Short Projects 2nd Trimester

Projects for Banská Štiavnica

IMLA 2009 I Nürtingen-Geislingen University Weihenstephan-Triesdorf University Rapperswil University

Golden And Silver Corridors I Lars Wolfer Chinyi Gu Agnieszka Gorniak Juliana Aschwanden

Hand In Hand Project I Sofia Lopez Denise Ascione Christoph Dankers

Landscape As A Goldmine I Roman Häne Nils Pudewills Louis Wenger

Strategic Toolbox For Banská Štiavnica I Franziska Schüller Martina Tuda Yvonne Keller

Turning The Outside In Turning The Inside Out I Markus Peter

Annotation

All works presented in this documentation were part of the second Trimester organised by one of the three Schools of the International Master of Landscape Architecture (IMLA), the Weihenstephan University of Applied Sciences, South - Germany.

The aim is to give an overview over all five projects worked out for the Slowakian City of Banská Štiavnica.
So, all works were shortened and missing parts or sentences were marked by brackets " [...] ".
Each work contains an annex were more information about authors and sources can be found.

Location

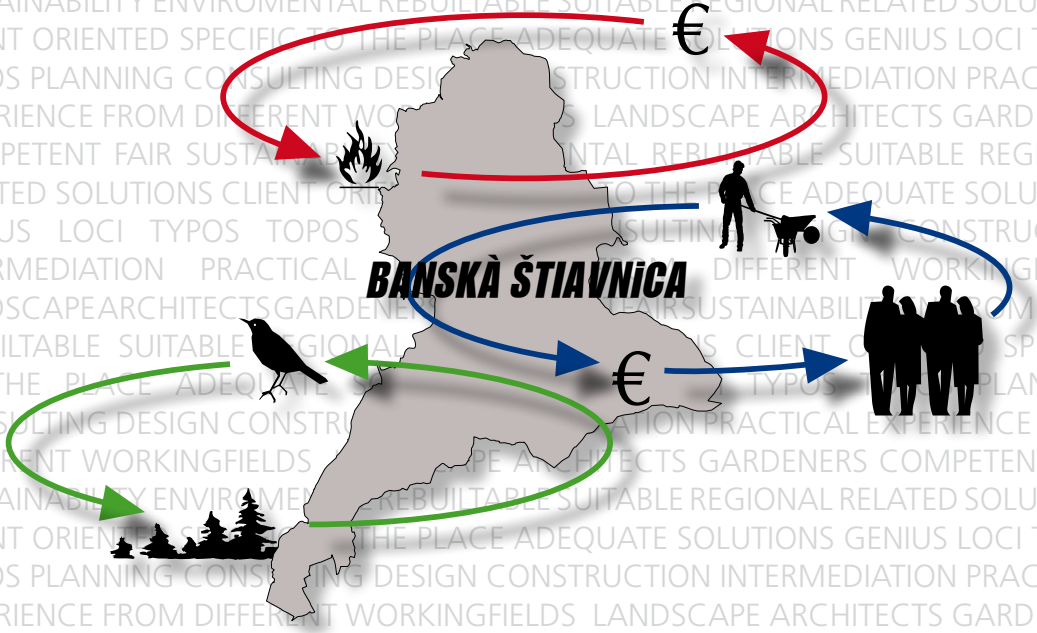
Banská Štiavnica (German: Schemnitz; Hungarian: Selmecbánya).
It is a small and charming city consisting of five districts which are situated in the West Carpathian Mountains. The city is located in the south part of Slovakia; in the so called Pohronie Region. In 1993, it was designated as cultural UNESCO World Heritage.

