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Energetski efikasna obnova zgrada

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Energetski efikasna obnova zgrada

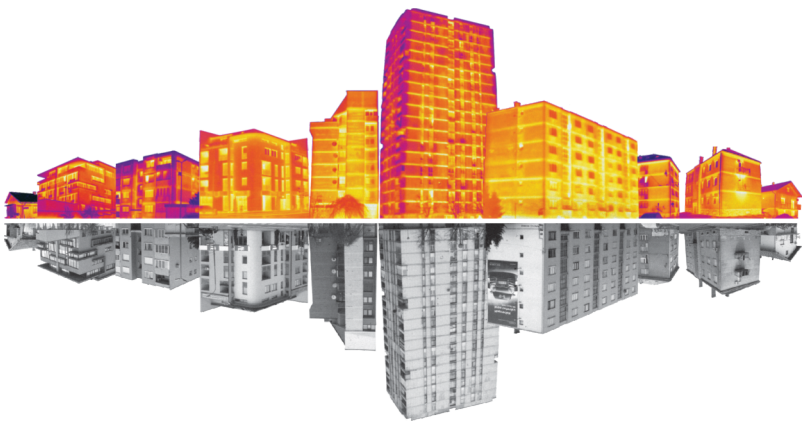
Šta je energetska efikasnost?

Energetski efikasno korištenje ili jednostavno energetska efikasnost je cilj da se smanji količina energije koja je potrebna za korištenje određenih uređaja ili vršenje određenih usluga.

Npr. postavljenje termoizolacije na kuću omogućava nam da koristmo manje količine energije za grijanje ili hlađenje prostora, a da pri tome imamo istu, ugodnu temperaturu u našim domovima. Ili npr. ugradnja LED rasvjete smanjuje količinu energije potrebne za postizanje istog nivoa osvjetljenja u poređenju sa korištenjem tradicionalnih sijalica sa žarnom niti.

Dakle, energetska efikasnost nije štednja energije. Štednja podrazumijeva određenja odricanja, dok energetska efikasnost nikad ne narušava uslove rada i življenja.

Poboljšanje energetske efikasnosti obično se postiže primjenom efikasnije tehnologije ili procesa proizvodnje ili pak primjenom općeprihvaćenih metoda za smanjenje gubitaka energije.



Koje su zgrade energetski efikasne? I zašto su one važne?

Da bismo znali koje su zgrade energetski efikasne, prvo moramo znati kakve su zgrade koje to nisu.

Ovo su tipične kuće i zgrade kolektivnog stanovanja u Bosni i Hercegovini. Njih čak 25,9% nema završenu fasadu, dok je 26,9% fasada urađeno naknadno.

Dominantni sistemi grijanja kuća su pojedinačne peći na čvrsto gorivo s drvetom i ugljem kao energentima. Pretpostavlja se da je stepen efikasnosti ovakvih sistema veoma nizak i da iznosi 50%.
Sistem daljinskog grijanja je dominantni sistem grijanja za sve ostale kategorije stambenih zgrada s ugljem, mazutom i prirodnim gasom kao energentom. Stepen iskorištenja ovakvog sistema procijenjen je na 85%.

Ove kuće i zgrade svake zime za grijanje troše od veliku količinu energije, čak do 474 kWh/m^2/god.

U tabeli ispod pronađite svoju kuću ili zgradu i vidite koliko troši energije svake godine.

Specifična godišnja potrebna energija za grijanje sa prekidom u grijanju

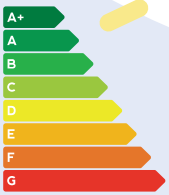
$Q_{H,nd,interm}$ (kWh/m²/god)

Period izgradnje	Samostojeće kuće	Kuće u nizu	Manje stambene zgrade	Stambene zgrade u nizu	Veliki stambeni blokovi	Soliteri
prije 1945	452.3	183.2	230.7	176.1		
1946-1960	474.0	321.3	216.2	158.8	176.7	
1961-1970	464.9	196.4	188.4	153.1	170.1	193.4
1971-1980	381.6	199.0	146.8		129.9	125.6
1981-1990	135.9	219.2	189.2	93.6	110.9	
1992-2014	127.6		65.2	68.1	54.8	

Sada da vidimo kakve bi bile ove kuće i zgrade da su **energetski efikasnije.** Uzimo jednu za primjer:

Ova porodična kuća izgrađena u periodu 1981–1990. s konstrukcijom spoljašnjih zidova od šupljih opekarskih blokova, s termoizolacionim slojem i obostrano malterisanim zidovima.

