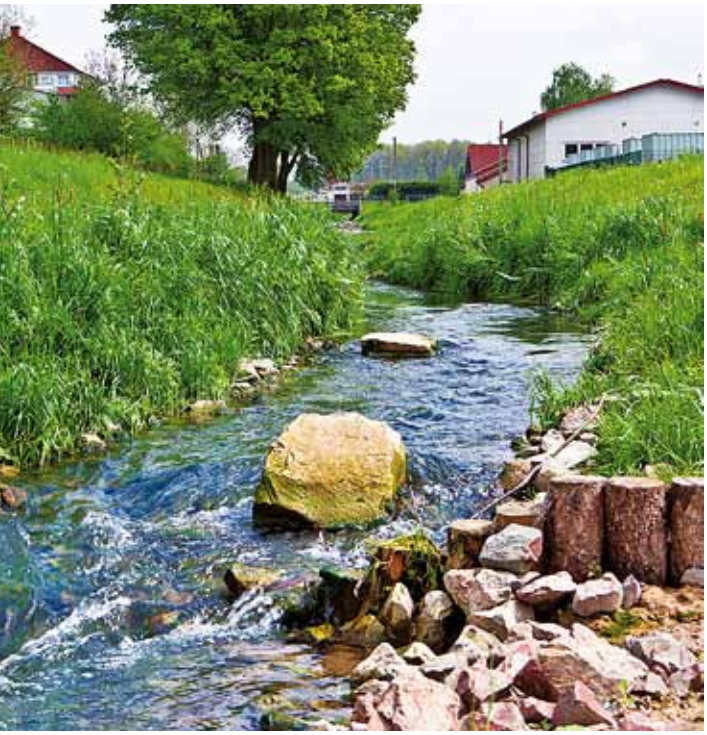


ADAPTATION COMPASS

Future Cities

urban networks to face climate change

Supplement
Explore Adaptation Options

Types of measures
Fact sheets on structural measures
Fact sheets on raising awareness measures

Contents

The Future Cities partners want to hand on their experiences gained, lessons-learned and problems encountered to other cities or regions in North-West Europe. During five years of intense cooperation, the partnership developed and implemented a variety of measures to make their cities and city regions fit to cope with climate change. In the Future Cities Adaptation Compass, these experiences are presented together with a structured and understandable approach which shall support cities to identify their own adaptation strategy.

This supplement brochure compiles the concrete experiences of the Future Cities partnership.

The information is part of the Future Cities Adaptation Compass – within the module "Explore Adaptation Options". In this module a database of adaptation options as well as of combinations of different options is given and evaluated: what types of adaptation measures exist for the urban scale? Which combinations are possible and efficient?

General information is provided for each type of measure, e.g. the category "green structures" is split up in the types "green roofs", "green walls" and "green open spaces". Fact sheets inform about the Future Cities measures. They document the technical description and practical experience of Future Cities pilot projects. For example the synergies and conflicts encountered because of other adaptation and mitigation measures are named.

Altogether 28 structural measures and 22 raising awareness activities are structured according to 11 types of measures.

More information about the Future Cities-project and the Adaptation Compass: see the main Guidance document and www.future-cities.eu

Disclaimer: The information is based on the experience of the Future Cities-partnership. It is not necessarily comprehensive, complete, accurate or up to date.

Status of information: December 2012

PART I: OVERVIEW OF MEASURES
Types of structural adaptation measures

Type of measure		Description as used in the Future Cities Adaptation Compass	Page
GREEN STRUCTURES: In the Adaptation Compass this category refers to adaptation measures dealing with the installation of green features (flora) in the city.			
	Green roofs	Roofs of buildings covered with vegetation	9
	Green walls	Walls (of buildings) covered with vegetation	10
	Green open spaces	Parts of cities not built upon, (partly) covered with vegetation	11
WATER SYSTEM: This category comprises adaptation measures dealing with water in the city, e.g. the integration of water bodies or the improvement of water management.			
	Water retention	Elements of the urban water system meant to delay the discharge of rainwater	12
	Water drainage	Elements of the urban water system that function for draining rainwater	13
	Urban water spaces - flowing	Open water elements in the urban environment with flowing water	14
	Urban water spaces - standing	Open water elements in the urban environment with standing water	15
ENERGY EFFICIENCY AND MITIGATION: In the Adaptation Compass the category comprises measures to reduce energy consumption and to use renewable energy as complementary actions to adaptation.			
	Increase energy efficiency	Less energy need for the same results in the urban structure, water and green structures	16
	Renewable energy	Measures for using renewable energy sources in the urban environment	17
URBAN STRUCTURE is in the Adaptation Compass a category for adaptation measures addressing the whole city and its morphology, i.e. the city build-up as well as its elements and materials.			
	Urban setting	Measures addressing the elements of the urban environment in their configuration	18
	Urban texture	Measures addressing the urban surfaces related to their material	19

Fact sheets on structural measures

Fact sheets inform about the implemented measures in Future Cities. They document the technical description and practical experience of Future Cities pilot projects and lessons learned: e.g. spatial characteristics of the measure – such as scale (region, town, quarter etc.) and use (city centre, business, residential), the adaptation problems which can be addressed with the measure and the synergies and conflicts encountered with other adaptation and mitigation measures or other sustainability aims.

The implemented adaptation measures cannot be connected with only one type or category of measure. In theory, the types of measures described have a very clear focus but all measures affect their surroundings in a variety of ways. For the implemented measures in Future Cities one major type was determined by its pattern and further types are additionally given remarking the further positive impacts of the options.

