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The concept of “Green Roofs” in Tirana

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Abstract. The term “green roof” is a pretty old concept in the history of Architecture, and it begins since prehistoric times with attempts of our ancestors to cover up their housing with greenery. But this term is not well known in Tirana and it is just starting to apply in the new era of projects.

The first attempts started in 2010, but there are very few existing projects that fulfill the construction details that a real green roof needs. First of all, we have to understand why we do need green roofs in Tirana. According to “The Guardian”, Tirana was called “the European pollution capital”, because the air pollution was far above the standards of the EU. There are a lot of advantages of the green roofs that may be relevant to Tirana and what’s important they reduce the amount of carbon dioxide in the air, as well as there are a lot of disadvantages mainly for the construction materials and the existing building structures.

Our project is one of the first green roof projects to be applied in Tirana as a successful experiment to create a lot of other green roofs in the future. We designed a sustainable low-cost roof on top of a small hospital in one of the most polluted areas in Tirana and the results are absolutely visible. We finally came to the conclusion that the green roofs are a major step into creating a better air quality in Tirana.

Keywords: Green roof, Tirana, attempt, era of projects, construction, advantages, disadvantages, pollution capital, hospital, air quality.

1. What is a green roof

The term “green roof” is a pretty old concept in the history of Architecture, and it begins since prehistoric times with attempts of our ancestors to cover up their housing with greenery. It is a very simple concept to explain, as the word speaks for itself, meaning that the roof of a building will be covered in green, summing up in the term “green roof”. Generally, when we deal with terms like this, we search on the web to find a specific definition, and the one from Wikipedia defines it as: “A green roof or living roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane.”⁴⁴ Unfortunately, this definition does not give the essential idea of a green roof and may be misunderstood by people. After a whole semester of personal studies and projects, we concluded on an overall somehow artistic definition of “green roofs” that might accordingly comfort their real meaning.

A “green roof” is a garden whose idea is to utilize unused urban rooftop space and turn it into a place of beauty creating an inspirational, relaxing and though provoking working environment, all in the

⁴⁴ “Green roof” definition by Wikipedia

middle of a concrete jungle. This subjective definition might be the best way to describe how you feel on top of a green roof, also by explaining why we should build more of them in its hidden meaning. So, in other words, giving a technical definition: "A green roof is an artificially created environment that behaves like real land, in order to naturally grow plants and to protect the building from aggressive weather agents."

Finally, all the aforementioned definitions explain the general concept of "a green roof" and facilitate the understanding of its natural function, created by high quality technologies.

The green roofs are created with a series of layers such as: protection layers, drainage layer, filter layer, irrigation and plant layer. All the above layers can be combined in many forms and technologies, but all possessing the same function of creating the best working terrace system.

2. History of green roofs

As we mentioned earlier, the term "green roof" is a well-known and early used concept since the human settlements were created. This is an easily proved fact, with information and data from history books and pictures taken at old human settlements. With the evolution of humankind, there was the urge to consider its living comfort, so humans recreated the nature surroundings in order to fit its own demands: to keep it warm in winter and cool in summer. While enhancing their living standards, humans started to build their houses with some very plain interventions that differentiated considerably their quality of life, which improved with time to the point of adding "green roofs" to their settlements.

Early "green roof" examples were found in Scandinavia during the Viking and Middle Ages. *In fact, reconstructions of Norse sod houses dating from 1000 A.D. are protected as a UNESCO World Heritage Site in [L'Anse aux Meadows](#), Newfoundland, and commemorate the earliest known European settlement in North America.*⁴⁵ This proves that the "green roof" concept has been used since the Middle Ages, because of its benefits improving human life, which is also protected now as a UNESCO World Heritage Site, as it is one of the earliest examples of green roofs in history. *During the oil crisis of the 1970s, West Germany explored lightweight adaptations of green roofs for the purpose of energy conservation. By 2005, an estimated 13 million m² roof area in Germany was covered with plants.*² With time passing, green roofs started to develop all over the world, creating a full working network of environments that fulfill a lot of everyday life needs. *In North America, the industry association [Green Roofs for Healthy Cities](#) was founded in 1999, and has organized annual green roof conferences every year since 2003.*²

This is a short summary of the early creation of green roofs and their spreading all over the world through time. Since 1970s, green roofs have been lauded for their splendid benefits as cost-effective solutions for urban environmental problems. As cities all over of the world learned about the benefits of green roofs, adoption of this lightweight technology has been growing worldwide. Cities that have adopted programs and policies which promote green roofs include Chicago, New York, Toronto, Portland, and Washington D.C.