Termovizijski snimak pokazuje da postoje izraziti termički mostovi na mjestima spoja zidova i poda, te pokazuje toplotne gubitke na dijelovima fasadnih otvora, što ukazuje na njihovo loše stanje. Ova kuća grije se na peć na ugalj i/ili drvo, a za toplu vodu koristi električni bojler.



Zamislimo sada da je pokušamo učiniti energetski efikasnijom!

Predložiti ćemo dva scenarija. Jedan standardni i drugi napredniji.

+ Standardni

Izolovanje spoljašnjeg zida slojem termoizolacije debljine 10cm

Izolovanje međuspratne konstrukcije prema negrijanom tavanu (s gornje strane) termoizolacionim slojem debljine 10cm

Zamjena postojećih prozora novim (U =1,6 W/mK)

Instalacija centralnog sistema grijanja i pripreme potrošne tople vode s kotlom na pelet ili drva, pirolitički kotao s akumulatorom toplote.

Niskotemperaturni sistem grijanja s izlovanim cijevnim vodovima u negrijanim prostorima i upravljan prema spoljnjoj temperaturi s programskim satom.

++ Napredni

Izolovanje spoljašnjeg zida slojem termoizolacije debljine 20cm

Izolovanje međuspratne konstrukcije prema negrijanom tavanu (s gornje strane) termoizolacionim slojem debljine 20cm

Izolovanje poda na tlu slojem termoizolacije debljine 10cm

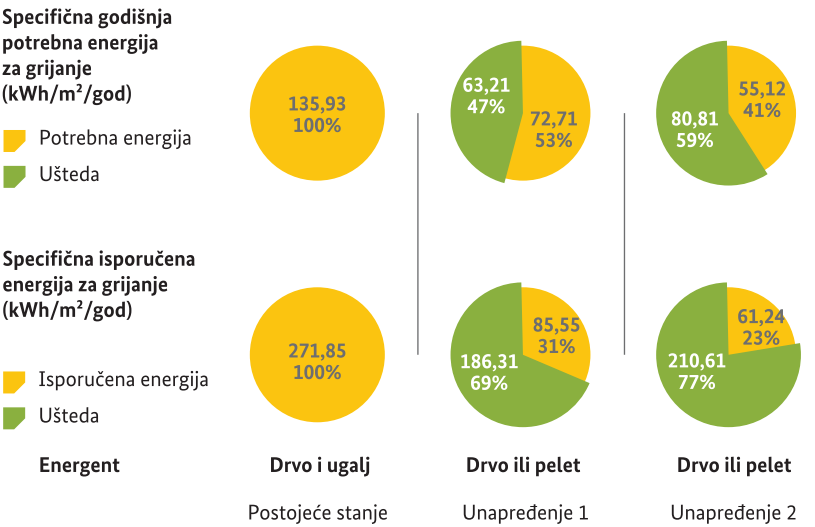
Zamjena postojećih prozora novim, (U =1,0 W/mK)

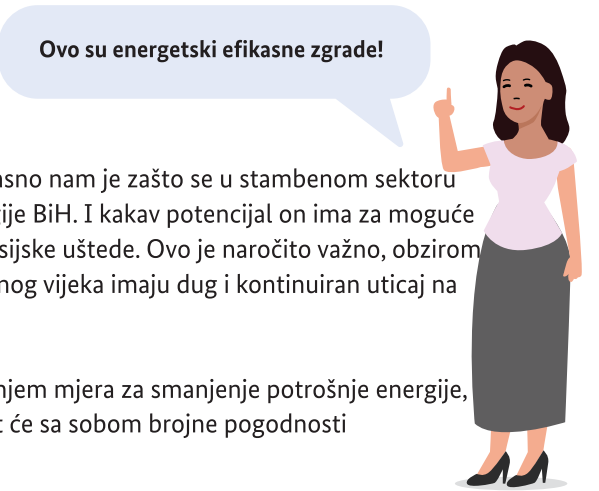
Instalacija centralnog sistema grijanja i priprema potrošne tople vode s kotlom na pelet ili drva, pirolitički kotao s akumulatorom toplote.

