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# SUSTAINABLE DEVELOPMENT / CLEAN ENERGY SECTOR ASSESSMENT

## FINAL REPORT

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# **ASSESSMENT OF THE SUSTAINABLE DEVELOPMENT/CLEAN ENERGY SECTOR IN BOSNIA AND HERZEGOVINA**

## **FINAL REPORT**

### **DISCLAIMER**

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

# LIST OF ACRONYMS

3E	Enterprise Energy Efficiency
BiH	Bosnia and Herzegovina
CCA-LDS	Climate Change Adaptation and Low Emissions Development Strategy for BiH
COP21	21st Conference of the Parties to the UNFCCC
COR	Contract Officer's Representative
EC	European Community
ECT	Energy Community Treaty
EE	Energy efficiency
EIA	Energy Investment Activity
ERBD	European Bank of Reconstruction and Development
ESCO	Energy Service Company
EU	European Union
FBiH	Federation of Bosnia and Herzegovina
GCC	Global Climate Change
GDP	Gross Domestic Product
GHG	Greenhouse gas
GIZ	German Agency for Technical Cooperation
HOA	Homeowners Associations
IR	Indicative Result
ITC	Information, technology and communication
LOCSEE	Low Carbon Strategies in Southeastern Europe
MoFTER	Ministry of Foreign Trade and Economic Relations
Mtoe	Millions in tons of oil equivalent
NAMAs	Nationally Appropriate Mitigations Actions
NEAP	Draft National Energy Efficiency Action Plan
NEEAP	National Energy Efficiency Action Plan
NMT	Non-motorized transport
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnership
REELIH	Residential Energy Efficiency for Low-Income Households Project
RS	Republika Srpska
SEAP	Sustainable Energy Action Plans
SFRY	Socialist Federal Republic of Yugoslavia
SME	Small and Medium Enterprise
SOUP	Support for Urban Programs
SOW	Statement of Work
UNDP	United Nations Development Programme
UNFCCC	United Nations Climate Change Conference
USAID	U.S. Agency for International Development
WBSEDF	Western Balkans Sustainable Energy Direct Financing Facility

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# EXECUTIVE SUMMARY

**Overview:** The USAID Mission in Bosnia and Herzegovina (BiH) is seeking short-term technical assistance to conduct an assessment to prioritize potential sectors/areas for assistance focusing on sustainable development in selected urban areas in BiH. The Mission is particularly interested in interventions that can advance energy efficiency and clean energy initiatives targeting the cities of Sarajevo, Banja Luka, and Zenica.

**Issues Analysis Methodology for the Assessment:** ECODIT was tasked by USAID to conduct an assessment of the sustainable development and clean energy sector in BiH and make recommendations for possible future programming. The ECODIT team reviewed existing programs, ongoing projects, and literature relating to sustainable development and the clean energy sector in BiH obtained before and during the in-country assessment. The ECODIT team conducted interviews in BiH for two weeks in May 2016 as well as in Washington, D.C., prior to arrival in BiH. The team conducted 30 qualitative interviews, engaging more than 80 individuals (for a list of people and organizations interviewed, see Annex B).

As part of the assessment, a comprehensive list of potential interventions was rapidly identified in the early days of the assignment, and they are listed in table form in Annex A, and also presented in narrative form in Section 4 with overall prioritization ratings (low, medium, and high) as well as best location(s) for implementation (i.e., Sarajevo, Banja Luka, and/or Zenica). The remaining period was used to evaluate and prioritize the interventions based on a set of criteria established in consultation with USAID/BiH Mission. These criteria are summarized below, and the list of interventions are ranked against them accordingly in Section 4.

- A. Support BiH sustainable development targets in path to EU accession:
  - Green economy (energy efficiency and waste reduction)
  - Ecological sustainability (greenhouse gas [GHG] emissions reduction)
  - Energy security
  - EU compliance
- B. Relevance to USAID/BiH Country Development Cooperation Strategy (2012–2016) Indicative Results (IR) targets:
  - Government processes improved and capabilities of actors strengthened (IR 1.1.1)
  - Civil society effectively informs, represents and advocates on behalf of citizens (IR 1.2.1)
  - SMEs in productive sectors, compete effectively in market economy (IR 2.1.1)
  - Regulations and policies foster private sector development and investments (IR 2.2.1)
- C. Intervention demand and feasibility of successful implementation:
  - Level of support from BiH counterparts
  - Level of support from other donors
  - Implementation cost-effectiveness
  - Capacity of counterparts
  - Period for achieving results
  - Political barriers and other bottlenecks mitigated

**Key Findings of Assessment:** USAID’s SOW (Annex E) for this assessment directed ECODIT to “provide USAID/BiH with an assessment of the capacities and needs of BiH’s sustainable development and clean energy sector, and make programmatic recommendations for potential future assistance to further strengthen the sustainable development and clean energy sector.”

All stakeholders interviewed agree that GHG emissions pose significant environmental and health risks, with urban areas being particularly vulnerable. The BiH electrical production sub-sector contributes the greatest

amount energy waste and pollution, and, consequently, it is the area that has received the greatest amount of attention and funding; however, there are political and legislative barriers accompanied by significant private sector interests that present challenges to the international donor community. In particular, the European Commission is encouraging a temporary ban of donor investment activities in the electrical production sector until BiH completes a suite of energy sector master plans at the State and Entity levels.

The vertical infrastructure sector (i.e., buildings) is the second largest contributor to pollution and energy waste in BiH. Although BiH's publically owned, institutional buildings (schools and libraries, municipal offices, hospitals and clinics, etc.) and facilities have been receiving a significant amount of investment from international donors, there has been minimal attention to the residential sector, and few lending mechanisms for residential facilities. Interventions in the housing sector will need to focus on balancing the economics of energy efficiency, where currently the low cost of energy sources discourages residents to improve the efficiency of their buildings or to use cleaner energy sources or supply systems for space heating. At the household level, it is difficult for residents to rationalize the financial benefits of these investments in a realistic time horizon where a positive rate of return can be realized and understood.

The transport sector is the third largest contributor to pollution and waste and, like the residential sector, has not been the beneficiary of concentrated donor assistance. In urban areas, the canton and municipal governments have significant financial interests in the operations of mass transit facilities, with responsibilities for managing traffic and monitoring vehicle emissions. Many opportunities exist in the transport sub-sector that do not require significant capital investment or institutional restructuring.

**Preliminary Recommendations for Possible Future Programming:** The following are preliminary recommendations for USAID to consider in a future program design pursuant to a sustainable development/clean energy sector in BiH.

## HOUSING

Programs of technical assistance in the housing sector in BiH seem to be quite limited compared with other countries in the regions, many of which have been beneficiaries of foreign assistance programs since the early 1990s. USAID may consider demonstrating that integrated efforts in the residential sector, addressing market, capacity and knowledge gaps, may result in significant improvements to reducing carbon emissions and energy costs while improving the living conditions of the population. Specifically targeting technical assistance in the residential building sector would be aimed at (1) improving the quality and efficiency of space heating systems and (2) improving residential energy efficiency.

One of the few housing-related programs has been supported by USAID, in collaboration with Habitat for Humanity International, is the Residential Energy Efficiency for Low-Income Households Project (REELIH), which, among other activities, recommended focusing on institution-building for Homeowners Associations (HOAs), in the areas of energy efficiency (such as awareness-raising campaigns among the HOAs). As a result, USAID and Habitat supported a follow-on project, "Survey on Homeowner Associations in Bosnia and Herzegovina," which was completed in Jan. 2014 by Energis, but with no apparent follow-on. The activities discussed in this report represent a good jumping-off point for a series of technical assistance and training activities for USAID to consider. (A summary of this survey as prepared by the local consultant, Energis, and is included for convenience as Annex C). The survey provides sound research and ultimately focuses on energy efficiency in residential buildings, including funding mechanisms, grant management, and a case study for launching pilot projects, which could be implemented in the three targeted cities.

A second opportunity for a meaningful USAID intervention may be support of a pilot project in its early stages in the New City Municipality of Sarajevo, involving seven multi-unit buildings located the working-class neighborhood of Alipacin. The first phase of weatherization for energy efficiency is nearly completion. Subsequent phases will install individual heat meters and allocators for all apartments, which will permit individual metering aimed at energy efficiency. This may present an excellent opportunity for USAID to provide meaningful interventions as identified jointly with the counterparts (e.g., in such areas as municipal-HOA-

homeowner co-financing mechanisms), so the pilot can be rolled out and the demonstration scaled up in the three targeted cities of this assessment.

Also worth noting is that the European Bank of Reconstruction and Development (EBRD) is currently preparing a project for early 2017, an extension of the Western Balkans Sustainable Energy Direct Financing Facility (WBSEDF), the new phase being a \$150 million on-lending program specifically for residential building upgrades for energy-efficient activities, with a portion for technical assistance and grants to assist borrowers to apply for credits, help banks to appraise and assess applications, and support verifications that the prescribed project investments were properly executed. Up to 20 percent of the loan may serve as an incentive (i.e., the loan could be written down as much as 20% if conditions are met). Direct loans will be made to financial intermediaries/local banks and indirectly to beneficiaries and HOAs as well as homeowners. This presents several opportunities for USAID intervention to support the program (i.e., training and technical assistance for homeowners).

## **TRANSPORTATION**

Increasing the quality and usage of public transit services could significantly reduce emissions by decreasing private vehicle usage. Interventions focused on traffic-optimization studies as well as financial and investment planning could significantly improve the borrowing capital in the sector and help local governments to better attract and leverage private capital sources and donor loan facilities.

Information, technology, and communications (ITC) tools can be deployed in the targeted cities in the urban transport sector to improve the user experience and decrease barriers to ridership, such as smart phone applications that provide updates about bus, trolley, and tram arrival times or that connect passengers to car-sharing and taxi services. These applications have been proven to decrease private car usage and subsequently traffic congestion, improving efficiency of the road network. The data gathered by these applications is also valuable for the planning, coordination, and justification of future urban transport investments, and to promote compact urban development through transit-supportive zoning.

Non-motorized transport (NMT) methods, such as bicycling and walking, provide the smallest emissions reduction potential but require the least investment and have the fewest implementation obstacles. NMT projects, such as bike lanes and bike sharing programs, tend to also create broad-scale awareness of the energy efficiency and clean energy issues, as they become viral talking points for citizens. Marketing about residential energy-efficiency programs can be combined with NMT activities to increase the appeal and awareness of green growth topics and urban competitiveness.

# 1. INTRODUCTION

## 1.1 CONTEXT/SCOPE

ECODIT was tasked by USAID to conduct an assessment of the sustainable development and clean sector in Bosnia and Herzegovina (BiH) and to make general recommendations for possible future programming, within the context of USAID's SOW for this assessment (see Annex E).

## 1.2 STRUCTURE

Following the Executive Summary, this report is divided into three sections and seven annexes. Section 1, this Introduction, gives an overview of the assessment and the methodology used.

Section 2 gives an overview and analysis of sustainable development in the context of efficient and clean energy goals, including background data and statistics of BiH relevant to these sectors, energy consumption and emissions trends, legislative and institutional frameworks, existing plans and adopted policies for energy efficiency and emissions reduction, a gaps analysis, and a discussion of other active donor programs related to sustainable development and the clean energy sector.

Section 3 provides USAID with recommendations to inform a planned new program design.

The annexes provide the following important background information on the assessment: firstly, and importantly, a table of potential interventions USAID may wish to consider in developing a program design, developed in a format to facilitate incorporation into a SOW; and a list of persons and organizations interviewed; meeting notes of all external meetings. (Note: These meetings summaries are not intended to be refined narratives; rather, they may serve as another resource to the USAID Design Team and will be useful for any follow-up meetings.) Two document summaries are included as they may serve as useful references: a survey of HOAs in BiH; and a brief description of a current housing pilot in Sarajevo related to energy efficiency. The USAID Statement of Work (SOW) guiding this assessment and a bibliography of referenced literature completes the annexes.

## 1.3 METHODOLOGY AND TEAM COMPOSITION

The ECODIT team reviewed existing programs, projects, and literature relating to the sustainable development and clean energy sector in Bosnia and Herzegovina obtained before and during the in-country assessment. The ECODIT team also conducted interviews in Washington, D.C., and in BiH for two weeks in May 2016. The team conducted 30 qualitative interviews, engaging more than 80 individuals (for a list of people and organizations interviewed, see Annex B).

The principal method used to gather data during fieldwork was that of semi-structured interviews with relevant stakeholders. The interviews used a standard outline of critical questions that corresponded to the SOW, but respondents were given wide latitude to offer their own opinions and insights. The team shared all information gathered and held periodic team meetings during the course of the fieldwork in order to exchange opinions and to formulate an outline for the oral and written reports. The team met with USAID/BiH two times: an in-brief on May 4, 2016, and a formal out-brief on May 13, 2016, attended by the Mission Director and two USAID staff members, at which the ECODIT team made an oral presentation and delivered a written Exit Briefing Summary at the USAID/BiH Mission. USAID staff also attended one of the interviews, namely, with the USAID management team at the USAID Energy Investment Activity (EIA) program, on May 13, 2016.

The ECODIT team included:

- Steve Anlian, an international development consultant and professional planner with extensive experience in multiple sectors including housing, as Team Leader;
- Steven Segerlin, an expert in urban planning and transportation, policy, and economics with experience working with governments, private investors, and infrastructure developers;
- Fuad Strik, founder of Energis, an energy expert with a regional reputation in management consulting and implementation of development projects throughout the Balkans and beyond; and
- Hamdija Mujenzin, an engineer and member of the Energis team with a background in energy efficiency and renewable energy, who also provided valuable logistical support.

## **1.4 ACKNOWLEDGEMENTS**

The team wishes to acknowledge the support received from the USAID Mission/Bosnia and Herzegovina in carrying out this assessment. In particular, ECODIT wishes to thank Peter Duffy, Mission Director; Thomas Rojas, Economic Development Office Director; Ankica Gavrilovic-Altumbabic, Project Management Specialist; and Samir Disdar, Project Management Specialist, who coordinated our mission and provided valuable technical support and guidance. We also wish to acknowledge Anthony Piaskowy, Urban and Land Tenure Specialist at the E3 Bureau, USAID Washington, the COR for Making Cities Work IDIQ and for the Support for Urban Programs (SOUP) Task Order under which this assessment was conducted.

## 2. SUSTAINABLE DEVELOPMENT/CLEAN ENERGY SECTOR ASSESSMENT

### 2.1 RELEVANT BACKGROUND OF BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina (BiH) is still undergoing a period of recovery from the war in the Balkans, which ravaged the region from 1992 to 1995. It caused far-reaching political upheavals and drastic interruptions in economic growth, including chronically high unemployment rates, the highest in the region. In the past five years, between 2011 and 2015, the national economy began seeing positive growth, at an annual average of 1.1 percent, while the national population actually shrank slightly by an annual average of -0.2 percent.

Recognizing economic growth as a critical pathway for regional security and EU accession, the international donor community continues to support programs that further the development of exports and industry. However, amid these efforts, there is a growing discontent in major cities regarding (1) pollution, (2) traffic congestion, and (3) increasing energy costs. These three issues are interlinked, and lead to an economy that emits nine times more CO<sub>2</sub> per US\$ of GDP than the average in EU countries, and 76 percent more than the average in the Western Balkan region. As a result, environmental protection and sustainable development are increasingly being prioritized by political leaders as an important factor for quality of life, but also for competitiveness and economic growth. In November 2015, conditions were so bad that several cities, on multiple occasions, declared a state of alert due to high concentrations of air pollutants and particle matter. Industrial cities such as Banja Luka, Zenica, and Sarajevo suffer from pollution year-round due to outdated factories and private vehicles, and in the capital city, thermal inversions created by the mountainous terrain and cold winter weather traps the smoke from residents burning coal and other “dirty” materials for heat.

These economic conditions in BiH vary from many of USAID’s other portfolio countries, which are at even earlier stages of their growth trajectories and industrial development. In such high growth environments, political leaders expect to achieve their greenhouse gas and COP21 emissions reduction targets by guiding new land and industrial developments towards sustainable models, clean energy, and energy-efficient infrastructure systems. Alternatively, with such low growth projections for BiH, this assessment and sustainable development initiative must focus on reducing consumption and emissions of existing economic activities rather than solely promoting energy efficiency in new industrial, commercial, and residential developments.

In the energy sector, BiH is heavily dependent on fossil fuels sources. However, many economists recognize that significant growth opportunity for the country exists in power generation and export, which has an abundance of hydropower, wind power, and biofuels potential. These sub-sectors could support an expansion of the size of the “green” economy in BiH. It could also support the “greening” of the domestic economy that is currently reliant on manufacturing of furniture, leather, footwear, and metals, all powered by fossil fuel-based energy sources. Investments in clean renewable energy sources could also stabilize and even decrease energy prices in the long run, which are key inputs in these industries. As a result, many donors and development banks have focused on funding initiatives in large-scale clean energy developments.

However, in terms of energy consumption and GHG emissions, it is the residential and transport sectors that are the largest contributors, and not the industrial or commercial sectors. BiH has one of the highest per household energy consumption and GHG emissions rations in the world, largely due to the significant demand for space heating and aging car fleets. As a result, households in BiH spend a greater proportion of their incomes on energy and transport costs and have less disposable income to use on education and human capital development or to invest in energy-efficiency improvements to their dwellings and heating and transport systems. This scenario leads to a vicious cycle where, with each passing year, these assets continue to degrade, decreasing their energy efficiency, increasing operating costs, and further decreasing disposable income available for improvements. Ultimately, these factors limit the competitiveness of BiH’s economy.

Additionally complicating the situation is the economic situation of the country and the slow payback periods for clean energy and energy-efficiency investments. In 2011, the poverty rate was 17.9 percent of the total population 2013, and in 2013, the GDP of BiH was \$18.15 billion. This translated into an average per capita income of \$4,748 nationally, and more than \$10,000 in urban areas. In the same year, the total debt of the central government was 46 percent of GDP.<sup>1</sup>

With such limited financial capacity, it is difficult for any single household to fund projects that will reduce GHG emissions or energy consumption. The annual economic benefits are too low and the payback period is too long. The investment requirement to upgrade systems is also large, frequently requiring more capital than any one family has available in disposable income or savings. Therefore, there is minimal incentive for a single household to make such improvements. In order to increase the benefits and reduce the payback period of energy-efficiency improvements, households or the government must identify joint investments that can impact multiple properties and achieve economies of scale. However, the legal framework and coordination capacity for such joint investments in BiH is limited, and generally has been conducted only by large state-owned district heating and urban transport enterprises that were established in the socialist era. Unfortunately, poor financial management of these businesses and decreasing subsidies during the period of privatization has led to severe liquidity issues, restricting expansion of customers while significantly degrading the quality and use of existing services.

In response, BiH must focus on methods for: (1) upgrading these existing infrastructure systems to utilize clean energy sources and modern energy efficient systems, and (2) improving the financial model and sustainability of existing clean energy and energy-efficient infrastructure systems. These efforts can provide significant potential for energy savings and emissions reduction, which, according to a 2010 World Bank study, could approach 280 million Euros—creating valuable fiscal space for other development-related priorities that are currently being disregarded by the local government. These actions will additionally result in a higher level of energy security and independence from foreign energy resources, such as Russia, to support heating, cooking, and transportation.

In the sections that follow, we will outline the energy consumption and emissions trends in BiH, with a specific focus on the three major urban centers of Sarajevo and Zenica in the Federation (FBiH) and Banja Luca in Republika Srpska (RS) where data was available. A summary of the characteristics of these cities is illustrated below, including their population density and household typology, which are basic factors in determining the financial viability of clean energy and energy efficiency measures.

**Table 1: Characteristics of Key Urban Areas**

Indicator	Sarajevo	Zenica	Banja Luca
<b>Geographic Area</b>	141.5 km <sup>2</sup>	206.0 km <sup>2</sup>	96.2 km <sup>2</sup>
<b>Population – Total<sup>2</sup></b>	448,646	115,134	199,991
<b>Population – Density</b>	3,171	559	2,078
<b>Households – Total<sup>3</sup></b>	173,556	44,282	76,919
<b>Household Typology<sup>4</sup></b>	-	-	-
- <i>Single-family Dwellings</i>	50-85% <sup>5</sup>	40-50%	50-60%
- <i>Multifamily Dwellings</i>	15-60%	50-60%	40-50%

<sup>1</sup> According to the World Bank Development Indicator Database. <http://data.worldbank.org/>

<sup>2</sup> According to the 2013 preliminary census results.

<sup>3</sup> Calculation produced by consultants using population and average household size of 2.6 persons.

<sup>4</sup> Estimates provided verbally by staff of each respective municipality.

<sup>5</sup> The large variances in household typology in Sarajevo is due to the four municipalities, where Old City Sarajevo has the most single-family dwellings, while Center City Sarajevo, New Sarajevo, and New City Sarajevo have increasing fewer single-family dwellings and more multifamily dwellings, respectively.