The green roof concept in Tirana is a newly used and developed one, due to the lack of technology and infrastructure, as well as the prohibition of new technologies and industrial materials by the dictatorial regime in Albania, especially by the time when the "green roof" concept was flourishing in Europe and beyond. The first attempts to build the green roofs in Tirana started in 2010, but there are very few

⁴⁵ Reference found at British Columbia Institute of Technology

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existing projects that truly fulfill the construction details that a real green roof needs. The early examples of these types of green roofs in Tirana include:



1. Terraces filled with flower vases and decorations, sometimes including small coffee tables, created from citizens living in those houses as an easy approach to the real green roofs.

Picture on the left taken from “Tema” newspaper, showing the terrace of an apartment near “Kristal” center.

2. Natural grass growing on top of buildings because of high humidity presence found on old buildings because of out of order pipe systems created to alienate rainwater that may be collected from the terraces and may be dangerous for the building.



Picture on the right taken from “Civitas” newspaper, showing an old nonfunctioning terrace where we see the grass growing because of the humidity.

As we observe the facts deeply, we can conclusively state that Tirana is the new member of the green roof society in the world, because of its lack of history and projects, which will be very soon changed and terrace gardens with rise above the concrete jungle creating new and exotic environments suitable to anyone.

3. Why do we need green roofs

Debates about the green roof effects on buildings and the environment have been present all over the world to comprehend the profits of green roofs and improve or adjust the disadvantages through time and practice. There are three categories of green roofs designed all over the world:

Extensive

- Low management requirements
- Do not require artificial irrigation
- Based on thin soil
- Non heavy system
- Suitable for flat and pitched roofs

Intensive

- High maintenance
- Require artificial irrigation
- Based on deep soil
- Heavy system (300kg per square meter and more)
- Suitable for flat roof only

Brown

- Consist on creating a natural habitat with insects, plants and birds
- Based on deep soil
- Specification of species suitable for the environment and supporting local biodiversity

The following are the overall advantages of green roofs. Thus a green roof can:

- a. Aesthetical – of course it is much more beautiful to see greenery and flowers on top of a building rather than piles of dirt or water systems and pipes as we most likely see in Tirana rooftops. Green roofs can be also used as family gardens, for commercial purposes and recreational spaces.
- b. Improves the air quality – because they add more plants which produce more oxygen for a certain terrain, and minimize the greenhouse effect.
- c. Administers rainwater – a green roof contains 70-90% of the rainwater during the summer and 25-40% during the winter, and it is able to naturally filter rainwater by increasing its time to reach the drainage pipes.
- d. Maintains the waterproofing layer – it is clear that a green roof gives longevity to the waterproof layer, because it covers and protects it from outside damaging intervention.
- e. Raises the longevity of the air conditioning systems – they will be no longer used as much as they would be in the lack of the green roof.
- f. Decreases the electromagnetic radiation by 99.4%
- g. Decreases the level of noise by 40dB
- h. Helps the environment and save biodiversity, because of the plant diversity of plants used on green roofs that creates different habitats for insects and birds.
- i. Increases health and welfare of the people who use it and live with it.
- j. Can be built using recycling materials

The reasons why we need to build green roofs in Tirana, in spite of the advantages they entail, is connected with the environmental issues and economic benefits gained along with the increasing number of green roofs.

For example, the first reason why we need to build a green roof in Tirana is because according to “*The Guardian*”, Tirana was called “*the European pollution capital*”⁴⁶ because the air pollution was far above the standards of the EU. Besides the air pollution, there are very high levels of noise pollution too, and as we mentioned before, green roofs have high effects on reducing these two disturbing components of everyday life in Tirana.

The second is a very important reason why we should build green roofs in Tirana. It is the economic benefit they generate. Building a green roof in Tirana requires a very low amount of money that can be raised by the citizens living in the block of flats or the owner of the terrace. This amount of money spent for the building and design of the green roof is very low compared to the amount of money gained from that green roof if it is used as an economic space (for example, open bars and restaurants or outside activity centers). In addition that, the main economic benefit goes to the investor of the building who spends less money to build a green roof and gains a huge amount of money when selling it, because the price per square feet of a terrace on the market is much higher compared to its cost. Accordingly, this benefit is similar with reference to parking spaces which also generate a lot of money when sold.