Ugradnja ventila s termostatskim glavama na grijaća tijela.

Instalacija dopunskog sistema grijanja potrošne tople vode.

Na grafikonu ispod pogledajmo koliko smo uštedili. Kada smo primijenili "standardne mjere" ušteda nam je **69%**, a ako primijenimo napredne čak **77%**.





Sada kada znamo sve ovo, jasno nam je zašto se u stambenom sektoru troši oko 45% ukupne energije BiH. I kakav potencijal on ima za moguće energetske, ekološke i finansijske uštede. Ovo je naročito važno, obzirom da zgrade zbog dugog životnog vijeka imaju dug i kontinuiran uticaj na potrošnju energije.

Konkretne akcije poduzimanjem mjera za smanjenje potrošnje energije, iako značajan izazov, donijet će sa sobom brojne pogodnosti investitorima.

Zašto ulagati u energetski efikasnu obnovu naših domova?

Danas kada posmatramo postojeće zgrade, razlozi zbog kojih se odlučujemo na obnovu, a da to direktno može da utiče na energetsku efikasnost zgrade, obično je vidna dotrajalost nekih građevinskih elemenata (prozori, vrata, nedostatak termoizolacije, fasadnog maltera, itd.), ili tehnički i pogonski problemi na sistemu instalacija (cijevi, ventili, kotao, bojler itd.).

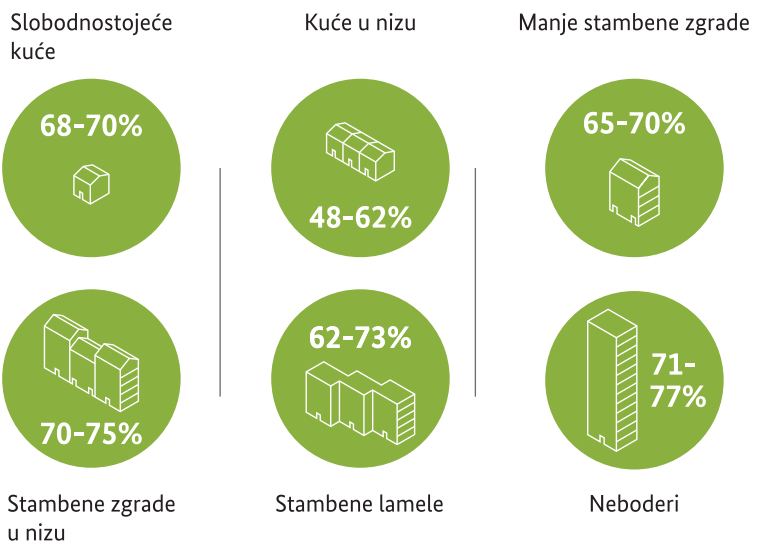
Razlozi zbog kojih je neophodna obnova postojećih zgrada, koji nisu sagledivi kao prethodni, a koje također zahtijeva energetska efikasnost su: loši unutrašnji uslova života (toplotni, vazdušni, svjetlosni, zvučni komfor) i koji se indirektno iskazuju kroz visoke parametre potrošnje energije (računi za potrošnju toplotne i električne energije) ili se javljaju kroz česta oboljenja korisnika (najčešće respiratorni trakt). Sve navedeno mogu biti razlozi da se postojeće kuće i zgrade obnove.

Direktne koristi od ulaganja i primjene energetski efikasnih mjera pri obnovi postojećih zgrada i kuća su:

Indirektna korist u oblasti zaštite životne sredine podrazumijeva smanjenje štetnih gasova u atmosferi i smanjenje globalnih klimatskih promjena.

