Trail back to the landscape
- Reactivating the city of Heerlen with a landscape approach

Anyi Zhou  4119592  Landscape Architecture  P5

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1. Introduction
Hilly South Limburg
Mining South Limburg
Energy South Limburg?
2. Research question
2.1 Infrastructure line as an instrument to re-organize and re-develop the landscape.
Metaphor from mining based infrastructure lines

- The first railway for ON I to transport coal was built in 1896.
  - Still in use now

- The second railway was built for Mine Emma in 1910.
  - Demolished, part of the route is still one of the main roads today.

- Many rail structure into the mining sites was built between 1920 - 1960
  - Demolished.

- Main road to transport silver sand from ON IV from 1955.
  - Still in use.
What is infrastructure line?

Infrastructure line is far more than a technical object.

- An instrument for landscape perception.
- An instrument for energy projects.
- An instrument for urban development.
2.2 From traditional energy to renewable energy

Energy assignment of Green Metropolis: 56% of total energy demand is ‘renewable energy’
2.3 Shrinking problem as an opportunity for new landscape and city
Landscape perception

Infrastructure line

Landscape elements

New urban landscape

Renewable energy project

Urban development [shrinking city]

Precondition
3. Research and design method
4. Site analysis
About mining in Heerlen

Heerlen is one of the most important cities in Dutch mining history which gathers 5 of 13 mines in Netherlands. It remained largely agrarian until coalmining began in the late 19th/early 20th century. In 1901, the national government stepped in and set up the State Mines. In a short period of time several large state-operated coalmines began production. The population rose sharply from **6646 in 1900** to **32,263 in 1930**. The coalmines remained central to the development of Heerlen into a modern city until the early 1960s.

In the period 1965–1975 the coalmines were closed altogether. In the area around Heerlen-Kerkrade-Brunssum and Sittard-Geleen **60,000** people lost their jobs.
Existing landscape typology

1. Topography
2. Natural reservation landscape
3. Mining landscape
4. Urban landscape
5. Agriculture landscape

Potential

- Coal mine hill
- Woodlands in Brunssummerheide
- Sandquarry
- Castle Hoensbroek
- Heerlen downtown
Potential Energy typology

Windfarm in forest
Biomass plant
Solar fields
Mine water project
Problem statement

1. Lost identity
2. Vacant land and Forgotten landscape
3. Limited interaction between urban and landscape
4. Scattered green hearts

A dramatic urban growth during mining age based on mining industry leads to a special urban structure: a couple of mining centers scattered in the city which are forgotten by people after mining age.
5. Shrinking
5. Planning and design concept
To create a new green heart for Heerlen by a new path system.
Topography
Natural landscape
Urban landscape

Hoensbroek center

Hoensbroek castle

Urban village

Urban village

Urban village

Heerlen center

Urban village

Urban village
Energy landscape

- Biomass fields
- Mine water project
- Windfarm in woodlands
- Solar farm in industrial area
- Biomass field
6. Infrastructure network Typology Study
I For relationship between landscape and urban

Urban fabric (black lines) and path structure over landscape areas indicate the existing Relationship between landscape and urban area.
Current situation: limited accessibility to landscape and little interaction between landscape and urban

Goal: dynamic interaction between landscape and urban according to different landscape quality and configuration
7. Design experiment
1. Topography
To maximize the experience of height difference of hilly landscape.

Existing random paths in brunssummerheide

New paths connects the highest points in this area.

No accessibility to the highest coal mine hill of Heerlen

A new path directly leads to the top of the coal mine hill.
View range level 1:
Terrace in quarry
- panoramic view of quarry area

View range level 2:
View tower on coal mine hill
- panoramic view of Heerlen

View range level 3:
Wind turbine on highest hill
- vista of the region
2. Natural landscape

Emma mine park
Brunssummerheide
Woodlands act as 'wall' between urban and natural landscape in terms of spatial structure. To transform the architectonic separation into a buffer and entrance zone between urban, natural landscape and public space.

Existing random paths through Emma park

A new path starts from urban area to biomass fields through the park.

Existing random paths through Brunssummerheide

A new path shuttles through woodlands and new public spaces along it.
Special sunken path as entrance to woodlands
Path over hilly landscape in Brunssummerheide
To follow the historical traces from mining industry by new infrastructure lines.

Traces left from mining industry:

- Mining factory and facilities
- Mining rail
- Quarry lake shore line

Existing cycling path along the sand quarry

A new scenic path follows the edge of the quarry and connects the post-industrial facilities to transform them to recreational sites.
4. Urban landscape
‘villages in city’

To form a new urban configuration - ‘village in the city’
- by stepping back to the rural structure;
- by activating the vacant land by tracing rural structure.
Transformation from urban tissue to eco-village

Stage 1: Some of the inner urban blocks are transformed into green space (agriculture).