## 2.2 ENERGY CONSUMPTION AND EMISSIONS TRENDS IN BIH

There are six major energy consumption clusters in BiH:

1. **Electrical production companies**, which exploit fossil fuel energy sources, such as coal, gas, and diesel, or renewable energy sources, such as hydro, solar, wind, and biomass, to produce electricity for the national grid using thermal combustion and turbine-powered generators.
2. **Industrial companies**, which draw electricity from the national grid or exploit fossil fuel and renewable energy sources to create their own electricity, or to create concentrated heat sources to drive their business processes. In some cases, the industrial companies sell excess electricity or heat to other consumers, such as the grid, local businesses, and buildings.
3. **District heating utilities**, which use coal, gas, or biomass to fuel large- and small-scale boilers that supply super-heated water to the radiators and space-heating systems found in public, commercial, and residential buildings.
4. **Water utilities**, which use electricity to power the pumps in their distribution systems.
5. **Urban transport services providers**, which use petrol, liquefied natural gas, and electricity their buses, trolley, and tram systems.
6. **Private vehicles and trucks**, which use petrol to fuel their engines.

### 2.2.1 ENERGY ECONOMICS

Generally, energy consumption in BiH can be characterized by a combination of relatively low per-unit energy prices and continuing electricity price subsidies. These conditions suppress the economic value of infrastructure improvements that leverage clean energy or energy-efficiency systems. It is also not clear that electricity prices in BiH reflect the long-term marginal cost of sustainable energy supply. Informed commentators stated that these factors, combined with limited awareness of the potential savings, reduce consumer interest in energy-efficiency investment and activity.

#### 2.2.1.1 Energy-Related Household Expenditures

According to the 2011 National Household Budget Survey, more than a quarter of annual household expenditures are incurred on energy-intensive activities.<sup>6</sup> As a result of the high costs as a proportion of expenditure and income, individuals prioritize the lowest-cost energy sources that are available, regardless of their economic efficiency or environmental and health impacts.

Table 2: Energy-Related Household Expenditures

Item	Incurred Expense (KM)	Portion of Total Expenses
Transport	172.50	16.3%
Energy, Gas, Water, and Other Fuels	151.09	12.4%
<b>Total</b>	<b>323.59</b>	<b>28.7%</b>

#### 2.2.1.2 Cost of Energy Sources for Space Heating

The following table summarizes the costs for space heating of residential buildings by various methods available in BiH.<sup>7</sup>

<sup>6</sup> Mitrović, Dajana and Šabanović, Edin. Household Budget Survey in Bosnia and Herzegovina, 2011.

<sup>7</sup> Consultant calculations.

In urban areas, district heating was referenced by municipal staffs as the most common space-heating method for large multifamily dwelling units and public building, while lignite coal and wood were the most common for single-family and smaller multifamily dwelling units.

Based on the average dwelling unit size of 60 m<sup>2</sup>, 14,580 kWh (200 kWh/m<sup>2</sup>) are required to heat and electrify an apartment for one winter season,<sup>8</sup> which is approximately six months in duration, from October to April. However, for single-family and small multifamily dwellings that are not connected to district heating systems, tenants typically only heat one or two rooms, and only when possible only during the evening hours. These dynamics significantly reduce the total energy demand, particularly for low-income households. These low levels of consumption depress the economic value and interests of consumers to utilize clean and energy-efficient fuels or systems that are more expensive.

**Table 3: Cost of Energy Sources for Space Heating**

Method	Fuel Cost	Minimum Furnace Cost
Wood Chips	0.0420 KM/kWh	150 KM
Wood Logs	0.0500 KM/kWh	150 KM
Coal (Lignite)	0.0600 KM/kWh	150 KM
Pellets	0.0670 KM/kWh	900 KM
Gas	0.1087 KM/kWh	300 KM
District Heating (Fixed)	0.0000 KM/kWh + 1.3662 KM per m <sup>2</sup> per year	700 KM
District Heating (Variable)	0.0735 KM/kWh + 0.5583 KM per m <sup>2</sup> per year	700 KM
Electricity	0.1400 KM/kWh	100 KM
Liquid Fuel (Oil)	0.1865 KM/kWh	150 KM

### 2.2.1.3 Cost of Energy Sources for Transport

The following table summarizes the costs for transport by various travel modes in BiH.<sup>9</sup>

**Table 4: Cost of Energy Sources for Transport**

Travel Mode	Fuel Cost	Minimum Vehicle Costs
Private Vehicle	0.124 – 0.14 KM/km	1,600 KM
Taxi	1.0 KM/km	0 KM
Bus / Trolley / Tram	0.06 KM/km	0 KM

## 2.2.2 ENERGY CONSUMPTION

According to the International Energy Agency report on Energy Balance of non-OECD countries, in 2013 the buildings sector in BiH was the largest energy consumer, absorbing more than 40 percent of total energy consumption, as measured in million tons of oil equivalents (Mtoe).<sup>10</sup> It was also the largest electricity consumer.

The transport sector was the second largest energy consumer in BiH, but almost entirely of oil or petrol.

Industry and commercial and public buildings were the third and fourth largest energy consumers, respectively.

**Table 5: National Energy Consumption Trends by Sector and Source**

<sup>8</sup>[https://www.energy-community.org/portal/page/portal/ENC\\_HOME/DOCS/328179/0633975AA7B97B9CE053C92FA8C06338.PDF](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/328179/0633975AA7B97B9CE053C92FA8C06338.PDF)

<sup>9</sup> Consultant calculations.

<sup>10</sup> <https://www.iea.org/statistics/statisticssearch/report/?year=2013&country=BOSNIAHERZ&product=Balances>

Sector (Mtoe)	Coal	Oil	Gas	Biofuels	Electricity	Heat	Total
Residential Buildings	60	79	56	174	398	95	1,230
Transport	-	927	-	-	7	0	934
Industry	248	91	55	-	357	0	751
Commercial & Public Buildings	94	59	24	-	174	28	378
<b>Total</b>	<b>401</b>	<b>1,223</b>	<b>111</b>	<b>174</b>	<b>940</b>	<b>124</b>	<b>2,974</b>

### 2.2.2.1 Energy Consumption for Heating

In the heating sector, the residential market is the largest consumer at 4,624 GWh annually, used primarily for space heating, followed by industry at 4,149 GWh annually, used primarily for business processes, and finally commercial and public services at 2,027 GWh annually.<sup>11</sup>

### 2.2.3 GREENHOUSE GAS EMISSIONS

According to the 2012 Climate Change Adaptation and Low Emissions Development Strategy for BiH (CCA-LDS), information on greenhouse gas (GHG) emissions is limited because there are very few monitoring stations, and the domestic capacity to manage the few that exist is insufficient. The only official and validated information is from 1990 when emissions were 34.04 Mt of CO<sub>2</sub> equivalent, of which energy production (including fuel for transport) was responsible for 26.5 Mt.

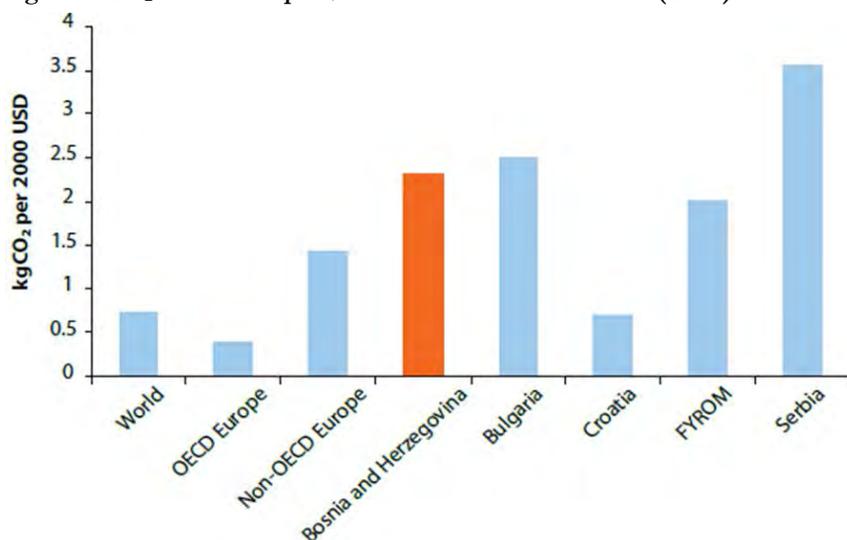
In comparison to other countries, BiH has roughly similar GHG emissions per unit of GDP to other Balkan countries at 1.59 kg CO<sub>2</sub> equivalent per Euro in 2008, but significantly greater emissions per unit of GDP than OECD European countries and the rest of the world. Further worsening conditions is the topography of BiH; the region's mountainous terrain tends to trap greenhouse gases in urbanized areas in the valleys during temperature inversions, increasing health risks to a large portion of the BiH population-at-large.<sup>12</sup>

In contrast, emissions to population, or per capita, in BiH was 5.18 tons of CO<sub>2</sub> equivalents per capita per annum in 2008, which is just barely half the EU average of 9.93 tons, and is among the lowest in Europe. These statistics illustrate the economic and social challenges for Bosnia and Herzegovina; caught in the poverty trap with low emissions per individual or per capita compared to other European countries, but with high emissions when compared to their GDP.

<sup>11</sup> <https://www.iaa.org/statistics/statisticssearch/report/?year=2013&country=BOSNIAHERZ&product=ElectricityandHeat>

<sup>12</sup> Energy Charter Secretariat. In-Depth Review of Energy Efficiency Policies and Programmes: BiH, 2012.

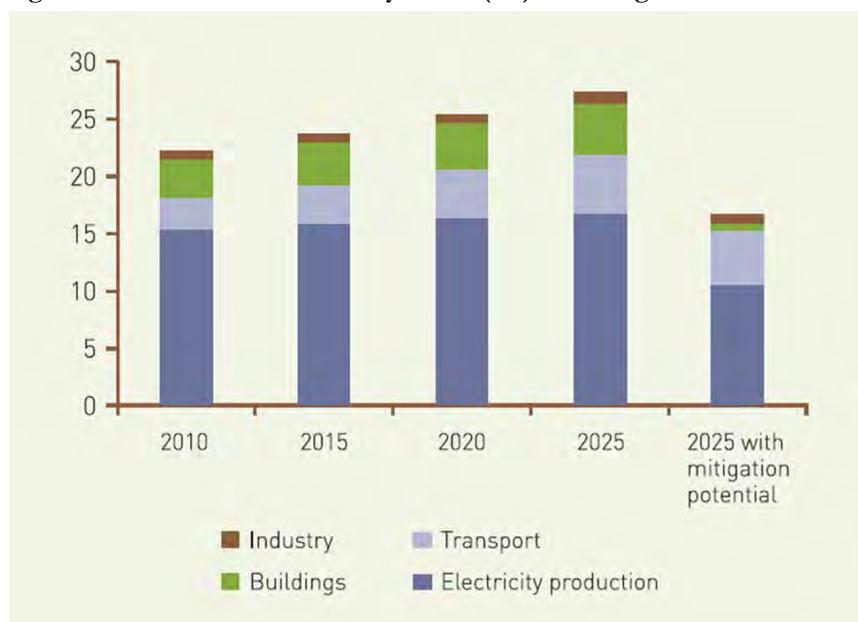
**Figure 1: CO<sub>2</sub> Emissions per \$ of Gross Domestic Product (GDP)**



Source: According to the World Bank Development Indicator Database. <http://data.worldbank.org/>

According to the CCA-LDS, the majority of GHG emissions come from coal production and thermal power plants in the electricity production sector. Emissions from heating buildings and transport are similar. However, transport-related emissions are expected to grow rapidly due to the expansion of road networks and car ownership. The expected growth of fossil fuel use in home heating is more moderate in view of growing prices, possible fuel switching to biomass, and gains in energy efficiency. These sectors then, buildings and transportation, represent the greatest opportunity for USAID to support technical assistance interventions influencing emission reduction in BiH. The figure below illustrates the total contributions, per million tons (Mt) of greenhouse gases, by sector. The electricity production sector is the largest, followed by the transport, buildings, and industrial sectors.

**Figure 2: Total GHG Emissions by Sector (Mt) and Mitigation Potential**



Source: 2012 Climate Change Adaptation and Low Emissions Development Strategy

### 2.2.3.1 Greenhouse Gas Emissions in Urban Centers

The intensity of GHG emissions in urban centers can vary greatly compared to national statistics due to the higher population density. According to the Law on Environmental Protection, cantons and municipalities are required to conduct biennial air quality assessments. However, due to funding constraints, very few urban areas have been able to conduct such assessments, except for Canton Sarajevo. The results of their 2010 and 2013 air quality assessments are found in the table below, which identifies the residential and transport sectors as being the largest contributors to CO<sub>2</sub> gases. The residential sector is identified the largest contributor of SO<sub>2</sub> gases and the transport sector is the largest contributor of NO<sub>x</sub> gases.<sup>13</sup>

**Table 6: Greenhouse Gas Emissions by Sector Canton Sarajevo**

Sector (tons per year)	SO <sub>2</sub>	NO <sub>x</sub>	CO <sub>2</sub>
Residential	1,250	393	747,287
Industrial	389	227	274,061
Transport	15	2,935	744,263
<b>2010 Totals</b>	<b>1,580</b>	<b>3,892</b>	<b>1,768,238</b>
<b>2013 Totals</b>	<b>1,654</b>	<b>3,554</b>	<b>1,765,611</b>
<i>Variance</i>	+ 4.7%	- 8.7%	-0.1%

## 2.3 LEGISLATIVE FRAMEWORK

The responsibility for energy policy in BiH resides under the competence of the two entities, FBiH and RS. However, there is currently no fully articulated set of entity policies, or a detailed energy framework at the BiH state (national) level.

BiH has established the necessary institutions at state and entity levels to effect and oversee energy market reforms in accordance with EU law. Regulatory authorities exist at state and entity levels, and certain entity powers and responsibilities for tariff setting and energy efficiency have been assigned to the entity energy regulators. Although there is broad endorsement of the direction of energy policy, the international community and donors acknowledge the slow pace of reform.

Energy efficiency is a significant factor in the planning and operations of large capital investments, such as power stations and district heating schemes, as there is a commercial interest in minimizing energy waste and losses. However, in terms of smaller capital-intensive assets, such as buildings and urban transport, although there may be energy-efficiency advocacy, the lack of a legislative mandate resulting in scarce financial and technical resources does not produce cost-effective clean energy solutions.

The state and entities of BiH have adopted the following laws, which govern energy efficiency and emissions.

#### Entity – FBiH

- Law on Energy Efficiency (Draft only; not ratified)
- Law on Environmental Protection (No. 33/03)
- Law on Air Projection (No. 33/03)
- Law on Fund for Environment Protection (No. 33/03)
- Law on Spatial Planning and Construction (No. 02/06)

#### Entity – RS

- Law on Energy Efficiency (No. 59/13)

<sup>13</sup> CETOR. Register of Air Emissions and Air Quality Categories for the Canton Sarajevo, 2013

- Law on Environmental Protection (No. 71/12)
- Law on Air Protection (No. 124/11)
- Law on Spatial Planning and Construction (No. 40/13)

At the entity level, RS has approved a comprehensive regulatory framework specifically for energy efficiency and clean energy in all infrastructure sectors, but in FBiH, regulations exist only indirectly through various activities covered in other energy sector legislation. A comprehensive FBiH law on energy efficiency is pending and expected to be adopted in the near future, according to the Ministry of Foreign Trade and Economic Relations (MoFTER) and other sources. For now, regulators may consider energy-efficiency issues in promulgation of tariffs and in their governmental approval processes for projects and investments.

The state of BiH, through signature of the Energy Community Treaty (ECT), has entered into an agreement that entails commitments to the delivery of energy policy reforms with the EU and with other Western Balkan countries. This agreement determines many elements of practical energy policy in BiH. However, few elements of the ECT, which focuses on harmonizing the legislative environment in BiH with the following relevant EU Directives, have been adopted at the Entity level.

- **Directive 2010/31/EU.** Energy performance of buildings.
- **Directive 2010/30/EU.** Labeling and standard product information of the consumption of energy and other resources by energy-related products.
- **Directive 2006/32/EC.** Energy end-use efficiency and energy services.
- **Directive 2012/27/EC.** Energy efficiency, whereby the parties commit to much stricter terms to be achieved in the field of energy efficiency.

## 2.4 INSTITUTIONAL FRAMEWORK

The BiH state government does not have any direct responsibilities, or competencies, in the energy-efficiency sector. However, MoFTER has an overarching policy role in the coordination of activities and harmonization of entities' authoritative bodies and institutions on the international level in the fields of agriculture, energy, environment protection, development and usage of natural resources, and tourism. MoFTER is also the signatory to the Energy Community Treaty in 2005, and is the lead national agency promoting the implementation of the EU Directives.

The entity governments are responsible for developing and implementing policies in energy and enforcing the laws. More specifically, each entity has an agency (ministry) that oversees energy production, power utilities, fuels, and mining activities as well as one that oversees all transportation activities.

Each of the 10 FBiH cantonal governments are also responsible for developing and implementing policies in energy efficiency and enforcing laws, in addition to being responsibilities of executing services, particularly in providing space heating or transportation services, either through public companies or private operators.

Municipal governments are primarily responsible for approving construction activities, enforcing building codes, and, in some cases, providing space heating or urban transport services, either through public companies or private operators.

Outside of the regulatory and executive functions of local governments, cantons and municipalities have been actively implementing energy-efficiency programs to improve the insulation and weatherization of public buildings in order to drive down operational costs.

Finally, commercial banks, international development banks, and donor institutions are supporting the energy-efficiency and sustainable energy sectors either through loan or grants programs. However, the majority of these sources are focused on providing financial mechanisms to public facilities or large businesses. There are

few financial mechanisms available to small business or individuals, but those that are available have low subscription due to the high interest rates on borrowing, transaction fees, and collateral requirements.

## **2.5 EXISTING PLANS FOR ENERGY EFFICIENCY AND EMISSIONS REDUCTION**

The state, entity, canton, and municipal governments of BiH have developed a range of strategic plans to promote energy efficiency and emissions reduction. These documents additionally provide assessments of the quantity of waste and pollution in the energy sub-sectors.

### State

- 2011 National Energy Efficiency Action Plan (NEEAP)
- 2013 Climate Change Adaptation and Low Emission Development Strategy
- 2013 Renewable Energy Action Plans and Regulations to Harmonize with EU Directives
- 2014 Nationally Appropriate Mitigations Actions (NAMAs)
- 2015 UNFCCC Conference of the Parties (COP21)

### Entity – FBiH

- 2012 Draft National Energy Efficiency Action Plan (NEAP)

### Entity – RS

- 2012 National Energy Efficiency Action Plan (NEEAP)

### Canton

- None existing; but requested to develop Energy Efficiency Action Plans under the NEEAP

### Municipal

- Sustainable Energy Action Plans (SEAP)

BiH is also a partner in a regional project under the EU program entitled Low Carbon Strategies in Southeastern Europe (LOCSEE). The project supports the development of a climate strategy for all SEE countries in relation to EU Accession, and covers mitigation and adaptation. All SEE countries must combine the process of transposition and implementation of EU legislation, and comply with their status requirements under the UNFCCC. The project aims to set a common regional platform for coordinated climate change mitigation strategies, and assist transition countries toward creating low-carbon societies. The project will also help develop regional capacity to improve climate change policies through sharing of information, methodologies, experiences, and good practices

### **2.5.1 POTENTIAL ENERGY SAVINGS**

In 2010, BiH produced the first National Energy Efficiency Action Plan (NEEAP), which identified the following energy savings potential by sector between 2011 and 2018: industrial (17%), services (16.8%), residential (6.52%), and transport sectors (4%).

Figure 3: National Energy Savings Targets by Sector



Source: 2011 Preliminary Note on the Implementation of the 1st Energy Efficiency Action Plan for BiH

In 2012, the Energy Community produced a more detailed study on energy efficiency in buildings, which estimated the energy savings potential of sub-categories as well as the unit costs to achieve those savings.

Table 7: National Energy Savings Potential and Investment Costs by Buildings Sub-Sectors

Buildings Category	Savings Potential (MWh/a)	Per Unit Costs (EUR/MWh/a)
Individual Dwellings	2,420,100	€ 221.27
Multifamily Dwellings	1,595,900	€ 653.55
Health Care	143,500	€ 445.99
Education	131,600	€ 478.72
Other	822,000	€ 500.00

## 2.5.2 MOFTER PRIORITIES

According to the Ministry of Foreign Trade and Economic Relations, at the state level of BiH, the most important steps planned in the near term with the aim of further development of energy efficiency in BiH are as follows.<sup>14</sup>

- Development and adoption of National Energy Efficiency Action Plan (NEEAP).
- Continuation of EU Energy Efficiency Directives transposition and implementation process.
- Finalization of development and adoption of primary and secondary legislation related to energy efficiency.
- Defining and implementing energy-efficiency measures.
- Raising public awareness on energy efficiency.
- Further promotion of investment environment for financing energy-efficiency projects.

<sup>14</sup> Pita, Minela. Structure of the Energy Efficiency Sector in BiH, 2016

## 2.6 EXISTING PROJECTS

The following section provides a summary of approved donor projects by sector since 2010, including a high level categorization based on sustainable development sectors. These projects are both loan and grant activities. The renewable energy sector received the most projects, and the most active donor was the government of Germany, through GIZ and other bilateral lending facilities. The public buildings sectors also received significant funding, while the residential buildings and urban transport sectors effectively received little or no funding support.

The source information for this rapid analysis was the Donor Mapping Database organized by the Donor Coordination Forum (<http://dmd.donormapping.ba/>; note that this database does not include pipeline projects that have not yet been approved).