Name / Location	Types of measures											
	Green roofs	Green walls	Green open spaces	Water retention	Water drainage	Urban water spaces - flowing	Urban water spaces - standing	Increase energy efficiency	Renewable energy	Urban setting	Urban texture	Page
 Green roof De Tweeling, Nijmegen, NL	●			●				●			●	20
 Green and brown roofs, Hastings, UK	●			●				●			●	21
 Green roofs - Town Hall, Nijmegen, NL	●			●				●			●	22
 Green roofs Latenstein, Tiel, NL	●			●				●			●	23
 Green wall Inner city, Nijmegen, NL		●		●							●	24
 Green public courtyards, Nijmegen, NL			●	●							●	25
 Cool Nature Park, Tiel, NL			●	●						●	●	26
 Slowed run-off Wvi, Ieper, BE			●	●	●		●					27
 Business park Boytal, EG, Bottrop, DE			●	●	●							28
 Use of rainwater, Wvi, Ieper, BE				●	●							29
 Adapted infrastructure, Rouen, FR			●	●	●						●	30
 Infiltration De Vloei Wvi, Ieper, BE	●	●	●	●	●							31

Name / Location	Types of measures											
	Green roofs	Green walls	Green open spaces	Water retention	Water drainage	Urban water spaces - flowing	Urban water spaces - standing	Increase energy efficiency	Renewable energy	Urban setting	Urban texture	Page
 Water Vision, Nijmegen, NL			●	●	●	●	●		●	●		32
 Water study De Vloei, Wvi, Ieper, BE			●	●	●		●					33
 Green-blue corridor, LV, Kamen, DE			●	●	●	●						34
 Water square Vogelbuurt, Tiel, NL			●				●					35
 Location, orientation, Hastings, UK								●		●		36
 Sustainable energy system, Ieper, BE								●	●	●		37
 Less fossil energy use, EG, Bottrop, DE								●				38
 Low energy houses, Wvi, Ieper, BE								●		●		39
 Rewenable energy Rouen, FR						●			●	●		40
 Cold - heat storage, Tiel, NL				●	●				●			41
 Cold - heat storage, Arnhem, NL					●				●			42
 Energy map / -strategy, Arnhem, NL									●	●		43
 Strategy underground, Nijmegen, NL			●	●	●				●			44
 Ambition note Wvi, Ieper, BE	●	●	●	●	●	●	●	●	●	●	●	45
 Climate dike, Tiel, NL			●			●				●		46
 Urban planning, Wvi, Ieper, BE	●	●	●	●	●	●	●	●	●	●	●	47

Fact sheets on raising awareness measures

The Future Cities partnership has implemented many measures to raise awareness for the topic of adaptation in general, to support the implementation of structural adaptation measures and to change the behaviour of the citizens. These actions are described in the Raising awareness fact sheets in the Adaptation Compass.

They comprise a description of the measures, the experiences made and the target groups approached. The examples are structured into the types of target group integration:
Inform: the role of the target groups is observer / listener.
Consult: the target group gives advice.
Co-produce: the target group functions as co-partner in implementing.

Name / Location	Type of target group integration			
	Inform	Consult	Co-produce	Page
 Energise Hastings Hastings, UK	●	●	●	48
 Sustainable storm-water management, Emschergenossenschaft, DE	●	●	●	49
 Enviro21 business park, Hastings, UK	●	●	●	50
 Twinning - international capacity building, Future Cities-partners, North-West-Europe	●	●	●	51
 Cooperation with professional schools, West Vlaamse Intercommunale, BE		●	●	52
 Green Allure inner city, Nijmegen, NL	●		●	53
 Study & site visits, West Vlaamse Intercommunale, BE	●		●	54
 Involvement of local partners, West Vlaamse Intercommunale, BE	●		●	55
 Educational programme, Tiel, NL	●	●	●	56
 Watergame Tiel, NL	●	●		57

Name / Location		Type of target group integration			
		Inform	Consult	Co-produce	Page
	Guideline Climate Change, Emschergenossenschaft, DE	●	●		58
	Interactive website, West Vlaamse Intercommunale, BE	●	●		59
	Climate change conferences, Emschergenossenschaft, DE	●	●		60
	Plan Advice Team, West Vlaamse Intercommunale, BE		●		61
	Facing up to Climate Change Seminar, Hastings, UK	●			62
	Climate campain Our green heart, Nijmegen, NL	●			63
	Information sessions on sustainability, West Vlaamse Intercommunale, BE	●			64
	Water awareness, Arnhem, NL	●			65
	Information exchange, West Vlaamse Intercommunale, BE	●			66
	Special edition of Journal Green about Nijmegen, NL	●			67
	Presentation of Luciline programme to potential investors, Rouen, FR	●			68
	Energy Market Green Living, Nijmegen, NL	●			70

PART II: TYPES OF MEASURES

Type: Green roofs

Category: Green structures

Roofs of buildings covered with vegetation

Description

Roofs covered with soil and plants. Systems range from extensive green roofs, intended to be self-sustaining, minimise maintenance, to intensive green roofs with higher soil layer for including shrubs and trees.

Spatial scale

Building level; Network of buildings; City quarter/street (especially business area); A network of buildings (at least 30.000m² - Kuypers, University of Wageningen) may influence the urban heat island effect.

