One Dross is understood as a natural component of dynamically evolving As such it is an indicator of healthy urban growth.
WASTED ENERGY + WASTED LANDSCAPE
with regards to energy:
reduce entropy by capitalizing on exergy

From Andy van den Dobbelsteen:
“Energy is everything, and as we know from thermodynamics, energy is never lost. But as the Second Law of Thermodynamics states: all processes lead to a greater state of entropy [disorder-ed]. Exergy diminishes while entropy increases. Exergy is the part of energy by means of which you can perform work, so it’s actually the quality part of energy, whereas entropy is the waste. Together they make up the total energy.”

with regards to landscape:
reclaim wasted landscapes for energy creation and creation of spatial cohesion

From Alan Berger:
“Wasted landscapes are a natural outcome of growth and success in a city, and, they are not bad, but they should be considered and planned for. Once the waste landscapes are identified, it will be the job of the entrepreneurial design professional to integrate and re-use these spaces in the urban world.”
UNDERSTANDING THE CONDITION OF DROSS

Space in the city that could benefit from reprogramming for adaptive reuse.

DROSSCAPE SURFACES AS A BYPRODUCT OF RAPID URBANIZATION AND HORIZONTAL GROWTH URBAN SPRAWL.

These spaces arise as a consequence of defunct economic and production systems.

According to Berger:

“Adaptively reusing this waste landscape figures to be one of the twenty-first century’s great infrastructural design challenges.”

These waste places have risen from deindustrialization as well as industrial growth, the latter having replaced old technologies with new ones... leading to “creative destruction”, or the abolishment of the obsolete.
SITTARD-GELEEN : TWO CITIES GROWING TOGETHER
Geleen residents:
- 32.3% work in Geleen
- 19% work in Sittard
- 14.7% work in Parkstad Limburg
- 11.4% work in Maastricht

size: 1.963 ha
households: 15,680
population: 32,444
SITE: PAST
the largest mine in Europe
History and Data
Production 1926 - 1967: 96,214,000 ton.
Locality of mine site: Lutterade/Geleen.
Number of shafts: 2, later (1958) expanded to 3.

In 1911 the Dutch Government bought the concessions “Maasvelden”. In 1912, and 1913 drillings were carried out by the Internationale Bohrgesellschaft Erkelenz in the areas west of the Emma and Hendrik concessions. Drillings were made at the towns of Geleen-Lutterade, Krawinkel and Schinnen. Additional shallow drillings were made near Urmond.

In 1915 it was decided to position the mine at Lutterade, community of Geleen. Railways were constructed for connection with the railway Sittard-Maastricht. In 1916 it was decided to name this 4th State Mine “Maurits”, after a famous 17th century member of the Dutch Royal Family.

In 1916, construction of the shafts was begun. The mine was taken in production in 1926. In 1947 the mine was connected to the Emma Mine by a 13 km straight tunnel. In the second half of the 1940’s and in the 1950’s the mine was expanded, and mining reached a depth of 810 m. A third shaft was completed in 1958. At the time of completion of the third shaft, the Maurits mine was the largest two-shafts mine in the world. It was the largest coal mine in the Netherlands. When in the beginning of the 1960’s the economic tide for coal mining turned, it was already anticipated to close the Maurits as one of the first mines. The mine was finally closed down in 1967. The surface facilities were afterwards demolished.

Directly adjacent to the mine site, DSM had already decades before started with cokes production and gasproduction. The “Stikstof Bindingsbedrijf” (SBB - or “nitrogen bonding plant”) became the locus for the next step in the history of DSM: it became (and still is) a large chemicals company.
Chemelot is more than just an industrial park. It is a unique chemical and materials community that ensures accelerated business growth through the open exchange of ideas. At Chemelot, various world-renowned companies are creating the most successful and innovative chemical and materials community in the Netherlands. Innovative chemistry begins here.
Chemelot

90+ companies

Research & Development
Start-up
Established Business
Service Provider

large chemical industrial complex

size 800 ha
jobs 6,500
visitors 1,000

Note: start years refer to years when production started. End years refer to closure in the cases of coal and coke, and 2010 in the case of plastics.
Logistics

Airports of Maastricht Aachen, Brussels, Düsseldorf, Köln-Bonn and Liége are located within a circle of 100 km.
The highways A2 (Amsterdam-Eindhoven-Liege) and A76 (Antwerp-Köln) are directly connected to Chemelot’s gates.
The railway Maastricht-Eindhoven has a direct link to the internal railnet of Chemelot.
The waterway Julianacanal is at a distance of 3 km of Chemelot and connected with pipelines, roads and a Chemelot owned railway.
Pipelines connect Chemelot with the seaports of Rotterdam and Antwerp, but also with the Rhine/Ruhr area.
Several logistic service providers, located on Chemelot or direct surroundings can take care of the product flow of investors on Chemelot.

