

2015 WHITE PAPER



GREENER CITIES
IN EUROPE



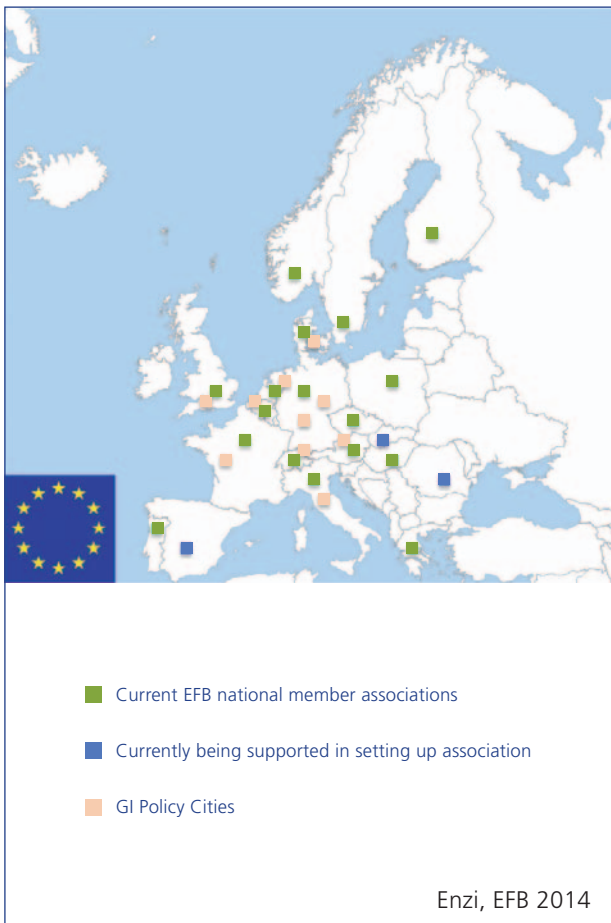
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WHO WE ARE

The EFB was founded in 1997 by the national associations of Switzerland, Austria and Germany; the federation is based in Vienna. There are currently 14 national green roof and wall associations that are members of the federation:

- Austria (VfB)
- Belgium (BVGg)
- Czech Republic (SZUZ)
- Germany (FBB)
- Greece (GRGR)
- France (ADIVET)
- Hungary (ZEOSZ)
- Italy (AIVEP)
- Netherlands (VBB)
- Poland (PSDZ)
- Portugal (ANCV)
- United Kingdom (livingroofs.org)
- Scandinavia: Sweden, Norway, Denmark, Finland (SGRA)
- Switzerland (SFG)



The national associations themselves consist of over 350 Small to Medium Enterprises and their employees, dealing with manufacturing, supplying and construction of Green Roofs and Walls in Europe.

All national associations have extraordinary members from Universities, City Governments, Planning and Architecture bodies related to the association.

WHAT WE DO

Green Roofs and Walls offer a wide range of different measurable benefits. They are, therefore, considered an important element of the Urban Green Infrastructure network. The EFB is supporting Green Roofs and Walls on a European level:

- **Encouragement and Support:**
New Countries setting up national Associations
- **Policy and Consultancy:**
Encouraging and supporting Cities and national Member associations in setting up Policy strategies
- **Education and Training, Promotion:**
Development of European Training materials and seminar plans (Green Roof Course and **Biosolar roof project**)
- **Knowledge Transfer:**
The establishment of thematic Working Groups within member countries and also at a transnational level;
Organising of study tours in various cities
- **Research and Evaluation Exchange:**
Exchange of research data, Information and establishing market reports
- **Best Practice:**
Exchanging best practice guidelines and standards
- **Communication and Discussion:**
At Conferences, B&B Platform, EU GI Working Group
- **Extended Networks:**
The Federation co-operates with international organisation such as the **World Green Infrastructure Network (WGIN)**, **International Green Roof Association (IGRA)**



Biodiverse Green Roof in Hungary, Budapest: a mix between extensive and intensive structures addressing pollinators needs (Dezsényi, Malmberg, Enzi 2013)



MARKET & JOBS

To provide an understanding of the current green roof markets in Europe, the EFB has started an evaluation process with its members in 2014. This is a relatively difficult task and the initial findings are only an overview of what the market is. The Federation hopes to refine the methods and figures in coming years.