Inhabitants (2006): 11.000
Area: 46,74 m²
Population density: 228 in/km²
Altitude: 600 m above see level
Geographical information: 48° 28’ N, 18° 54’ O
Website: www.banskastiavnica.sk

History
Gothic times, Renaissance, Mining Academy, Austrians and Hungarians, Turks and the gallery-system of Glanzenberg are some terms which formed the history of the city.
Banská Štiavnica was the most important mining city in Slovakia since the 13th century. The excavation of gold and silver forms the economical, social and political development for centuries and also influences the appearance and the self-understanding of the city.
Besides, this goes along with outstanding engineer and scientific work which can be seen in the city itself and its near surrounding. So, the city is designated as UNESCO World Heritage under the title “Historic Town of Banská Štiavnica and the Technical Monuments in its vicinity”.

final report

« Landscape as a goldmine »



Landscape As A Goldmine | Roman Häne Nils Pudewills Louis Wenger

Content

Profile

Roman Häne

IMLA since 2009

University
Hochschule für Technik Rapperswil
Graduation
Dipl.-Ing. (FH)
Branch of Study
Landscape Architecture

Nationality
Swiss

Languages
Swissgerman (mother tongue)
German
English
French

Nils Pudewills

IMLA since 2009

University
Fachhochschule Wiesbaden
Graduation
Dipl.-Ing. (FH)
Branch of Study
Landscape Architecture
Specialisation Open Space Planning

Nationality
German

Languages
German (mother tongue)
English
French (basic)

Louis Wenger

IMLA since 2009

University
Hochschule für Technik Rapperswil
Graduation
Bachelor of Science (FH)
Branch of Study
Landscape Architecture

Nationality
Swiss

Languages
German (mother tongue)
English
French (basic)
Italien (basic)

1. Summary

“Landscape as a goldmine” is handling with two current problems of the community of Banská Štiavnica. As solution possibilities are shown, which turn deficits to chances.

One of the problems is related to the huge need of foreign energy to in form of gas and electricity. Because of the combination of long and hard winters and poorly isolated buildings, the heating costs are one of the strongest factors to the living costs. Another problem is the dependence on Russia, which deliveres the gas.

The second problem is related to the constant overgrowing of the landscape. Because of the topology, most parts of the terrain are steep slopes, the exploitation is economical not profitable, and the area of forest is expanding. In the future this has several negative effects on the shrinking biodiversity, on the deficit of cultural land and to the touristic sector.
Through the usage of the land to produce biomass, as compensation to the delivered gas for heating, both problems may be solved. “Landscape as a goldmine” is a sustainable solution which is handling with existing potentials and it offers Banská Štiavnica a lot of possibilities. The usage of the cultural landscape seems to be an answer to finally stop the energy dependency. This project with the usage of biomass may help to strengthen the power of the community, in economical, ecological and also social aspects.

The benefits of the usage of biomass aren‘t to be underestimated: The maintenance of the landscape generates jobs, retains the character of the open landscape for recreation and tourism and ensures the biodiversity.

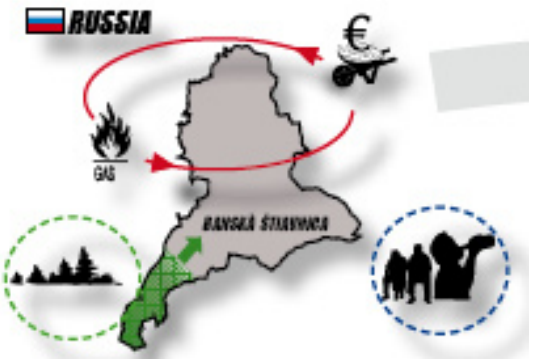
2. Concept

Project approach

In view of the transformation pressure for alternatives after fossil forms of energy, an inevitable transformation into energy landscapes will take place. Sustainable development is the key to implement new economical approaches in holistic concepts for a long term political and climate change.

Current circuits

- Money goes out of Banská Štiavnica: Energy from Russia.
- The area of forest is expanding.
- The unemployment rate in the region of Banská Štiavnica was 12.81% (10.8.2009, ec.europa.eu/ youth).



Interruption of the circuits

- The energy delivering from Russia stops: Money stays in Banská Štiavnica.
- Developing a new strategy for landscape cultivation.
- Developing new workplaces.

