with all secondary and tertiary contacts). From 10,000 possible first grade, secondary and tertiary contacts only 50 crowd members pay in EUR 72,000 (imagine one project in Serbia costs EUR 1,2 million, the bank needs 30% down payment (= EUR 360,000), the local land

and infrastructure has a value of EUR 50,000. Theoretically we would need EUR 310,000 (360,000 minus 50,000) but we go for EUR 360,000 into the project. With go on Web with a volume of EUR 72,000 (which makes 20%; 72,000/360,000). In the crowd platform there must be a so called "whow"-effect: "Already 20% collected. This must be a good project:"
    - Remark: Don't start with your project with ZERO INVESTED CAPITAL!;
    - From a very low (or no) level it is from psychological point of view very difficult to blow up your project!,
    - SEE SIMON and others!
- The first project is done. Inform all your crowd members of the first successful project. The first project is going to be invested (after finalized negotiations with the bank and of course you have costs now, you need people who run the investments, who prepare the payments according to construction progress, etc., but you have made the feasibility plan and you know how much you will earn within the next 10 to 15 years (depending on the FIT time));
- Now it is time for the next project. EPBL will make a press conference and invite local newspapers of Lower Austria and Burgenland (NÖN, district newspaper of the district Bruck an der Leitha, etc.). Let's prepare the local investors around Bruck an der Leitha for future projects!
- The CEC might have some budget as well and will create a PR article for newspapers of ÖH TU (Official Representation of University Students). The students are most likely not the investors of today. But change their mindset and they are investors of tomorrow!
- Do regularly information on Facebook, twitter, Xing, Linkedin, etc.
- With the know-how you can do the same jobs as well in CEE, SEE, CIS, etc. You have partner, alumni, students, etc. from this region. According to internet research crowdfunding starts as well in this region. There are some attempts!