**Table 8: Classification of Approved Donors Projects Since 2010**

Donors	Renewable Energy	District Heating	Public Building Efficiency	Residential Building Efficiency	Urban Transport	Total Value (Euros)
<b>EBRD</b>	-	1	-	-	-	7,000,000
<b>EC</b>	1	-	2	-	-	3,188,270
<b>EIB</b>	-	-	-	-	-	1,250,000
<b>Gov. of Germany</b>	2	-	-	1	-	169,000,000
<b>Gov. of Norway</b>	-	-	1	-	-	78,387
<b>Gov. of Czech Rep.</b>	1	-	1	-	-	1,032,800
<b>IFC</b>	1	-	-	-	-	53,975,000
<b>JICA</b>	1	1	-	-	-	88,249
<b>USAID</b>	2	-	1	1	-	7,950,631
<b>UNEP</b>	-	1	-	-	-	NA
<b>UNDP</b>	-	-	1	-	-	NA
<b>Total</b>	<b>8</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>243,563,337</b>
<b>Activities</b>						
<b>Specific Investment</b>	6	3	5	1	-	NA
<b>PPP</b>	1	0	2	1	-	NA
<b>Technical Assist.</b>	2	1	4	1	-	NA
<b>Fiscal Policy</b>	1	0	1	-	-	NA
<b>Legal Reform</b>	1	0	1	-	-	NA

## 2.7 GAPS ANALYSIS

Given the relatively low per-unit prices of fossil fuel sources and electricity in BiH, it is difficult to influence consumer behaviors outside of large public and commercial users. Alternatively, almost all stakeholders can agree that GHG emissions pose as significant environmental and health risks to the economy and individuals, with urban areas being particularly affected.

In that regard, the electrical production sub-sector contributes the greatest amount energy waste and pollution, and therefore it is the area that has received the greatest amount of attention and funds. However, there are legislative barriers and significant private sector interests that make operating activities complex. In particular, the European Commission has put a temporary pause of investment activities in the electrical production sub-sector until BiH completes a suite of energy sector master plans at the entity and state levels.

The buildings sub-sector is the second largest contributor, and it appears that public facilities are receiving a significant amount of investment from international donors. There has been minimal attention to the residential

sector, and few lending mechanisms for residential facilities. Interventions in this discipline will need to focus on balancing the economics of energy efficiency, where currently the low cost of energy sources discourages residents from improving the insulation of their buildings or using cleaner or more efficient-energy sources or supply systems for space heating. At the household level, it is difficult to rationalize the financial benefits of these investments in a time period that matches the planning horizon of the homeowners or renters.

The transport sub-sector is the third largest contributor and, like the residential sector, has not been the subject of concentrated donor assistance. In urban areas, the canton and municipal governments have significant financial interests in the operations of mass transit facilities, and they are also responsible for managing traffic and monitoring vehicle emissions. Many opportunities exist in the transport sub-sector that don't require significant capital investment or institutional restructuring. As various modes of the transportation touch the lives of urban dwellers in BiH, there is another unique opportunity to raise awareness of the importance of a green and clean economy through targeted outreach and communication mechanisms linked to public transport systems, which may have spillover effects on the other clean energy advocacy activities.

## 3. RECOMMENDATIONS FOR FUTURE PROGRAMMING

The following are recommendations for USAID to consider in a future program design for sustainable development and clean energy in BiH, concentrated in the two areas identified with the greatest potential for meaningful interventions: the residential and transportation sectors.

### 3.1 RESIDENTIAL SECTOR RECOMMENDATIONS

Housing privatization was one of the first steps taken during the transition from socialism to a market economy in the former Socialist Federal Republic of Yugoslavia (SFRY) when large blocks of apartment buildings were transferred to the registered tenants by the government, in much the same fashion as in most of the Soviet Union and Eastern Bloc countries, that is, for free or under extremely favorable terms. Multi-unit buildings were transferred into a condominium form of ownership, with residents becoming owners of their own apartments along with an undivided share of the common areas. Over a four-year period from 1999–2003 in BiH, more than 90 percent of the previous public housing stock was privatized; a small portion of the housing remaining under public ownership (primarily previously occupied by former military personnel who left Bosnia during the war) is now managed by municipalities and used to meet social welfare obligations and public housing objectives for targeted socio-economic groups.

The previous sections in this assessment point to the fact that buildings are the largest energy consumer in BiH, absorbing more than 40 percent of total energy, as well as a large contributor to energy waste and pollution, second only to the electrical production sub-sector. While public, institutional buildings and facilities have been receiving a significant amount of investment from international donors in terms of technical assistance in energy efficiency, the residential side has received virtually no attention by the donor community, even though the residential sector is the largest contributor of SO<sub>2</sub> gases. While USAID's Country Development Cooperation Strategy for BiH 2012–2016 states that "USAID/BiH should focus on residential energy efficiency" as "an area of comparative advantage for USAID"; no programs targeted at this intervention have been implemented to date. This stands true as well for international donor programs in general; that is, this assessment did not uncover any substantive programs of technical assistance to the housing sector, in energy efficiency or otherwise.

USAID may consider demonstrating that integrated efforts in the residential sector, addressing market capacity and knowledge gaps, may result in significant improvements to reducing carbon emissions and energy costs while improving the living conditions of the population. Specifically targeting technical assistance in the residential building sector would be aimed at (1) improving the quality and efficiency of space heating systems and (2) improving residential energy efficiency.

#### **Activity Cluster 1 – Improving the Quality and Efficiency of Residential Space Heating**

Prior to the transition from socialism to market economies in the Balkans, much of the housing stock—namely, individual, single-family homes on their own plots of land—was already in private hands. The major effort underlying housing privatization initiatives was the transfer of ownership of multifamily housing stock from the state to the apartment tenants, together with the responsibility for maintaining and operating the buildings, including the roofs, stairways, foundations, and mechanical systems, including space heating requirements.

Residential space heating, one of several communal services related to multi-unit buildings, accounts for the lion's share of energy use in the BiH residential sector. Because previous construction and heating methods did not focus on energy efficiency, highly inefficient energy use exacerbates the negative effect of escalating energy

prices. The majority of BiH's housing stock in urban areas consists of multistory apartment buildings that are generally of low quality, are poorly insulated and maintained, and provide a low level of comfort.

In the building heating sector, the residential market is the largest consumer, primarily for space heating of residential flats. District heating systems serve most multi-unit buildings in the three targeted BiH cities of Sarajevo, Banja Luka, and Zenica, and, in some cases, also serve single-family homes in higher-density districts around city centers. Publically owned and operated district heating utilities use coal, gas (in Sarajevo only), and, to a lesser extent, biomass to fuel large- and small-scale boilers that supply super-heated water to the radiators and space-heating systems found in residential buildings.

Toplane Sarajevo, a public company owned by the Sarajevo Canton, is the largest district heating supplier in Sarajevo and in BiH. Composed of 132 individual boiler houses, 44 are medium and large boiler houses, and 88 are roof-top. Toplane provides hot water district heating to about 1,500 buildings, providing heat to almost 50,000 housing units. The main fuel is natural gas, with alternatives of light and heavy oils when needed. Most of central Sarajevo is served with the exception of the Old Town area, where gasification infrastructure is limited. The only dwelling units that have individual meters are approximately 2,500 units in new buildings constructed over the last several years. The heating charge for apartments is divided into fixed portion of the monthly charge (regardless of consumption), which is targeted towards ongoing maintenance of the infrastructure, with a variable portion. Toplane has a series of projects planned as part of its development program for the period of 2017–2019, with the goals of increasing energy efficiency, reducing overall energy consumption, reducing of harmful emissions, and creating more favorable heating and living conditions while sustaining a profit. A goal of Toplane's management team is to have all apartments metered and billed on consumption by 2020 (i.e., installing a meter at every building, not necessary at every residential unit). Toplane should be considered as a potential counterpart for a USAID technical assistance intervention.

The BiH Law on Production, Distribution and Supply of Thermal Energy clarifies the duties between producers and consumers of thermal energy; sets the conditions for the production, distribution, and supply of thermal energy; and regulates investment in such services and infrastructure while also taking into account the specificity of heating systems in each entity (FBiH Ministry of Spatial Planning and its cantons, and RS Ministry for Spatial Planning, Civil Engineering and Ecology). Implementation can be undertaken with donor support, so this also presents an opportunity for USAID intervention.

BiH has a significant level of forest cover. Biomass, including firewood and wood waste from forestry and the wood-processing industry and residues from agricultural production, represents a major source of energy. The advantage of small district heating plants serving mini-grids is that they are close to the end-user of energy; therefore, transmission losses are minimized compared to a centralized system. The introduction of renewable energy is already foreseen in existing or new district heating systems. Implementation can be undertaken with public and private sector investment, including banks, as well as with donor and international financial institution support. Emission reduction resulting from utilization of the biomass potential in co-generation plants would decrease emissions of CO<sub>2</sub>. At the same time, sustainable jobs would be created by the construction of these facilities and mini-grids, as well as by their fuel supply and maintenance. Another benefit from using biomass is an anticipated increase of energy security, primarily thermal energy, as heat energy biomass plants would replace a portion of fuel that is currently imported (heating oil, natural gas, etc.).

At this time, district heating companies in BiH charge for delivered heat based on residential floor area. The BiH Law on Consumer Protection, together with the Republic of Srpska Law on Energy, stipulates that energy delivered to the consumer should be metered and charged according to actual consumption, with expected savings in the range of 5–10 percent of final energy consumption (energy delivered to consumers). Implementation of these laws has been slow and only a small number of cases of individual metering exist. It is proposed to install heat meters in all buildings connected to district heating systems. This will enable payment based on actual consumption of heat, instead of the current system of payment in which consumers are not motivated to save heat energy. Activities on the ground will be implemented by district heating providers (companies and municipalities), banks, and possibly private investors, potentially with USAID's support.

## Activity Cluster 2 – Improving Residential Buildings’ Energy Efficiency

The field of energy efficiency has the greatest potential to reduce total energy consumption, which ultimately has a direct effect on emissions reductions and improvement of energy performance of buildings. Based on best practices, the following actions have been found to be the most effective ways to increase energy efficiency in residential buildings:

- Raising awareness of energy-efficiency measures, energy-efficient building materials, appliances available on the market, energy certification of buildings, energy labels for equipment and appliances, and effective outreach for energy management in buildings.
- Adoption and implementation of regulations for thermal insulation and energy savings based on energy efficiency standards.
- Research and development of energy-efficient technologies.
- Subsidizing energy efficiency through financial mechanisms.

The mix of occupants within buildings often makes it difficult to sustain HOAs. Differences in income and lack of awareness create bottlenecks to engaging collective solutions to residential energy efficiency. Households from varying economic strata living under the same roof are a result of wholesale housing privatization during economic reforms. Financial resources for most of the condominiums are limited because of the residents’ insolvency, which impedes residential energy-efficiency investment and other communal projects.

Several years ago, the USAID-supported Enterprise Energy Efficiency (3E) project organized a roundtable with banks in BiH on “Challenges of Financing Energy Efficiency Projects.” USAID launched an initiative for lending to the general population and legal persons in BiH for energy-efficiency projects. The general outcome was to raise the banks’ awareness of energy-efficiency projects in BiH and to introduce financial mechanisms, incentives, monitoring/evaluation, and other methods of performance evaluation for these types of loans. There are few lending mechanisms for residential facilities. Interventions here will need to focus on balancing the economics of energy efficiency, as the low cost of energy sources currently discourages residents from improving their buildings’ insulation or using cleaner or more efficient energy sources or supply systems for space heating. At the household level, it is difficult to rationalize the financial benefits of these investment in a time period that matches the planning horizon of the homeowners or renters.

The European Bank of Reconstruction and Development (EBRD) is currently preparing a project for early 2017, an extension of the Western Balkans Sustainable Energy Direct Financing Facility (WBSEDF), the new phase being a \$150 million on-lending program specifically for residential building upgrades for energy-efficient activities, with a portion for technical assistance and grants to assist borrowers to apply for credits, help banks to appraise and assess applications, and support verifications that the prescribed project investments were properly executed (i.e., work financed by the credit was completed in total compliance with the scope of project specifications). Loans up to \$2 million will be available for energy-efficient projects for multi-unit residential buildings, through credit lines to local banks, with housing collectives (HOAs) allocated 35 percent of total EBRD funds. Up to 20 percent of the loan may serve as an incentive (i.e., if the investments have been properly spent and improvements made, then the principle of the loan could be written down as much as 20%). Direct loans will be made to financial intermediaries/local banks and indirectly to beneficiaries, HOAs, and homeowners. This presents several opportunities for USAID intervention to support the program (i.e., training and technical assistance for homeowners).

USAID, in collaboration with Habitat for Humanity International, supported the Residential Energy Efficiency for Low-Income Households Project, which, among other activities, recommended focusing on institution-building, centered on HOAs, in the areas of energy efficiency (such as an awareness-raising campaign among the HOAs) and many other activities. As a result, USAID and Habitat supported a follow-on project, “Survey on Homeowner Associations in Bosnia and Herzegovina,” which was completed by Energis. The summary of this Survey as prepared by the local consultant, Energis, which is also supporting this subject assessment, is a good jumping-off point for a series of technical assistance and training activities for USAID to consider, and is

included for convenience as Annex C. The Survey provides sound research and, ultimately, focuses on energy efficiency in residential buildings, including funding mechanisms, grant management, and a case study for launching pilot projects in the targeted cities.

One such pilot project is underway in the New City Municipality of Sarajevo, involving seven multi-unit buildings of 15–17 stories, with a total of 345 units, located in the working class neighborhood of Alipacin, where the residential stock is among the worst in Sarajevo due to deferred maintenance coupled with war damage. The first phase of façade and roof renovations, including insulation, new doors, and windows, will be completed in the second half of 2016. Subsequent phases will install heat meters and allocators for all apartments, which will permit individual metering to aim at converting to consumption-based rates.

The cost of the pilot is \$1.2 million, and cost sharing is 40 percent from the municipal budget and 60 percent from the canton-level Ministry of Spatial Planning. Toplane, the aforementioned public district heating company, will participate on this pilot project. This may present an excellent opportunity for USAID to provide technical assistance in such areas as financing mechanisms for energy efficiency, HOA institution-building, and other activities. Based on the results, USAID could then scale up and expand this model to other municipalities in Sarajevo, and to Zenica and Banja Luka. A summary of this pilot project as provided by the New City Municipality is in Annex E.

Additionally, there are two useful reference documents:

1. **2013 Good Practices for Energy-Efficiency Housing in the UNECE Region (UN-HABITAT)**  
Provides a detailed list of energy-efficiency building improvement activities that are customized for Europe and the Balkan region, along with their installation or construction costs and projected annual energy, emissions, and cost savings (see pages 80-88). Then in 2016, GIZ is expected to complete and publish a housing typology study specifically for BiH that includes an energy consumption and emissions model for detached single-family housing, attached single-family housing, low-density multifamily housing, and high-density multifamily housing. This housing typology study will also include detailed recommendations for energy-efficiency building improvements along with their installation or construction costs and their projected annual energy, emissions, and cost savings based on real case studies of projects completed in BiH. This study is also expected to include knowledge products to allow any individuals to perform a rapid energy consumption and savings audit based on the input of simple criteria such as a building's physical size, number of rooms, wall and roof material type, and energy sources for space heating.
2. **2015 Assessment of the Energy-Efficiency Investment Potential in Western Balkans (EBRD)**  
Provides a detailed review of energy-efficiency financing best practices in Europe and the Balkans, methodologies for calculating the market size, proposed credit-lending criteria for single-family and multifamily housing, and types of incentive mechanisms and analytical techniques to determine the appropriate incentive level. Finally, it provides comprehensive guidance outlining technical assistance and policy dialogue activities to support banks, energy efficiency installers/suppliers, and HOAs.

## 3.2 URBAN TRANSPORT SECTOR RECOMMENDATIONS

The Canton Sarajevo air quality audit of 2013 identified that urban transport was the leading contributor to SO<sub>2</sub> and CO<sub>2</sub> emissions, while nationally the transport sector ranks third in terms of emissions. Similar air quality audits have not been completed in Zenica or for Banja Luka due to funding constraints, but the results are expected to be roughly the same. This higher quantity of emissions in dense urban areas is particularly problematic because the health risks it creates impact a greater number of persons per square kilometer. Additionally, the mountainous topography in Sarajevo and Zenica tends to trap the greenhouse gases, which amplifies their impacts.

The potential interventions to reduce emissions in the urban transport sector are numerous, but at a high level they can be categorized in three activity clusters. Each of these clusters has varying degrees of emissions reduction potential, investment requirement, and implementation obstacles. The table below provides a rapid ranking of the activity clusters.

**Table 9: Classification of Urban Transport Sector Activity Clusters**

ID	Activity Cluster	Emissions Reduction Potential	Capital Investment Requirement	Implementation Obstacles
1	Improving the quality of private vehicle fleet	High	High	High
2	Increasing the quality and usage of public transit services	Medium	Medium	Medium
3	Increasing options for zero carbon mobility	Low	Low	Low

### Activity Cluster 1 – Improving the Quality of the Private Vehicle Fleet

Improving the quality of the private vehicle fleet in BiH would require a large-scale turnover of equipment to upgrade the fuel efficiency and emissions performance of the stock to Euro category 3 or 4, which tend to be cars between 5 and 10 years in age. The current average vehicle age in BiH is 15–20 years. Therefore, an intervention focused on turnover or upgrading of the vehicle fleet would be complicated because of the low economic capacity of the citizens to invest in higher-quality vehicles. In that same regard, it would be unlikely that politicians would consider passing laws to increase the regulations of private vehicle emissions, besides what they have already done, which included a ban of private vehicle imports of Euro category 1 or 2 cars.

Alternatively, a similar reduction of emissions could be achieved by improving traffic management systems, such as optimization of traffic light signal timing and road network (e.g., dynamic signage, one-way streets, flexible direction lanes, etc). These interventions would reduce traffic congestion and travel times, and decrease idling time and emissions of vehicles. They would also require much less capital investment and would be easier to implement by local governments.

### Activity Cluster 2 – Increasing the Quality and Usage of Public Transit Services

Increasing the quality and usage of public transit services could significantly reduce emissions by decreasing private vehicle usage. The total investment required to improve services is also much less than a large-scale upgrading of the private vehicle fleet, and the costs would not be the burden of individual citizens, but would be largely funded through private sector investments and the streamlining of public sector expenditures, which are already large in the public transit sector. However, due to poor financial planning and limited technical knowledge in project packaging and appraisal, these changes are not happening naturally. The local governments and public companies are not trained in producing the economic and financial analyses to forecast how improvements in service quality will increase ridership, operational revenues, or tax collections (via increased rental rates and business activity at transit-adjacent properties). They are also not accustomed to performing cost-benefit analyses for operational investments that will decrease illegal ridership, such as e-ticketing systems or turnstiles, and prevent illegal service providers from stealing riders; nor are they accustomed to analyzing how streamlining bus routes and making bus improvements will decrease annual gas and maintenance expenditures. In absence these skills, the public transit companies and local government are restrained to preparing “wish lists” with little justification in their annual budget requests.

Interventions focused on financial and investment planning could significantly improve the borrowing capital in the sector and help local governments to better attract and leverage private capital sources as well as donor loan facilities. These interventions would need to be customized to the funding method for public transit present in each city, as Sarajevo, Zenica, and Banja Luka each have a different formula. For example, Sarajevo directly operates its public transit services through a canton-owned entity, whereas the city of Zenica owns the

rolling stock assets but has retained hired a private operator, and Banja Luka licensed its routes to multiple private companies who are responsible for the rolling stock and operations.

Finally, many cities have been deploying information, technology, and communications (ITC) tools in the urban transport sector to improve the user experience and decrease barriers to ridership, such as smart phone applications that provide updates about bus, trolley, and tram arrival times or that connect passengers to car-sharing and taxi services. These applications have been proven to decrease private car usage and subsequently traffic congestion, improving efficiency of the road network. The data gathered by these applications is also valuable for the planning, coordination, and justification of future urban transport investments, and to promote compact urban development through transit-supportive zoning.

### **Activity Cluster 3 – Increasing Options for Zero Carbon Mobility**

Increasing options for zero carbon mobility, such as non-motorized transport (NMT) methods like bicycling and walking, provides the smallest emissions reduction potential, but requires the least investment and has the few implementation obstacles. NMT projects, such as bike lanes and bike sharing programs, tend to also create broad-scale awareness of the energy efficiency and clean energy issues, as they become viral talking points for citizens. Marketing about residential energy-efficiency programs can be combined with NMT activities to increase the appeal and awareness of green growth topics and urban competitiveness.

## **3.3 POTENTIAL INTERVENTIONS FOR USAID CONSIDERATION FOR FUTURE PROGRAMMING**

USAID interventions are anticipated to be the traditional technical assistance and training activities through selected implementing partners, although there are some other opportunities (i.e., DCA financing). Interventions are recommended considering that USAID has been active in BiH for many years, there is an active and mature donor community with associated assistance activities, and USAID desires to leverage existing activities in order to achieve crosscutting objectives in sustainable development, in particular, engaging urban programs to achieve emissions reductions, clean energy, and other Global Climate Change (GCC) targets. With this in mind, the Assessment Team offers a menu of potential interventions below (further described in Section 4 and Annex A), rating all activities under the following criteria:

1. **Costs of USAID Intervention**—Predominantly technical assistance and training costs supporting a discrete activity, and not capital costs of implementation of that activity.
2. **Leverage Opportunities**—In most instances, counterparts are named as likely partners in this activity, based in part on responses during stakeholder interviews, and in some cases, a particularly attractive leveraging opportunity is identified by name (e.g., an existing donor or government program, a completed or ongoing pilot program, a cooperating donor funding/financing proposal that would complement a USAID intervention, etc.).
3. **Political Barriers**—Likely legislative and potential institutional bottlenecks and dependence upon actions and decisions by BiH government bureaucracy to proceed with various stages of the proposed intervention.

