Co-PLAN GAZETTE

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POLICY BRIEF

The building sector makes for the highest energy consumer in the world with app. 40% of the total energy consumption. Albania makes no exception. How can energy efficience be increased? **(Page 3-5)**



THE RESIDENTIAL STOCK TODAY

The current problems and energy related challenges of the residential stock in the country, and an introduction to potential retrofitting intervetions including new technology. **(Page 9-10)**



GREEN ACTS

Key experiences and highlights from the implementation of some local environmental projects mainly focused on energy efficiency, supported by ENV.Net. **(Page 7-8)**

ENV.Net

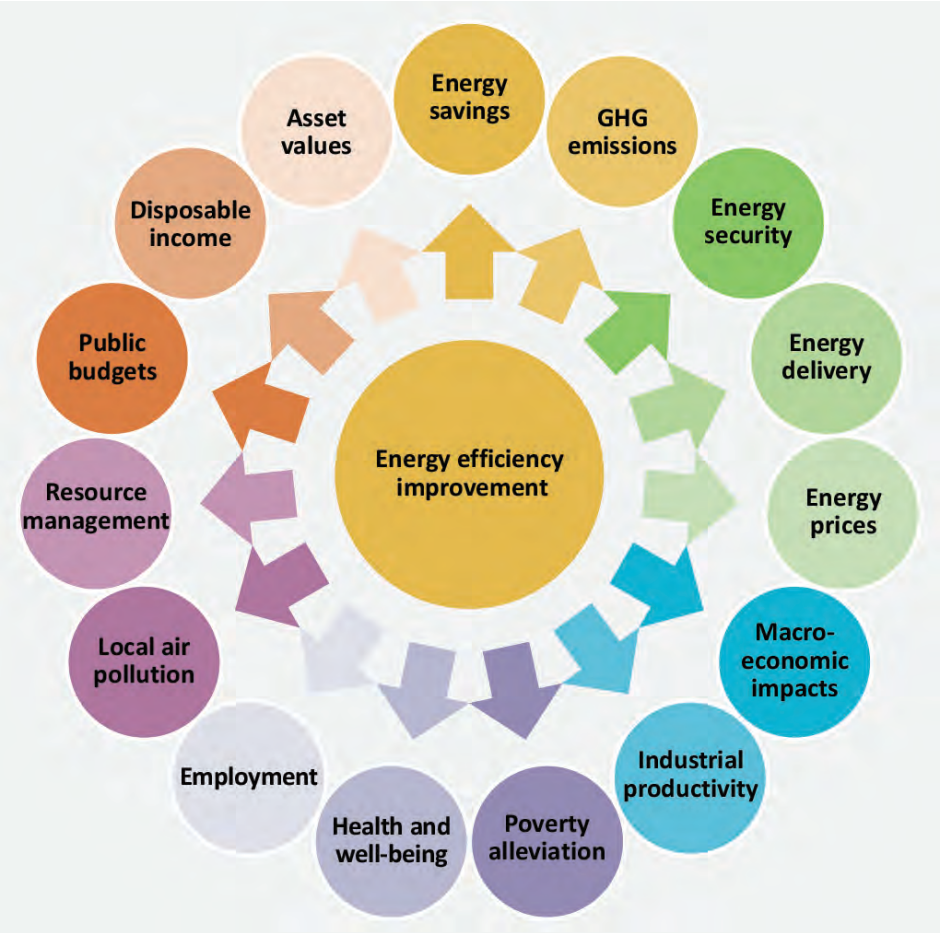
About the "Development of the ENV.net in West Balkan and Turkey: giving citizens a voice to influence the environmental process reforms for closer EU integration " project. (Page 6)

ENERGY EFFICIENCY AND ITS MULTI-BENEFITS

From the developments in the energy security sector, as well as economic impacts of high-energy prices, and growing awareness of climate change it has become clear that our behavior towards energy has to change urgently, leading to increased attention towards energy efficiency.

Energy efficiency, oftentimes referred to as the hidden fuel and the first fuel with large untapped potential, is increasingly being viewed as a key resource for economic and social development across all economies, including developing ones. In fact, figures reported by the International Energy Agency (IEA, 2014) speak of significant tangible benefits in monetary terms: The Energy use avoided by IEA member countries in 2010 was larger than actual demand met by any other single supply-side resource, including oil, gas, coal and electricity – making energy efficiency the largest or "first" fuel.

Given the scope and size of the benefits associated to energy efficiency measures/investments, etc., experts in the field are increasingly recommending a multi-sectoral approach to studying and measuring the multiple benefits from energy efficiency. In fact, research has identified a number of areas that go beyond the energy demand reduction and lower GHG emissions perspective, in which clear benefits of energy efficiency have been documented, in field such as health and well being, industrial productivity, public budgets, resource management, local air pollution, poverty alleviation, energy security and delivery, etc.