New approach

- The money will be invested in B.Š.
- The potential of the own land will be used.
- New jobs will be generated.

Newly generated sustainability

- New closed cycle with energy and money.
- New cycle with workplaces, money and social improvement.
- New cycle with landscaape cultivation and biodiversity.

New generated benefits

- Independence (energy production out of biomass).
- New workingplaces in Banská Štiavnica.
- Saving the landscape scenery for touristical aspects.
- Saving and improving of the biodiversity.
- A big amount of money stays in the comunity.
- Social life will improve (less unempoyed persons).
- The cultivation of the cultural land is saved.

3. Identification and description of issues

Introduction
The project “Landscape as a goldmine” is oriented to the theory of sustainability. [...]
It‘s divided in two subchapters, the current state and possible future developments. The latter is using the methodology of scenario to show the possibilities

Economical issues
- Current state [...]
- Possible future developments

Based on the biomass production Banská Štiavnica’s economical situation improves a lot.
The money which was paid for Russian gas deliverance gets reinvested in the community and has generated a lot of new workplaces.
Because of a far-sighted strategy, [...] the good commercial related to the social and ecological improvment even the tourism is increasing.

Social issues
- Current state [...]
- Possible future developments

The implementation will strengthen the identification of the population in the region through the gained independence.
The biomass production generates a variety in workplaces. In production, in cultivation, in cropping, in transport, in logistic, administration etc.
New workingplaces means new perpectives.
[...]migration from the land will decrease. [...]
Finally, the jobs related to the landscape cultivation, may be a chance for the members of the Roma community. [...]

Enviromental issues
- Current state [...]
- Possible future developments

By careful implementation of plants for the biomass production, the landscape scenery-will profit.
The core of the structures are hedge-bands
Thanks to them, the landscape gets more structured, which also guarantees the EU-founds for agriculture in the future, [...] They offer corridors and habitats for a lot of animals and protect the land, [...] from erosion.
[...]

4. Vision statement

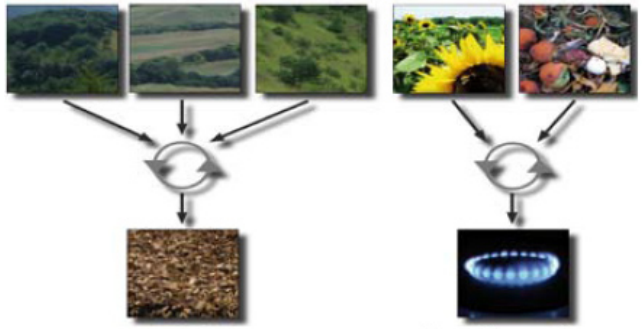
The structural diversity of the landscape in Banská Štiavnica is very attractive and provides different habitats for fauna and flora.
[...] Our aim is to keep the structural diversity through maintenance of the landscape without further subsidies.
To avoid expensive maintenance programmes the idea is to use the growing biomass as resource for energy production. As a result the region becomes more independent from energy imports. New job opportunities would emerge in the energetic sector. [...]
The local energy production provides potential synergies between social, economical and environmental aspects. Therefore is our strategic aim to provide the electricity and thermal energy in Banská Štiavnica on 100 % renewable basis till 2020.

The transformation of Banská Štiavnica in an energy-independent region follows the three strategic principles of sustainable development. These are:
– Efficiency
– Consistency
– Sufficiency
[...]

5. Investigation of renewable energy resources

Renewable energy

Renewable energies are energies, which replenish naturally. They are in human time scale continuously available.



Materials out of biomass | Image 01

Potential resources of renewable energy in Banská Štiavnica are:
- Biomass
- Waterpower
- Wind power
- Solar energy
- Geothermic

Biomass

• What is biomass?

Biomass is biological material derived from living, or recently living organisms. In the context of biomass for energy this is often used to mean plant based material.[...]