Problems addressed

- Heat/Extreme cold: Thermal insulation layer cools in the summer and keeps the warmth in the winter
- Heavy precipitation: Increased decentralised water retention
- Heat/Drought: Network of green roofs in a city quarter improves air quality and microclimate

Combination with other types of measures

- Water retention
- Increase energy efficiency
- Urban texture

Implementation – functionality issues

Structural restrictions of existing roofs have to be observed: light-weight extensive green roofs or (more costly) structural reinforcement might be needed for intensive green roofs.
New buildings can be planned and constructed adequately from the beginning including ventilation etc.

Further Benefits

- Combination with energy strategies/mitigation measures: Improved insulation: Effects for mitigating depends on type of heating used.
- Increased CO_2 uptake lowering fine dust loads in the air
- Increase biodiversity - depending on the type of roof and plants used and the urban environment
- Improved liveability and attractiveness of urban surroundings: e.g. for work spaces
- Green roofs have a longer lifetime than conventional roofs.

Economic issues

A basic green roof costs 30-50 Euro/m² (2007).
Saving costs if there are charges for rain water discharge: About 50 % of the rain water precipitation might be held back - depending on the plant layer and the season (summer-winter) (Praxisratgeber Regenwasser Emschergenossenschaft).
Saving costs due to the longer lifetime.

Acceptance

If funding is available, acceptance is higher than if private owners or investors have to pay fully.

Possible obstacles

- Lack of resources
- Resistance of administration
- Lack of knowledge and lack of acceptance
- Structural preconditions and existing slope
- Monument conservation
- Combination with renewable energy measures (solar panels) can be difficult.

Find examples in Structural Fact Sheets

Green roof
De Tweeling
Nijmegen, NL

Green and
brown roofs
Hastings, UK

Green roofs
Town Hall
Nijmegen, NL

Green roofs
Latenstein
Tiel, NL

Infiltration
De Vloei
Wvi, Ieper, BE

Ambition
note
Wvi, Ieper, BE

Urban
planning
Wvi, Ieper, BE

Type: Green walls

Category: Green structures

Walls covered with vegetation

Description

Vertical parts of the urban environment, e.g. facades of buildings, covered with vegetation. Mostly, the green walls are whole facades or parts of the facade that are covered with plants. The plants can be rooted in the ground or be planted in boxes on different levels of the building. Depending on the type of plants railings are necessary as climbing support.

Spatial scale

Building level; City quarter/street

Problems addressed

- Heat/Extreme cold: Green facades improve primarily the microclimate of a building/close neighbourhood
- Heat/Drought: The plants take up CO_2 and fine dust from the air and improve air quality locally
- Heavy precipitation: Green walls contribute to decentralised water retention

Combination with other types of measures

- Green roofs
- Water retention
- Increase energy efficiency
- Urban texture

Implementation – functionality issues

Construction is possible directly attached to the building or as freestanding structure.
Plant types and water system need to be chosen with care and depend on the local situation.
Buildings need to be checked for stability.
Leafage, air cushion and evaporation downsize the heating-up of the house wall by intense solar radiation and, in case of indeciduous plants the loss of heat during winter. Deciduous plants allow gain of solar warmth in winter. Damage of the walls is not expected when the wall is intact and without cracks.
Leafage helps to protect walls, e.g. against deterioration due to solar radiation.

Further benefits

- Combination with energy strategies/mitigation measures: Improved insulation: Effects for mitigating depends on type of heating used.
- Increased CO_2 uptake lowering fine dust loads in the air
- Increase biodiversity - depending on the type of roof and plants used and the urban environment
- Improve liveability and attractiveness of urban surroundings: e.g. for work spaces.

Economic issues

Investment costs, maintenance and costs for watering; savings.

Acceptance

Often acceptance is low due to lacking knowledge: owners think that facades might be destroyed by plants; the inhabitants often approve the measure due to positive visual aspects. Stakeholder involvement is useful.

Possible obstacles

- Irrigation is needed during heat and drought periods: most effective plants with high vegetation mass need most water
- Plants need to be suitable for the location, e.g. high air pollution might cause damages to the plants
- The construction and plants might be sensitive to extreme events like storm
- Any additional vegetation mass might cause more maintenance for the cleaning of streets and the drainage system etc.(Might increase flooding because of blocked drainage pits)
- May conflict with mitigation systems (solar energy harvesting).

Find examples in Structural Fact Sheets

Green wall
Inner city
Nijmegen, NL

Infiltration
De Vloei
Wvi, Ieper, BE

Ambition
note
Wvi, Ieper, BE

Urban planning
Wvi, Ieper, BE

Type: Green open spaces

Category: Green structures

Parts of cities not built upon, covered with vegetation

Description

Parts of cities not built upon, e.g. courtyards, parks, alongside water bodies or streets, which are at least partly covered with vegetation. They can be of different sizes.

Spatial scale

Building level; City quarter/street; City; Region - depending on size and location of the green space.

Problems addressed

- Heat: Cooling effect: In daytime by shading and evapotranspiration for surrounding area; in night time by accumulation of cold air and ventilation. Green open spaces can lower heating up and decrease heat island effects.
- Heavy precipitation: Increased water retention

Combination with other types of measures

- Water retention
- Urban setting; Urban textures

Implementation – functionality issues

- Development is subject to available spaces
- Time is needed for the plants to grow and to achieve full effectiveness.
- Effectiveness of existing green open spaces can be enhanced choosing appropriate plants/design (e.g. meadows with bushes or loose tree population).
- Cooling effects appear with a minimum park size of 2.5 hectare; the effect reaches approx. as far as the diameter of the park. Smaller green areas can contribute to reducing heat islands if linked closely and arranged in an appropriate pattern.
- Ventilation paths shouldn't be blocked.