All things equal, items on the menu with low intervention costs, medium to high leveraging opportunities, and low political barriers may be most attractive to the Mission, but all potential interventions are presented, as the Mission will likely have other considerations as well.

### **Residential Buildings – Space Heating**

In targeting GHG emissions reduction, while this analysis deliberately does not assess BiH's production side of energy, including the electrical sub-sector, as a candidate for new USAID programming, it is critical to address systems that provide space heating to residential buildings, namely, district heating for most multi-unit,

collective buildings (“on-grid” meaning on the district heating grid) in the targeted cities and, for off-grid housing (i.e., housing which is not served by district heating) methods that residents use to heat individual homes. Examples of interventions include:

- Improve the sustainability and expansion potential of district heating grid schemes to decrease individuals using low-efficiency or high-emissions space heating sources;
- Development of small utility district heating mini-grid schemes to decrease individuals using low-efficiency or high-emissions space heating sources; and
- Promote the use of clean energy sources for off-grid households to decrease use of fossil fuel heating sources and decrease total emissions.

### **Residential Buildings – Energy Efficiency**

Regardless of how residential buildings and individual homes are heated, enhancing energy efficiency (i.e., how heating energy is distributed within homes and residential buildings, how heat can be insulated and retained, and how new metering systems and market mechanisms can be employed to provide incentives to consumers to conserve energy) will be important. Another opportunity presents itself here, namely, for USAID to consider more robustly engaging the housing sector at large in BiH, with a whole series of potential technical assistance and training opportunities: community participatory activities (i.e., through HOAs), Small and Medium Enterprises (SMEs) (i.e. through housing management and maintenance companies, heating equipment and insulation suppliers, etc.) and Energy Service Companies (ESCOs), all with the common theme of advancing clean and efficient energy. Illustrative interventions would include:

- Improve building maintenance practices to decrease heat losses and emissions;
- Develop credit lines for co-financing investment in building improvements to increase investment in energy-efficiency building improvements and decrease total emissions;
- Support the creation of a viable ESCO market to increase investment in energy-efficiency building improvements and decrease total emissions;
- Make building improvement activities more affordable for low-income households to increase investment in energy-efficiency building improvements and decrease total emissions; and
- Enhance the market value of “green” buildings to increase investment in energy-efficiency building improvements and decrease total emissions.

### **Transportation – Private Vehicles**

As qualified in the Assessment Report, based on USAID’s agenda, programs aimed at improving the quality of the private vehicle fleet in BiH are not recommended except perhaps by modest technical assistance activities to decrease emissions from private vehicles by improving vehicle performance (i.e., development of a “green car” certification program, or preparation of traffic management plans for the targeted cities) and decreasing hours of vehicle operation, etc.

### **Transportation – Public Transit**

Reduction of emissions in the transportation sector can be achieved by major shifts to public transport by technical assistance to improve management systems, such as optimization of traffic light signal timing and road network (e.g., dynamic signage, one-way streets, flexible direction lanes, etc.). These fairly low-cost operational interventions would reduce traffic congestion and travel times, and decrease idling time and emissions of vehicles. A sampling of USAID technical assistance interventions may include:

- Improve the sustainability and attractiveness of public transport services to increase ridership and decrease use of private vehicles with high per capita emissions;

- Develop robust and regulated private transport services (mini-buses and shared vehicles) to decrease individual vehicle ownership with high per capita emissions; and
- Promote mode shift from private vehicles to public or private transport services to increase ridership and decrease use of private vehicles with high per capita emissions.

### Transportation – Zero Carbon Mobility

Increasing options for zero carbon mobility, such as non-motorized transport (NMT) methods like bicycling and walking requires the least investment and has few implementation obstacles. USAID support for the growth of zero carbon mobility infrastructure to increase usage of NMT modes would be well placed.

This activity, as well as all of the potential USAID assistance interventions should be supported by robust information, technology, and communications (ITC). While this applies as well to the potential housing programs, technical assistance activities in the transportation sector uniquely carry a whole series of communication and outreach tools linked to the actual modes of transportation to improve user experience and decrease barriers to ridership.

Section 4, Detailed Activity Descriptions, describes potential USAID interventions in supporting the government of Bosnia and Herzegovina on the state, entity, canton and municipal levels, while engaging private sector and civil society stakeholders, to achieve articulated sustainable development goals and GCC targets on BiH’s path to EU Accession. The approach to achieving these goals and targets are presented in this Assessment Report through an urban programming lens, by engaging crosscutting activities related to clean energy and energy efficiency in BiH cities. (Note: These same potential interventions are also provided in table form in Annex A).

## 3.4 PRIORITIZATION OF INTERVENTIONS BY LOCATION

At the beginning of the assignment, USAID guided the Assessment Team to focus on three urban areas: (1) Banja Luca, (2) Zenica, and (3) the four municipal governments whose boundaries together comprise the City of Sarajevo.

In the **housing sector**, these urban areas can be further divided into urban design sub-groups based on the land use factors and building types, which can be characterized as follows:

1. Detached Single-Family Residential Housing (DSF)
2. Attached Single-Family and Low-Density Multifamily Residential Housing (ASF-LDMF)<sup>15</sup>
3. High-Density Multifamily Residential Housing (HDMF)<sup>16</sup>

For the three urban areas selected by USAID, the composition of sub-groups is roughly as follows.<sup>17</sup>

**Table 10: Composition of Urban Design/Housing Sub-Groups**

Urban Area	Population	DSF	ASF-LDMF	HDMF
<b>Banja Luca</b>	199,911	25%	60%	15%
<b>Zenica</b>	115,134	25%	30%	15%
<b>Sarajevo - Old City</b>	38,911	30%	60%	10%
<b>Sarajevo - Center City</b>	59,238	15%	60%	25%
<b>Sarajevo - New Sarajevo</b>	68,802	15%	25%	60%

<sup>15</sup> One to six households per building.

<sup>16</sup> More than six households per building.

<sup>17</sup> Estimates prepared by ECODIT based on a visual assessment of land uses.

<b>Sarajevo - New City</b>	124,471	25%	15%	60%
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The proportions of urban design sub-groups are important because the energy consumptions, energy efficiency, and GHG emissions of each cluster can vary greatly, requiring a different mix of interventions to achieve sustainable development objectives.

**Detached Single-Family (DSF) Residential Housing.**

These communities are generally not connected to a district heating grid and commonly use low-grade heating sources (e.g., coal, oil). They also have the poorest quality insulation as all four walls and the roof are exposed surfaces to the outdoors. In that regard, prioritized interventions for these communities are as follows:

1. Establishment of small utility district heating mini-grid schemes using clean energy sources.
2. Conduct energy audits and communicate benefits of mini-grid and energy-efficiency building improvements.
3. Promote use of EBRD and EEO lending facilities.
4. Support establishment of investment tax credits for mini-grid schemes and energy-efficiency building improvements.



**Attached Single-Family and Low-Density Multifamily (ASF-LDMF) Residential Housing.**

These communities are also not generally connected to a district heating grid and use low-grade heating sources (e.g. coal, oil). However, the insulation quality of the ASF-LDMF buildings are higher than DF housing because they tend to have only two walls exposed to the outdoors and only the top floor residents have an exposed roof. In that regard, prioritized interventions for these communities are as follows:

1. Establish small utility district heating mini-grid schemes using clean energy sources.
2. Conduct energy audits and communicate benefits of mini-grid and energy-efficiency building improvements.
3. Promote use of EBRD and EEO lending facilities.
4. Establish investment tax credits for mini-grid schemes and energy-efficiency building improvements.



### **High-Density Multifamily (HDMF) Residential Housing.**

Unlike the first two sub-groups, these communities are generally connected to a district heating grid where residents pay a flat services fee based on the floor space size of their housing unit. In recent years, there has been increasing efforts to convert from a flat services fee to a consumption-based services fee by installing meters. There has also been a growing trend to establish homeowners associations (HOAs) that are responsible for contracting with service providers for building maintenance. However, because of poor quality services provided by the large district heating utilities and limited understanding or benefits of HOAs, many households are unwilling to pay for the service fees. In other cases, low-income households and senior citizens lack the funds to pay the service fees. These factors strain the financial model for heating and building maintenance services, and therefore the utilities or HOAs lack the funds or liquidity to invest in energy-efficiency measures for their grids and buildings. Frequently, the households that comprise the HOAs also do not understand the benefits of energy-efficiency measures and reject or decline to participate with such projects. In that regard, prioritized interventions for these communities are as follows:



1. Mainstream HOAs and use of building maintenance operators (BMOs) and service providers.
2. Create a viable ESCO market and establish of ESCO companies that install meters and invest in energy-efficiency building improvements.
3. Support large district heating utilities with financial and investment planning that will reduce financial losses.
4. Promote use of EBRD and EEO lending facilities.

In the **urban transport sector**, the three cities can be segmented by the type of transport services offered, and their unique issues related to service quality.

**Banja Luka.** Urban transport services in Banja Luka are almost fully privatized besides some minimal subsidies. The municipality has licensed its routes to third party providers who are responsible for the rolling stock and operations. They have also instituted an electronic fare-collection system. As such, their services are in the strongest financial condition of the three cities as their service providers are incentivized to improve service quality as a means to maximize ridership and fare revenue. However, Banja Luka has problems with illegal urban transport service providers and lacks high-density corridors where urban transport can thrive. In that regard, prioritized interventions for its communities are as follows:

1. Upgrade bus stops to include limited-access queues, heaters, and visual communication systems.
2. Construct grade-separated bus priority lanes.
3. Install intelligent traffic-management systems.
4. Develop high-density, compact, and mixed-use neighborhoods along key transit stations using tax-increment financing and land-value capture methods.

**Zenica.** Urban transport services in Zenica are partially privatized. The municipality owns the rolling stock, but has hired third-party providers who are responsible for operations (e.g., driving the buses). They have also instituted an electronic fare-collection system, which is greatly increasing the financial conditions of their services. However, similar to Banja Luka, Zenica has problems with illegal urban transport service providers, but does have a greater concentration of high-density corridors. In that regard, prioritized interventions for its communities are as follows:

1. Upgrade bus stops to include limited-access queues, heaters, and visual communication systems.
2. Construct grade-separated bus priority lanes.
3. Develop high-density, compact, and mixed-use neighborhoods along key transit stations using tax-increment financing and land-value capture methods.

**Sarajevo.** Urban transport services in Sarajevo are fully operated as public enterprises. The canton owns and operates the rolling stock, and has only recently begun piloting a electronic fare-collection system. After decades of poor corporate management, the urban transport company, GRAS, is in dire financial condition, and the canton is carrying significant outstanding debt, leading to spiraling subsidies. However, in Sarajevo, urban transport has the greatest mode share per passenger kilometer travelled in comparison to the other two cities. Without a functioning urban transport system in Sarajevo, the city would become gridlocked and pollution from private vehicles would spike. In that regard, prioritized interventions for its communities are as follows:

1. Deploy a system-wide electronic fare-collection system.
2. Upgrade bus, tram, and train stops to include limited-access queues, heaters, and visual communication systems.
3. License low-revenue bus routes to third-party service providers using a flexible zone-based system instead of fixed pathways.
4. Install intelligent traffic-management systems.
5. Develop high-density, compact, and mixed-use neighborhoods along key transit stations using tax-increment financing and land-value capture methods.

### 3.5 OBJECTIVES AND ILLUSTRATIVE INTERVENTIONS

Based on this combined methodology, which focuses on high ERR and place-specific interventions, the Assessment Team recommends the following programming mix to increase investments in clean energy and the energy-efficiency sector in BiH and advance the BiH accession process related to energy and transport sector requirements.

There are four objectives that support this purpose, each detailed below. Elaborated descriptions of the activities are provided in Section 4.

- Objective 1: **Address economic deficiencies of clean energy and energy-efficiency projects in the housing sector by applying new technologies and tax incentives, and communicating results.**
- Objective 2: **Address legal and regulatory impediments to clean energy and energy-efficiency projects in the housing sector.**
- Objective 3: **Achieve energy savings using fiscal policy tools and PPPs in the housing and transport sectors.**
- Objective 4: **Advance EU accession requirements in the energy-efficiency sector.**

To achieve the sustainable development and clean energy objectives, a potential program design may undertake the four objectives as below.

#### **Objective 1: Address economic deficiencies of clean energy and energy-efficiency projects in the housing sector by applying new technologies and tax incentives, and communicating results.**

At present, individual households not connected to the district heating utilities have few affordable clean energy and energy-efficient options for space heating. In urban areas, these tend to be the Detached Single-Family (DSF) housing communities and Attached Single-Family and Low-Density Multifamily Residential (ASF-LDMF) housing communities. For these residents, using gas and bio-fuels is much more costly than coal or oil;

also, the furnace systems that use clean energy resources are more costly, compounding the difficulty. Therefore, residents in BiH have difficulty justifying investments in clean energy sources for space heating or improvements to building insulation that would decrease their overall energy requirements. The total economic savings in one year are minimal, and the payback period is long. These investments also require financing since the upfront capital cost is greater than most individual household savings or disposable income. Financing in BiH is troublesome since the interest rates are high, as are the collateral requirements. These factors may still allow a net positive investment, but for individual households that have limited financial or technical knowledge of energy-efficiency investments, the transaction seems too risky.

In that regard, third-party investors and small-scale service providers could be better positioned to make the investment on behalf of the household since they can more easily access private capital, borrow from banks with better terms, and achieve economies of scale by serving multiple households.

In recognition that these services fall under the competency of the cantons and municipalities in BiH, and not the BiH “entities”, efforts should be focused on the urban areas of Banja Luka, Zenica, and Sarajevo.

The activities and relevant intervention locations within BiH will include, but not be limited to the following:

1. Produce feasibility studies to forecast the economic and financial rates of return of establishing mini-grids and estimated cost savings for various scales (number of connections), housing typologies and sizes, and heating sources.
2. Provide grants to pilot the establishment of mini-grids, and to validate the feasibility study estimates.
3. Use existing data sources and the GIZ Energy-Efficiency Housing Typology Model to produce investment guidelines on economic and financial rates of return on buildings improvement for various housing typologies and sizes, as well as heating sources.
4. Provide grants to pilot energy-efficiency building improvements for DSF and ASF-LDMF housing, and to validate the feasibility study estimates and calibrate investment guidelines.
5. Provide TA and grants to implement an information, education, and communications (IEC) campaign about the benefits of mini-grid and energy-efficiency building improvements, and the sources of financing, including the newly established EBRD and Energy-Efficiency Obligation (EEO) lending facilities.
6. Provide TA to solicit investors to establish SMEs providing mini-grid services in both installation and operations.
7. Provide TA to train SMEs providing mini-grid services in both installation and operations, as well as the financing process its sources, including the newly established EBRD and EEO lending facilities.
8. Provide TA to establish investment tax credits for households and businesses investing in mini-grid, metered heating systems, and energy-efficiency building improvements.
9. Conduct energy audits for DSF and ASF-LDMF housing to increase awareness of benefits and connect customers to mini-grid service providers.

## **Objective 2: Address legal and regulatory impediments to clean energy and energy-efficiency projects in the housing sector.**

The core focus of this objective is to identify and address obstacles in legislation that impede clean energy and energy-efficiency investments intended to decrease energy consumption and emissions. These investments could include the introduction of higher-grade heating furnaces that rely on biofuels; connection of multiple households to a joint heating sources, like a mini-grid; or improvement of building insulation (e.g., windows and walls). Since these investments are costly for any individual household, and most people’s technical expertise and understanding is limited, there is a market for third-party investors and small-scale services providers where the state-owned district heating utilities do not provide coverage. In urban areas, these tend to be the DSF and ASF-LDMF housing communities.

In order to create an investor-friendly environment for third-party investors and small-scale service providers, BiH needs to establish a regulatory and administrative framework that will promote, attract, and legitimize such business activities, including the usage of HOAs and ESCOs. Currently, there is no legislation prohibiting such services, but because there are few service providers supporting this market besides the district heating utilities, investors and their potential customers are unsure if they would be legally recognized by the government and their contracts accepted in the court should either party not fulfill its commitments.

The first step is a comprehensive assessment of the existing laws, regulations, and contracts to outline development process, strengths, and limitations. Promotion materials should then be developing that illustrate the investment framework and legal steps for developers, contractors, and their clients, as well as standardized guidelines and best practices for contracts between service providers and customers.

TA will then be provided to better clarify laws and regulations, if necessary, and to streamline the permitting process for project participations.

In recognition that these services fall under the competency of the cantons and municipalities in BiH, and not the BiH entities, the focus should be on the urban areas of Banja Luka, Zenica, and Sarajevo.

The activities and applicable geographies in BiH will include, but not be limited to the following:

1. Perform SWOT (Strengths, Weaknesses, Opportunities, Threats) assessment of state, entity, cantonal, and municipality laws and regulations regarding investment procedures for mini-grids, energy-efficiency building improvements, HOAs, and ESCOs to determine inefficiencies, overlaps, and gaps.
2. Work closely with governments, local communities, NGOs, investors, and regulatory commissions to draft revised laws and regulations to improve the business environmental for investments, particularly at the cantonal and municipal levels.
3. Streamline the permitting process for investors to build mini-grids and engage in ESCO contracts.
4. Work closely with cantons and municipalities to establish standardized contract agreements for mini-grid services, building maintenance service providers, energy-efficiency housing improvements, and ESCOs.
5. Develop and assist the partners to implement simplified guidelines for energy-efficiency investors.

### **Objective 3: Achieve energy savings using fiscal policy tools and PPPs in the housing and transport sectors.**

In addition to the removal of economic and legal hurdles for households and SMEs to implement clean energy and energy-efficiency measures, BiH must also improve the financial condition of the large state-owned enterprises in district heating and urban transport. Since the end of the socialist era, the financial condition of these services have degraded rapidly due to decreasing subsidies and poor corporate management practices. This has led to a deterioration in the quality and coverage of services, driving customers to alternative heating sources or use of private vehicles, and also a growing unwillingness to pay for services if they cannot be disconnected if opting for these alternatives, leading to a long list of outstanding debts. This situation has led to a vicious cycle that further erodes the financial condition of the service providers and worsens service quality or coverage. As the alternative options for customers are generally coal- and oil-based heating sources and driving private vehicles, this trend leads to increasing emissions.

Therefore, the focus on this objective will be to support the development of fiscal policy tools and utilization of PPPs to improve the quality of services and financial conditions of the large service providers in district heating and urban transport. The targeted beneficiaries of these interventions include High-Density Multifamily (HDMF) housing communities and commuters living in urban transport accessible corridors in the cities of Banja Luka, Zenica, and Sarajevo. Given the unique situations of each state-owned enterprises, the interventions will be tailored based on their strengths and weaknesses.

The activities and relevant intervention locations within BiH will include but not be limited to the following:

1. Provide TA to support cantons and municipalities to establish obligation schemes that dedicate a percentage of specific types of tax revenue streams to subsidize district heating and urban transport service providers.
2. Produce a tariff and financial management assessment of district heating and urban transport service providers to identify the adequacy of their rates, fees, and borrowing practices, and to implement revisions agreed upon by cantons and municipalities.
3. Provide TA to prepare a policy for subsidies for district heating and urban transport service providers, and for the maximum allowable share of the operational revenues that can be subsidized, and their distribution across services lines and customer segments.
4. Provide TA to identify customer segments or locations where district heating and urban transport services are not meeting minimum cost-recovery targets and to evaluate the options for their closure or concessioning to third-party services providers.
5. Produce a study to identify alternative methods to increase sources revenues of district heating and urban transport service providers.
6. Provide TA to support cantons and municipalities in the design, appraisal, and implementation of PPP opportunities to provide the following services:
  - a. Housing Sector
    - i. ESCO credit lending facility for all housing segments—in all three cities.
  - b. Transport Sector
    - i. Upgrade and maintenance of bus, tram, and train stops to include limited-access queues, heater, and visual communication systems—for all cities.
    - ii. Construction and maintenance of grade-separated bus priority lanes on high-capacity corridors, also called bus rapid transit, to curb illegal service providers—in Banja Luka and Zenica.
    - iii. Licensing of low-revenue bus routes to third-party service providers using a flexible zone-based system instead fixed pathways—in the hillside areas of Sarajevo.
    - iv. Installation, maintenance, and operation of intelligent traffic management systems—in all three cities.
    - v. Development of high-density, compact, and mixed-use neighborhoods along key transit stations using tax-increment financing and land-value capture methods—in all three cities.