• Biomass production in Banská Štiavnica

The focus is, besides the energy-production, to maintain the landscape in using the abandoned land. Thus the following research concentrates on the energy-production from wood and woody forms of biomass.

Possible sources of biomass in Banská Štiavnica are:
- Wood taken from green structures along the street
- Wood taken from the forest
- Hedge-rows in the landscape
- Wood from private garden maintenance
- Produced biomass from agricultural areas e.g. short rotation coppice, agro-forestry systems
- Shrubs and grass from the grassland area

- Biomass	43'900 [GJ/year]
- Biogas	12'600 [GJ/year]
- Geo thermal energy	53'000 [GJ/year]
- Water power	39'700 [GJ/year]
Summary	149'200 [GJ/year]

Fabian & Vanko, s.r.o. „Koncepcia Rozvoja Mesta Banská Štiavnica V oblasti Tepelnej Energetiky." 2006.

The total potential of available biomass for energy purposes is estimated at 6500 m3 per year. This figure is probably related to the biomasspotential, which is not used in the forests of Banská Štiavnica.
The total amount of available biomass cannot be defined precisely, yet. Further research is necessary, a possibility to estimate the yearly availability biomass is to acquire the total amount with airplane-based laser scanning supported by GIS. [...]

6. Impact assessment

Like every form of land use the usage of biomass affects the landscape. To prevent or minimise or adverse impacts and to assess beneficial effects of land usage - to implement the production of biomass an impact assessment is needed. The main criteria to analyze the impact in the landscape are the landscape scenery, the biodiversity and recreation. [...]

Landscape aesthetics

The whole northern part of the landscape is almost spared from the urban sprawl. Thus the former traditional structure of landuse has been left intact and can be seen even today. In general there are three typical landuse-types which are characterising the landscape scenery of Banská Štiavnica.

- Forest

In the areas where the topography is characterised by steep terrain and at the top of the hills, forest is prevalent.

- Grassland and hedges

Small chambers of grazing land are seperated by hedge-rows on steeper slopes next to the settlement.

- Agricultural land

Arable land characterises the plane parts where the exposition of land is orientated to the south-west.

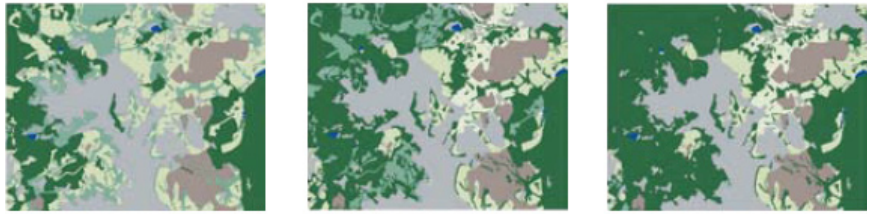
• Looming development

The area of forest is increasing, in a lot of areas, this is well, obvious visible. [...]

If the looming trend of shrubing continous the landscape in Banská Štiavnica will be almost overgrown by forests. Under consideration of ecological aspects and aestetical aspects and also economical aspects the reforestation of the landscape should be stopped.

Overgrowing of the landscape in the area of Gallvaria hill | Image 01

Detail view on succession steps | Image 01



The schematic illustration of the areal increasing | Image 01

Biodiversity

As result the individual geomorphological structures have a big variety and differentiation in plant cover. [...] So the Štiavnica hills are richly represented by species which are protected (Steffek, 1998).
Particular attention towards biomass is to be paid to the hedge-rows. They are linking the biotopes to one another. An encouragement of investments in additional hedge-rows would stimulate the biodiversity and the production of biomass.

Recreation and Tourism

The surrounding of Banská Štiavnica is known as an open landscape from the mining era. Without measures to keep the landscape open, the high attractiveness for recreation and tourism will decrease. [...] However, new
measures like the usage of biomass, will achieve synergies between the beauty of the cultural landscape, recreation and tourism.