Stage 2: More urban blocks are transformed into green space (agriculture), a new village configuration is formed by buildings along main path structure with ‘village green’ inside.

Stage 3: Programs are invited to some of buildings which benefit both the local people and visitors. The space related to the programs along the main path becomes public at the same time.
Section A-A’

Before

Community garden

Meeting and education

Renewable energy

After

Case reference:
Ökodorf Sieben Linden, eco-village in Germany
Path as main structure for shrinking transformation
Urban village model
A new member on Dutch village list
5. Energy landscape

- Biomass fields
- Mine water project
- Windfarm in woodlands
- Solar farm in industrial area
- Biomass field
- Mine water project
To create ‘green urban block’ by new paths: an integration of energy landscape and urban area.
A typical case of ‘eco-village’.

Limited accessibility to vacant land and agriculture land

New functional path network goes through landscape by extending urban fabric.

Existing landscape will be activated and transformed to energy landscape.
Path as structure for energy landscape showcase
6. Master plan
New path system goes into different landscapes and activates various programs.
Shrinking areas show potential for landscape transformation.
A new green heart for city is expected to be developed with the structure of a new path system.
A new urban morphology 'green village in city' is formed around landscape or transformed from shrinking area.

Four pillars of ecovillages defined by the Global Ecovillage Network (GEN), which are Ecology, Social, Economy and Worldview. Not all of these are equally important all the time. Each should have its own dominated quality.
7 energy projects integrated with landscape and communities make the landscape productive again after mining age.
1. Windfarm in woodlands
   - 480 ha woodlands
   - 18 windturbines of 5 MW
   - 25200 households
   - 54% of all the households in Heerlen

2. Solar farm along railway
   - 23ha for solar panel
   - 4800 households
   - 10% of all the households in Heerlen

3. Biomass park in eco-village
   - 27 ha vacant land
   - 11 ha woodlands
   - 200-250 households

4. Proposed mine water project in eco-village
   - 300 dwellings

5. Existing mine water project
   - 330 dwellings
   - 33000m²

6. Windturbines in mine heritage site
   - 2 windturbine of 1.5 MW
   - 860 households

7. Biomass fields in eco-village
   - 21 ha vacant land
   - 150-180 households

Eco-village
Goal: Self-sufficient
9. Conclusion and Reflection
New path system as a network
New path system makes landscape accessible and contributes to a new relationship between urban and landscape
New path system as a new network of programs which connects existing and new landscape, social, culture and energy programs.
The new network stimulates urban growth around the landscape areas.
New path system as design interventions
Infrastructure line

Landscape perception

Energy project

Urban development [shrinking city]
Path as an object for experience
Path as entrance to landscape
Path as functional infrastructure for energy projects
Landscape perception

Infrastructure line

Energy project

Urban development [shrinking city]
Path as green corridor based on existing urban main roads
Path as connection of programs and gathering space
Path as structure for new urban form
10. Zoom in Design
10.1 Landscape path in sand quarry
1. Entrance from ring road
2. Recreation site - Former mining rail
3. Entrance to big lake
4. Bridge path along quarry edge
5. View stage as part of the bridge
6. Recreation site - Former mining factory
7. Wetlands along lake
Different layers of design elements to re-call and re-develop the post-industrial landscape

- Dots - Recreational sites from old buildings and facilities
- Lines - Path
- Lines - Plants
View points and sightlines
1. Entrance to small lake
2. View tower and water path - Mining shaft and rail
3. Entrance to big lake
5. View stage as part of the bridge
7. Wetlands along lake
10.2 Biomass park in eco-village

Transformation process of Eco-village: a sustainable self-sufficient community

Current situation: fragmented green area of a mine leftover

Central biomass park: test fields and research center

Urban fabric grows into the biomass landscape which creates boundary for a new urban park.

Eco-village: energy self-sufficient
Reference case: Jühnde
-first “bio energy village” in Germany

Since autumn 2005, the heat and electricity supplies for the village have been entirely harnessed from waste products collected from the surrounding fields, by feeding them into a one-of-a-kind biogas plant.
Bird's eye view of central biomass park
Going through different 'plant blocks' with different colors, smell and spatial quality. Knowing about how can they produce energy for our daily life.
Exhibition and education points along the main path provides information about energy corps and biomass energy combined with other programs.
Thank you !