#### **Objective 4: Advance EU accession requirements in the energy-efficiency sector.**

The Energy Community Treaty (EnC) represents BiH's main agreement currently in force with EU acquis requirements. The reform and restructuring of the energy sector is one of 16 key areas under the Stabilization and Association Agreement (SAA) signed between Bosnia and Herzegovina and the EU in June 2015. As of March 2016, BiH continues to operate without a single country-wide energy strategy. The legislative framework on renewable energy still does not comply with the EnC requirements as BiH has yet to submit a national renewable energy action plan (NREAP) to the EnC. Submitting the plan must be treated as a priority, together with ensuring that BiH's renewable energy targets are met by developing a state-level framework to supplement the framework at entity level. As for energy efficiency, secondary legislation was adopted at various governance levels, particularly in Republika Srpska, but there has been limited progress in developing a legislative and institutional framework at the State level. In particular, the Federation needs to adopt its draft energy-efficiency law. BiH has also missed its EnC deadline to align with the 2006 Directive on Energy End-Use Efficiency and Energy Services. Due to limited coordination between authorities at state and entity levels, BiH has also not yet developed or adopted a state-level national energy-efficiency plan (NEEAP) or a consistent roadmap for enacting the acquis under the EnC Treaty.

As a result of these limitations, the EnC has suspended the use of IPA funds (Instrument for Pre-Accession) in the energy sector until BiH prepares and approves the state-level NEEAP and amends the state law on public

procurement to include energy-efficiency criteria. Republika Srpska has already prepared and approved a NEEAP, but the Federation has not. It is expected that the Federation will complete this process in the next six to nine months, at which time, a state-level document and roadmap can be prepared by simply merging these two entity-level documents and harmonizing some of the approaches. Once this framework is developed, BiH must also establish a structure for monitoring and reporting on the implementation of the NEEAP, and ensure that it is adequately sourced with funds and personnel. GIZ has made preliminary commitments to support this latter process.

In addition to the NEEAP, BiH must continue its efforts to comply with the Energy-Efficiency Directives 2012/27/EU, which also require the establishment of national programs for renovation and retrofitting of public buildings using energy-efficiency measures and the establishment of energy-efficiency obligation (EEO) schemes. The USAID EIA project has provided support for the preparation of the NEEAP and made significant progress on the establishment of the EEO schemes. UNDP has taken a lead role in coordinating the renovation of public buildings. Therefore, the core focus of this objective is to assist MOFTER and host country partners to prepare, transpose, and implement Energy Community Treaty requirements and Energy-Efficiency Directives related to the NEEAP, which currently has limited donor support.

The activities and relevant intervention locations within BiH will include but not be limited to the following:

1. Provide TA to MOFTER and host country partners to advance the preparation and adoption of the state level NEEAP in relation to all the above objectives.
2. Provide TA to cantons and municipalities to revise laws and regulations in accordance with the guidelines developed in the adopted NEEAP.

More detailed descriptions of these activities listed under Objectives 1, 2, 3, and 4 are included in Section 4, along with additional intervention options that were given a medium or low rating based on our issues analysis methodology described in the Executive Summary.

## 4. DETAILED ACTIVITY DESCRIPTIONS

While Annex A includes a comprehensive list of potential technical assistance and training interventions for USAID to consider, this section prioritizes activities based on optimization of three factors, namely, significant leveraging opportunities for USAID with counterparts and other donors, minimal political barriers to engage, and cost effectiveness to maximize limited resources. While all activities listed under the Residential Building Sector section can be successfully implemented in all three targeted cities (Sarajevo, Banja Luka and Zenica), the proposed interventions under the Transportation Sector are recommended to be implemented in different locations, primarily due to varying levels of existing infrastructure and operating systems in the three cities, as well as different degrees of institutional capacity of the cooperating counterparts, the local transportation organizations.

### RESIDENTIAL BUILDING SECTOR

#### 4.1 RESIDENTIAL BUILDINGS – SPACE HEATING FOR ATTACHED SINGLE FAMILY AND LOW DENSITY MULTIFAMILY HOUSING

##### **A. DEVELOPMENT OF SMALL UTILITY DISTRICT HEATING MINI-GRID SCHEMES TO DECREASE INDIVIDUALS USING LOW-EFFICIENCY OR HIGH-EMISSIONS SPACE HEATING SOURCES.**

##### **RECOMMENDED LOCATIONS: SARAJEVO, BANJA LUKA AND ZENICA**

**a. Establish legal and regulatory framework for small utility providers, including easement rights**

In neighborhoods with single-family dwellings, it may not be financially feasible for the primary district heating grid to be expanded. There may also be higher ROI projects for the utility based on their limited borrowing capacity. This scenario provides an opportunity for third-party investors who can develop mini-grid schemes in areas not serviced by the primary grid. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements for small utility providers in order to establish an enabling environment for private investment.

**b. Develop standardized contract guidelines for small utility providers**

The lack of vetted contract conditions are limitations for customers who are interested in participating with new investment schemes, as each individual household would need to seek costly legal advice. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and to establish an enabling environment for private investment.

**c. Produce feasibility studies for small utility providers**

Investors and households may not be aware of the ROI of district heating mini-grid schemes. Technical assistance could produce feasibility studies that forecast and promote the profit potential of such operations in order to catalyze investment by companies, individuals, or cooperatives.

**d. Pilot projects for small utility providers**

Studies have shown that there is a profit opportunity in district heating mini-grid schemes where multiple single-family dwellings and/or small multifamily dwellings purchase a common furnace and boiler and establish joint distribution systems. These systems can also be more efficient than individual heating

systems based on high-emissions heating sources. A grant-funded pilot will demonstrate the financial benefits in the forms of savings or profit potential of such systems.

**e. Solicit investors to establish small utility providers (SMEs)**

Investment in developing countries is typically stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes profitable project opportunities to third parties. The clearinghouse could also match companies to potential customers.

**f. Provide financial guarantees for small utility providers**

Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects to decrease the aversion of investors to district heating mini-grid schemes.

**g. Conduct trainings for small utility providers**

Another constraint to investment is technical knowledge regarding operations of district heating mini-grid schemes. If the first few investment projects fail because of poor management, future investors will become averse to mini-grid projects. Technical assistance could provide trainings to small utility providers to maximize their potential for success.

## **4.2 RESIDENTIAL BUILDINGS – ENERGY EFFICIENCY FOR HIGH DENSITY MULTIFAMILY HOUSING**

### **A. IMPROVE BUILDING MAINTENANCE PRACTICES TO DECREASE HEAT LOSSES AND EMISSIONS.**

#### **RECOMMENDED LOCATIONS: SARAJEVO, BANJA LUKA AND ZENICA**

**a. Enhance legal and regulatory framework for multifamily and neighborhood Home Owners Associations (HOAs)**

HOAs in many countries are considered legal business entities whose revenues are supported by dues paid by its members. This arrangement increases the borrowing capacity of the group of homeowners whose mutual interest is the maintenance of their buildings. Group purchasing also can decrease maintenance costs through economies of scale. HOAs are not currently recognized in FBiH, but they are in RS. In both entities, the regulations are limited and unclear. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements for HOAs in order to establish an enabling environment for this form of joint investment.

**b. Develop standardized contracts for building maintenance operators (BMOs)**

The lack of vetted contract conditions are limitations for customers who are interested to hire a BMO, as each individual household or HOA would need to seek costly legal advice. Many of those who have utilized BMOs in BiH have had negative experiences enforcing contract conditions and are therefore skeptical of the business model. This scenario leads to non-payment or a low willingness to pay BMO fees, which in turn decreases service quality and continues to degrade public opinion. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and HOAs and to establish an enabling environment for private investment.

**c. Produce feasibility studies for building maintenance operators**

Homeowners have limited knowledge about the economic and financial benefits of the BMO business model. Technical assistance could support an assessment to determine the savings, costs, and feasibility of BMOs.

**d. Pilot projects for building maintenance operators**

Homeowners are often skeptical of studies and only learn by direct experience from family or members of their community. A grant-funded pilot will help to demonstrate the financial benefits in order to increase the utilization of the BMO business model.

**e. Solicit investors to establish building maintenance operators**

There are few BMOs in BiH, which limits competition and quality for services provided. New business establishment is stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes the business demand of profitable projects to third parties that are considering establishing BMO companies. The clearinghouse could also match companies to potential customers.

**f. Provide financial guarantees for building maintenance operators**

Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects in to decrease the aversion of investors to establishing BMO companies.

**g. Conduct trainings for homeowners and building maintenance operators**

Another constraint to the use of BMO schemes is technical knowledge regarding their operations. When projects fail because of poor management, future investors and customers will become averse to the BMO business model. Technical assistance could provide trainings to homeowners and BMOs to maximize their potential for success.

**h. Conduct trainings for architecture and engineering (A&E) firms on best practices for energy-efficiency building improvements**

Another constraint to investment is technical knowledge regarding energy-efficiency building improvements. When investment projects fail because of poor capacity, future customers become averse to energy-efficiency projects, and A&E firms increase their costs. Technical assistance could provide trainings to A&E firms to maximize their potential for success and to decrease their costs of services.

**B. SUPPORT THE CREATION OF VIABLE ESCO MARKET TO INCREASE INVESTMENT IN ENERGY-EFFICIENT BUILDING IMPROVEMENTS AND DECREASE TOTAL EMISSIONS.**

**RECOMMENDED LOCATIONS: SARAJEVO, BANJA LUCA AND ZENICA**

**a. Enhance legal and regulatory framework for ESCO activities**

ESCOs are not currently used widely because it is unclear how they are treated legally in court. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements.

**Develop approved standardized contract guidelines for ESCOs**

The lack of vetted contract conditions are limitations for customers who are interested to participate in an ESCO scheme, as each individual household or HOA would need to seek costly legal advice. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and HOAs and to establish an enabling environment for private investment.

**b. Establish operating agreement with district heating companies for ESCO schemes**

ESCO schemes require a legally binding agreement with district heating companies that commit the financial benefits of energy savings to trust accounts that repay the investor who conducts the building improvements. Technical assistance could establish this operating agreement in order to decrease the legal costs for homeowners and ESCOs and to establish an enabling environment for private investment.

**c. Produce feasibility studies for ESCOs**

Homeowners have limited knowledge about the economic and financial benefits of the ESCO business model. Technical assistance could support an assessment to determine the savings, costs, and feasibility of the business model.

**d. Pilot projects for ESCOs**

Homeowners are often skeptical of studies and only learn by direct experience from family or members of their community. A grant-funded pilot will help to demonstrate the financial benefits in order to increase the utilization of the ESCO business model.

**e. Establish form-based energy audit methods for single-family households**

The up-front capital costs for technical services to estimate the energy savings of building improvement activities creates an investment barrier. Technical assistance could produce a simple form-based energy auditing method for single-family homes that relies on basic inputs (e.g., floor area, building materials, heating source, etc.), and eliminates the need for expensive specialized auditor services.

**f. Solicit investors to establish ESCO companies**

There are few companies offering ESCO services in BiH, which limits competition and quality of services provided. New business establishment is stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes the business demand of profitable projects to third parties that are considering establishing ESCO companies. The clearinghouse could also match companies to potential customers.

**g. Provide financial guarantees for ESCO companies**

Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects to decrease the aversion of investors to establishing ESCO companies.

**h. Conduct trainings for homeowners and ESCO investors**

Another constraint to the use of ESCO schemes is technical knowledge regarding their operations. When projects fail because of poor management, future investors and customers will become averse to the ESCO business model. Technical assistance could provide trainings to homeowners and ESCOs to maximize their potential for success.

## **TRANSPORTATION SECTOR**

### **4.3 TRANSPORT – PUBLIC TRANSIT**

#### **IMPROVE THE SUSTAINABILITY AND ATTRACTIVENESS OF PUBLIC TRANSPORT SERVICES TO INCREASE RIDERSHIP AND DECREASE USE OF PRIVATE VEHICLES WITH HIGH PER CAPITA EMISSIONS.**

**a. Support financial planning, management controls, and fiscal policy**

Public transit finance is complex as operational revenues (fares) in the public transit sector typically never cover the full cost of service, even in OCED countries. As a result, public transit companies are reliant on grants, loans, and subsidies provided by the national or local governments, who have limited public transit sector financial-planning expertise. Supporting the application of new approaches to financial planning, management controls, and debt restructuring could dramatically decrease the financial burden and release funds for other critical needs or service improvements.

**Recommended Location(s):** Zenica and Sarajevo

**b. Pilot installation of electronic ticketing systems**

Electronic ticketing systems help to decrease fare non-payment and increase operational revenues. Banja Luka and Zenica have already implemented such systems, but Sarajevo, whose public transit system is much larger and whose services are multimodal, has not. These systems are funded by a subsidy or grant, and are usually justified based on the potential revenue improvements. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.

**Recommend Location(s):** Sarajevo

**c. Pilot installation of limited-access queues at high-capacity tram and trolley stops**

Limited-access queues improve transit stoppage time and decrease fare non-payment by better organizing passengers prior to loading. These systems are funded by a subsidy or grant, and are usually justified based on the potential revenue improvements. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.

**Recommended Location(s):** Banja Luka and Sarajevo

**d. Pilot installation of real-time bus arrival displays and electronic signage**

Passengers make travel mode decisions by considering the waiting and travel time trade-offs of public transit or private vehicles. Many cities have increased transit ridership and operational revenues by introducing electronic signage to eliminate uncertainty in transit arrival times. These displays can sometimes be fully funded by advertising revenues, and can additionally include promotional information about environmental issues and energy efficiency. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.

**Recommended Location(s):** Banja Luka, Zenica, and Sarajevo

**e. Develop real-time bus arrivals smart phone application**

In a similar way as real-time bus arrival displays, many cities have increased transit ridership and operational revenues by deploying web-based and smart phone applications. These applications can sometimes be fully funded by advertising revenues, and can additionally include promotional information about environmental issues and energy efficiency.

**Recommended Location(s):** Banja Luka, Zenica, and Sarajevo

**f. Pilot installation of space heaters at transit stops**

Cold weather is another constraint to the use of public transit, which is when pollution in many urban areas is the worst due to air inversions. In winter months, many regular transit riders prefer private vehicles in order to avoid waiting in low temperatures at transit stops. Many cities have increased ridership and operational revenues during the winter months by introducing space heaters at stops. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.

**Recommended Location(s):** Banja Luka, Zenica, and Sarajevo

**g. Support bus route optimization study along high-demand routes**

Most global cities operate the same base routes for decades, never considering how travel patterns change over time at urban areas cyclically grow and contract. This leads to lower-performing routes that are operated just because they were legacy services. An optimization study will help the transit companies or local government to re-organize their system to maximize ridership based on demand. These technical skills are typically not retained in-house, and require external expertise.

**Recommended Location(s):** Banja Luka and Sarajevo

**h. Support the concessions for services on low-volume residential collector lines**

New approaches to increase ridership on transit systems have focused on the “last kilometer” of travel for passengers between high-demand travel corridors and households. However, publicly operated service on these low-demand routes is complicated to rationalize, and cities who do provide residential collector bus lines accept large operational losses. These services are better operated by the private sector, who can provide more dynamic and scalable services, whereby cities organize concessions based on ward or precinct areas that lead to transit stations instead of specific road routes. This method could be particularly useful in Sarajevo in the hillside neighborhoods. Technical assistance could be needed to design the concession contract and to forecast and market to private companies the travel demands and revenue potential.

**Best Recommended Location(s):** Sarajevo

**i. Establish transit or bus priority lanes (with pavement markings, plastic pylons, or concrete aprons)**

Travel times on transit systems is slowed due to private vehicle traffic congestion. Many cities have rationalized the closure of one lane to private vehicles on high-capacity corridors where the transit services are transporting more passengers than cars, which leads to a significant increase in travel speeds on transit services. Studies have also shown that separating transit and private vehicle traffic increase travel speeds for private vehicles since the two modes have different stopping patterns. These lane closures can be cost effectively produced using pavement markings, plastic pylons, or concrete aprons. In some cities, they even allow taxis to use the “priority” lanes. These blockades also decrease public transit revenue losses from illegal transport providers, like mini-buses, who frequently pick up passengers at transit stations before the public service arrives. Technical assistance could be needed to design the lane closure plan and evaluate its benefits in order to gain approval by local governments.

**Recommended Location(s):** Banja Luka and Zenica

# ANNEXES

# ANNEX A: POTENTIAL INTERVENTIONS

The following table supports the “Overall Priority” ratings (Low, Medium and High) assigned in Section 4 of the Assessment Report, in terms of intervention costs, leverage opportunities and political barriers, based on inputs from USAID, counterpart government representatives, the donor community and other stakeholders.

## A.1 RESIDENTIAL BUILDINGS – SPACE HEATING

USAID Intervention	Activity Description	Intervention Costs	Leverage Opportunities	Political Barriers
<b>(1) Improve the sustainability and expansion potential of district heating grid schemes</b> to decrease individuals using low efficiency or high emissions space heating sources.				
Support financial planning, management controls, and fiscal policy	The financial model of district heating grid schemes is complex as rates are not set by the utilities, but by local governments. These rates are typically depressed and do not cover the long-term cost of service. This scenario leads to a vicious cycle where lack of maintenance investment causes water and heat losses that increase in operational expenses, and in turn further decreases the funds available for maintenance. As service quality degrades, non-payment by frustrated customers increases. This problem will continue to be exacerbated as customers convert from a flat tariff rate structure based on dwelling floor area (m <sup>2</sup> ) to a metered rate structure based on consumption using heat cost allocators, which will decrease total revenues for the utility without any decrease in system maintenance costs. Supporting the application of new approaches to financial planning, management controls, and debt restructuring could dramatically decrease the financial burden and release funds for other critical needs or service improvements.	Low	Public Heating Companies	Low
Pilot individual metering and digital billing systems	Studies have shown that customers who pay a variable tariff rate with metered systems consume less heat than customers who pay a flat rate, which in turn decreases the heating load for the system and decreases operational costs and emissions of the utility. Digital billing systems allow the utility to require pre-payment for services, and thereby decrease non-payment risk. These systems are funded by a subsidy or grant, and are usually justified based	Low	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Low

	on the potential savings to the consumer or revenue improvements to the utility. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the local government, customers, or private investors.			
Produce tariff-balancing study for conversion of rates from fixed to variable	As more customers convert from a flat rate structure based on dwelling floor area (m <sup>2</sup> ) to a metered rate structure based on consumption using heat cost allocators, total revenues for the utility will decrease without an equivalent decrease in system maintenance costs. Technical assistance could support scenario planning to determine how the variable rate should change as meters become standardized.	Low	Public Heating Companies	Low
Produce feasibility studies to upgrade furnace and boilers	Utilities often lack the expertise to perform the complex studies that identify the economic and benefits created from infrastructure improvements that decrease operating costs, such as upgrading the performance factor or furnaces and boiler systems. Utilities also have difficulties getting such studies approved by their board of directors because they do not increase revenues. Technical assistance could support an assessment to determine the savings, costs, and feasibility of various technology enhancements.	Medium	Med: Banks and Private Equity	Low
Produce feasibility studies to upgrade transmission lines	In a similar way as furnace and boiler upgrades, utilities lack to the expertise to evaluate investments that decrease water and heat losses in transmission lines. Technical assistance could support an assessment to determine the savings, costs, and feasibility of various technology enhancements.	Medium	Med: Banks and Private Equity	Low
Produce feasibility studies to establish renewable energy sources (biomass, geothermal)	Utilities often lack the expertise to perform the complex studies that identify the economic and financial benefits created from infrastructure improvements that decrease operating costs, such as uses of renewable energy sources. Utilities also have difficulties getting such studies approved by their board of directors because they do not increase revenues. Technical assistance could support an assessment to	Low	Public Heating Companies	Low

	determine the savings, costs, and feasibility of various technology enhancements.			
Produce feasibility studies to evaluate viability of grid expansion	The expansion of utilities is typically demand driven. However, not all prospective customers are aware of the economic and financial benefits of joining the grid. Technical assistance could support the development of a strategic plan by identifying neighborhoods and buildings using high-emissions heating sources that could be connected and cost-effectively serviced by the district heating grid, which could decrease overall emissions per capita in urban areas.	Low	Public Heating Companies	Low
<b>(2) Development of small utility district heating mini-grid schemes</b> to decrease individuals using low efficiency or high emissions space heating sources.				
Establish legal and regulatory framework for small utility providers, including easement rights	In neighborhoods with single-family dwellings, it may not be financially feasible for the primary district heating grid to be expanded. There may also be higher ROI projects for the utility based on their limited borrowing capacity. This scenario provides an opportunity for third party investors who can develop mini-grid schemes in areas not serviced by the primary grid. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements for small utility providers in order to establish an enabling environment for private investment.	Low	Entity / Canton / Municipality	High
Develop standardized contract guidelines for small utility providers	The lack of vetted contract conditions are limitations for customers who are interested in participating with new investment schemes, as each individual household would need to seek costly legal advice. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and to establish an enabling environment for private investment.	Low	Entity / Canton / Municipality	Low
Produce feasibility studies for small utility providers	Investors and households may not be aware of the ROI of district heating mini-grid schemes. Technical assistance could produce feasibility studies that forecast and promote the profit potential of such operations in order to	Low	Private Sector	Low

	catalyze investment by companies, individuals, or cooperatives.			
Pilot projects for small utility providers	Studies have shown that there is a profit opportunity in district heating mini-grid schemes where multiple single-family dwellings and/or small multifamily dwellings purchase a common furnace and builder and establish a joint distribution system. These systems can also be more efficient than individual heating systems based on high-emissions heating sources. A grant-funded pilot will demonstrate the financial benefits in the forms of savings or profit potential of such systems.	Medium	Private Sector	Low
Solicit investors to establish small utility providers (SMEs)	Investment in developing countries is typically stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes profitable project opportunities to third parties. The clearinghouse could also match companies to potential customers.	Low	Private Sector	Low
Provide financial guarantees for small utility providers	Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects to decrease the aversion of investors to district heating mini-grid schemes.	Low	Private Sector	Low
Conduct trainings for small utility providers	Another constraint to investment is technical knowledge regarding operations of district heating mini-grid schemes. If the first few investment projects fail because of poor management, future investors will become averse to mini-grid projects. Technical assistance could provide trainings to small utility providers to maximize their potential for success.	Low	Private Sector	Low
<b>(3) Promote the use of clean energy sources for off-grid households</b> to decrease use of fossil fuel heating sources and decrease total emissions.				
Produce feasibility studies for furnace conversions to high-efficiency renewable biomass sources	Homeowners of single-family dwellings typically have limited knowledge about the economic and financial benefits of conversions to higher-efficiency furnaces that utilize cleaner renewable energy sources such as biomass. Technical assistance could support an	Low	Med: Entity Environmental Funds	Low

	assessment to determine the savings, costs, and feasibility of various technology enhancements.			
Pilot furnace conversions to high-efficiency renewable biomass sources	Homeowners are often skeptical of studies and only learn by direct experience from family or members of their community. A grant-funded pilot will help to demonstrate the financial benefits in order to catalyze investment by homeowners.	Low	Med: Entity Environmental Funds	Low
Communicate health and environmental risks of high-emissions energy sources	A large-scale communications program is required to educate consumers about the negative economic and financial impacts of using high-emissions energy sources, particularly the health risks. Technical assistance could support a citywide behavior change communities program to increase awareness.	Low	Med: Entity Environmental Funds	Low