Traffic

Despite a dissected landform this territory has a very good network of roads [...] Because an owner of these roads is needed (Steffek, 1998), a PPP with the local energy provider would be an adequate solution [...]

7. The implementation of biomassproduction

Implementation of the concept

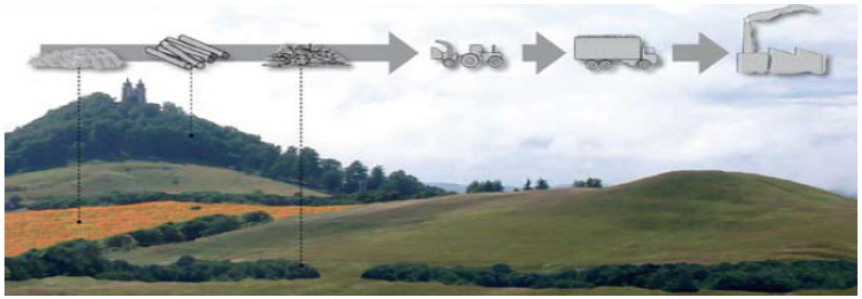
[...] In the forefront at a general planning level of implementation the current state and the potentials needs to be determined and assessed. [...] Second step of the implementation is the initiation of the transformation process. [...]

The implementation of renewable energy usage in form of biomass

The strategic vision includes all forms of renewable energy sources. One of these sources is Biomass, which has a high potential for usage in Banská Štiavnica. [...]

Rough formulated guidelines for the implementation are:

– Keep the open-landscape open by usage
– Linear organisation of biomass production according to the landscape types
– Linear organisation and reduction of existing structures to linear structures
– Sustainable usage of biomass



Sources of biomass from the landscape and the crop process | Image 01

Implementation into the landscape

One example of implementation into the landscape follows the scheme of alternating hedgerow-maintenance. A piece of a hedgerow approx. 100m is cut out and shredded. In the following year another peace is cut out. So different ages of hedgerows are in the landscape with several habitats for species. [...]

Energy forestry is a form of forestry in which a fast-growing species of tree or woody shrub is grown specifically to provide biomass or bio fuel for heating or power generation. [...]

The production of wood in the landscape is to be made on the criteria of a sustainable resource utilisation. Possible implications are the certification systems of Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification Schemes (PEFC), [...]
Derivation of the total amount of biomass out of the landscape is subject to an in depth assessment.

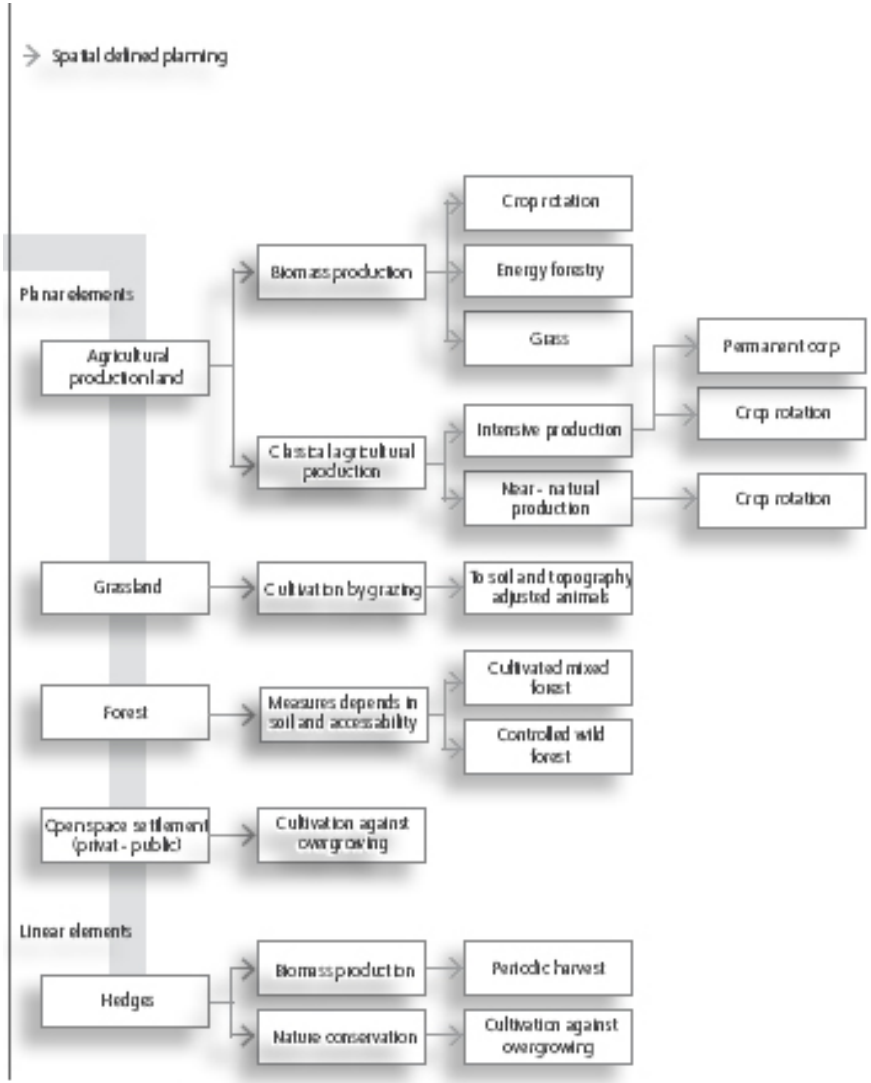
Scheme of alternating hedgerow-maintainence