Kolike i kakve bi bile koristi, najbolje govori podatak da moguće uštede, nakon primjene samo jedne mjere energetske efikasnosti - postavljanja termoizolacije na omotač, za stambene kuće i zgrade izgrađene prije 1971, pa i u periodu 1971-1980 (periodi tipske gradnje sa visokom potrebnom energijom za grijanje, jer nisu posjedovali toplotnu izolaciju ili je bila minimalna, 2-3cm) iznose:

Prikaz mogućih ušteda:



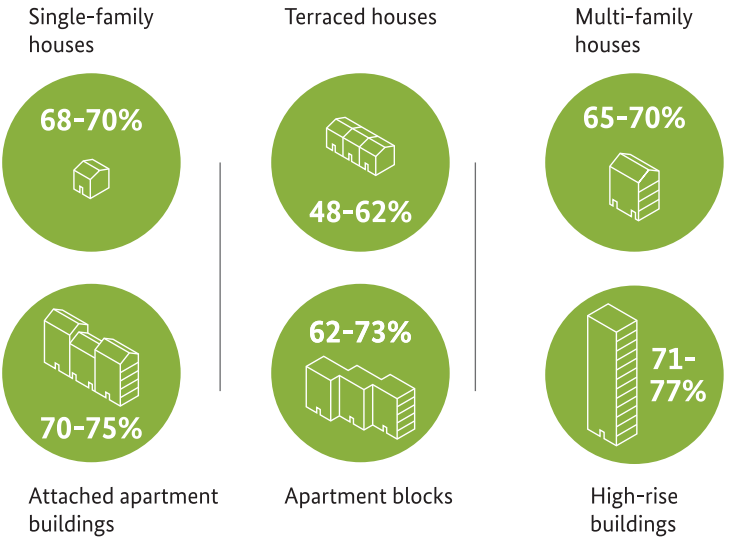
Investitori i korisnici postojećih zgrada pri obnovi zgrada ulaganjem u termičku obnovu, prema energetskim, ekonomskim i uopšte tržišnim uslovima, mogli bi za 6,7-8,2 godine isplatiti uložena sredstva.

Investitori treba da znaju da samo ulažući u obnovu cijelog omotača, mogu očekivati ovakav period otplate i uopšte dugotrajnost omotača, jer pojedine tehničke detalje na omotaču moguće je pravilno riješiti samo pri obnovi cijelog omotača.


Štedimo energiju,
poštedimo okoliš,
investirajmo u ljude i poslove
koji kreiraju sigurniju i kvalitetniju budućnost.
Energetski efikasne zgrade.


Let's save energy,
spare the environment,
let's invest in people and jobs
that create a safer and a better future.
Energy efficient buildings.

The best indicator of the benefits is data on savings. After applying only one measure of energy efficiency – e.g. thermal insulation to a house or building built before 1971 or between 1971 and 1980 (periods of typical construction with high energy requirements for heating, because they did not have thermal insulation or it was minimal, 2-3cm) savings amount to:



Owners and users of houses and buildings should know that by investing in thermal renovation, according to energy, economic and general market conditions, they could expect a return on their investment in 6.7-8.2 years.

Investors should know that they can expect such a repayment period only when investing into the renovation of the entire building envelope and the longevity of their building in general, because certain technical problems can only be solved if addressed in their entirety.

Why invest in energy efficient renovation of our homes?