The estimation lists six countries in Europe. The markets in each one of these countries are very different due to varying policy activities and incentives. All figures are conservative estimates, and the figures consider the manufactured and delivered quantities of green roof components such as substrates and other layers. The most detailed market report in the world is from Germany. This market is the most mature and therefore has the most accurate data. Currently there are 86 million m² of green roofs that have been installed in Germany and many flat roofs are already greened. The German Association has been monitoring a constant market trend since 2008 that

shows the market is increasing by an average 5 % per year. In most countries the majority of green roofs are extensive with the exception of Hungary. Here the market is mainly in the area of intensive green roofs (65 %).

There is great potential to increase the market for green roofs and walls throughout Europe. The Federation would like the markets in other European countries to move towards the volumes installed in Germany. There are growth opportunities within the sector of high skilled jobs, addressing the growing potential of decision making support as well:

- Education and Training, Competence
- Conferences and Networks
- Consulting of applied urban Green Infrastructure projects
- Research and Development
(Tools and Technologies, Synergies)

Examples Europe

Target Country	Green Roof Stock total m ² (2014)	Green Roofs new/year m ²	ratio extensive %	ratio intensive %	Yearly sales figures €
Austria	4.500.000	500.000	73 %	27 %	27.350.000
Germany	86.000.000	8.000.000	85 %	15 %	254.000.000
Hungary	1.250.000	100.000	35 %	65 %	5.662.500
Scandinavia (S, N, DK)		600.000	85 %	15 %	16.050.000
Switzerland		1.800.000	95 %	5 %	51.300.000
UK	3.700.000	250.000	80 %	20 %	28.000.000
	95.450.000	11.250.000			382.362.500

Trend: growing (FBB DE)

Source: European Federation of Green Roofs and Walls – EFB 2015 (unpublished)

RELEVANCE TO EU AGENDA



Synergies between Biodiversity
and Renewable Energy
Production in Switzerland
(Gedge, Baumann 2014)

There are various strategies and policies emanating from the European Commission, which the EFB, as an industry, can have a direct and positive effect upon.

Green Infrastructure and Ecosystem Services Strategy (GIES)

Although this strategy is directly linked to the delivery of biodiversity across the Union, the focus of GIES implicitly links across the sustainability agenda. The Federation members have been instrumental in delivering biodiversity in cities, particularly in the UK and Switzerland. In these countries certain cities have specific policies for ecological compensation. Within the Swiss Green Roof Standards there is a standard for ecological compensation. Recently our other German speaking Associations (Austria and Germany) have joined up with the Swiss to write specific guidance on the delivery of biodiversity on green roofs. This is partly in response to EU strategy.

The Federation has been an active member of the GIES working group and is disappointed that the working group may cease to exist. One of the issues the Federation is concerned about is how the working group has been closely tied to the Biodiversity Strategy for Europe. Whilst the Federation fully supports the Biodiversity Strategy, GIES provides a much broader range of benefits, especially in urban areas.

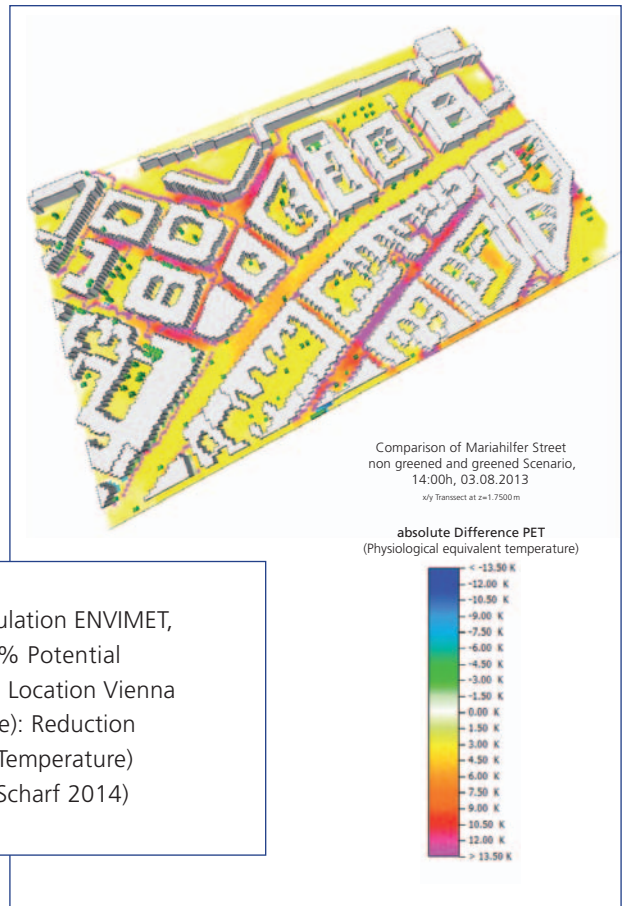
The technologies associated with our Federation help to provide a wide range of ecosystem services on buildings and for the cities in general.