Processing of biomass

Sources of biomass are:
– Wood taken from green structures along the street
– Wood taken out from the forest
– Hedge- rows in the landscape
– Wood from private garden maintenance
– Produced biomass from agricultural areas e.g. short rotation coppice, agro-forestry systems
– Shrubs and grass from the grassland area

Before the transformation process into heat energy or electricity the biomass needs processing into suitable forms for the power plant. [...] Forms of processing are the production of woodchips or pellets, the transportation and the storage of biomass. Depending on the power plant thermal energy and electricity can be generated on renewable basis.

Overview: Processmap [*extract*]



8. Feasibility at the example of Drienova

The estate of Drienova

Drienova is a city district of Banská Štiavnica. Around 60 % of Banská Štiavnica's inhabitants live there. The buildings are made with precast concrete slabs (Paneláks), which is typically for the communist era.

The district Drienova is a central heated. At the moment the heating plant is gas-fired and the heat-supply of the flats takes place with long-distance heating. Long-distance heating is a grid of pipes to deliver energy in form of hot water into the building blocks. Due the existing infrastructure is it comparable easy to exchange to gas-fired plant against a biomass-fired plant.

In general it is possible to produce heat and electricity with biomass in the same plant. Due a lack of data and a lack of time the following research is on a general basis. Also economical calculations related to the power plant and the improvement of infrastructure would be very interesting. This is subject to an in depth research.

Aim of the following calculation is the approval of feasibility to heat a whole district based on biomass.

The calculation is based on figures out of the energy concept for Banská Štiavnica (Fabian & Vanko P.16). The following calculations are done under the premise that 50% heating energy is saved because of insulation of the buildings and technical improvements. This assumption follows the first guiding principle "efficiency".

[...]

Average gas consumption

It is unclear if the heat demand relates to the gas consumption in 2003 or 2005. Therefore the amount of energy is derived from the average gas consumption of 2003 and 2005.

Origin natural gas has different caloric values (http://www.erdgasinfo.de/582.asp, 25.07.09). The caloric value is the amount of energy in one m3 of natural gas.