These simple arguments are the real advantages of green roofs in Tirana, added to the overall advantages of green roofs as a concept.

4. Disadvantages of “green roofs”

There are not many disadvantages of green roofs, because these systems have improved over the years. However, the main disadvantages appear due to imperfections during the green roof design or during their building process.

- a. One of the main disadvantages is the weight of a green roof. It is very important to be designed since the beginning of the building, so that it can be added to the construction details so the system can be calculated as part of the building since at the beginning phase. A simple green roof can be 500kg/sqm or more, depending on its design, and it is a high weight that can affect the architecture of the building and the construction system as well.
- b. The possibility of condensation – exists because of the tearing of the protective layer from the plant roots, which is not very common, but still possible.
- c. Another mistake made during the design is the wrong selection of plants type, because not all plants can be planted on a green roof. They have to be very resistant to temperature changes and aggressive weather, as well as must have short roots, otherwise they can damage the terrace and the layers.
- d. Other mistakes can be very destructive for the drainage system during the green roof construction or the low waterproofing power of the layer.

⁴⁶ Reference from “*The Guardian*” newspaper

Despite these disadvantages, green roofs are still the best choice for covering empty terraces and giving them a function and beauty. Another issue relevant to disadvantages is the matter of technology which will be improved in no time.

5. Our project

The new era of green roof projects is rising in Tirana also supported by the new policies of the Municipality of Tirana. One of the recent projects to be soon built in Tirana is the green roof of the small nursery hospital in “21 Dhjetori” neighborhood, where we have been working on for a whole semester.

This project purpose is to bring a healthy space to the patients and visitors of the hospital, providing them a relaxation and waiting area open to the public as well. The reason why we chose this particular building to design a green roof on, is because we found it necessary to donate not a simple bunch of flowers to the patients of the hospital, as we usually do to our friends and family when they get treatment on hospitals, but to donate a whole roof healthy garden for them to relax and enjoy.



Besides, another strong reason has to do with the building location, which is the most polluted *Picture taken before the intervention* area in Tirana, and the presence of our *3D image of our green roof project* green roof would help to improve, not only the patients', but also the citizens' health too.

The concept of the design comes from the universal doctors' logo, as we aimed to connect the shape with its function and place. The logo containing the snake around a cup, was translated into a snaggy pathway revealing small places to sit and to enjoy the multicolored flowers we especially picked for this roof garden. The existing terrace contained a series of old non-functional chimneys that we transformed into seating spots. We designed them with a lot of love for the patients, we covered them in wood and carved inspirational quotes to be easily found and read from the people sitting on them. An ugly detail of the existing terrace is the water containers that luckily are gathered in one spot of the terrace, which we covered in metallic net and planted flowers on vases so they could not be clearly seen, but easily accessed by the workers.

The technological system of the green roof is very easy as a concept, and easy to be built. We created a set of pipes for drainage in order to collect the rainwater in case of emergency. Except the layers that we used in the green roof, we also append the pipes system to be totally sure that the drainage system would not fail. The reason we used the pipes system, is because the drainage layer

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technology is not perfect yet in Albania, and consequently problems could have been aroused in the future if we did not design a secure net of pipes for special emergencies.

Conclusions:

The green roof concept is incoming very powerfully in the building industry in Tirana, due to the Municipality policies, to worldwide known advantages of the green roofs and the advanced technologies entering Albanian industry. The pollution level is rising every day, and so is the citizens’ awareness and the desire to confront it with effortless methods such as green roofs spread over the existing terraces, i.e. the best solution for Tirana so far. The new era of green roof projects is rising, starting with the green roof built on the existing terrace of the Municipality building, which has started to become a good example for other existing terraces in Tirana. The effects of green roof are magical for the environment and for our health as well. Accordingly, that is why we need to increase their number and build them appropriately by improving their technology. There is still a lot of work to be done according to green roof building technology and people’s acknowledgment of this concept, but above all the good news is that the future of roofs and terraces in Tirana seems to be getting greener and greener very in a short time.

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