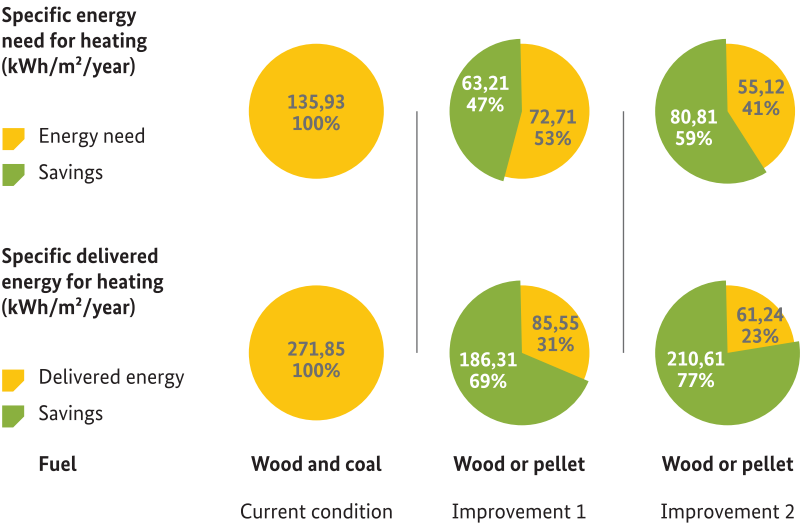
Today, the decision to renovate existing buildings and to improve energy efficiency is usually based on visible deterioration of some building elements (windows, doors, lack of insulation or facade plastering, etc.), or technical and operating problems with the installation system (pipes, valves, boiler etc.).

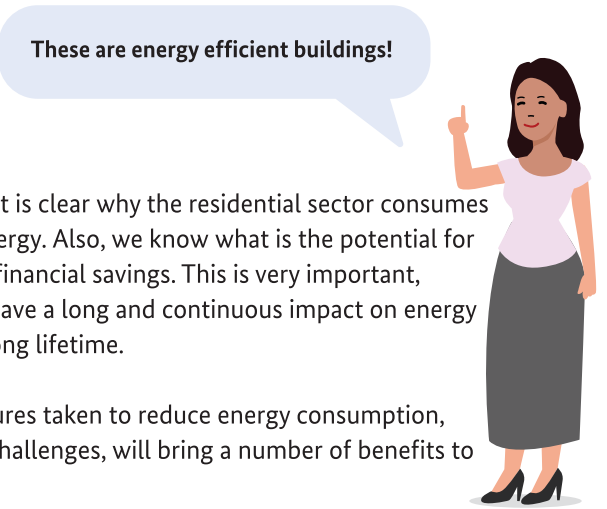
Reasons for renovating existing buildings, that are not as obvious as the previous ones but are also related to energy efficiency, are poor living conditions (thermal, air, light, sound comfort), and they are indirectly related with high parameters of energy consumption (electricity and heating bills) or frequent diseases of the users (most often the respiratory tract diseases). All of the above can be reasons to renovate existing houses and buildings.

Direct benefits of investing and applying energy efficient measures in the renovation of existing houses and buildings are:

Indirect benefits in the field of environmental protection are the reduction of harmful gases in the atmosphere and mitigating global climate change.

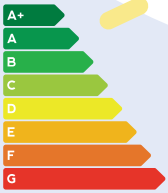
In the chart below let us have a look how much we have saved. By applying "standard measures", our savings are **69%**, and by applying advanced measures the savings are **77%**.





Now that we know all this, it is clear why the residential sector consumes about 45% of BiH's total energy. Also, we know what is the potential for energy, environmental and financial savings. This is very important, considering that buildings have a long and continuous impact on energy consumption due to their long lifetime.

Concrete actions and measures taken to reduce energy consumption, even with their significant challenges, will bring a number of benefits to investors.



Now, let us imagine how would we make it more energy efficient.

We will propose two scenarios. One standard, and another one, more advanced.

+ Standard

Insulation of external wall with thermal insulation layer of 10cm

Insulation of construction between the floors towards the unheated attic (on the upper side) with thermal insulation layer of 10cm

Replacing the windows with new ones with (U =1.6 W/mK)

Installing of central heating system for heating and domestic hot water on wood or wood pellet, pyrolytic boiler with heat accumulator.

Low-temperature heating system with insulated pipeline in unheated spaces and operated according to the outside temperature using a programmable timer.