Further benefits

- Increased CO_2 uptake lowering fine dust loads in the air
- Increase biodiversity - depending on the type of roof and plants used and the urban environment
- Improve liveability and attractiveness of urban surroundings: e.g. for local recreation
- Shading might prevent damage of materials, e.g. roads

Economic issues

Planting and maintenance costs (e.g. including vegetation mass and tree maintenance)

Acceptance

The acceptance of green open spaces might be decreased when citizens are afraid of noise and littering or when conflicting with other urban uses. The involvement of all stakeholders is crucial.

Possible obstacles

- Extreme weather/storm events: danger of falling branches (maintenance needed); damages to the plants.
- Droughts: during dry periods, irrigation might be needed.
- Conflicts with other usage of space, e.g. parking lots.
- Closed roof of leafs might block air exchange and can lead to an accumulation of air pollutants.
- Leaves may block gullies and can lead to local flooding.
- Risk of costly damages for underground infrastructure because of roots grows.
- Use not intended (noise, littering) can lead to problems with the neighbourhood.

Find examples in Structural Fact Sheets


Green public courtyards Nijmegen, NL


Cool Nature Park Tiel, NL


Business park Boytal EG, Bottrop, DE


Infiltration De Vloei Wvi, Ieper, BE


Water Vision Nijmegen, NL


Slowed run-off Wvi, Ieper, BE


Adapted infrastructure Rouen, FR


Water study De Vloei Wvi, Ieper, BE


Green-blue corridor LV, Kamen, DE


Water square Vogelbuurt Tiel, NL


Strategy underground Nijmegen, NL


Ambition note Wvi, Ieper, BE


Climate dike Tiel, NL


Urban planning Wvi, Ieper, BE

Type: Water retention

Category: Urban water systems

Elements of the urban water system meant to delay the discharge of rainwater

Description

Measures in the urban water system which slow down rain water (storm water) drainage, including decentralised storage/ retention.

Spatial scale

Building level; City quarter/street; City

Problems addressed

- Heavy precipitation/Floods: buffering of rain water, storm water flooding can be reduced;

Combination with other types of measures

- Green roofs
- Green open spaces
- Water drainage, urban water spaces flowing, urban water spaces standing
- Urban setting

Implementation – functionality issues

Close relationship with all parts of the urban water system

Further benefits

- May be combined with recreational use and water art work to create awareness.

Economic issues

The costs vary according to size and complexity of a measure or a pool of measures

Acceptance

Acceptance for implementation on private grounds may be low due to costs, public funding can increase acceptance. Social acceptance for implementation on public space depends on possible conflicts with other urban uses.

Possible obstacles

- Available space/conflicts with other urban (underground) uses may arise.

Find examples in Structural Fact Sheets

Slowed run-off
Wvi, Ieper, BE

Use of rain water
Wvi, Ieper, BE

Water Vision
Nijmegen, NL

Business park Boytal
EG, Bottrop, DE

Adapted infrastructure
Rouen, FR

Infiltration De Vloei
Wvi, Ieper, BE

Water study De Vloei
Wvi, Ieper, BE

Green-blue corridor
LV, Kamen, DE

Green roof De Tweeling
Nijmegen, NL

Green and brown roofs
Hastings, UK

Green roofs Town Hall
Nijmegen, NL

Green roofs Latenstein
Tiel, NL

Green wall Inner city
Nijmegen, NL

Green public courtyards
Nijmegen, NL

Cool Nature Park
Tiel, NL

Cold-heat storage
Tiel, NL

Strategy underground
Nijmegen, NL

Urban planning
Wvi, Ieper, BE

Ambition note
Wvi, Ieper, BE

Type: Water drainage

Category: Urban water systems

Elements of the urban water system that function for draining rainwater

Description

Elements of the urban water system that function for draining rainwater, e.g. the canal system, infiltration wells. There are two possible ways to achieve improved drainage of rain water:
a) surface or underground canal system, system of ditches and ponds or similar
b) reduce the sealing of surfaces by e.g. building water-permeable pavement, infiltration ditches, basins, wells, galleries.

Spatial scale

Building; City quarter; City

Problems addressed

- Heavy precipitation: flooding during peak flows is reduced by leading the rain water in drainage systems (e.g. ditches, ponds) or due to improved infiltration capacity

Combination with other types of measures

- Green open spaces
- Water retention
- Urban texture

Implementation – functionality issues

The effectiveness of infiltration depends on e.g. soil type, groundwater level, amount of pavements and size of the measure, calculation of future heavy precipitation and aims, e.g. related to damage potential.

Further benefits

- Increases sustainability and life quality in the city quarter
- Can improve biodiversity: if drainage systems are combined with green structures.

Economic issues

- Development and installation costs depend on kind of system: underground or surface water drainage.
- Maintenance costs are mostly higher for underground systems

Acceptance

Acceptance depends on the way measures are implemented; might be low if limited urban space is needed. Combination with other city functions (e.g. living space, parking lots etc.) is helpful.

Possible obstacles

- The effectiveness of the measure can be low if e.g. ground water level is high
- Maintenance needed: for surface structures e.g. a ditch along a street, littering might be a problem
- Conflicts with other urban uses may arise.