Average Heat- / Gasconsumption (2003 and 2005):					
	Heat			Gas	
Drienova ∑ -50%	24334,5	GJ/year		756522,5	m³/year
Conversion factor GJ in MWh:	6759,58	MWh/year	B13/3,6		
Assumed energy content of natural gas:					
Gross calorific value:	9,8-11,5	kWh/m³			
Lower calorific value:	8,8-10,4	kWh/m³			
Average lower					
calorific value:	9,3	kWh/m³	(9,8+8,8)/2	0,0093	MWh/m³
Energy consumption in MWh / Jahr related to the gas-consumption (Average from 2003 and 2005):					
				7035,66	MWh/year

Table 2: Calculation of the energy consumption derived from gas consumption

The average consumption of natural gas in Drienova, would be around 756522 m3/year if all the buildings were isolated. Converted into MWh 7035 MWh/year were necessary to heat the buildings in Drienova.

Calculation	Value	Unit	Formula	Value	Unit
Energy requirement MWh / year related to the gas consumption (average from 2003 and 2005)					
				7035,66	MWh/year
Starting values für energy content of woodchips:					
Wood moisture:	30%				
Quota of coniferous wood:	60%				
Quota of hardwood	40%				
	Uncompressed volume Sm3	t	tatro	MWh	
Spruce	1	0,25	0,17	0,847	
Beech	1	0,39	0,27	3,388	
Calculation of the required uncompressed volume woodchips:					
Dispersion of wood	60/40	% / MWh			
Energy content	1,8634	MWh / Sm^3			
Uncompressed volume:	13110,25	Sm^3 / year			
Required uncompressed volume woodchips:				13110,25 Sm^3/year	

Table 3: Calculation of required biomass

The total amount of biomass is derived from the assumption that 60% of one m3 woodchips are spruce and 40% are beech. The conversion factors of the energy content of wood are taken from “Energieholzproduktion in der Landwirtschaft”.
For the heating supply in Drienova are 3776 m3/year of biomass in form of woodchips necessary. Preconditions are measures to save heat energy. Without energy saving measures around 7551 m3/year are required to heat Drienova.
The total available volume of biomass in Banská Štiavnica is estimated around 6500 m3 (Fabian & Vanko P.18). It is possible to heat Drienova based on biomass, if energy saving measures are taken.

9. Funding opportunities

Funding on European Union level

- Introduction

The funding of sustainable energy projects relates to the action of the European Union against climate change. [...] The use of renewable energy in form of biomass is correlates between energy-topics and environmental topics. Therefore energy and environmental programmes are relevant for the project “Landscape as a Goldmine”.

- Intelligent Energy Europe (IEE)

Intelligent Energy Europe (IEE) is one programme out of a pool of programmes related to transport and energy. [...]

- ELENA

The European Local ENergy Assistance will assist cities and regions in developing their sustainable energy investment projects and mobilising investments. [...]

- JASPERS

[...] Jaspers supports the preparation of infrastructure projects. Aim of the programme is to assist the preparation of major infrastructure projects, which will be supported by the EU Structural Funds and the Cohesion Funds. [...]

- LIFE +

LIFE+ is a programme coordinated by the Environment Directorate-General. [...] 250 Mio are available for projects [...]

Funding on national level

- Rural development plan (2007-2013)

The rural development programme corresponds with the rural development plan, [...]

- Rural development programme of the Slovak Republic 2007-2013

The programme applies to the entire territory of Slovakia. Banská Štiavnica is located in the Banska Bystrica region, which is defined as a significant rural region. This classification is important for the amount of possible support.
The overall objectives of this program are:
Embedded into the framework of these [following] four axes are several measures. [...]

- Axis 1: Improving the competiveness of the agricultural and forestry sector
  Priority of axis 1 supports modernization, innovation and effectiveness of the agricultural and forestry sector. The measures are focused on technical aspects of agriculture and forestry: [...]
- Axis 2: Improving the environment and the countryside
- Axis 3: The quality of life in rural areas and diversification of the rural economy
- Axis 4: Running the local action group

Financing

• Operational Programme 'Competitiveness and Economic Growth'

This national programme is co-funded by European Regional Development Fond (ERDF) under the convergence objective. Managing authority is the Ministry of Economy in Bratislava. Aim of this programme is to maintain and to foster the competitiveness and efficiency of industrial production and the energy sector, while respecting the conditions of sustainable development. [...]