Feedstocks

Naphta and gasoil are processed to plastics; several components are available for co-siting options. This is also valid for the natural gas chemistry, leading to ammonia, ureum, fertilizers, organic chemical products, fine and specialty chemicals. Other feedstock can easily be transported via ship, railcar or truck. The site logistics are in place.

Utilities

Delivery of electricity, steam (several pressures), natural gas, nitrogen, oxygen, instrument air and compressed air, drinking water, raw water, demin water ; intake of steam, waste gas, carbon black oil, residues. Support in Emission Trading system Europe.

Storage

Most site users of Chemelot invest in their own logistic assets. There is a tendency for logistic service providers to invest in storage and warehousing on the Chemelot site. Outside the Chemelot site various assets and services are in place and developing.

Number of Employees

The Chemelot site users employ directly 6500 people. Another 1000 jobs have been created on Chemelot, and realised by external service providers. 1500 people visit each day.

Available Land

For chemical investments 50 ha of land is still available. Another 50 ha is available for chemical/industrial service providers. Most of the land is brown field with co-siting opportunities. On the Research & Business Campus office space and laboratories can be rented for start up companies.
demarcated as "landscape" but its inaccessible...
no integration of campus into structure vision for 2020
the region’s relationship to chemelot (acceleration) + chemelot’s plans for itself (masterplan)

Three parties, the Province of Limburg, the University of Maastricht, together with the Medical Center (MUMC+) and DSM Nederland have taken on the plan of developing a master plan for the Material Science Campus Chemelot and recorded this in a letter of intent in March 2010: “The Chemelot Campus will be the ultimate Euroregion location for business and educational- and research organizations in the Material Sciences. One location where entrepreneurs and top researches love to work and where students enthusiastically gain their first practical experience and where the focus is on open innovation. In 2018, over 2000 knowledge workers will be located at the Chemelot Campus, a strong cluster of international stature”.

The Acceleration Agenda for 2008-2011 has the ambitious aim of further upscaling and acceleration of this successful development at the Chemelot R&B Campus. The key to this successful development is mainly the co-operation between Chemelot’s Industrial Park and the Chemelot R&B Campus and the innovative programmes implemented by DSM at the campus. With national and provincial support, Chemelot will collaborate to promote new economic activity, to better coordinate education and industry, and to raise awareness of the possibilities offered by new materials. The aim is for the R&B Campus to become one of the top three in Europe.

Employment
An increase from 1000 FTEs at present to more than 2000 FTEs (knowledge workers) after 2015.
Gate 1 (Freight Entrance, North)
Gate 2 (Campus Entrance)
Gate 3 (Drie Kruiken) - Closed
Gate 4 (Maurits 1) - Closed
Gate 5 (Kerenshofweg Entrance)
Gate 6 (Beekerveld Freight Entrance)
Gate 7 (Main Entrance, South)
edge conditions
chemelot in the background
lack of buffer, harsh edge transition
romantiscizing the site
ENERGY RELATED: chemelot

MINEWATER

CO2 STORAGE

HEAT CASCADE/EXCHANGE

GREEN NET

The "Mine water project" aims at pumping up warm water from great depth out of abandoned coal mines for heating purposes.

At Heerlen the tunnel system of the mine Oranje Nassau III is used for this. The project was dual Dutch and English. In Great Britain the project was carried out at Midlothian. The UK-side however stopped their part of the project. In the Netherlands the project is continued. After successfully reaching two tunnels of the ON-III-mine, and the observation that the water temperature was sufficient for the goals set, the project was expanded.

At October 1, 2008 the first mine water energy plant in the world has been opened at Heerlerheide.

The energy plant will, first as a test, deliver warmth and cooling to the new nearby housing complex "Gen Coel". It will not remain restricted to this. In the future, also the office buildings of CBS and APG (formerly ABP) will be available for mine water energy.

The mine water project is the first geothermal project in the Netherlands. The interest in geothermal energy as a sustainable energy source has risen enormously since the start of the mine water project. Also in other parts of the world the project is looked at with great interest. The concept of course can be used also in other former mining areas.