Find examples in Structural Fact Sheets


Adapted infrastructure Rouen, FR


Infiltration De Vloei Wvi, Ieper, BE


Business park Boytal EG, Bottrop, DE


Water vision Nijmegen, NL


Water study De Vloei Wvi, Ieper, BE


Green-blue corridor LV, Kamen, DE


Slowed run-off Wvi, Ieper, BE


Use of rainwater Ieper, BE


Cold-heat storage Tiel, NL


Cold-heat storage Arnhem, NL


Strategy underground Nijmegen, NL


Ambition note Wvi, Ieper, BE


Urban planning Wvi, Ieper, BE

Type: Urban water spaces - flowing

Category: Urban water systems

Open water elements in the urban environment with flowing water

Description

Open water elements in the urban environment with flowing water, e.g. rivers, streams.

Spatial scale

City quarter/street; City; Region

Problems addressed

- Heat: reduces heating up of surrounding areas
- Heavy precipitation (Floods): buffering and drainage of rain water, flash floods are therefore reduced

Combination with other types of measures

- Green open spaces
- Water retention; water drainage
- Urban setting

Implementation – functionality issues

Effects of buffering and draining rain water depend among others on catchment parameter and precipitation characteristics.
The effect of cooling and preventing heating up is improved when water is moving with many turbulences (spray effect).

Further benefits

- Increases sustainability and life quality in the city quarter
- Can improve biodiversity, e.g. for aquatic and riparian life-forms
- May be combined with recreational public space which is cooler in summer than its surroundings
- Restoration of a channelled stream may improve underground functions, biodiversity, ecological functions
- Combination with disconnecting rain water from the sewer system and draining storm water into open spaces: reduces risk of drying out in times of drought/ heat.

Economic issues

The costs vary according to size and complexity of measure

Acceptance

- Acceptance of neighbours may not be very high as they are afraid of littering, noise and smell of the water body and surroundings.
- Acceptance can be improved by early involvement of stakeholders and citizens.

Possible obstacles

- Could cause flooding itself
- Might cause accidents
- Available space/ conflicts with other urban uses may arise.

Find examples in Structural Fact Sheets

Green-blue corridor Kamen, DE

Water Vision Nijmegen, NL

Ambition note Wvi, Ieper, BE

Climate dike Tiel, NL

Urban planning Wvi, Ieper, BE

Renewable energy Rouen, FR

Type: Urban water spaces - standing

Category: Urban water systems

Open water elements in the urban environment with standing water

Description

Open water elements in the urban environment with standing water, e.g. ponds, water squares.

Spatial scale

City quarter/street

Problems addressed

- Heat: Water surfaces in the city can reduce heating up
- Heavy precipitation: increases water retention in the water body and reduces peak flows, amount depends on size of standing water

Combination with other types of measures

- Green open spaces
- Water retention, water drainage, urban water spaces - flowing
- Urban setting, urban texture

Implementation – functionality issues

Very different designs and volumes are possible, depending on the aim, i.e. if focus is on retention of rain water or reducing urban heat island effect.

Further benefits

- Can improves biodiversity for aquatic life-forms
- May be combined with recreational public space which is cooler in summer than its surroundings
- The attractiveness of a city quarter or neighbourhood can be enhanced.

Economic issues

The costs vary according to size and complexity of measure.

Acceptance

Urban water spaces are accepted, in general, as they contribute to an attractive living environment.
Acceptance might be lowered when conflicts arise (see obstacles).

Possible obstacles

- During Heat & Drought: eutrophication can become a problem, maintenance is needed to keep water clean to avoid smelling.
- The place can become an attractive meeting place and noise as well as littering can be a problem (if combined with recreational use).
- Conflicts with other urban uses may arise.
- Standing water can contradict the aim of cooling during summer nights, due to the specific heat capacity.

Find examples in Structural Fact Sheets

Water square Vogelbuurt Tiel, NL

Water Vision Nijmegen, NL

Water study De Vloei Wvi, Ieper, BE

Slowed run-off Wvi, Ieper, BE

Ambition note Wvi, Ieper, BE

Urban planning Wvi, Ieper, BE

Type: Increase energy efficiency

Category: Energy efficiency and mitigation

Less energy need for the same results
in the urban structure, water system and green structures

Description

Measures to reduce the energy consumption and to increase the efficiency of the energy input of a building or entire city quarters i.e. less energy for the same or even better results.
Aspects concerned are density of a city / city quarter, type of buildings, orientation. Aspects on building level are e.g. passive solar design, air tight building envelope, high insulation system, passive cooling or natural ventilation.

Spatial scale

Building; City quarter/street; City

Problems addressed

- Heat/ Extreme cold: The resilience of the buildings against heat waves and extreme cold is improved

Combination with other types of measures

- Green roofs; green walls
- Renewable energy
- Urban setting; urban texture

Implementation – functionality issues

The implementation is highly depending on the location and the initial conditions, e.g. new buildings/city quarters or existing buildings/city quarters.
The orientation of the buildings and the set-up of the quarter is important to achieve low energy or passive house standard.

Further benefits

- Less energy consumption, greenhouse gas emission is reduced
- Create good living conditions, improve liveability in the city quarter
- Raise comfort and healthy conditions in the building / quarters
- Reduce the overall energy demand and therefore the dependency on fossil energy sources like gas, oil or coal

Economic issues

- Cost for low energy / passive house are 10 to 15% higher than for a standard building (Belgium, 2011)
- Additional costs for maintenance of the ventilation system arise
- Additional costs will be repaid after a long time period (with yearly energy bills); depending on energy prices
- Several funding possibilities exist, reduce individual costs (e.g. for solar panels, for retrofitting existing buildings).