Appendix I: Nature: Protected Areas in the Balkan Region

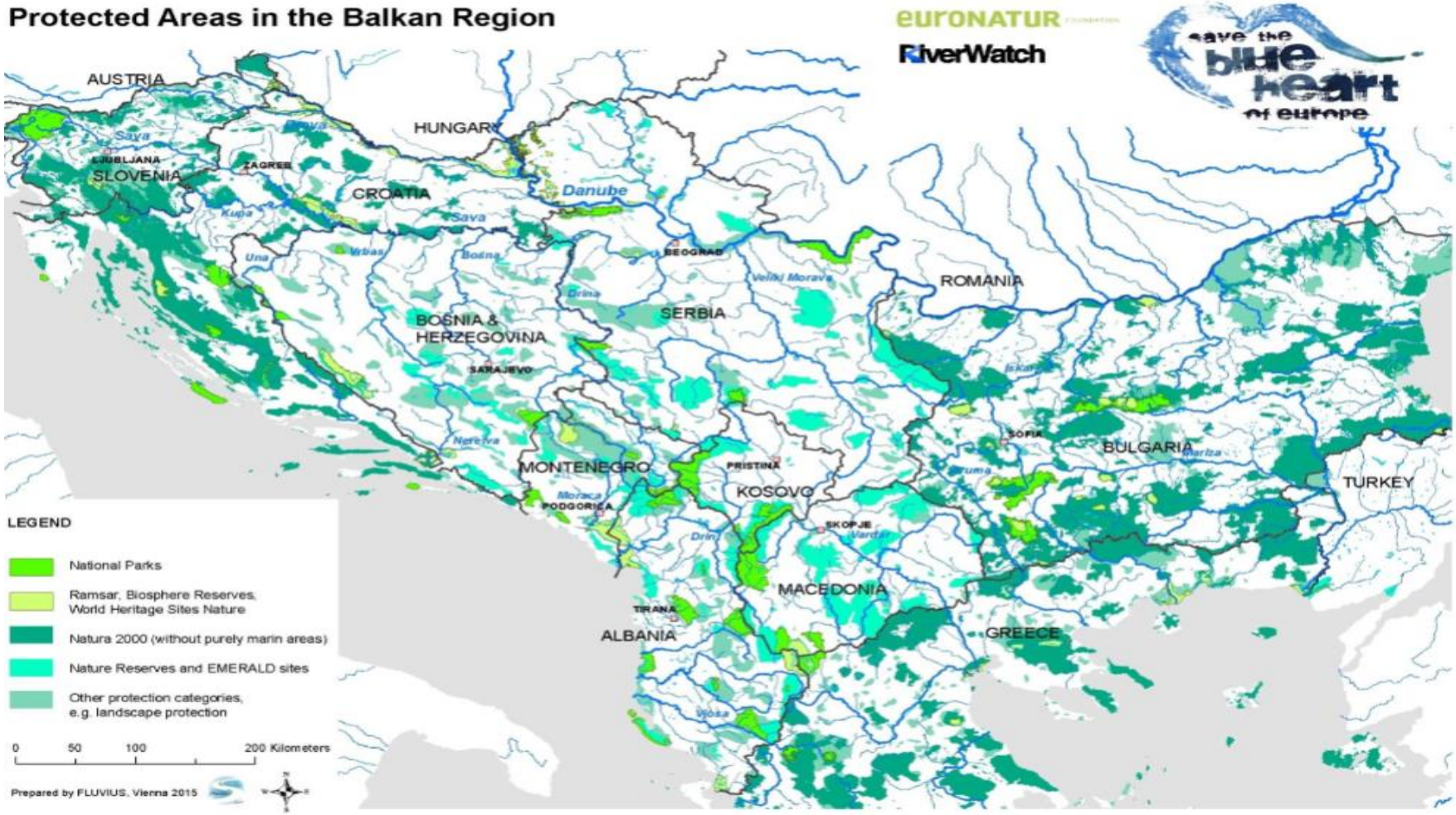


Figure 62: SHPP: Protected Areas in the Balkan Region (Riverwatch)

Appendix J: Nature: Hydropower plants in Balkan rivers

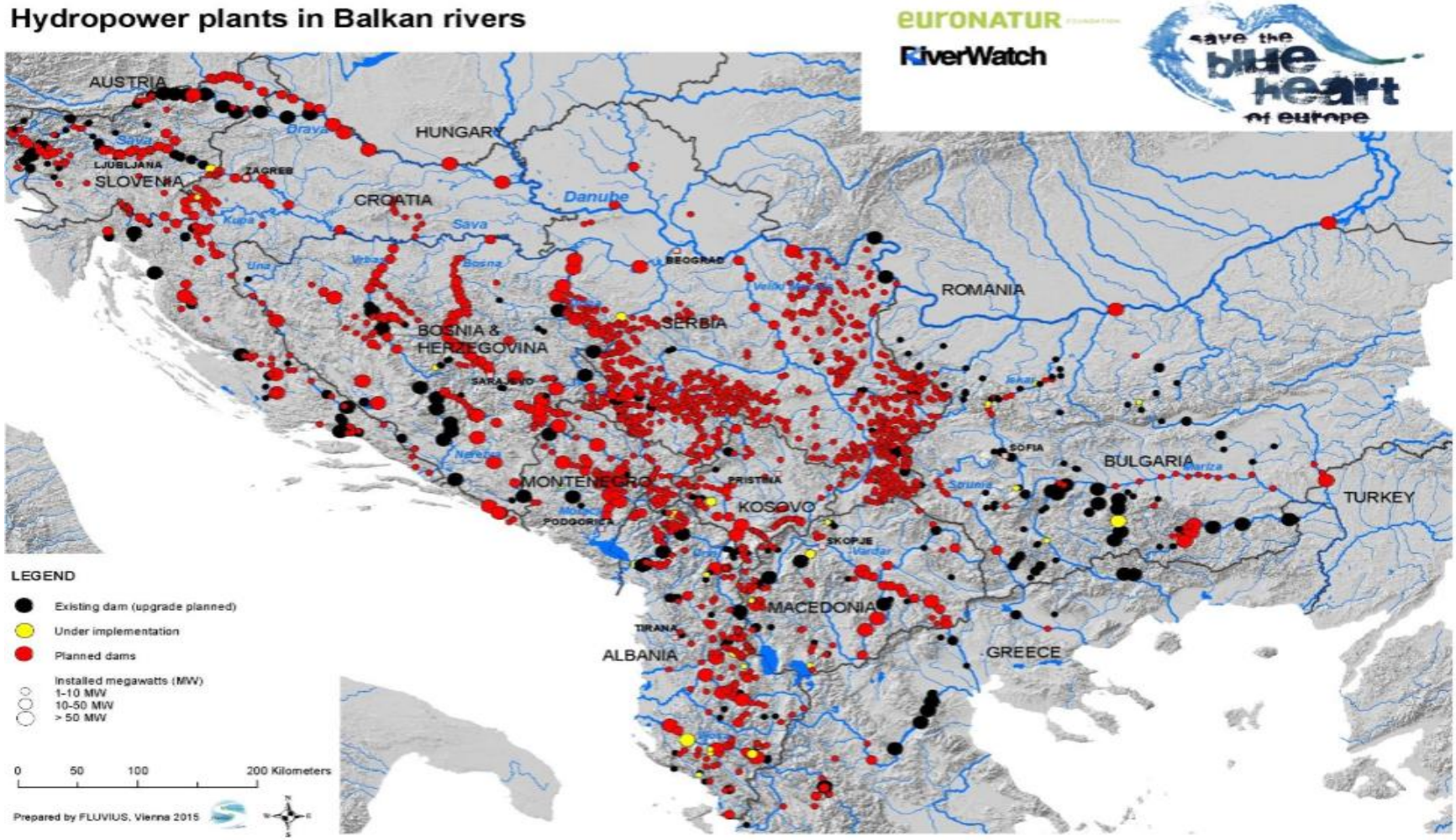


Figure 63: Overview of HPP in the SEE region (in red those in pipeline; Riverwatch)