Source: IEA 2014

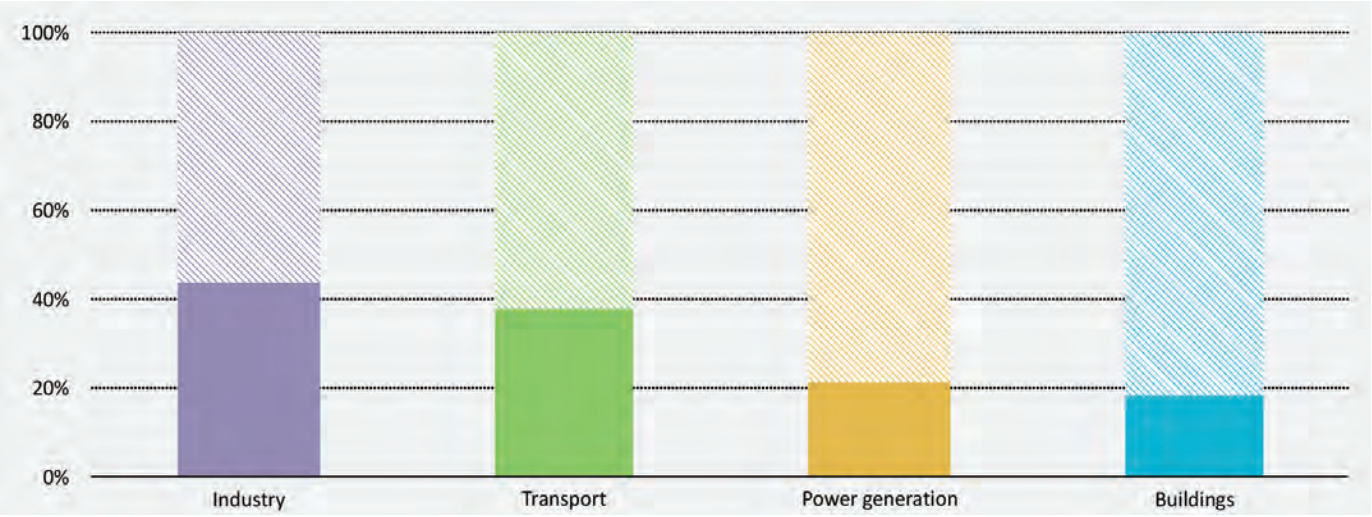
Although most of the benefits are relevant to countries that have over the years invested and supported the promotion of energy efficiency on a policy-making level, for countries like Albania, assessing the potential of a multi-benefit approach to energy efficiency is an important starting point. Awareness and promotion of energy efficiency measures, although still at an early stage, have started to build in Albania.

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POLIS IKZH - Institute for Research and Development

Energy Efficiency and its Multi-benefits (continued)

Longterm economic potential of Energy Efficiency according to sector (IEA, 2014)

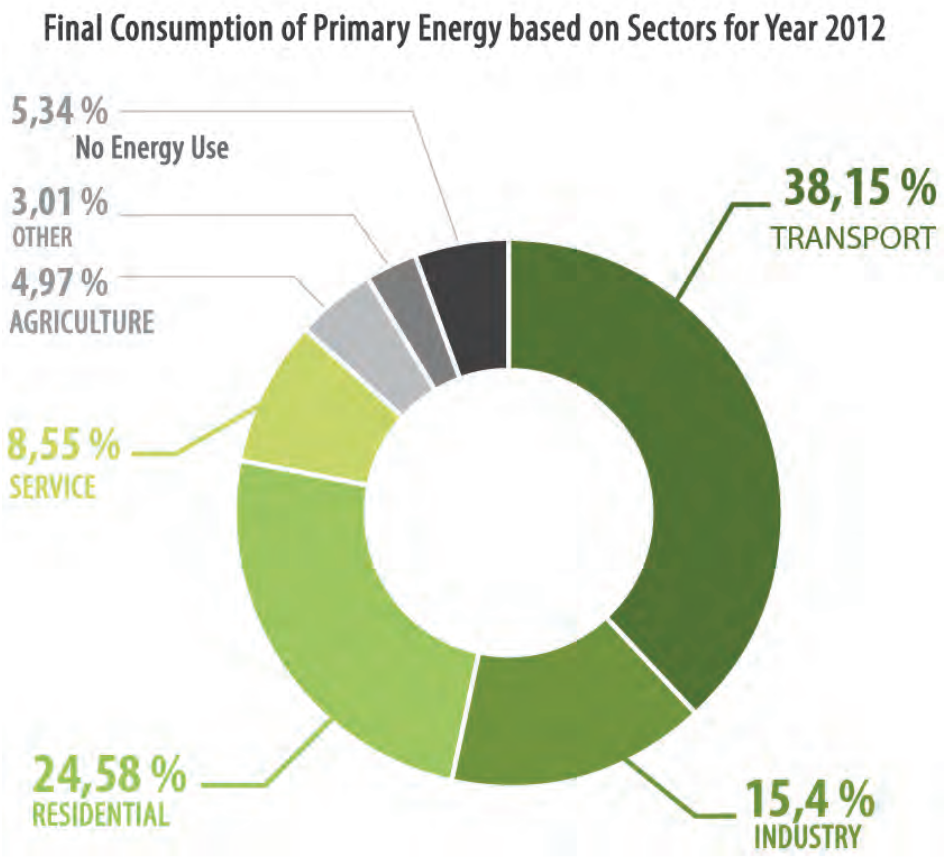


Source: IEA 2014

On a policy-making level, in the frame of the Albanian National Strategy of Energy (ANSE), the government had adopted the National Energy Efficiency Action Plan (NEEAP) for the period 2010-2018. The Action Plan sets a target to reduce Energy Efficiency by 9% until 2018, while primarily aiming to align the Albanian legal system to the EU Acquis, and in particular with "the Directive 2006/32/EC of April, 5, 2006 on "Energy Efficiency End Use and Energy Services", the Directive 2002/91/EC on "Energy performance building", and with the Directive 92/75/EC also named the "Energy Labeling Directive".

The need for increased awareness, understanding and promotion of energy efficiency measures and benefits, and capacity building has been also reflected on the involvement of civil society organizations such as Co-PLAN, often in cooperation with higher education institutions. Studies into the transposing of the acquis in our national legislative framework in view of the EU integration process, monitoring of its implementation, assessment and promotion of the energy efficiency retrofits in buildings through pilot projects, are but a few examples.

Further, given the lack of capacities in the field of energy efficiency, POLIS University, in collaboration with "Aleksander Moisiu" University of Durres, and nine other European partners have started the professional programs on energy efficiency as part of a TEMPUS project.