These include issues related to water, clean air, and temperature regulation, social and economic well-being. Some of these services are specifically relevant to other pressing areas within the Commissions activities.



Climate Change Adaptation (CCA)

The delivery of green roofs and walls in the urban realm will address many issues associated with climate change. The increased likelihood of flash floods and excess urban heat are headline issues. These issues will become increasingly important for urban areas to deal with. Already cities such as Vienna are looking to these types of interventions to ameliorate these negative effects. Adaptation to change is a key strategy for the commission within the Climate Action agenda. We are convinced that green infrastructure in the built environment will be an important element in creating resilient cities.



Microclimatic Simulation ENVIMET, Scenario use 100 % Potential Green Wall Space, Location Vienna (Mariahilfer Strasse): Reduction of PET (perceived Temperature) of 3-13 K (Bruse, Scharf 2014)

Potentials of the Urban, Wildlife to the City: our Pollinators need support (Gedge 2013)



The Low Carbon Market

Green roofs and walls can help to reduce the carbon load of buildings especially in summertime. They can help reduce cooling loads in buildings and in winter they can also have a positive effect on heating loads.

The ongoing **Biosolar roof project**, promotes the green roof/solar energy combination at roof level. This is a EU funded project. This approach not only provides low carbon energy through optimized solar production, but also the provision of biodiversity by specific planting and ecological approaches. As our industry grows we will be able to respond further in helping deliver these objectives through innovation and implementation.

Health and Well-being

Provision of green space in cities is an important factor to ensure citizens can lead healthy lives. Many of Europe's cities are densely built and there is often little space to improve and increase areas of green space. A city is naturally dense with building mass, especially in the central core. Greening up the cities of the future in Europe will require buildings new and old to adopt green roof and wall technology to help improve the health and well-being of citizens. There is already growing demand for this approach in a number of European cities, such as Paris, Copenhagen and Berlin.

Provision of green space on hospitals, healthcare centres and other medical buildings can provide patients with access to green space, which can help recovery rates. There is now a body of evidence that recognizes the role of nature and green space for health and wellbeing.

Another area that is becoming increasingly important, is the role of green space within buildings. The use of interior greening can significantly increase the health and of occupants. This is particularly important in the work place where there is growing evidence that indoor planting can reduce sick leave and increase productivity. Our members produce and supply a range of indoor green walls for buildings. This is another global growth area in which Europe is leading the field.

Green roofs and walls can also, especially in the central districts of cities, help absorb air borne pollutants, which can adversely effect the health of citizens across the Union.

The Economy

The global market for green roofs and walls is predicted to amount to €6.8 billion market by 2017. Europe has traditionally been the market leader in green roof and wall technology. Over the coming years many of our companies will be addressing this burgeoning market through the development of new products and services as the world market grows. This is particularly true of the German companies who are currently the leading green roof companies in the world. Many other industry players in Europe are also becoming benchmark companies, such as the Dutch company Sempergreen.

However Europe could fall behind as new countries innovate and address the challenges for the industry in the twenty first century. It is therefore important that Europe recognises the contribution our industry has already provided for the global market. Support for industry through research and innovation projects can help maintain our market edge in the global market for green roof and wall technologies across the globe.



5 different Green Roofs and Walls on/in LEED Platinum certified Green House Budapest (Dezsényi, Malmberg, Enzi 2014)



MARKET BARRIERS

There are unfortunately barriers to creating a fully fledged green roof and wall market across the whole of Europe. Currently in the vast majority of European cities they are treated as a relatively unimportant element of the built environment.