**A.2 RESIDENTIAL BUILDINGS – ENERGY EFFICIENCY**

USAID Intervention	Activity Description	Intervention Costs	Leverage Opportunities	Political Barriers
<b>(1)</b>	<b>Improve building maintenance practices</b> to decrease heat losses and emissions.			
Enhance legal and regulatory framework for multifamily and neighborhood Home Owners Associations (HOA)	HOAs in many countries are considered legal business entities whose revenues are supported by dues paid by its members. This arrangement increases the borrowing capacity of the group of homeowners whose mutual interests are the maintenance of their buildings. Group purchasing also can decrease maintenance costs through economies of scale. HOAs are not currently recognized in FBiH, but they are in RS. In both entities, the regulations are limited and unclear. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements for HOAs in order to establish an enabling environment for this form of joint investment.	Low	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Medium
Develop standardized contracts for Building Maintenance Operators (BMOs)	The lack of vetted contract conditions are limitations for customers who are interested to hire a BMO, as each individual household or HOA would need to seek costly legal advice. Many of those who have utilized BMOs in BiH have had negative experiences enforcing contract conditions and are therefore	Low	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Low

	skeptical of the business model. This scenario leads to non-payment or a low willingness to pay BMO fees, which in turn decreases services quality and continues to degrade public opinion. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and HOAs and to establish an enabling environment for private investment.			
Produce feasibility studies for building maintenance operators	Homeowners have limited knowledge about the economic and financial benefits of the BMO business model. Technical assistance could support an assessment to determine the savings, costs, and feasibility of BMOs.	Low	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Low
Pilot projects for building maintenance operators	Homeowners are often skeptical of studies and only learn by direct experience from family or members of their community. A grant-funded pilot will help to demonstrate the financial benefits in order to increase the utilization of the BMO business model.	Medium	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Low
Solicit investors to establish building maintenance operators (SMEs)	There are few BMOs in BiH, which limits competition and quality for services provided. New business establishment is stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes the business demand of profitable projects to third parties that are considering establishing BMO companies. The clearinghouse could also match companies to potential customers.	Low	Canton / Municipality HOAs	Low
Provide financial guarantees for building maintenance operators	Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects in to decrease the aversion of investors to establishing BMO companies.	Medium	Existing Private Building Management Companies	Medium
Conduct trainings for homeowners and building maintenance operators	Another constraint to the use of BMO schemes is technical knowledge regarding their operations. When projects fail because of poor management, future investors and customers will become averse to the	Low	High: Pilot in Sarajevo New City by Municipality and Sarajevo Canton	Low

	BMO business model. Technical assistance could provide trainings to homeowners and BMOs to maximize their potential for success.			
Conduct trainings for architecture and engineering (A&E) firms on best practices for energy-efficiency building improvements	Another constraint to investment is technical knowledge regarding energy-efficiency building improvements. When investment projects fail because of poor capacity, future customers become averse to energy-efficiency projects, and A&E firms increase their costs. Technical assistance could provide trainings to A&E firms to maximize their potential for success and to decrease their costs of services.	Low	Canton / Municipality Private Sector	Low
<b>(2) Develop credit lines for co-financing investment in building improvements</b> to increase investment in energy-efficiency building improvements and decrease total emissions.				
Promote use of existing and upcoming credit lines for energy-efficiency building improvements	A few credits lines for energy-efficiency buildings improvements are currently being offered by local commercial banks. The financial terms of these credit lines will soon become much more attractive when a new EBRD on-lending facility is established. However, funds are not available to market these financial products widely. Technical assistance could support a communications program to increase subscription to these credit lines.	Low	High: EBRD and Local Commercial Banks	Low
Enhance legal and regulatory framework for revolving funds at multiple levels of governments	Revolving funds to support energy efficiency have been established at the entity level, but not at the canton or municipal level. Technical assistance could help to develop a framework that recognizes the legal rights and operational requirements for revolving funds to increase their widespread use as a financial tool to incentivize energy efficiency investments.	Low	Entity / Canton / Municipality Private Sector	Medium
Establish dedicated revenue streams or obligation schemes to support revolving funds for energy-efficiency building improvements	Revolving funds have been established at the entity level using fees collected from polluters, and efforts are underway to also leverage a small fee on energy consumption. Technical assistance could help to identify additional financial sources at the canton or municipal level.	Low	Canton / Municipality (USAID EIA Project)	Med
<b>(3) Support the creation of viable ESCO market</b> to increase investment in energy-efficiency building improvements and decrease total emissions.				
Enhance legal and regulatory framework for ESCO activities	ESCOs are not currently used widely because about it is unclear how they are treated legally in court. Technical assistance could help to develop a	Low	Entity / Canton / Municipality	Medium

	framework that recognizes the legal rights and operational requirements for ESCOs in order to establish an enabling environment for their utilization.			
Develop approved standardized contract guidelines for ESCOs	The lack of vetted contract conditions are limitations for customers who are interested to participate in an ESCO scheme, as each individual household or HOA would need to seek costly legal advice. Technical assistance could help to develop standardized contract guidelines that are endorsed by the entity or local governments in order to decrease the legal costs for households and HOAs and to establish an enabling environment for private investment.	Low	Canton / Municipality	Low
Establish operating agreement with district heating companies for ESCO schemes	ESCO schemes require a legally binding agreement with district heating companies that commit the financial benefits of energy savings to trust accounts that repay the investor who conducts the building improvements. Technical assistance could establish this operating agreement in order to decrease the legal costs for homeowners and ESCOs and to establish an enabling environment for private investment.	Low	Public Heating Companies Private Sector	High
Produce feasibility studies for ESCOs	Homeowners have limited knowledge about the economic and financial benefits of the ESCO business model. Technical assistance could support an assessment to determine the savings, costs, and feasibility of the business model.	Low	Private Sector	Low
Pilot projects for ESCOs	Homeowners are often skeptical of studies and only learn by direct experience from family or members of their community. A grant-funded pilot will help to demonstrate the financial benefits in order to increase the utilization of the ESCO business model.	Low	Private Sector	Medium
Establish form-based energy audit methods for single-family households	The up-front capital costs for technical services to estimate the energy savings of building improvement activities creates an investment barrier. Technical assistance could produce a simple form-based energy auditing method for single-family homes that relies on basic inputs (e.g., floor area, building materials, heating source, etc.), and eliminates the need for expensive specialized auditor services.	Low	Entity / Canton	Low

Solicit investors to establish ESCO companies (SMEs)	There are few companies offering ESCO services in BiH, which limits competition and quality of services provided. New business establishment is stymied by a lack of awareness of profitable projects. Technical assistance could develop an investment clearinghouse that promotes the business demand of profitable projects to third parties that are considering establishing ESCO companies. The clearinghouse could also match companies to potential customers.	Low	Private Sector	Low
Provide financial guarantees for ESCO companies	Financial guarantees can help decrease the risk for companies considering new investments activities, but are concerned about client non-payment risk. USAID's Development Credit Authority could provide guarantees for a limited set of initial projects to decrease the aversion of investors to establishing ESCO companies.	Low	Private Sector	Low
Conduct trainings for homeowners and ESCO investors	Another constraint to the use of ESCO schemes is technical knowledge regarding their operations. When projects fail because of poor management, future investors and customers will become averse to the ESCO business model. Technical assistance could provide trainings to homeowners and ESCOs to maximize their potential for success.	Low	HOAs Private Sector	Low
<b>(4) Make building improvement activities more affordable for low-income households</b> to increase investment in energy-efficiency building improvements and decrease total emissions.				
Develop subsidy methods (e.g., deductions, credits, grants, vouchers)	Many homeowners cannot afford the cost of building improvement projects. In multifamily dwellings, these homeowners can decline to participate with or block such projects. Technical assistance could help to develop a framework for a subsidy program that can support low-income households and eliminate this aversion.	Low	Canton / Municipality	Medium
<b>(5) Enhance the market value of "green" buildings</b> to increase investment in energy-efficiency building improvements and decrease total emissions.				
Establish "green" buildings certification scheme	The economic savings of energy-efficient buildings is undervalued. A "green" buildings certification program can increase the awareness and market value for energy efficient and properly maintained buildings.	Low	Med: Entity Environmental Fund	Low

### A.3 TRANSPORT – PRIVATE VEHICLES

USAID Intervention	Activity Description	Intervention Costs	Leverage Opportunities	Political Barriers
<b>(1) Decrease emissions from private vehicles</b>				
by improving vehicle performance and decreasing hours of vehicle operation.				
Develop “green” car certification program	The economic savings of low-emissions and fuel-efficient vehicles is undervalued, and annual emissions testing is currently not required. A “green” car certification program can increase the awareness and market value for high-performance and properly maintained vehicles.	Low	Canton	Low
Establish vehicle emissions monitoring checkpoints	There is limited data or awareness by the government of vehicle emissions and the quality of the vehicle fleet in urban areas. Establishing checkpoints can improve datasets for policy decision making and increase awareness by the public.	Low	Canton	High
Prepare a traffic management plan	Urban road networks are not efficiently used, leading to traffic congestion and unnecessary vehicle idling. A traffic management plan could optimize the timing of traffic signals; improve pavement markings, signage, and intersection design; establish freight corridors; consider one-way and flex-lane conversions; and separate public transit and private vehicle traffic lanes.	Low	Municipality	Low
Support “Green Mobility” days to increase awareness	There is limited appreciation by the public of the environmental, economic and social impacts of vehicle emissions. Combined with targeting education programming, a “Green Mobility” day’s activity could temporarily close notable urban roads to private vehicles and only allow pedestrians and public transit. These programs create a viral media buzz, typically make international journals increasing the urban areas image as a “greening city,” and instantly capture the attention of inhabitants about these important issues.	Low	Municipality	Low

## A.4 TRANSPORT – PUBLIC TRANSIT

USAID Intervention	Activity Description	Intervention Costs	Leverage Opportunities	Political Barriers
<b>(1) Improve the sustainability and attractiveness of public transport services</b> to increase ridership and decrease use of private vehicles with high per capita emissions.				
Support financial planning, management controls, and fiscal policy	Public transit finance is complex as operational revenues (fares) in the public transit sector typically never cover the full cost of service, even in OCED countries. As a result, public transit companies are reliant on grants, loans, and subsidies provided by the national or local governments, who have limited public transit sector financial planning expertise. Supporting the application of new approaches to financial planning, management controls, and debt restructuring could dramatically decrease the financial burden and release funds for other critical needs or service improvements.	Low	Public Transit Companies / Municipality or Canton	Low
Pilot installation of electronic ticketing systems	Electronic ticketing systems help to decrease fare non-payment and increase operational revenues. Banja Luka and Zenica have already implemented such systems, but Sarajevo, whose public transit system is much larger and whose services are multimodal, has not. These systems are funded by a subsidy or grant, and are usually justified based on the potential revenue improvements. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.	Low-Medium	Public Transit Companies / Municipality or Canton	Low
Pilot installation of limited access queues at high-capacity tram and trolley stops	Limited access queues improve transit stoppage time and decrease fare non-payment by better organizing passengers prior to loading. These systems are funded by a subsidy or grant, and are usually justified based on the potential revenue improvements. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.	Low-Medium	Public Transit Companies / Municipality or Canton	Low
Pilot installation of real-time bus arrival	Passengers make travel mode decisions by considering the waiting and travel time trade-offs of public transit or private vehicles. Many cities	Low-Medium	Public Transit Companies /	Low

displays and electronic signage	have increased transit ridership and operational revenues by introducing electronic signage to eliminate uncertainty in transit arrival times. These displays can sometimes be fully funded by advertising revenues, and can additionally include promotional information about environmental issues and energy efficiency. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.		Municipality or Canton	
Develop real-time bus arrivals smartphone application	In a similar way as real-time bus arrival displays, many cities have increased transit ridership and operational revenues by deploying web-based and smartphone applications. These applications can sometimes be fully funded by advertising revenues, and can additionally include promotional information about environmental issues and energy efficiency.	Low	Public Transit Companies / Municipality or Canton / Private Sector	Low
Pilot installation of space heaters at transit stops	Cold weather is another constraint to the use of public transit, which is when pollution in many urban areas is the worst due to air inversions. In winter months, many regular transit riders prefer private vehicles in order to avoid waiting in low temperatures at transit stops. Many cities have increased ridership and operational revenues during the winter months by introducing space heaters at stops. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton	Low-Medium	Public Transit Companies / Municipality or Canton	Low
Support bus route optimization study along high-demand routes	Most global cities operate the same base routes for decades, never considering how travel patterns change over time at urban areas cyclically grow and contract. This leads to lower-performing routes that are operated just because they were legacy services. An optimization study will help the transit companies or local government to re-organize their system to maximize ridership based on demand. These technical skills are typically not retained in-house, and require external expertise.	Low	Public Transit Companies / Municipality or Canton	Low

Support the occasional of services on residential collector lines	New approaches to increase ridership on transit systems have focused on the “last kilometer” of travel for passengers between high-demand travel corridors and households. However, publicly operated service on these low-demand routes is complicated to rationalize, and cities who do provide residential collector bus lines accept large operational losses. These services are better operated by the private sector, who can provide more dynamic and scalable services, whereby cities organize concessions based on ward or precinct areas that lead to transit stations instead of specific road routes. This method could be particularly useful in Sarajevo in the hillside neighborhoods. Technical assistance could be needed to design the concession contract and to forecast and market to private companies the travel demands and revenue potential.	Low	Public Transit Companies / Municipality or Canton	Low
Establish transit priority lanes (with pavement markings, plastic pylons, or concrete aprons)	Travels times on transit systems is slowed due to private vehicle traffic congestion. Many cities have rationalized the closure of one lane to private vehicles on high-capacity corridors where the transit services are transporting more passengers than cars, which leads to a significant increase in travel speeds on transit services. Studies have also shown that separating transit and private vehicle traffic increase travel speeds for private vehicles since the two modes have different stopping patterns. These lane closures can be cost effectively produced using pavement markings, plastic pylons, or concrete aprons. In some cities, they even allow taxis to use the “priority” lanes. These blockades also decrease public transit revenue losses from illegal transport providers, like mini-buses, who frequently pick up passengers at transit stations before the public service arrives. Technical assistance could be needed to design the lane closure plan and evaluate its benefits in order to gain approval by local governments.	Low	Public Transit Companies / Municipality or Canton	Low
Establish legislation to provide dedicated	Many global cities have improved their financial borrowing capacity	Low	Municipality or Canton	High

<p>revenue streams or obligation schemes, called TOD, or “Transit Oriented Development” finance (e.g., % of VAT, building height/FAR bonus, land value capture, tax-increment finance tools)</p>	<p>from private banks by establishing dedicated revenue or obligation schemes to automatically commit funds from existing tax revenue sources to the subsidy of public transit companies. Cantons and municipalities in BiH are already significantly subsidizing public transit service, but it is typically organized through the annual budget. Establishing these automatic fiscal transfers and removing the unpredictability in the budgeting process has been proven in studies to improve financial management of public transit companies and decreases the risks for private banks considering loans for service improvements. It also enhances the relationship of urban development and quality and sustainability of transit services. Technical assistance could be needed to design these financial mechanisms and evaluate their benefits in order to gain approval by local governments.</p>			
<p>Expand the tax base around transit stations (e.g., property registrations)</p>	<p>Many cities in BiH have a low rate of property registration, meaning that many commercial and residential buildings are not paying taxes, which are an important financial base for subsidies of public transit companies. Local governments in developing countries usually lack a quality land cadastre database to identify unregistered properties that are not paying taxes. Technical assistance could help to improve existing databases and develop a registration plan, especially for areas around transit stations where the most likely users of transit services live.</p>	<p>Low-Medium</p>	<p>Municipality or Canton</p>	<p>Medium-High</p>
<p>Support joint development projects with private real estate developers (direct investment and profit sharing, and in-kind land contributions)</p>	<p>Many global cities have increased revenues available for transit services by allowing commercial advertisements and billboards in urban areas. New approaches to increase revenues have included joint development projects where local governments co-invest with private companies to develop underutilized real estate properties along transit routes. The city contributes land and/or cash equity into the deal and in exchange receives a share of the building rental profits in addition to</p>	<p>Low</p>	<p>Municipality or Canton</p>	<p>Medium-High</p>

	taxes levied on land value and business activity. The projects, when strategically located, also improve ridership and operational revenues on transit services. Technical assistance could help to identify and design a framework for developing such projects, identify key private sector partners, and evaluate the benefits of the concept in order to gain approval by local governments.			
<b>(2) Develop robust and regulated private transport services (mini-buses and shared vehicles)</b> to decrease individual vehicle ownership with high per capita emissions.				
Enhance legal and regulatory framework for private transport services	Most cities have private transport service providers in the form of taxis or licensed bus routes. They also have varying degrees of individual car and bus owners providing informal or unregistered transport services. For decades, local governments saw such providers as competitors and tried to make such services illegal, but recently new approaches are trying to formalize and better coordinate such services since they can provide transport services to a large user group at no cost to the city, decreasing individual car ownership and per capita emissions. Technical assistance could help to develop a framework for integrating these private transport services into the wider transit network.	Low	Municipality / Canton	High
Revise private bus route licenses to avoid public transport service conflicts	In many global cities, inter-urban and inter-regional private transport services utilize the same routes as public transport services. This scenario creates a conflict whereby the private services consume ridership from public services, putting the financial model of the public services at risk. Technical assistance could recommend methods to appropriately revise the private transport routes and improve the connectivity between public and private services at intermodal transfer terminals, which is also a land development opportunity to promote compact, low-emissions urban design.	Low	Municipality / Canton	Medium-High
Develop e-hail smartphone application	Many global cities have decreased individual car ownership, usage, and per capita emissions by deploying web-based and smartphone	Low	Municipality / Canton	Low

	<p>applications to connect passengers with shared car services. The applications are particularly useful for individuals living in areas without transit access, or for individuals wanting door-to-door transport services. These applications can sometimes be fully funded by advertising revenues, and can additionally include promotional information about environmental issues and energy efficiency.</p>			
<p><b>(3) Promote mode shift from private vehicles to public or private transport services</b> to increase ridership and decrease use of private vehicles with high per capita emissions.</p>				
Produce tariff study and parking plan to revise parking rates and management	<p>Parking in urban areas is typically undervalued or underpriced, sometimes even free or unenforced. As a result, individual car usage is being promoted through indirect subsidies by local governments. Technical assistance could support cities to identify the appropriate rate structure, by location, and evaluate the benefits of the concept in order to gain approval by local governments.</p>	Low	Municipality / Canton	Low
Support establishment of electronic ticketing systems for parking	<p>Electronic ticketing systems help to decrease fare non-payment and increase revenues. Banja Luka has already implemented such systems, but Sarajevo and Zenica have not. A grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality or canton.</p>	Low	Municipality / Canton	Low
Decrease parking minimums standards in transit accessible areas	<p>Zoning regulations in many countries, including BiH, establish standard minimum requirements for parking spaces per building, regardless of location, typically between 1 and 1.5 parking spots per household. In urban areas, these requirements promote individual car ownership, and many global cities are now decreasing the requirements for properties in transit-accessible zones. Technical assistance could review and revise these policies, and evaluate the benefits in order to gain approval by local governments.</p>	Low	Municipality	Low-Medium
Establish car-sharing services to support unserved communities	<p>Urban areas tend to have a variety of private and public transport services, and as such individual car ownership is less of a necessity. However, many individuals will still always prefer</p>	Low	Municipality / Canton	Low

	usage of private cars for some or all of their trips. In order to decrease individual car ownerships, many global cities have recruited private companies to establish car-sharing programs, where vehicles are located at strategic points across the city that individuals can rent on an hourly basis and can leave at their destination rather than return them to their origin. Typically, in order to entice a private investor to establish such services, some legal approval or framework is required to ensure that the services are operating legally. Technical assistance could design a car-sharing program and legal framework, evaluate the benefits in order to gain approval by local governments, and attract a private investor to develop and operate the services.			
Produce feasibility study for cable car system	Specifically, in Sarajevo, the mountainous topography makes transit services by road difficult and lengthy as routes must take switch-back routes to get down to the commercial districts. Many global cities with similar terrain, such as Bogota and Rio de Janeiro, have developed cable car systems to decrease individual car usage and emissions and to dramatically cut travel times. The city of Sarajevo is already considering such transport services, but lacks the in-house technical expertise to design and evaluate the projects. Technical assistance could help design the cable car systems and evaluate the benefits of the project in order to get funding approval by the municipality or canton, or to attract a private investor to develop and operate the services.	Low	Municipality / Canton	Low