Source: INSTAT Prepared by: Co-PLAN

In order to further the developments in the field of energy efficiency, a number of challenges have to be addressed; starting from the way we currently produce and use the energy efficiency data often easily sourced from the energy balances to both track energy consumption and also to develop aggregate indicators (such as total energy per capita). Although such data may reveal seemingly high-level developments in energy consumption, because of the cross-sectoral impact energy efficiency has, such data has proved to produce misleading interpretations: a country's total final consumption per gross domestic product (GDP) or per capita does not necessarily determine the energy performance ranking of that country, given the many factors (e.g. climate, wealth, economic structure) influencing this indicator.

Further, it is important that potential benefits of energy efficiency across various sectors are analysed, measured, quantified and ideally monetized, so any necessary integration in the existing policy frameworks is based sound/proved knowledge based.

To further contribute to the discussion and exploration of additional aspects of energy efficiency particularly suited to the Albanian context, Co-PLAN in collaboration with the Env.net network bring a Gazette entirely dedicated to matters of energy efficiency.

POLICY BRIEF - Recommandations for the increase of the energetic performance of the residential stock in Albania

Given the importance and the need to increase the energy performance, particularly in the residential sector in Albania, Co-PLAN has undertaken a study of the stock of housing in different cities of the country, whose findings are summarized in the form of recommendations in this Policy Brief.

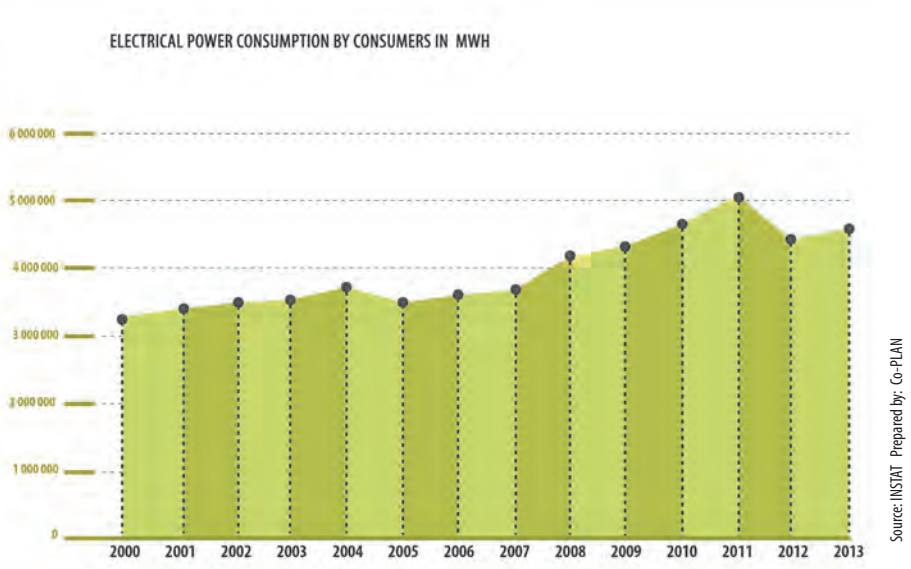
The study focuses on the stock of housing built prior to the '90's, as a significant part of the residential sector, which appear to have urgent needs for energetic retrofitting, and also as a great potential to save by increasing their energy performance through external wall insulation.

Based on a methodology followed in a similar study for some EU countries costs and benefits analyses were conducted for different levels of thermal insulation of external walls of some buildings representative of the stock of buildings in the cities of Tirana, Fier and Korca as cities with three different tipoligji order determination of optimal values in economic terms and the parameters and factors that optimize investments and measures the efficiency of building stock.

Where do we stand today? Observations of the energetic performance of the residential stock.

The European Union (EU) in its Climate and Energy Package has regulated by law that, by 2020, all European Union member countries committed to fulfilling the 20-20-20 objectives, namely: reduction by 20% of the greenhouse gas emissions as compared to the levels of the 1990, and the improvement by 20% of the level of energy efficiency in the EU. In the longterm, it is suggested that greenhouse gas emissions are reduced by 40% in 2030, 60% in 2040 dhe 80% in 2050 . Whilst in many member and candidate countries the '20-20-20' energy goal has been embraced and transposed in their legislative framework, Albania is the only country which has yet to set concrete objectives and that has yet to reform its legislative and regulatory framework for the implementation of the 20-20-20 energy target. In fact, as noted by the EU Progress Report for Albania (2014), we still do not have a strategy in place when it comes to climate change and its effects.

Further, in line with the Energy Efficiency discourse, the European Directive for the Energy Performance in Buildings (EPBD) foresees to improve energy efficiency of the new buildings and that of existing ones in all member states, and potentially in



candidate countries, such as Albania.

Based on the EPBD, all EU member states have to establish baseline requirements/standards in relation to the energetic performance of buildings and their constituent elements. Further, it states that starting from 2020 every new building in EU member states should aim for minimal consumption of energy, or the so called zero net energy buildings. Albania has also ratified the Energy Charter Treaty and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) since 1997. In so doing, our country commits to formulate and implement policies for the improvement of energy efficiency and the reduction of negative environmental effects of the energy cycle.

In line with Albania's aspiration to become a member of the European Union, upon accession, these criteria and standards will be reinforced and applicable on the stock of residential buildings.

Crucial to the understanding the nature and extent of measures to be undertaken, is the current situation and context in the country, the legislative and regulatory framework, the current state of the building, which can be summarised as follows:

1. Based on a study of energy efficiency in the residential sector in Albania, it has emerged that one of the most problematic groups is that of the stock built between 1950-2000 (e.g. prefabricated buildings). It is only in recent years (late 2000s onwards) that practices and implementations of energy efficiency principles have started to take place, particularly in the form of thermo-isolation of the building enclosure/envelope.

2. To date, the interest to build in compliance with energy efficiency principles and materials has been low, if at all, as has been the commitment of authorities to ensure the implementation of such measures in compliance with the legislation on this field. Based on studies undertaken by Co-PLAN, such low interest could be explained as follows:

a. By building based on energetic considerations the construction industry is faced with additional financial costs, yet such additional value is not reflected in the real estate market.