Planning/Legislation

Developers consider the costs prohibitive to include the technologies in their designs without direct planning and legal interventions.

Green roof and wall technology is generally reliant on progressive policies at a regional or city scale to ensure that new developments and buildings are required to implement these technologies. For example Berlin currently has 1 m² of green roof per citizen and many other German cities, through Federal and regional planning have delivered similarly densities per citizen over the last 30 years.

Green Walls and their contribution
to the Urban Climate, Vienna
(Enzi, Oberbichler, Haas, Reitterer 2015)

Retrofitting of Green roofs and walls

To address climate change, cities will need to consider the retrofitting of green space in cities. However, although many cities have identified the potential, there is a serious question of how this will be funded. Whilst cities may need this additional green space, it remains a question of how to implement it. The main barrier is still financial.

Another barrier is a lack of innovation globally on the production of good quality lightweight systems with the performance criteria to meet the various climate change and biodiversity scenarios.



The Federation considers there to be an immediate need to:

- Develop financial mechanisms to help deliver a retrofit market across the Union.
- Support the development of innovative and appropriate lightweight solutions for the greening of buildings that would currently be excluded from retrofit projects.

Maintenance: Financial Obstacle vs. Jobs and Growth

Maintaining green space is also seen as another financial barrier. Many public and private clients see maintenance as an obstacle, ignoring the potential it holds.



Pollinators need support (Gedge 2013)

MARKET POTENTIALS

There are two main areas of potential for the future:

Increasing the number of cities and regions implementing strategies and policies to deliver Green Roofs and Walls

The green roof and wall market is relatively small. However with more cities and regions developing favourable planning policies to increase implementation on new developments, this market will grow. In London, with the adoption of a specific policy on green roofs and walls, the

market size increased by 300 % over 7 years. Outside of London, other major contributions in UK are constrained by national planning objectives that are currently not favorable to the development of specific urban green infrastructure policies. This is also the case in many other countries across the Union.



Old Building stock embraces Green Walls for a long time already, Vienna (Enzi, Preiss 2013)

Retrofitting of Existing Stock

If the main barriers to retrofitting existing stock can be overcome through the development of financial and innovative solutions, then the potential market size for green roofs and walls could deliver real economic, social and environmental benefits.

It is estimated in London, that 30 % of Central London's existing roofspaces could be greened. That equates to 10 million m² of potential green roofs within the central activity zone. With an average price of 60 per m² for the cost of installation in London that equates to potential business in the region of €600 million. Currently London has 0.3 m² of green roofs per citizen. If the existing roofs

that could be greened were, then every Londoner would have 1.4 m² of green roofs. Aside from the immediate economic value to the green roof market, that would significantly increase the social and environmental benefits to the population of London.

It is difficult to use a similar approach to urban areas across the Union, as London is a relatively unique city in terms of its built fabric. Furthermore costs of green roofs in London are relatively high. However if a fifth of every capital city in the Union had the potential to be retrofitted with green roofs with an average price of €30 m² the potential market size in Europe would be in the order of €3.36 billion.

Green Roofs, Urban Gardening and Social cohesion in Paris, France (Lassalle, Enzi 2013)



THE FUTURE

Green roofs and walls provide a full range of benefits across the social, environment and economic agendas. The Federation therefore proposes a vision:

For every urban citizen within the Union there will be 5 m² of green roof or wall by 2030

Considering that two-thirds of the population of the European Union dwells in the Urban Environment that equates to a population of 365 million people.

The Federation considers that lack of urban green space in our cities can be addressed by our industry. If all urban citizens by 2030 were to have at least 5 m² of green roofs or walls each, the current population would lead to an additional 1,82 billion m² of green roofs and walls in Europe. Using current prices the green roof and wall market would be worth in the region of over €62 billion market. Of course this figure is likely to be much higher as by 2030 the urban population will have grown further.



Business and Biodiversity:
0-Emission Boutique
Hotel Stadthalle, Vienna
(Reitterer, Enzi 2014)



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IMPRINT

Published by the EFB in 2015 (1. Edition)

Photo page 1: Getty Images, and Arup on behalf of the London Sustainable Development Commission