**A.5 TRANSPORT – ZERO CARBON MOBILITY**

USAID Intervention	Activity Description	Intervention Costs	Leverage Opportunities	Political Barriers
<b>(1) Support</b>	<b>growth of zero carbon mobility infrastructure</b>			
to increase usage of non-motorized transport modes and decrease emissions from private vehicles.				
Establish revolving fund for bicycle lanes	Bicycle lanes do not provide cities any operational revenues, unlike roads that partially cover their costs through	Low	Municipality	Low

	<p>tax levies on petrol. Therefore, they must be funded by subsidies from the local government, which are justified based on the concept that diverse transport options support competitive, economically vibrant cities, and increase tax revenues. These programs create a viral media buzz, typically make international journals increasing the urban areas image as a “greening city,” and instantly capture the attention of inhabitants about these important issues. In order to promote the development of bicycles lanes, a revolving loan fund should be established by entity or canton governments that amortize the capital costs, reducing the upfront and annual expenses of investment, in order to promote municipalities to make such strategic investments. Technical assistance could design the obligation scheme and evaluate the benefits of the project in order to get approval by the local government.</p>			
<p>Establish dedicated revenue streams or obligation scheme to fund pedestrian-oriented development (e.g., sidewalks and green public spaces)</p>	<p>In a similar manner as bicycles lanes, sidewalks and public spaces do not provide cities any operational revenues. Therefore, they are also funded by subsidies under the concept that they promote competitive, economically vibrant cities, and increase tax revenues. However, in order to prioritize investment in pedestrian infrastructure, cities have established dedicated revenue or obligation schemes to automatically commit funds from existing tax revenue sources to the subsidy of sidewalks and public spaces.</p>	<p>Low</p>	<p>Municipality</p>	<p>Medium-High</p>
<p>Establish bike-sharing program</p>	<p>In order to decrease individual car ownerships, many global cities have recruited private companies to establish bike-sharing programs, where bicycles are located at strategic points across the city that individuals can rent on an hourly basis and can leave at their destination rather than return them to their origin. Typically, in order to entice a private investor to establish such services, some legal approval or framework is required to ensure that the services are operating legally. Technical assistance could</p>	<p>Low</p>	<p>Municipality</p>	<p>Low</p>

	design a bike-sharing program and legal framework, evaluate the benefits in order to gain approval by local governments, and attract a private investor to develop and operate the services. Alternatively, a grant-funded pilot will help to demonstrate the financial benefits of full-scale deployment in order to get funding approval by the municipality, canton, or private investor.			
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# ANNEX B: PERSONS INTERVIEWED

## Government of Bosnia and Herzegovina (BiH)

### BiH State Ministry of Communications and Transportation

#### Department of Transportation

Dario Basic, Head of Department for Road and Railway Transport

Miroslav Djerić, Advisor for International Cooperation

### BiH State Ministry of Foreign Trade and Economic Relations

Biljana Trivanović, Head of Department for secondary energy and projects

Branka Knežević, Senior Advisor in the Department of primary energy and politics

## Government of Republika Srpska (RS)

### Ministry for Spatial Planning, Civil Engineering and Ecology, RS

Miladin Gacanović, Deputy Minister, Civil Engineering

Milos Joke, Deputy Minister of Project Coordination and Development

### Ministry of Transportation and Communications, RS

Natasha Kostić, Deputy Minister

## City of Banja Luka, RS

Zoran Jovanović, Mayor of Municipality

Maja Lukach, Admin. Assistant

Verica Kufić, Head of Local Economy

Salvo Davidić, Head of Transportation

Lucina Antić-Morava, Associate, Environmental

Brando Music, Electric Supply to Buildings

Maja Rhyacian, Associate, Energy Efficiency

Adelina Soap, Associate, Local economic development

## Government of Federation of Bosnia and Herzegovina (FBiH)

### Ministry of Physical Planning, FBiH

Jasmine Katia, Head of Department of Energy Efficiency

Mustafa Copal, Project Coordinator for Federation of BiH (PIU for Energy Efficiency in BiH)

### **Environmental Fund of the Federation of BiH (FBiH)**

Elma Catatonic, Advisor to the Director

Tatiana Catatonic, Senior advisor for environmental monitoring

Ada Emirati, Advisor for urban development

### **Sarajevo Canton, FBiH**

#### **Ministry of Economy, Sarajevo Canton,**

Dr. Mahram Subic, Minister

M.Sc. ENEA Azalea. Professional Advisor for European Integration

#### **Ministry of Physical Planning, Construction and Environmental Protection, Sarajevo Canton**

Kediri Ludic, Minister

Sajida Kavala, Assistant of Minister

#### **Ministry of Transportation and Communication, Sarajevo Canton**

Dr. SC, Mujjo Faso, Minister

Mummer Kuban, Deputy Minister, Technical Operations

Emir Hot, Deputy Minister, Finance and International Relations

#### **GRAS**

Ivo Kuban, Technical Directors for Services

#### **Topline Sarajevo District Heating Service**

Admire Dauber, Director

Myrrha Konica, Head Mechanical Engineer

Samir Slavic, Head Electrical Engineer

Zenji Lubezki, Administrative Assistant to the Director

### **City of Sarajevo**

Hardin Ibrahimović, Advisor to the Mayor

Zinnia Conic, Head of Department of International Cooperation and EU Integration

Zara Koranic, Intern

### **Municipalities of Sarajevo**

#### **Municipality of Novo Sarajevo (New Sarajevo), Sarajevo**

Ends Begonia, Deputy Head of Municipal

Erna Sadiki, Head of Communal Services

### **Municipality of Stair Grad (Old Town) Sarajevo**

Ibrahim Hadzibajric, Mayor  
Selma Velic, Head of Sector for Local Development  
Sanin Hadzibajric, Expert for Local Development and  
Cooperation with civil society organizations

### **Municipality of Center Sarajevo**

Predrag Slonovic, Head of Economic Development Department  
Ljiljana Borovcanin, Senior Associate, Local Economic Development  
Aida Cengic, Intern

### **Municipality of Nov Grad (New City ) Sarajevo**

Hamdija Dizdar, Head of Department of Investment and Infrastructure  
Munira Delic, Infrastructure Division  
Emina Colic, Infrastructure Division – Project manager  
Emina Kundo, Admin. Assistant/Intern

### **Zenica-Doboj Canton, FBiH**

Fahrudin Brkic, Minister of City Planning, Communication, Transportation and Environment  
Eladina Mujic, Deputy Minister for Transportation  
Fehim Humkic, Advisor for Transportation  
Aida Sumbuljevic, Director, City Planning and Housing  
Sead Cizmic, Deputy Minister of Environment  
Amra Pojskic, Advisor for Economy

### **City of Zenica, FBiH**

Selver Kelestura, Chief Administrative Officer  
Jusuf Boric, Transportation of City of Zenica  
Mirsad Cizmo, Housing of City of Zenica  
Semira Karic, Urban Planning  
Jugoslav Andjelic, Dept. of Energy and Entrepreneurship  
Amra Mehmedic, Advisor for Economics and Energy Efficiency  
Mubera Pezo, Communal Services and Utilities/Environment

## **Donors/Multilaterals/Other**

### **European Commission (Delegation of EU to BiH and EU Special Rep. in BiH)**

Amila Ibricevic, Political Advisor on Economic Affairs

### **International Finance Corporation (IFC), World Bank Group**

Dzenan Malovic, Operations Office, Clean Energy & Resource Efficiency Advisory.

### **European Bank for Reconstruction and Development (EBRD)**

Ian Brown, Head of Office

### **GIZ**

Joachim Gaube, Sector Fund Manager

Benjamin Struss, Deputy Sector Fund Manager

Lutz, Jarczynski, Project Leader

### **UNDP**

Sanjin Avdic, Sector Leader, Energy and Environmental Sector

## **Donor Implementing Partners/Private Sector**

### **USAID Energy Investment Activity (EIA)**

Ognjen Markovic, Chief of Party

Mak Kamenica, Deputy Chief of Party

Fahrudin Kulic, Senior Engineer

### **CETEOR, Sarajevo**

Samra Prasovic, Head of Energy Department

Vedad Suljic, Head of Environmental Department

### **ENOVA**

Samir Bajrovic, Executive Director

Jasmin Gabela, Economic Development

## **NGOs**

### **Energis Association – Center for Education and Raising Awareness of Energy Efficiency**

Fuad Strik, President of the association

Altijana Strik, Director of the association

Hamdija Mujezin, Project Assistant

## **USAID**

### **USAID/Washington, Bureau of Europe and Eurasia (E&E)**

Jamila Amodeo, Sr. Energy and Environmental Advisor

Andrew Popelka, Energy Advisor

### **USAID/BiH Mission**

Peter Duffy, Mission Director

Thomas Rojas, Economic Office Director

Samir Dizdar, Project Management Specialist

Ankica Gavrilovic-Altumbabic, Project Management Specialist

# ANNEX C: SURVEY OF HOMEOWNERS ASSOCIATIONS (EXCERPT FROM REPORT)

**Survey of Homeowners Associations in Bosnia and Herzegovina**  
**Center for Education and Raising Awareness of Energy Efficiency**  
Energis / USAID REELIH / Habitat for Humanity International

## Conclusions

This survey analyzed the capacity, structure and legal framework of the Homeowner Associations in Bosnia and Herzegovina. According to the Agency for Statistics in BiH, It can be concluded that buildings in Bosnia and Herzegovina consume as much as 52% of the total energy (both electricity and heating) that is used in-country and has the largest energy efficiency savings potential of all energy sectors. All of the interviews conducted with the HOAs proved that these statistics are true. The residential buildings are in very bad shape and consume a lot of energy.

In the Federation of Bosnia and Herzegovina, the legal framework (provisions, rules and guidelines) must be harmonized on all levels of government (municipal, cantonal and federal) to achieve more fluent and transparent implementation. This survey recommends that the REELIH project works with decision makers through advocacy, raising awareness, and training to make amendments to the Law on Homeowner Associations in both entities. The project should advocate for HOAs to be registered as legal entities, as seen previously in Macedonia. As legal entities, the HOAs can be more organized, have more power over their property, and can have the authority to apply for group loans to be used for energy efficiency renovations. In this sense, the REELIH project needs to use its advocacy expertise. Banks do not want to take the risk and give group loans to groups who are not legal entities. Therefore, trainings and workshops need to be organized with the banks to raise their awareness of investments in residential energy efficiency by providing them with different financial models, tools, and mechanisms to handle these loans.

The mix of occupants within buildings often makes it difficult to form and sustain HOAs. Differences in income and lack of awareness are two of the primary reasons to invest in residential energy efficiency. When households from very different economic strata live under the same roof, households will be capable of handling very different levels of cost. Financial resources for most of the condominiums are limited because of the residents' insolvency, which could impede residential energy efficiency investment projects. The HOAs are aware of this problem and emphasize that the biggest obstacle to investing in long-term energy efficiency measures are finances. About 98% of the HOAs interviewed stated that there are always some flat owners that do not pay the monthly fee for building management and therefore are not willing to pay for a loan for reconstruction.

Also, the survey shows that energy efficiency awareness is very low. This low level of awareness accounts for high levels of energy intensity, heat loss, and energy bills. Therefore, researchers recommend an energy efficiency awareness raising campaign among the HOAs. Respondents' answers have shown extremely limited knowledge of the following subjects:

- Condominium management body structure
- Responsibilities of the Condominium management body
- Theory and practice of decision making processes
- Loan/credit project management skills

- Residential building energy efficiency
- Resident benefits that result from investment in energy efficiency renovation projects

**Recommendations:**

In terms of investment projects, most of the condominiums are not experienced with management. Those that do have experience with previous renovations faced rather ad-hoc management. Therefore, HOAs and all other condominium owners should be trained in project management, effective communication, transparency, and the benefits of energy efficiency measures. These trainings will strengthen capacity through enhancement of knowledge and fund raising skills.

The following subjects are recommended to be included in the training curriculum. This list is not exhaustive.

- Condominium management body structure
- Responsibilities of the condominium management body
- Theory and practice of the decision-making process
- Loan/credit projects management skills
- Residential building energy efficiency
- Residential benefits that result from investing in renovation projects that are aimed to raise energy efficiency
- Fund raising for investment of the renovation project aimed to raise the residential building's energy efficiency.

Financial resources for most of the condominiums are limited because of resident insolvency, which impedes investment in residential energy efficiency projects.

For the next phase of the Residential Energy Efficiency for Low-Income Households Project, it is recommended that the project considers pilot projects for:

- condominiums which have more than 70% fee collection,
- condominiums that consist of panel/monolithic type buildings;
- helping managers understand the importance of development projects for their residents;
- situations where the effective implementation of the work will increase the fees.

The REELIH project should provide incentives for HOAs, like free energy audits. This can be done as a co-financing mechanism. For example, when implementing pilot projects, the REELIH project would provide free energy audits, the apartment owners would pay for the materials, and the municipality would subsidize the low or no income households.

# ANNEX D: HOUSING PILOT PROJECT, NEW CITY MUNICIPALITY, SARAJEVO: SUMMARY

## Pilot Project for Increasing Energy Efficiency in Residential Buildings Samira Frašte 13,14,15,16 and 17, Sarajevo, 2015

Under the 2013 project entitled “Lets Launch the New City Together“, the Municipality has started preparing a program of activity for increasing energy efficiency in residential buildings for New City Municipality of Sarajevo.

Based on the adopted strategic document, Strategy of Development of the New City Municipality, Sarajevo, 2014-2020, studies for improving energy efficiency in residential buildings in Canton Sarajevo Canton were performed, in coordination with all authorized agencies of Sarajevo Canton, including project documentation with bills of quantities for scopes of work. Based on the mayor’s adopted recommendation that within the implementaion of a pilot project of heating residential and public buildings, reconstruction and redesign of the facades of residential buildings would be performed at Samira Frašte Street, 13,14,15,16 and 17, with the purpose of increasing the energy efficiency of these residential buildings locaed in the area of Alipašino field. For realization of this project, 2.048.096,56 KM will be required. The primary goal of reconstruction and redesign is repairing mechanical damage incurred during the war, and additional work on heating-related elements, to improve energy efficiency and energy preservation, and also redesign of the facades to improve building appearance. The project’s components are:

- Repairing all the damaged elements;
- Additional 10 cm insulation of all walls and floors surrounding heated residential spaces
- Additional 8 cm insulation between floor (both heated and unheated spaces)
- Installation on all the exterior surfaces with additional thermo-inslutation course and treatment of all surfaces with finished fasade coatings
- Replacing the existing windows and doors with PVC thermo-insulated profiles, glazed with thermo-insulated glass.

For Phase One, the BiH Ministry has provided 700,000 KM and the Municipality has provided 500,000 KM, totaingl 1.200.000 KM for 2015 (for 3 buildings: 15,16 and 17) with completion in June 2016.

For Phase Two, which includes buildings 13 and 14, the Municipality has contributed 500,000 KM, with an additional 350.000 KM required for construction (replacing of the windows and doors, and installing the facade insulation).

At a meeting held 14.01.2016. Ministry of spatial planning, building and protection of the environment, has provided 129.120 KM for installing heat meters for every flat in these buildings (1,725 heating units for 345 flats in these 5 buildings).

For replacing all the thermo-regulation valves and subvalves, an additional 100,000 KM is required. For finishing all the work, an additional amont of 579.120 KM is required:

1. For replacing the facade openings and setting the therm-insulation: 350.000 KM
2. For installing heat meters (total of 1,725): 129.120 KM
3. For replacing the thermo-regulation valves (total of 1,725): 100.000 KM

# ANNEX D: USAID/BiH SOW for ASSESSMENT



## USAID | BOSNIA-HERZEGOVINA

### SOW FOR USAID/BOSNIA AND HERZEGOVINA SUSTAINABLE DEVELOPMENT/CLEAN ENERGY/ SECTOR ASSESSMENT

#### Problem Statement

The USAID Mission in Bosnia and Herzegovina (BiH) is seeking short-term technical assistance to conduct an assessment to prioritize potential sectors/areas for assistance focusing on sustainable energy in selected urban areas in BiH. The Mission is particularly interested in interventions that can benefit multiple sectors in terms of energy efficiency and clean energy as the overarching themes. To achieve maximum impact the interventions will target the major BIH cities from both themes.

The overarching objective of USAID assistance in BiH is to support the country's aspirations to join the European Union. The EU-Bosnia Stabilization and Association Agreement (2009) provided broad policy goals and initiatives to advance this goal. The 2014 EU Reform Agenda provides more specific, short-term priorities. Further, in addition to meeting approximation requirements specified in the EU acquis, Bosnia and Herzegovina must work toward meeting international obligations related to pollution and climate change. Bosnia and Herzegovina (BiH) ratified the United Nations Framework Convention on Climate Change (UNFCCC) in year 2000. After UNFCCC ratification, BiH pledged to set up an appropriate policy, institutional and legal framework to meet the Convention requirements. In response to COP 21 objectives, BiH pledged to improve energy efficiency that will result in reduced carbon dioxide emissions. As Her Excellency Mdm. Maureen Mc. Cormac stated at the BiH Road to COP21 Conference opening in November 2015 (the conference was co-organized by the Embassy of France in BiH, the Embassy of the United States of America in BiH, the American University in BiH and the United Nations in BiH): "Human beings are directly causing and accelerating climate change, and at the core of this issue is our very survival on this planet. The good news though, is that it's not too late to curb emissions, limit the damage, and seize the environmental, economic, and security benefits of a cleaner, greener energy future".

USAID BiH programs aim to support these and other multi-lateral policy initiatives, predominately through engagement in the areas of democracy and governance, and economic growth. Within the economic growth portfolio, USAID focuses on increasing the competitive capacity of the private sector and improving governance issues related to private sector growth and investment.

This assessment, findings and recommendations to USAID should include specific actions to leverage current USAID efforts in the areas of energy and small and medium sized enterprises (SME) development to enhance sustainable development through improved energy efficiency and energy security. The assessment may be used by USAID project design teams as an outline for a scope of work for a new assistance project, if it is deemed that sufficient and reasonable opportunity exists to have meaningful impact.

This is a Level of Effort (LOE) scope of work that is not expected to exceed a total of four weeks, including time required to produce the final report. The expected start date is on/around February 20, 2016.

#### Background Information

Even before the war the country was a regional production hub for heavy metals and chemical industries. The country was a principal source of raw materials (ore, wood, coal) and the energy base of former Yugoslavia. Environmental awareness did exist, but it was poorly implemented prior to the war, and as a result BiH was exposed to serious degradation of its natural resources. After the war, BiH faced a significant number of social, economic, and other challenges, including a devastated industrial base, weakened economy, outdated infrastructure, serious brain-drain (particularly among young people), and poor capacity at all levels of local governance. BiH's environment is characterized by a number of challenges: 1) pollution of soil, water, and air, 2) degradation of forests, 3) poorly managed protected areas, 4) use of outdated and unclean/polluting technologies, 5) political struggles, and 6) a lack of technical expertise to make effective changes. Among efforts to reinvigorate the economy, the issues of environmental protection and sustainable development have surfaced as key for the country to preserve its natural resources and landscapes. However, it is evident that the country will face numerous hindrances to meet the strict EU Accession standards.

The energy security has a two pier structure: It depends not only on quantities of generated energy but also on the efficiency of the energy sector, including level of energy consumption and energy losses. BiH is one of two countries in Europe that export electricity. In addition, new energy generation investments are increasingly focusing on renewable energy. However, outdated energy producing facilities, war damages, low living standards and poverty resulted in poor development of the sustainable energy in key industrial sectors, such as energy, housing, transportation, etc. The situation is worst in BiH's largest cities that accommodate around 50% of the total population.

The following facts illustrate the aforementioned deficiencies in energy management:

1. The energy production/supply side has increased by 63 percent between 2000 and 2011. At the same time energy consumption has grown by 48 percent, with the buildings sector recording one of the highest growth rates among all sectors. (*Source: International Energy Agency (IEA), Energy Balances of non-OECD Countries, 2013*).
2. In 2011, buildings were the largest electricity consumers, accounting for approximately 65 percent of electricity use. The buildings are also the largest consumer of heating energy. Some 12 percent of households are connected to district heating while the remaining households meet their heat demands through use of electricity, gas and wood. The recent household survey showed that around 82 percent of households use wood biomass for at least a part of their space heating or cooking. (*Source: Energy Community Secretariat, Biomass Consumption Survey for Energy Purposes in the Energy Community, Bosnia and Herzegovina, National Report, 2012*).
3. BiH's economy has high energy and carbon emission intensity. BiH's energy sector is characterized by the inefficient use of energy on both the supply and demand side. BH is still almost 40 percent more energy intensive than the average in the Western Balkan countries, and more than twice the average in EU countries. (*Source: World Bank Indicators; World Bank Energy Efficiency Project Appraisal Document, 2014*).
4. Regressive and fragmented legislative, institutional, and fiscal/taxation framework create an insufficient stimulant for energy efficiency improvements. Consequently, high energy intensity and heavy reliance on coal in the energy sector, results in CO<sub>2</sub> emissions being comparatively high. BH emits nine times more CO<sub>2</sub> per US\$ of GDP than the average in EU countries and 76 percent more than the average in the Western Balkan region. (*Source: World Bank Indicators; World Bank Energy Efficiency Project Appraisal Document, 2014*).