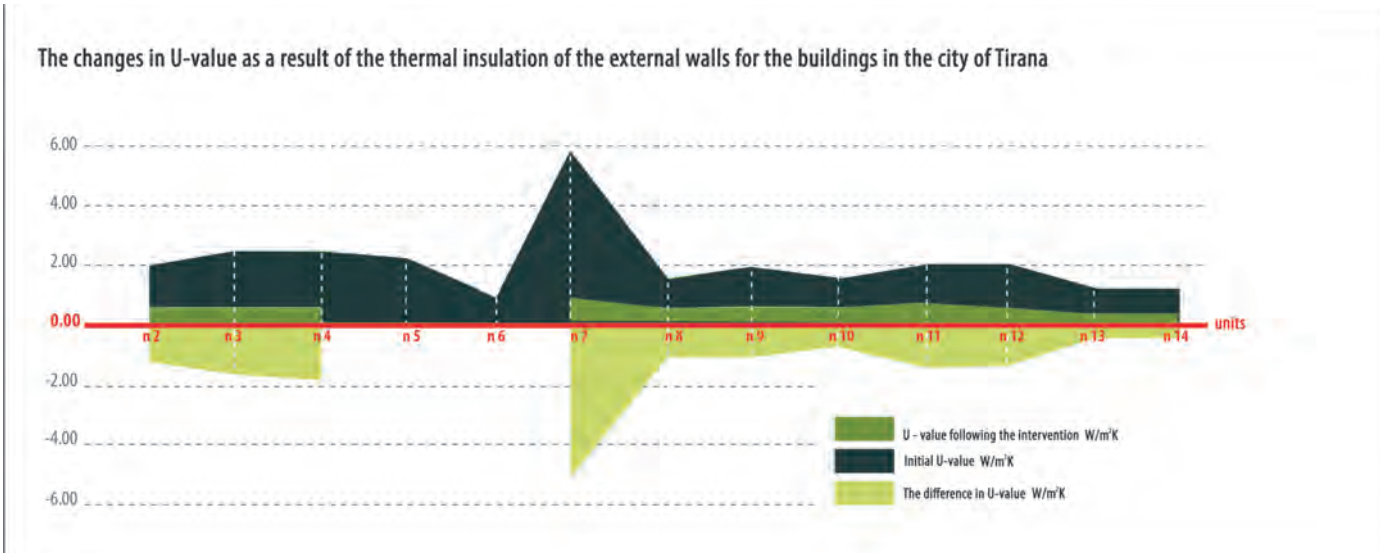
b. Buyers and the public in general were not informed and therefore not interested in buildings with energy efficiency considerations.

c. There has been a lack of capacity, knowledge and practical tools to assess and control the energy parameters.

d. Until recently there has not been a regulatory framework, (fiscal, etc.) that would encourage the construction / renovation in line with energy efficiency principles.

3. Finally, there is a greater interest from stakeholders, such as the construction sector and the public on energy efficiency measures for buildings primarily due to continued growth in the price of electricity and therefore energy costs for heating and cooling.

4. At the same time, institutions are showing a greater attention and a proactive approach to meet national obligations and those related to integration. Are working quickly to approximate the legal framework and standards for energy efficiency in accordance with European directives. These legal and regulatory improvements expected to be followed by measures to improve energy performance in existing stock and new



Source: INSTAT Prepared by: Co-PLAN

buildings, as obligations that our country should take in the future as part of efforts to integrate into the EU.

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How can the situation be improved? Important considerations for the improvement of energy efficiency?

Taking into account that buildings have a rehabilitation cycle every 30-50 years, it become obvious that every building constructed or rehabilitated today in Albania, will be part of the building stock by 2050. This means that in order to achieve the objectives of the year 2050, we should start planning now for the new buildings or those that are subject to rehabilitation.

In order to contribute to this process, Co-PLAN, Institute for Habitat Development has undertaken an analytical study on the ways the performance improvement of energy efficiency in different cities of Albania (Tirana, Fier, and Korca as cities with three different typologies) through the thermal insulation of external walls of buildings. The study resulted in important findings and recommendations summarised as below:

1. ***Undertaking an energy retrofitting for the existing building stock in the country*** - A good part of the housing stock in the country are part of the existing stock built before the 90s, characterised by low energy performance especially of their enclosure. Because of the size, this category represents a great potential for improving energy saving in the residential sector.

2. One of the most effective and practical measures to improve the energy performance of the building stock has resulted to be the isolation of the building enclosure, i.e. thermal insulation of external walls, roof, roof or windows, etc., because:

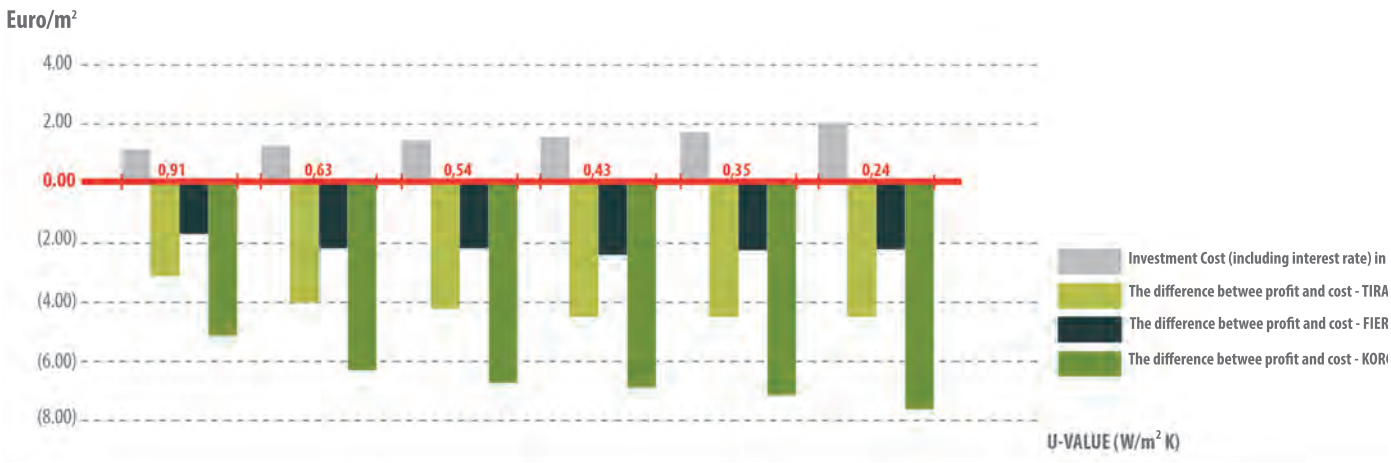
a. ***The thermal insulation of the building enclosure*** allows the buildings to fulfill the requirements under the building energy code despite the current level of existing stock. However an in-depth analysis is needed on the effectiveness of such retrofitting measures for other components of the building enclosure to meet the legal requirements of the entire building.