Acceptance

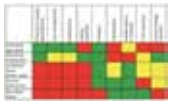
- Social acceptance is growing during the last years, especially as energy prices are increasing
- Solutions on building level are more accepted than collective solutions (e.g. central heat storage for quarter)
- Information campaign and stakeholder involvement is beneficial to improve acceptance

Possible obstacles

- Improper use and maintenance of buildings
- Lack of know-how of local business of sustainable building
- Lack of recycling material in decent distance

Find examples in Structural Fact Sheets


Location, orientation
Hastings, UK


Sustainable energy system
Wvi, Ieper, BE


Low energy houses
Wvi, Ieper, BE


Less fossil energy use
EG, Bottrop, DE


Ambition note
Wvi, Ieper, BE


Urban planning
Wvi, Ieper, BE


Green roof De Tweeling
Nijmegen, NL


Green and brown roofs
Hastings, UK


Green roofs Town Hall
Nijmegen, NL


Green roofs Latenstein
Tiel, NL

Type: Renewable energy

Category: Energy efficiency and mitigation

Measures for using renewable energy sources, in the urban environment

Description

Renewable energy sources in the urban environment concern two main sections: generation of heating or cooling (solar, geothermal, biomass) and generation of electricity (solar, wind, biomass/biogas, hydro). Within the Adaptation Compass the focus is on renewable energy measures that are combined with the water system (e.g. cold-heat storage) and which are influenced by the urban spatial structure.

Spatial scale

Building; Urban quarter/street; City

Problems addressed

- Heat/ Extreme cold

Combination with other types of measures

- Increase energy efficiency
- Urban setting, urban texture: e.g. configuration for using solar energy

Implementation – functionality issues

The natural conditions of the site are crucial: e.g. the groundwater level and underground structure for use of geothermal energy or the solar radiation for use of solar energy. Need and provision must fit, e.g. good insulated buildings are precondition for sole use of geothermal energy for heating. Spatial preconditions are also necessary, e.g. the orientation of the buildings for solar energy use.

Further benefits

- Responding to the envisaged higher demand for cooling buildings during summer and to prevent from use of air conditioning systems based on fossil energy
- Greenhouse gas emission is reduced
- Reduces the dependency on fossil or nuclear energy sources like gas, oil, coal or uranium
- Combination with solving problems of the groundwater (high levels, pollution) can be especially beneficial (e.g. using cold-heat storage)

Economic issues

Cost-effectiveness has to take into account specific investments and maintenance costs. Compare to costs for fossil/nuclear energy (from generation to waste disposal). The industrialisation of renewable technologies makes the use of renewable energies more and more affordable. Several funding possibilities (e.g. for solar panels, for retrofitting existing buildings).

Acceptance

- Social acceptance for renewable energy is high
- Social acceptance can be improved by creating synergies (e.g. solving problems in the water system and providing opportunities for new developments)
- Solutions on building level are more accepted than collective solutions
- Information campaign and stakeholder involvement is beneficial to improve acceptance

Possible obstacles

- Green walls and green roofs: installation of solar panels might be contradictory
- Interference with the underground function and setting might arise (use of geothermal energy)
- New techniques and involvement of many stakeholders: development is subject to a complex process
- Lack of know-how of building and maintaining services

Find examples in Structural Fact Sheets


Renewable energy Rouen, FR

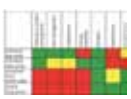

Cold-heat storage Tiel, NL


Cold-heat storage Arnhem, NL


Energy map and -strategy Arnhem, NL


Strategy underground Nijmegen, NL


Water vision Nijmegen, NL


Sustainable energy system, Wvi, Ieper, BE

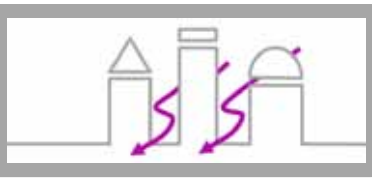

Ambition note Wvi, Ieper, BE


Urban planning Wvi, Ieper, BE

Type: Urban setting

Category: Urban structure

Measures addressing the elements of the urban environment in their configuration



Description

Measures addressing the three dimensional composition of buildings or the elements of the urban environment in their configuration, e.g. the height and width of streets to influence the wind paths.
The measures comprise the protection and creation of cool air generating areas and of ventilation paths to reduce urban heat islands. To ensure the cooling down of heat islands, ventilation paths have to be ensured from areas generating cool air to areas which tend to heat up.

Spatial scale

Building level; City quarter/street; City; Region

Problems addressed

- Heat wave: less dense building structures (with “cool” surfaces) are less sensitive for heating up themselves; ventilation paths help areas vulnerable to heating up.

Combination with other types of measures

- Green open spaces
- Water retention; urban water spaces – standing, urban water spaces - flowing
- Urban texture

Combine ventilation paths with cool/fresh air generating areas (see green open spaces): enhances effects
Combine with measures related to the texture of urban surfaces

Implementation – functionality issues

The effectiveness of measures depend on:

- the spatial relation between the area vulnerable to heating up and
- the size and location of areas generating cool air; small areas producing cool air need to be connected adequately to show effects
- orientation of ventilation paths
- interrelationship have to be considered from local to regional levelmust be regarded

Further benefits

- Human comfort can be improved during heat waves; includes aspects of health and attractive surroundings for living and working
- Areas generating cool air can be developed for recreational use and thus can enhance the attractiveness of city quarters.

Economic issues

The costs vary according to size and complexity of a measure or a pool of measures and benefits need to be considered on the costs scale of the whole city or city quarter; consider in new development or re-development projects from the beginning.