++ Advanced

Insulation of external wall with thermal insulation layer of 20cm

Insulation of construction between the floors towards the unheated attic (on the upper side) with thermal insulation layer of 20cm

Insulation of the floor on the ground with thermal insulation layer of 10cm

Replacing the windows with new ones with (U =1.0 W/mK)

Installing of central heating system for heating and domestic hot water on wood or wood pellet, pyrolitic boiler with heat accumulator

Installation of thermostatic radiator valves

Installing of additional system for domestic hot water

Here, we have one example to see what these houses and buildings would be like if they were **more energy efficient**:

This single-family house was constructed in the period 1981–1990 with external walls made of hollow clay blocks, with thermal insulation, and plaster on both sides.

The thermovision image shows prominent thermal bridges along beams, on joints of walls and floors, as well as major heat loss at openings on the facade indicating their poor condition. This house is heated by a stove that uses coal and/or wood, and for hot water it uses an electric water heater.

Find your house or building in the table below and see how much energy it uses each year.

Specific energy need for intermitted heating - $Q_{H,nd,interm}$ (kWh/m2/year)

Construction period	Single-family houses	Terraced houses	Multi-family houses	Attached apartment buildings	Apartment blocks	High-rise buildings
before 1945	452.3	183.2	230.7	176.1		
1946-1960	474.0	321.3	216.2	158.8	176.7	
1961-1970	464.9	196.4	188.4	153.1	170.1	193.4
1971-1980	381.6	199.0	146.8		129.9	125.6
1981-1990	135.9	219.2	189.2	93.6	110.9	
1992-2014	127.6		65.2	68.1	54.8	

Which buildings are energy efficient? Why are they important?

To be able to understand which buildings are energy efficient, first we must understand what kinds of buildings are those which are not.

These are the typical single-family houses and multi-apartment buildings in Bosnia and Herzegovina.
25.9% of them do not have a completed facade, whereas 26.9% of the facades were built afterwards. Dominant heating systems of single-family houses are individual solid-fuel furnaces with wood and coal as fuel for the heating system. It is assumed that the efficiency of these systems is very low and amounts to 50%. District heating system is the dominant heating system in all other categories of residential buildings with coal, crude oil and natural gas as fuel. Efficiency of this system is estimated at 85%.

Every winter these buildings consume a large amount of energy for heating, even up to 474 kWh/m2/year.

Energy Efficient Renovation of Buildings

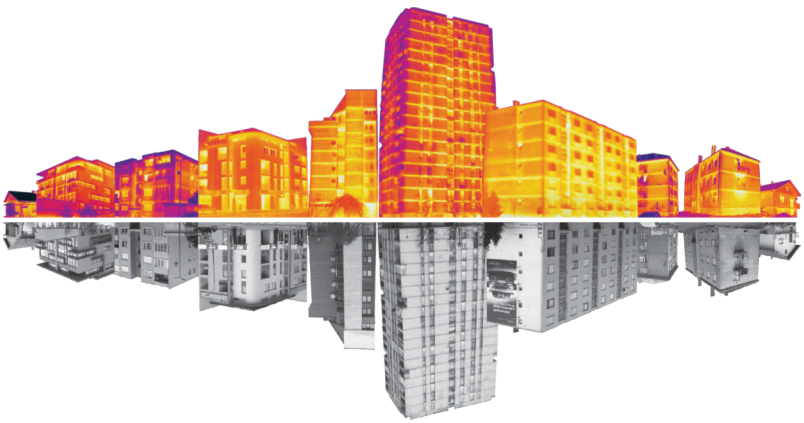
What is energy efficiency??

Main goal of efficient use of energy, or simply energy efficiency, is to reduce the amount of energy required to use certain devices or perform certain services.

For example, by installing thermal insulation on the house we will use less energy for heating and cooling the house, and we will have the same, comfortable temperature in our homes. Or, for example the installation of LED lighting reduces the amount of energy required to achieve the same level of illumination compared to the use of traditional incandescent bulbs.

So, energy efficiency is not the same as energy reduction. Reduction implies certain sacrifices, while energy efficiency never reduces comfort of working and living conditions.

Improving energy efficiency is usually achieved by applying more efficient technology or production process, or by applying generally accepted methods to reduce energy loss.



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