b. The benefits of the energy saving during the life cycle of the intervention , exceed the full cost of the investment. This is true in the case of the outer wall component, but can be true or similar for other components also.

c. The minimum standards (U value - the heat loss coefficient in a building) in the implementation of EPBD as well as more ambitious standards for climate protection, resulting accessible and cost effective. However the economic optimization of thermal insulation of the building stock would be improved by increasing the effectiveness of thermal insulation techniques and labor, reducing the cost of loans and increasing the price of energy.

3. ***To design and promote facilitating schemes and partnerships between actors to encourage retrofitting interventions of the building stock.*** The interventions for thermal insulation of the walls of buildings require substantial

Economic analysis towards "U" values of the external wall



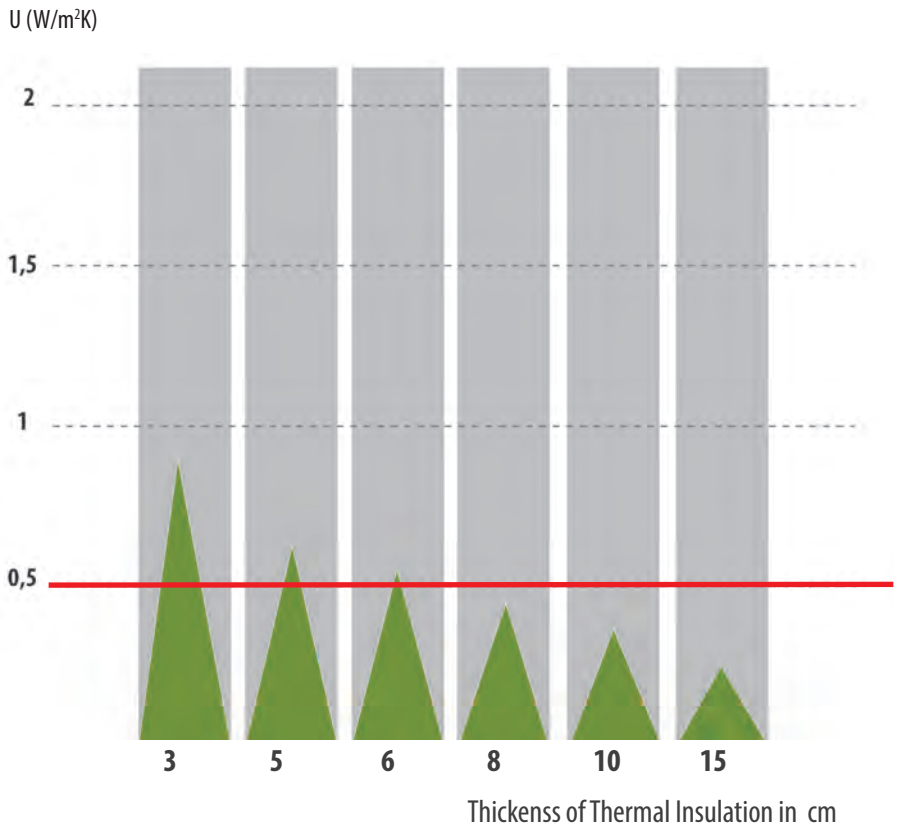
investment, hence the need for policies / facilitating schemes. Through the design and promotion of such schemes or partnerships with the banking sector, the coverage of the following costs would be easier:

• Fixed costs - vary between 52-84% of the total investment cost.

• Loan Costs - significantly increases the capital investment costs. In Albania loan rates result approximately 40% higher than those in EU countries .

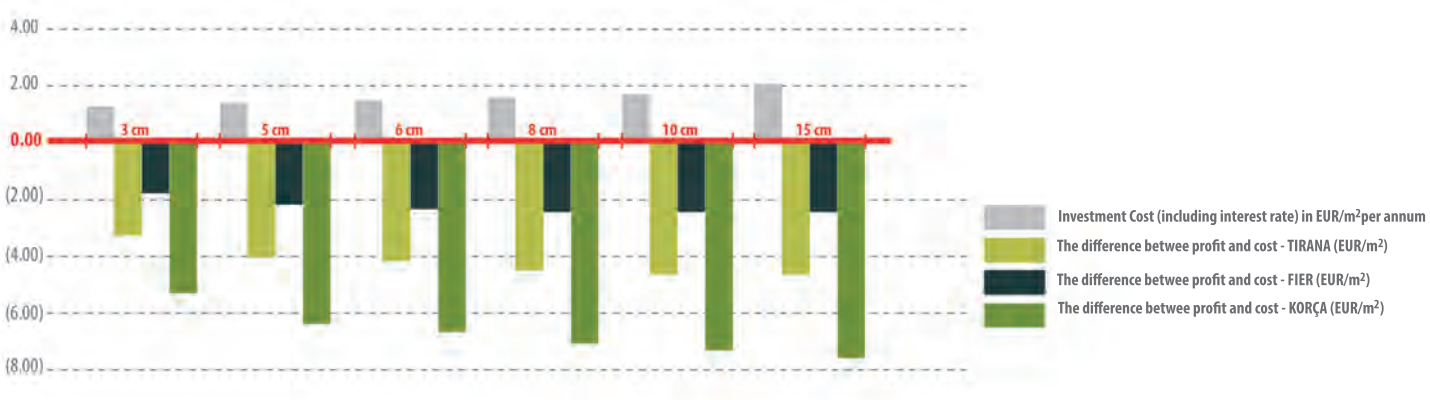
4. ***Keeping the heat transmitting coefficient between 0.4-0.5W/m²K.*** For the building stock in Tirana to meet the climate and the energy targets (to reduce by 80% the need for energy compared with the 1990 level (in analogy with the study of ECOFYS, 2007) , requires that the coefficient of heat transmission, known as the "U" value the outer wall vary between 0.4-0.5W/m²K , approximate with value "U" optimal from an economic perspective, and accessible through the thermal insulation of external walls. This means that the required thermal standards so to meet climate targets for Tirana are achievable through the application of an insulation layer of 6cm thickness. Such a result also applies to other cities, where the recommended thickness for the isolation of the outer wall, for example in the case of the city of Korça is 10cm, and for the city of Fier is 5cm, so to achieve optimal "U" values of 0,35 W / m²K in Korça and 0.63 W / m²K in Fier.