Acceptance

Acceptance depends on the concrete circumstances of measures taken.

Possible obstacles

- Ventilation paths might have negative effects (on human comfort) during cooler seasons
- Conflicts may arise with the aims of a “compact city”

Find examples in Structural Fact Sheets

Ambition note
Wvi, Ieper, BE

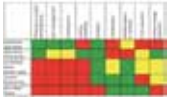
Climate dike
Tiel, NL

Urban planning
Wvi, Ieper, BE

Cool Nature park
Tiel, NL

Water Vision
Nijmegen, NL

Location, orientation
Hastings, UK



Sustainable energy system
Wvi, Ieper, BE

Low energy houses
Wvi, Ieper, BE

Renewable energy
Rouen, FR

Energy map and -strategy
Arnhem, NL

Type: Urban texture

Category: Urban structure

Measures addressing the urban surfaces related to their material

Description

Measures addressing the urban surfaces e.g. ground, walls, roofs, concerning the material.
Measures comprise choosing material which decreases the thermal load (e.g. less concrete/ asphalt – more vegetation for roofs) and/ or which increase the reflection of sun light (e.g. choosing lighter colours).

Spatial scale

Building level; Business/industrial park;
City quarter/street; City

Problems addressed

- Heat wave: reduces the heating up of areas, cooling effect during nights
- Heavy precipitation: If more vegetation is used run-off can be reduced

Combination with other types of measures

- Green roofs, green walls, green open spaces
- Open water – flowing, open water - standing
- Urban setting

Implementation – functionality issues

- Ability to be resilient to extreme temperatures
- Material must be adapted for respective use
- Surfaces with standing water cool during hot days but may contribute to higher temperatures during summer nights.

Further benefits

- If more green spaces are used: Lower fine dust load, may have positive effects on biodiversity, recreational use, attractiveness for living and working.
- Depending on concrete measures: e.g. combination with re-deveopment of urban areas.

Economic issues

Choosing lighter colours is very cost-effective and can be implemented within short-term, especially if compared to measures regarding the urban setting (more long-term).

Acceptance

Social acceptance depends on concrete measure.

Possible obstacles

- Conflicts may arise with urban design aims, e.g. regarding regionally typical appearance of buildings or regarding monument conservation

Find examples in Structural Fact Sheets

Green roof
De Tweeling
Nijmegen, NL

Green and brown roofs
Hastings, UK

Green roofs
Town Hall
Nijmegen, NL

Green roofs
Latenstein
Tiel, NL

Green wall
Inner city
Nijmegen, NL

Green public courtyards
Nijmegen, NL

Cool Nature Park
Tiel, NL

Adapted infrastructure
Rouen, FR

Ambition note
Wvi, Ieper, BE

Urban planning
Wvi, Ieper, BE

PART III: FACT SHEETS ON STRUCTURAL MEASURES

Green roof "De Tweeling"

Status	Implemented in 2010
Location	The Netherlands, Gelderland, Nijmegen, Willemskwartier
Spatial info	Kindergarten "De Tweeling"; residential area
Measure type(s)	Green roofs; Water retention, Increase energy efficiency; Urban texture
Contact	Ton Verhoeven, t.verhoeven@nijmegen.nl

Description and Aim

On the extension of an existing kindergarten a green roof (400 m²) was constructed combined with all kind of other sustainable building design aspects (heating, ventilation). This green roof is also an extension of the garden. The kindergarten works on an anthroposophic basis and the children play and sleep outside. The green roof which is visible from the ground helps with the feeling of a green surrounding.

Adaptation to climate change

With the green roof storage of a part of the rain water is arranged, the rest of the rainwater flows into the ground (disconnected building).
A green roof is a good insulation layer in times of heat.

Problems addressed:
Heat wave, heavy precipitation / flooding

Receptor(s):
Built environment, vulnerable groups

Experiences

Functionality:
The impact of a green roof of 400m² is on the site itself: The green roof together with the insulation layers reduces the impact of the sun on the roof and therefore lowers the cooling demands during hot times. The green roof lowers the impact of heavy rainfall, so less rainwater has to be brought underground via the disconnected system. A green roof also has other positive aspects e.g. increasing the biodiversity (flowers, insects) and lowering fine dust loads in the air. Both are aspects the kindergarten uses in its philosophy.

A green roof lasts longer than a conventional roof, e.g. because the vegetation is more sustainable for heat exposure. A green roof of 400 m² has no reducing effects on a scale of a town or town area.

Further synergies/benefits:
A fine example for the municipality's green roof strategy and for communicating that strategy. A fine example of a very sustainable building (climate control, energy supply and water retention).

Costs:
Estimated € 50 to € 60 / m² (total € 20.000 - € 24.000). The municipality gave a subsidy of € 10.000,- (€ 25 / m²).

Funding:
International and local. Subsidy of the municipality for the green roofs. Subsidy of Future Cities for the rain water monitoring devices.

Stakeholder involvement:
Building owner of the private kindergarten, constructor, engineering office of the municipality (for the monitoring).

Acceptance:
The city of Nijmegen uses this example in its green roof strategy and will place pictures of the roof in the second version of the Nijmegen green roof booklet.

Obstacles/restrictions:
In exchange for the local green roof subsidy the city of Nijmegen requested to install a rainwater monitoring device (paid by the municipality). Implementing the device within the construction of the building was difficult.