It is obvious that there is significant potential for energy savings and carbon emission reductions in BiH through energy efficiency improvements in urban areas. Considering that more than half the world's population lives in cities, and urban populations are rapidly growing, particularly in developing countries such as Bosnia and Herzegovina, it is obvious that urgent action is needed to address mounting problems. A 2010 World Bank study estimated the energy savings potential in BH to be highest in the buildings sector (20-60 percent), followed by industry (10-30 percent) and the transport sector (8 percent). The same study stipulated that the energy efficiency measures in the public and private sector could generate annual energy cost savings of

approximately Euro 280 million - money that could create fiscal space for other development- related priorities that are currently being disregarded by the local government.

Bosnia and Herzegovina's development strategy envisions BiH becoming a sustainable and prosperous "green" economy by 2025, which can be achieved through the implementation of the Climate Change Adaptation and Low-Emission Development Strategy. The strategy has been adopted by the BiH Council of Ministers and both entity governments. It outlines actions that would enable both economic growth that will be in-sync with environmental protection while focusing on key economic sectors such as agriculture, energy sector, transport etc.

The component that tackles the development of an economy based on low-emission principles prescribes:

- Efficient use of resources;
- Increase in energy efficiency;
- Popularization of renewable energy resources; and
- Improved services in energy and transport sectors.

These actions will result in a higher level of energy security and less dependence on foreign energy resources, particularly energy required for heating. This specifically refers to use of Russian natural gas as a heating and cooking fuel. It is important to note that energy efficiency is currently far less costly than renewable energy in most places, and while projects in renewable energy are important for the future of clean energy generation, the most effective solution for BiH would include both energy efficiency and renewable energy generation projects.

Given that BiH's economic recovery is trending at a slow pace and that the country is currently struggling to address some of its most negative economic tendencies -- such as continued political crises, threat of terrorism, weak governance, fiscal deficit, high unemployment, poor infrastructure, weak SME sector, inability to attract foreign investments, imbalance between available education and market needs resulting in further brain drain among youth -- the issues of sustainable development and sound environmental stewardship have been continuously marginalized. Ultimately, this marginalization will be a major obstacle for EU Accession, since the environmental accession pre-conditions are among the hardest to meet for candidate countries, or even for strong economies of developed EU Member States. Some EU Member States are still struggling to implement all provisions of the EU environmental acquis. (*Source: European Commission Directorate-General Environment: The costs of not implementing the environmental acquis, 2011*). Transposition of EU environmental acquis into national legislation is the key pre-requisite for recent members of the EU. For instance, the EU environmental acquis for Croatia consists of 300 different documents classified in 9 groups that include horizontal legislation changes (integration of EU acquis and standards in all economic sectors) for air pollution, water pollution, etc. According to Garret Tankosic Kelly, Principal of EU's SEE Change Net Foundation, in his statement provided to the press in June 2015 on the occasion of World Environment Day hosted by the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) in Sarajevo, "the only solution to the dying planet was in reducing carbon emissions by 40 percent by 2030, which is an obligation for every EU member state and aspirant members, including BiH".

Further, tax incentives and "Polluter pays" tax policies, paired with a public awareness campaign, are expected to result in a considerable increase in application of clean technologies, energy efficiency measures and reductions in emissions. These initiatives are expected to have a considerable impact on urban areas, which accommodate about 50% of BiH's population. Poor urban planning principles, an outdated transportation network, and poor application of "Polluter Pays" taxation principles hinder further investments in clean technologies, including clean energy and/or energy efficiency in all key sectors. The current legislative system, including fiscal policies, does not stimulate sufficient promotion of energy efficiency measures or emissions reduction. The legislation does not provide tax breaks or incentives for the application of clean technologies,

either in industries or households. Further, polluters are inadequately sanctioned and discouraged from continuing bad practices that generate energy losses and high emissions. Since USAID has been a key player in the reform of BiH's public finances for the last 20 years, the Mission can provide leverage in the fiscal sector. Therefore, the Mission sees fiscal policies as a source favoring sustainable development. The State and the two entity governments have a variety of available fiscal instruments to promote a sustainable economic transition process: reforming energy subsidies and supporting clean technology while taxing use of fossil fuels and high emission producers in key economic sectors.

Policies that will be introduced through this project will result in reduced air pollution in major BiH cities, not just by introducing new technological solutions, but also through tax and zoning policies that stimulate significant behavioral changes. They can also provide a significant source of new revenue for clean sustainable technologies. Further, in the case of BiH tax policies a better balance between different cargo transportation models could be achieved by stimulating transportation models other than road trucking, which is the sector almost exclusively owned by local interests groups close to the political elites. In this manner the project will support USAID's anti-corruption efforts by providing equal opportunity for transport sectors such as railway that have been marginalized by the political elites to favor their interests in the road cargo transport. Sound environmental fiscal policies can drastically change this approach and create a more competitive environment that may result in higher energy efficiency and reduced emissions in the transportation sector. According to the UNEP's survey, specific taxes incentivizing sustainable development are the most effective tools in addressing environmental issues. In the case of BiH's major cities, such levies (or tax breaks if deemed more appropriate and efficient) may shift household and district heating sources away from coal and crude oil burning to clean energy sources. Furthermore, restructuring of the taxation system in the country may have some long term benefits that exceed the immediate goals related to energy savings and reduced emissions. One of the great examples of tax restructuring was initiated in Germany where a majority of the eco-tax revenues was transferred to the country's public pension scheme in order to reduce labor costs, while a smaller percentage was used to promote renewable energy and energy efficiency. This could be a great incentive for the local government in BiH to buy-in into this activity, given that the pension system in both BiH entities is regularly subsidized by the government. Additionally, BiH has the second highest labor cost in Europe. Finally, when promoting sustainable energy development, fiscal policies should consider their potential social impact on low-income households. This is important in the overall context of the country, which suffers an unemployment rate of 45%.

Growing discontent among BiH citizens and international organizations, specifically regarding pollution in major cities, suggest that there may be an opening for more concerted efforts in these directions. A recent cable prepared by the US Embassy focusing on air quality in BiH cities suggested the need for urgent action to mitigate the devastating effects of air pollution. Several cities in Bosnia and Herzegovina (BiH), including the capital city Sarajevo, suffer from serious air pollution that is often above prescribed levels. During November 2015 several BiH cities on multiple occasions declared a state of alert due to high concentrations of air pollutants, including sulfur dioxide (SO<sub>2</sub>) and particle matter. Industrial cities such as Zenica, Kakanj, and Tuzla suffer from pollution year round due to outdated factories. The capital city of Sarajevo regularly experiences high pollution in the winter months from thermal inversion when residents begin burning coal of poor quality and other "dirty" materials for heat.

Sarajevo's pollution-related problems were first detected in 1967 when the city became known for the highest air pollution levels in Europe. In the 1970s, the city of Sarajevo switched to gas heating to reduce air pollution. Most of the central heating plants in the city were converted to natural gas, leaving very few plants using crude oil as fuel. Coal was not allowed in an effort to reduce the levels of sulphur dioxide and particle matter. Today, BiH is currently struggling with high unemployment and high prices for natural gas, and this has forced the local population to return to the use of coal, wood, and often waste motor oil as heating fuels. The city government uses an expensive foreign resource (natural gas from Russia) as opposed to using the available local resources for heating (such as hot water generated in Kakanj Thermal Plant as a by-product of electricity generation). According to the Embassy's cable detailing the air pollution in BiH, local experts suggest that 70

percent of air pollution in non-industrial cities in BiH, such as Sarajevo, comes from individual households. Based on data from the BiH Agency for Statistics, the country's estimated population is 3,447,156, and the number of households exceeds 1 million.

Methods of heating applied in BiH residences are varied: 30 % of residential buildings mostly use district heating while 70% of housing units mostly use coal fuel and wood for heating. Energy losses in heating are substantial: the local legislation and construction code have only recently included provisions for energy efficiency measures for new residential buildings. Housing units are mostly old (more than 80% of the housing stock is over 30 years old and built prior to the adoption of regulations on thermal protection of buildings). The legislation has not proscribed or stimulated the introduction of energy efficiency measures or clean technologies for already existing residential buildings or individual housing units. As a result, Sarajevo is again recognized as the most polluted capital in Europe. According to the World Health Organization (WHO), the capital of Bosnia and Herzegovina Sarajevo has the highest concentration air pollution out of all European cities. With a yearly average of 117 micrograms per cubic meter, it is far above the European Union's stipulated limit of 40 micrograms. Especially dangerous are dust particles with a diameter of less than 10 micrometers (known as PM10). Their small size allows them to bypass the body's natural filters and penetrate deep into the lungs. WHO studies have shown that a high concentration of airborne particles increases the risk of respiratory and cardiovascular illness. Recent alarming levels of air pollution in Sarajevo were reported by major EU news agencies, such as Deutsche Welle (DW). These reports inevitably have a negative impact on BiH's marketed image as a desirable tourist destination.

In addition to inadequate legislation regulating emissions from commercial and residential dwellings, BiH's outdated public transportation system as well as the increasing number of private automobiles also contribute to the problem. Given that in 2011 a total of 1,026,254 vehicles were registered in BiH, and based on available transportation data, we can conclude that the average number of motor vehicles in BiH is 45,121 vehicles/1,000 km of roads in the country. Insufficient roadway width, steep slopes, sharp radiuses of curvature, and poor zoning in cities that are planned for a much smaller number of vehicles, as well as other factors, contribute to a low operating speed on the roads of BiH (average 50 km/h) and almost continuous traffic jams in the major cities throughout the country. This results in deteriorating health and environmental conditions, increased costs of doing business, prolonged travel times to and from work, etc.

Sarajevo has seen a dramatic increase in the number of registered vehicles since the war: from the pre-war number of 20,000 registered vehicles to approximately 150,000 vehicles in 2011. The level of air pollution from vehicles in urban areas is extremely significant. During interviews that USAID held with the Federation Ministry of Transportation, it was noted that no car registration renewals are issued unless the emissions report is submitted verifying compliance with the prescribed standards for emissions. However, air pollution from vehicles remains the second largest contributor to the overall pollution level in Sarajevo. This rule on emissions compliance is embedded in the rulebook for registration of motor vehicles. However, recent discussions and investigations by State Department officials in BiH indicated irregularities in the work performed by the car inspection stations that are tasked with measuring and reporting emissions.

Additionally, the average age of motor vehicles in BiH is very unfavorable to climate change mitigation and air pollution prevention. The total number of registered road motor vehicles in 2011 was 1,026,254. Of the total number of registered road motor vehicles in 2010, 86% were passenger vehicles, 9% were cargo vehicles, and 5% were from all other categories of vehicles. Of the total number of registered motor vehicles, 7% were road motor vehicles registered for the first time in 2010. According to the Ministry of Communications and Transport it is expected that the number of vehicles in BiH will grow at an annual rate of 4% soon reaching 1.8 million vehicles. According to official data, the average age of cars driven on BiH roads is 17 years. Over 77 percent of the vehicles are older than 10 years, and over 30 percent of the vehicles are older than 20+ years. (*Source: Statistics listed in the Embassy's cable*). Air pollution from cars is not a problem unique to BiH. It is quite common in some EU Member countries. For instance, in 2013 transport accounted for almost one-quarter of the EU's total GHG emissions (one-fifth excluding international aviation and maritime emissions). Passenger cars contribute almost 45% and heavy-duty vehicles a further 20% of the transport sector's emissions.

### Scope Of Work for this Assessment

To address the problems described above, USAID/Bosnia and Herzegovina is interested in exploring opportunities to leverage ongoing programs, including those implemented by other donors or government organizations. with the focus on clean energy and energy efficiency promoting climate change mitigation/adaptation and a “green” economy growth. in cities, The Mission is not interested in ‘starting from scratch’ in a new area of policy [dialogue] or capacity building, but rather seeks to leverage ongoing efforts. The Mission does not have a preconceived geographic focus for the program, but recognizes that the greatest impact might be realized through focusing geographically and welcomes suggestions. The main target of this assessment, and possible USAID activities, will be on BiH urban areas. Urban areas were identified as major contributors to GHG emissions and energy waste. In essence, this is a “smart cities” type of assessment with a narrowed focus on a few sectors of interest to the Mission.

The assessment team will propose an in-depth analysis on issues, programs, and opportunities in the areas of clean energy and energy efficiency. A literature survey and expert in-country consultations will be conducted to:

1. Identify urban opportunities for impact and probability for success within the sectors and [or] areas of interest to the USAID Mission.
2. Prioritize actions for USAID funding, with the particular focus on urban regulations related to transportation and zoning, fiscal policies incentives, and obstacles for private investments and.
3. Identify and recommend methodologies/approaches to increase energy efficiency and the use of clean energy technologies to help reduce GHG emissions and promote sustainable development.

USAID is considering the following sectors/industries for potential assistance to advance USAID’s GCC Initiative (focused on achieving BiH’s COP21 Agreement):

- Urban Development and transportation;
- Energy (including Renewable Energy);
- Public Finances (taxation & tax incentives);
- Public Private Partnerships to promote sustainable growth.

The assessment will recommend specific public finance interventions (e.g., tax breaks, tax incentives) to encourage the use of clean technologies and energy efficient measures that will help reduce urban GHG emissions. urban pollution.

The consultant lead (or assessment team) is required to have regular weekly meetings with USAID technical offices in BiH while in country. Other meetings may include the U.S. Embassy Economic Section, officials from the state and entity level governments and other donors that may support these reforms.

The assessment shall propose impact indicators relevant for the proposed approaches.

For specific sectors that may be recommended for USAID assistance, the assessment shall specify laws, policies and procedures, and recommend explicit interventions. The assessment should, by compilation of secondary sources (i.e. existing studies by other organizations) gauge the capacity of BiH authorities to implement recommended reforms. A particular concern should be paid to distinct delineation of responsibilities and obligations between state, entities, cantons and municipalities. The assessment will put forth precise areas where assistance is needed to increase technical capacity of local officials and practitioners.

The assessment will identify factors contributing to GHG emissions and impeding sustainable economic development [in cities??] in BiH; evaluate the current state contributions to emissions of prominent economic sectors in urban areas; assess relevant policies for increasing urban energy efficiency; and recommend specify interventions to be implemented by USAID to increase clean energy and energy efficiency. Considering the

limited budget, the assessment team (and assessment report) will prioritize sectors and actions to ensure the greatest probability for success, quick impact and high return on investment. The assessment will also identify champions of the reform process among local governments, the NGO community and other donors with established presence in the country.

The assessment will help the Mission address the following questions:

- What are the most relevant actions [for USAID assistance to promote] sustainable energy and return on investment (ROI)? What are important aspects of assistance, such as increasing the adoption of new technologies and new investments in clean energy and energy efficiency; invigorating trade in “green” products and technologies; reducing business costs related to employees’ health and productivity; and job creation?
- Are there specific ongoing programs, policies, standards, procedures and interventions that are ripe for USAID investment and might benefit from USG engagement?
- Are there critical factors (environmental, economic, social, institutional, and legislative) that could limit progress and results?
- Who are BiH champions that can facilitate sustainable development in the referenced sectors?

### Methodology

The assessment will include both desk-study and field activities.

Desk-study activities:

1. Examine existing background information about Bosnia and Herzegovina, including relevant economic, social, and environmental conditions; government institutions and organizations; key stakeholders and donors focused on the environment and economy; legislation related to key sectors selected for intervention; and other relevant information required for this assessment as well as relevant EU directives and EU Sustainable Development Strategy goals.
2. Hold meetings with relevant offices in Washington, such as USAID’s Bureau for Europe & Eurasia, the Office of Global Climate Change (GCC), and the Office of Private Capital and Microenterprise (PCM), the latter to inquire about possible private sector and donor-coordinated external funding mechanisms in support of “green” investments in BiH.
3. Assemble a team of experts, including local consultants, to conduct the field assessment and analyze the issues that impede sustainable development in BiH. The team shall be assembled to ensure performance of the assignment in a timely manner. The team may be accompanied and assisted by USAID staffers from the GCC office during the assessment.

Field activities:

4. Upon arrival in BiH, the lead consultant will hold a meeting with the USAID Mission to obtain detailed information about the Mission strategy and portfolio, discuss planned assessment activities, and jointly adopt a methodology/approach.
5. The assessment team will hold meetings with relevant representatives of local government institutions, agencies and Ministries to gather information and experiences about already implemented and planned activities relevant to the scope of the planned activity.
6. The assessment team will hold meetings with international donors, agencies and NGOs involved in programs in BiH relevant to the scope of the assessment, such as REC, EC, WB, UNDP, GIZ, SIDA, EBRD, etc.

## Reporting

1. The consultant lead and assessment team will report weekly to USAID on achieved progress. The reporting will be in writing or in meetings with the responsible COR or other assigned USAID representative.
2. The assessment team will produce a final report summarizing the results of the assessment. The report will not exceed 20 pages, excluding annexes. Before the final report is accepted by USAID, a draft report must be submitted to USAID for comments. A deadline for submission of the draft report is 25 days from the day the contract has been signed. There will be only one draft and one opportunity for USAID to provide comments on the draft report. A deadline for submission of the final report is 5 days from the day the USAID comments have been submitted to the contractor. The report will include but not be limited to:
  - A. Introduction and general overview, listing information sources, site visits and meetings.
  - B. Summary of report, not to exceed 3 pages.
  - C. Description of other relevant donors, planned activities, and levels of funding.
  - D. Recommendations for USAID involvement in targeted sectors, substantiated with specific actions, preliminary cost/benefit analysis, based on available inputs, and anticipated results. This document will be used as a framework for the project's scope of work.
  - E. Brief analysis of legislation, procedures and institutions of relevance to the sustainable development of targeted sectors. Analysis of all institutional and legislative constraints impeding emissions reduction in targeted sectors/industries.

## Level of Effort

It is anticipated that the assessment will take a total of four weeks.

## Expertise

Personnel: In order to conduct the assessment ECODIT should establish a team of qualified people with solid international experience, preferably from the region (E&E region). The international team should have at least two full-time members. Team members must have experience in promoting socioeconomic and environmental sustainability in urban design, city planning, and fiscal policy projects. Team members must be versed in applying rigorous economic techniques and developing innovative, analytical approaches to sustainable solutions in complex urban environments. Team members must possess advanced degrees from relevant fields.

It is preferable that team members have some USAID experience, with hands-on knowledge in conducting similar assessments. The team should consist of:

1. Urban economist with expertise in fiscal policies/eco-taxation related to energy, transport, and urban planning.

The urban economist must have excellent analytical and writing skills with education and/or professional background in sustainability planning, urban economics, urban planning, and eco-fiscal policy modeling/design. This team member must also have demonstrated experience in sustainable development, with a particular emphasis on quantitative analytical approaches to developing innovative solutions to complex challenges facing cities. Experience in one of the following areas will be expected:

energy efficiency / green building policy modeling; economic dimensions of urban re-development; fiscal impact analysis and policy development in terms of sustainable development; and cost-benefit analysis for “sustainable cities” action plans. A CV or resume for the Urban Economist position should be submitted to USAID and approved by Mission and Washington staff.

## 2. Urban planner/spatial manager

Expertise in policy reforms related to transportation, housing, and zoning, with education, certification and/or professional background in urban or regional planning, or related field required. Preferred undergraduate majors include economics, environmental studies, and urban/spatial planning. Candidate must be able to work in a team environment to analyze and solve the complex infrastructure and environmental challenges facing urban areas. Must be a creative team player with strong communication skills, and excellent understanding/knowledge of the issues that affect modern cities. Knowledge of resilient/sustainable infrastructure strategies, understanding of environmental engineering and proven ability to manage public infrastructure and city planning policies to address issues such as GHG emissions/pollution, traffic congestion and efficiency of transportation sector, energy efficiency in transportation and buildings, zoning, etc.

Must integrate the spatial, structural features of a city, typically captured in GIS, and the dynamics of environmental quality indicators that can be obtained by monitoring. To provide decision relevant information supporting planning and management, these components are integrated in models for scenario analysis and optimization tasks. A CV or resume for the Urban Planner position should be submitted to USAID and approved by Mission and Washington staff.

### Deliverables

The main deliverable under this scope of work is a report as described in the previous section of this document. A draft final report should be submitted to USAID no later than 25 days from the day the contract modification is signed. The assessment team should submit two hard copies and one electronic copy to USAID/Bosnia and Herzegovina.

## ANNEX F: BIBLIOGRAPHY/RESOURCES

**NOTE: Because of the nature of many of these referenced documents (online, excerpted handouts from stakeholder meetings, translations from Bosnian, etc.), some of the conventional references are absent, or otherwise, not available. These are marked as N/A (not available/not applicable).**

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