Priority Axis	EU Contribution	National Public Contribution	Total Public Contribution
Innovation and competitiveness	432 320 000	76 291 765	508 611 765
Energy sector	168 836 400	29 794 659	198 631 059
Tourism	146 680 400	25 884 706	172 564 706
Technical assistance	24 163 600	4 264 165	28 427 765
Total	772 000 400	136 235 295	908 235 295

Table 2: Funding of Operational Programme 'Competitiveness and Economic Growth'

• Operational Programme 'Environment'

This national programme is co-funded by European Regional Development Fond (ERDF) and the Cohesion Fond under the convergence objective. Managing authority is the Ministry of Environment in Bratislava. Aim of this programme is to strengthen the environmental aspects relating to sustainable development.

[...] Priority axis 5 covers the protection and regeneration of natural environment and landscape with 2.6 % of the total funding.

Priority Axis	EU Contribution	National Public Contribution	Total Public Contribution
Protection and Rational Utilisation of Water Fund (CF)	915 643 065	161 584 070	1 077 227 1355
Flood Protection (CF)	120 000 000	21 176 471	141 176 471
Air Protection and Minimisation of Adverse Effects of Climate Change (ERDF)	180 000 000	31 764 706	211 764 706
Waste Management (CF)	485 000 000	85 588 235	570 588 235
Protection and Regeneration of Natural Environment and Landscape (ERDF)	50 756 935	8 957 106	59 714 041
Technical assistance (CF)	48 600 000	8 576 471	57 176 471
Total	1 800 000 000	317 647 059	2 117 647 059

Table 3: Funding of Operational Programme 'Environment'

Conclusion - Funding

The above-mentioned enormous funding opportunities reveal the meaning of measures
related to sustainable development. The use of renewable-energy resources is integrative part of sustainable development. Starting from first project idea to implemented measures expenses are fully or partly co-financed by European-Union or Programmes from Slovakia. Especially the EU-programme seems to be very promising in relation to the development concept Banská Štiavnica 100% renewable till 2020.

10. Conclusion

In the last chapter we will sum up again. The two main problems in the region of Banská Štiavnica are as follows:
To stop the overgrowin-process is our first aim in region. As we have seen in the looming development, overgrowing has negative consequences and is a danger for the attractiveness of the landscape, the biodiversity and in long-term also for tourism. To break the money drainage and to develop an regional economic circle is our second aim.
The project outline “Landscape as a goldmine“ can solve this aims by floating the suggestion to implement the usage of biomass in the landscape.
The commercial advantage, out of biomass generation, is a new driving force for the region. As benefits, biomass generation can boost the regional development and will strengthen the local economy as well as the independence from energy imports.
But the integration into the landscape needs management: Sensitive encroachments upgrade the aesthetic image of the landscape and stimulate the biological diversity.
The calculations out of the short study are showing well that biomass can deliver Drienova and more areas to heat them with biomass out of the region.

Finally, we will close the brackets with the three pillars of sustainability:
The implementation will strengthen the economical structures, the identification of the population in the region through the gained independence and keeps the landscape scenery attractive with positive effects for tourism, local people and biodiversity.
In other words: Landscape is a goldmine.

11. References

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Imprint

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For more information about IMLA

HSR University of Applied Sciences, Switzerland
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Students

Agnieszka Gorniak I Christoph Dankers I Denise Ascione I Franziska Schüller I Juliana Aschwanden I Lars Wolfer I Louis Wenger I Markus Peter I Martina Tuda I Nils Pudewills I Qinyi Gu I Roman Häne I Sofia Lopez I Yvonne Keller

Supervisors

Prof. Dr. Frieder Luz I Prof. Christoph Jensen
Weihenstephan University of Applied Sciences

Documentation by

Franziska Schüller I Martina Tuda

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