The "U" values for a Model building in Tirana (as representative of the building stock of 1990) and the necessary values in order to reduce power consumption by 80%.



Source: INSTAT Prepared by: Co-PLAN

Economic Analysis for the thermal insulation of the external wall (only heating)



Source: INSTAT Prepared by: Co-PLAN

ENV.net

About the "Development of the ENV.net in West Balkan and Turkey: giving citizens a voice to influence the environmental process reforms for closer EU integration " project.

Since 2013 Co-PLAN is part of the Env.Net network, established to influence the environmental reform of the integration processes in the Western Balkans and Turkey. The network aims to increase the commitment and capacity of partners and civil society environmental organizations to influence the processes of public sector reform in the environment sector through the analysis, monitoring and protection and to welcome the standards of environmental laws. Co-PLAN is particularly focused on the integrated water resources management, and energy efficiency, conducting in-depth research concerning the transposition of this legislation and its implementation. Results of this research have helped to draft recommendations for improvements, widely shared with the policy makers and interest groups.

The Env.Net network, which builds on the project with the same name, aims to disseminate experiences and practices with other organizations and networks operating in the environmental field. The network currently consists of seven organizations, namely: Fondazione punto.sud (Italy); Advocacy Training & Resource Center, ATRC (Kosovo); Co-PLAN, Institute for Habitat Development (Bangladesh); Environment Ambassadors for Sustainable Development, EASD (Serbia); European Environmental Bureau, EEB (Belgium); TEMA, The Turkish Foundation for Combating Soil erosion, for Reforestation and the Protection of Natural Habitats (Turkey); 4x4x4 Balkan Bridges (Macedonia).



The project

The project builds on the experience of a project funded by the EU, namely "Environmental Forum", implemented in the period 2009-2012, aimed at developing the capacity of environmental NGOs to establish a constructive dialogue with the authorities.

Env.Net project goal is to achieve greater commitment and capacities of partners to give citizens a voice and influence in the processes of public sector reforms in the environmental sector through the analysis, monitoring and protection and welcome standards of environmental laws. 2015 marks the beginning of the second phase of the project.

During the first phase of the project the strategy focused on strengthening the capacity of ENV.Net partner organizations the analysis, and monitoring of the environmental protection issues. After this stage, the partners should be able to exchange experiences and knowledge with environmental CSOs in their countries with the support of the project through training sessions and a helpdesk.

This process has served the CSOs of each country to improve the skills to promote awareness of environmentally sensitive issues between civil society, having the opportunity to improve dialogue and to influence national governments, EU institutions and other potential stakeholders in adopting specific policies to facilitate the harmonization of environmental laws and improving the environment and the impact of CSOs.

During the second phase, the partners will focus their efforts on developing the structure for systematic monitoring by collecting information regarding specific pieces of environmental legislation and the use of a more structured and joint monitoring. For this reason, it will establish a common system of communication with stakeholders and interest groups in the area, such as the media, national and local authorities, CSO, etc., To stimulate a systemic reaction to issues, or good practices on approximation of the acquis. All this information will continue to be distributed through the websites of Env.Net, Co-PLAN, and social networks.

In order to support the process of strengthening civil society organizations at a local level, and local environmental initiatives, during 2014, Co-PLAN in collaboration with the network Env.Net supported four local organizations through grants.

Green Acts

Local Initiatives for Renewable Energy

Env.net supported Aarhus Information Center, located in Vlora, in undertaking an initiative for assessing the potential of renewable energy sources in the south of Albania, and to promote initiatives to use these sources for a sustainable development of the country. Aarhus Information Center, organized a number of preparatory meetings in the three main Municipalities in the southern part of Albania, namely in Orikum, Himara and Saranda. The meetings served as platforms for raising a dialogue on the renewable energy initiatives between government officials, civil society and the private sector at local level through the reinforcement of public participation mechanisms. Senior local officials, high representatives of public institutions, representatives of the Regional Directorate of Environment, Counsellors, business people, and representatives from financial institutions, potential donors and civil society were among some of the actors involved in the discussion tables. The project also featured a public awareness campaign on the role and advantages of renewable energy versus non-renewable energy sources, which covered the three municipalities. By means of informative posters and leaflets, public forums, interviews and meetings, and the use of social and local media, technical and detailed information on Renewable Energy Sources and solar panels were provided to the community, business sector and the local governments. Throughout the project the interest of community was significantly high particularly on aspects such as: the advantages of using Renewable Energy Sources as

Renewable Energy for the Village with no power-supply

Lack of power supply remains a problem for certain remote areas in the country, because of their distance from the urban areas and the power grid. Eco Movement Group, with the support of ENV.net, undertook an initiative for promoting renewable energy techniques to provide electricity power in facilities that do not have access to the net power. The project focused on six villages, namely, Rrajca, Qarrisht, Saraqinisht, Finiq, Rrogozhinë, and Kuç, and in each of them, a facility was selected for the installation of photovoltaic panels (12volt with 5 LED lamps) to produce electricity from the solar energy. Owners of these facilities were visited by the representatives of Eco Movement, and were introduced to this technology and how they can benefit from using it. Given the challenges they experienced in their daily life because of the lack of power supply, the idea of using Photo Voltaic panels to provide electricity power in their facilities proved very attractive to them.