How does CO2 storage work?

The CO2 is directly from the ammonia plant is captured and injected into the ground at over 1800 meters deep. This is more than one kilometer below the deepest existing mine. Sandstone and coal layers, the CO2 in the rock spread. A compressor in the ammonia plant is all that is needed and of course a smart metering plan.

When does it happen?

In 2009, first started with the various licensing procedures and the substrate accurately mapped. The project is expected to begin in early 2011 the first hole that will provide much additional information. This test is still very limited and small, and must first prove that everything works.

Early 2013, the entire system to be operational. The plan is for 10 years from that moment in time more than 2 megatons of CO2 permanently store.

Is it safe for humans and the environment?

Yes. The CO2 will in fact after a few years forever bound in the soil at great depths. One part is again part of the sandstone and much adheres to the deep coal seams. A comprehensive monitoring plan ensures that we always know where the CO2 is.

In recent years, cascade use of heat energy, so-called “heat cascading”, in the industrial sector is expected to be one of the promising measures for improving the energy efficiency of regional energy demand system.

Heat cascading is interpreted as conversion of waste heat energy at high temperature levels to heat demand at lower temperature levels or electricity demand in manufacturing processes of industries.

Since the oil crises in 1970s, heat cascading has contributed to energy savings particularly in four major energy intensive industries, i.e. iron & steel, cement, paper & pulp and ethylene industries.

The improvement of energy efficiency in the industries, however, became stagnant, because most conventional technical measures were already introduced in each of these industries.

Further energy savings can therefore be brought about only by interconnection of waste heat supply and energy demand between different industries.

Green Net is a local sustainable energy network in formation.

Through an underground pipe network sustained heat from Biomass Power Plant Sittard (BES) and waste heat from industrial Chemelot used for heating and cooling homes and businesses in Sittard-Geleen, Beck and Stein.

Companies in the Green Net are connected permanently reduce their energy costs. Also they do not (re) invest in their own heating or cooling.

Moreover, connecting to Green Net also interesting for the socially responsible business.
ENERGY RELATED : spatial
past
present
future
METHOD
THE SITE AT THE CHEMELOT CAMPUS CAN BE A CLUE TO SOLVING THE CITY’S PROBLEMS

3D SPATIAL ANALYSIS WILL BE THE STARTING POINT FOR DESIGN
TO CREATE A NEW SPATIAL COHESION

TO CHANGE THE RELATIONSHIP OF CHEMELOT TO THE CENTER OF GELEEN

TO CREATE A PRODUCTIVE PERFORMATIVE LANDSCAPE FROM WASTED SPACE
(that used to produce 700million kWh/yr)

ECOLOGICAL
phytoremediation
phytodemarcation

SPATIAL
expand the green network of the city
establish new civic space

RECREATIONAL
connect existing paths
add recreational space for all age groups

PRODUCTIVE
energy
biomass

GOAL
CHEMELOT ENERGY CONSUMPTION
**ELECTRICITY**

40%
Limburg

**NATURAL GAS**

4-5%
Netherlands
15% of 500MW = 75MW = 657,000 MWh/yr

on site:
12 x 16,300 MWh = 195,600 MWh/yr
1 x 7.5 MW geothermal plant = 51,000 MWh/yr

*requires 25 more wind turbines along the highway or elsewhere to produce the remaining 411,000 MWh/year*
SPATIAL STRUCTURE ANALYSIS
1. disused industrial zone
2. town gateway
3. urban fabric

three intervention zones
1. disused industrial zone

2. town gateway

3. urban fabric
underground mine shafts

former staatsmijn maurits (demo’d)

present chemelot layout

future site interventions

LAYERS
1. road alignment

2. landscape islands

3. new town gateway

4. urban fabric

5. production zone

- disused industrial zone into redevelopment zone with mixed use and civic space
- dross islands into landscape corridor
- addition to civic space, relocation of police station, opening of view
- remove highrise blocks and parking lots and replace with properly scaled mixed use
- new accessible energy production and energy transfer zone
align car road

redvelopment commercial zone

city park

new pedestrian path

town gateway

new mixed use

- hotel
- university buildings
- research offices
- student housing
- restaurants
- daycare
- parking
- public plazas
- server farms

+ hotel
+ university buildings
+ research offices
+ student housing
+ restaurants
+ daycare
+ parking
+ public plazas
+ server farms

tram connection to research campus

civic space
THANK YOU