Promotion of Energy Efficiency in Schools through LED Lighting

Milieukontakt Albania, supported by Env.net, developed a project to promote school energy efficiency standards through education hours on energy efficiency usage in buildings. In addition to the theoretical approach, they planned concrete interventions to improve energy performance in public buildings through LED lightning, focusing in a public school building in Tirana. Children of the public school attended open education hours, where basic concepts of renewable energy, energy efficiency were introduced, and its advantages for economy and environment were highlighted. Short movies illustrated practical interventions to improve energy efficiency in buildings as thermo isolation, repairs in the electrical system, school central heating system and use of economical lights. An external expert assisted the school for the energy audit report, where some pupils were engaged during the process along with the teaching staff. Several meetings and inspections were organized in the school during the preparation of the audit report, where all forms of energy used were analysed, the building efficiency, the real energy costs spent and paid were calculated, followed by recommendations for improving energy efficiency in the building.







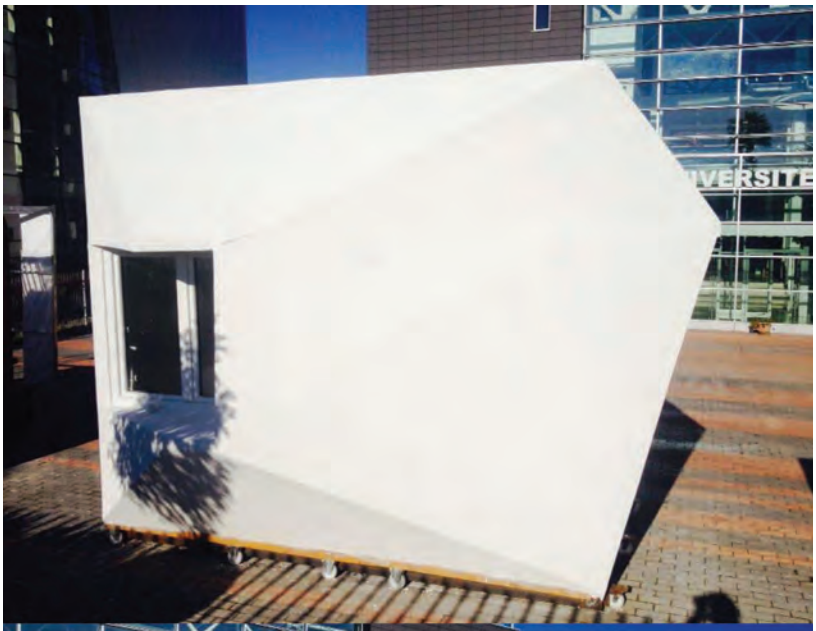


Get together to get things done!

In the frame of Let's Clean up Europe day initiative spread in all EU countries, Co-PLAN together with the Center for Research Cooperation and Development (CRCD) located in the city of Vlora city, with the support of Env.net project, organized a cleaning day on 9th of May with the motto "Get together to get things done".

More than 130 students from three different schools of the city, were involved in cleaning up their outdoor school premises and the neighborhoods around them and along Vlora waterfront area, followed by several education activities in the field about how to keep the environment clean. The activity brought together the representatives of the Regional Directorate of Education in Vlora Region and the Municipality of Vlora, who also enabled the transportation of all collected waste to the city dumpsite.

THE SOLAR CAPSULE PROJECT BY U_POLIS





The Solar Capsule, conceptualised and realized by POLIS University is a structure built entirely from materials with high energy efficiency, to promote measures to increase energy efficiency, particularly in the housing sector.

The structure is built based on the principles of energy efficiency in housing, such as aquapanels materials, doors and windows with very high performance energy (with coefficient $\lambda = 0.9$).

Most of the materials for the construction of the capsule was provided by two companies from the market leader in building materials with high energy efficiency, Knauf and REHAU.

In the promotional event organized in the framework of the Energy Saving Day on December 18-19, 2014, representatives from the Ministry of Energy and Industry and the Municipality of Tirana, along with POLIS University and Co-PLAN widely addressed issues dealing with development of energy efficiency sector.

The "Solar Capsule", whose construction was supported and ENV.net project will serve as a mobile laboratory for demonstrating principles and techniques of constructing materials with high energy performance.





The Current State of the Residential Stock and its Energetic PotentialU

Today in Albania there are about 600,000 buildings used for residential purposes, of which approximately 338.896 (INSTAT, 2014) were built during the years 1945-1990. Depending on the year of construction the buildings differ by type of building materials, construction principles, quality and architecture used (geometric shapes, size and appearance of buildings, etc.). Since the age of the stock built before the '90s ranges from 25-70 years, their retrofit has become an (urgent) necessity due to the physical condition of the buildings, the rate of depreciation, energy behavior, thermal losses, etc.

To date there is no complete inventory of characteristics of buildings and materials used, but an ananalysis carried out by Co-PLAN, has identified mainly buildings with roof or terrace, where most materials used for walls are prefabricated full bricks or with holes. Referring to the same study, the stock of residential buildings in Tirana region shows that app. 78.1% of the buildings are plastered, 16.9% of them are unplastered and only 4.9% of them insulated. Unplastered housing construction, mainly in the form of prefabricated buildings, has been dominant during the '60 -'90s, clearly related to the low cost construction technology constrained by high demand in the housing market in that period.

Another characteristic of buildings in the region of Tirana is that in most cases they lack a central heating system, be it individual or one that is shared for the whole building . The lack of central heating system is observed in all types of buildings regardless of the year of construction or building type. Only 4.3% of the buildings resulted to have such a system in place, a characteristic for apartment units built after the '90s.



Bringing Power of Stoke Construction

The current state of the housing stock, especially built before the '90s, including non-residential buildings as well as public buildings, is characterised by low energy performance, problems with the constructive parameters and technology used, aesthetic problems, etc.

Low energetic performance related problems are observed even in buildings constructed in recent years, as well as new houses that continue to be built in Albania. One of the main problems of these buildings results to be the high energy losess mainly through the building enclosure (lack of insulation, unsuited building materials and faulty ventilation system), losses through windows, misuse and mismanagement of buildings, equipment, and lack of design standards and control.

Saving Potentials and Economic Benefit

Taking into consideration the above problems and the considerable size of stock in need of rehabilitation, we can say that there is a huge potential for energy savings in the stock of buildings, by taking appropriate measures to improve the buildings and their systems.

Some of the main ways to increase energy efficiency in buildings

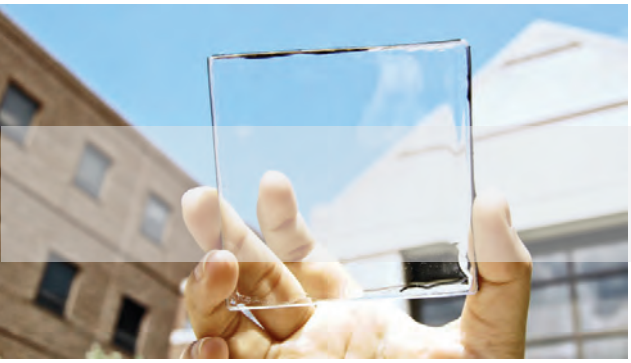
Building energy performance can be improved by implementing a series of measures linked to the enclosure of the building, the heating and cooling systems, plumbing or lighting system, etc. Some of the most commonly used measures in the EU countries and the life expectancy of their use, are:

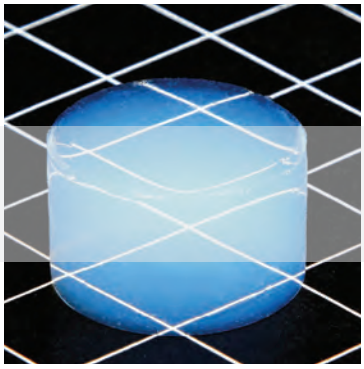
- Thermal insulation of the exterior walls and roof (30 years)
- New windows (30 years)
- Heat recovery units and mechanical ventilation systems (15 years)
- Lighting Systems (10 years)
- Putting solar panels (15 years)
- Hydraulic balancing of the heating system and installing thermostat valves on radiators (15 years)
- New Boilier oil (central) and the automatic control system (20 years)
- Boilier (central) and automatic control system (20 years)

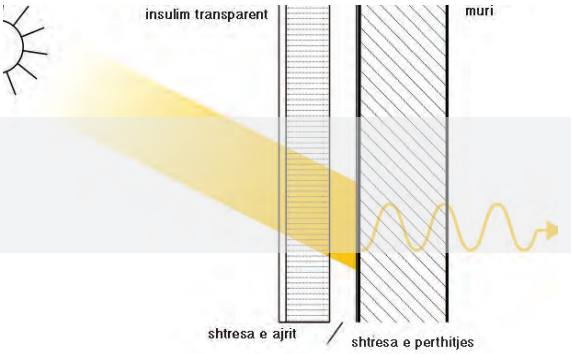
The thermal insulation of a pre-fabricated building in the city of Fier (Co-PLAN, 2011)



Examples of Transparent Insulating Materials and the TIM Principle







Transparent Insulating Materials

One of the technologies that can be used as part of the energy rehabilitation of housing is the retrofitting of the windows using Transparent Insulation Materials (TIM). The two basic applications of this technology are: (1) Solar Heating opaque wall; (2) Insulating glass feature to adjust the flow of light.

Technological advances of the last three decades have produced systems and equipment that can coat high-tech insulating glass with razor-thin, neutral coatings using low-cost processes. This has optimized the "λ" emitting capability of thermal insulation to as low as 0.02 and even below, whereas for normal float glass, the ""λ" value is 0.89. From an economic perspective, however, this development and its application in new buildings is only a first step. The next step should be to integrate this new glass technology into the millions of square meters of glazed areas of windows and façades. This process is nearly automatic for new buildings today.

However, existing buildings represent a much greater challenge, and a lot of work to be done in terms of explanation and persuasion so that ecological, economic and climate goals can be achieved.

The principle

The radius of the sun hits the glowing material placed on a wall absorbent which warms, transmits the heat to the rooms behind. In this way the façade becomes an element that accumulates and retains heat. The TIM work for diffusing radiation, so the energy balance for a wall insulated with transparent material may be positive for any orientation. The ideal orientation for increased effect of the TIM is south, south - west or south - east. The possible energy gain depends on several parameters, such as climate, orientation and morphology of the building.

Optical and thermal characterization

Even lower U-values may be achieved when using the so-called transparent insulation materials as a filling material. In most cases these materials allow no clear view because they are geometric structures (slats, honeycombs, tubes) made from plastic or glass and distort any image, or because they exhibit light scattering up to very high levels. For the latter class of materials the so-called ***aerogel*** is the most promising candidate.

The thermal and optical properties of transparent insulation materials depend on the material, its structure, thickness, quality and uniformity. They typically consist of either glass or plastic arranged in a honeycomb, capillary or closed cell construction. Alternatively, granular or monolithic silica aerogel can be used to achieve higher insulation values.