Green and brown roofs

Status	Implemented in 2010
Location	UK, East Sussex, St. Leonhards on Sea
Spatial info	Building; Business/industrial park
Measure type(s)	Green roofs; Water retention; Increase energy efficiency; Urban texture
Contact	www.sussexexchange.co.uk


John Williams, Sea Space

Description and Aim

Green and brown roofs were constructed on a new business building providing exchange services complementing an existing business site. Within the brown roof parts the environmentally diverse brown field sites was replicated and thus, vegetation associated with such sites can colonise a range of low-fertility substrates, i.e. sand, rotting timber, etc. The roofs are part of the integrated concept for ventilation and infiltration of rain water.

Aims are to prevent flash flooding, to reduce the need for active energy using services and to add to the overall robustness of the roof.

Adaptation to climate change

The measures taken make the building more resilient during heat waves and heavy precipitation.

Problems addressed:

Heat wave, heavy precipitation / flooding

Receptor(s):

Built Environment

Experiences

Functionality:

Contribution to protection against flash flooding and heat wave. Helps the building be resilient to climatic extremes. The implementation of the roofs was straightforward. This measure is integral to the sustainability strategy for the wider site.

Further synergies/benefits:

There are mitigation benefits to this project, and it is a demonstration of the technique that can be replicated elsewhere.

The site exposure is exploited in terms of wind profile to promote wind assisted natural ventilation including the use of roof mounted structures or cowls to harness the wind.

Costs:

The cost of maintenance of the cowls is comparable with that of an active system.

Funding:

International (Interreg IVB-project Future Cities) and local.

Stakeholder involvement:

Client, investors, statutory authorities, local planning authority, local residents and businesses

Acceptance:

The site and its sustainable features was promoted through a range of communication channels including, the benefits for occupiers. By this high acceptance was created.

Obstacles/restrictions:

Sensitivity of adjacent site of special scientific interest and the supply of water into the local water courses. These needed to be taken into account during the hydrology study of the site. Planning regulations restricted the extent of roof mounted structures.

Green roofs - Town Hall

Status	Implemented in 2009
Location	The Netherlands, Gelderland, City of Nijmegen
Spatial info	Building; Inner city / city centre
Measure type(s)	Green roofs; Water retention; Increase energy efficiency; Urban texture
Contact	www.waterbewust.nl/groendakmetsubsidie.html

Description and Aim

On three parts of the roof of the city hall green roofs have been installed. These green roofs consist of sedum plants in the greater part of the roof and higher plants around these roofs in separated constructions.

The aim of this project is to prevent the roof from extensive heating in summer and to capture rainwater.

Adaptation to climate change

The direct impact is less heat both in the roof as well as below the roof inside the building. Another direct impact is the (partly) storage and slowing down of (heavy) rainfall run-off.

Problems addressed:

Heat wave, heavy precipitation / flooding

Receptor(s):

Built environment

Experiences

Functionality:

Saving energy by cooling, capturing fine dust and CO_2 from the air, storage of excessive storm water. Cooling the building.
Less rainwater in the combined sewer system.

Green roofs are more expensive to install but they will last twice as long as 'black' roofs. Other benefits are not directly economical. The benefits are therefore higher than the costs.

It is important to plan the process of implementation very good. On roof 1 first the green roof and later on the security measures were installed. So the layers of the green roof had to be removed temporarily on different spots in order to install the fixing points of the security measures. The process was improved, first installing the security measures and then the green roof, with the following roofs.

It is also important to hire an external maintenance organisation, because this needs specific expertise.

Further synergies/benefits:

A lot of the civil servants work in the rooms overlooking the green roofs and therefore staff can benefit from a nicer working ambiance

Costs:

First green roof: € 22.500,- (550 m^2). Sedum was planted (with plugs).
Second green roof: € 30.000 (540 m^2). A construction with plants was used.
Third green roof: 2 parts together 400m^2; the costs were € 23.000,- (only the green roof part). Small units with Seedum are clicked together.

Funding:

International and local. International: Future Cities.
Municipal: Funding from the programme "Green Allure Innercity"

Stakeholder involvement:

City council and the civil servants.

Acceptance:

The projects are presented on the Nijmegen website.

Obstacles/restrictions:

On the roofs also devices (rail) are needed for cleaning the windows, and security measures had to be taken for the people who are carrying out the maintenance.

Green roofs “Latenstein”

Status	Implemented 2011 – 2012
Location	The Netherlands, Gelderland, Tiel, Tiel East / Latenstein
Spatial info	Urban quarter/street; Business / industrial park / schools
Measure type(s)	Green roofs; Water retention; Increase energy efficiency; Urban texture
Contact	Annemieke Spit, aspit@tiel.nl

Description and Aim

Realisation of 3000 m^2 green roof on business building. The aim was to motivate businesses with large flat roofs that are suitable for transformation into green roofs and thus contributing to water retention, increased energy efficiency, improved air quality and biodiversity.

Adaptation to climate change

Problems addressed:

Heat wave, heavy precipitation/ flooding

Receptor(s):

Built environment

Experiences

Functionality:

Reduction peak flows of rain water.

Green roofs reduce the inside temperature during hot days.

On a large scale contribution to reducing the Urban Heat Island effect.

Further synergies/benefits:

The green roofs will improve the liveability in Tiel East because of their effects on air quality, water retention (reduction of peak flows), reduction of urban heat island effects, etc.

They contribute to more biodiversity and better air quality.

Synergy with the aim to mitigate greenhouse gas emissions through improved insulations and less heating demand during winter and less cooling demand during summer.

Funding:

International and local: From the Future Cities-project and local sewerage fund.

Stakeholder involvement:

Owners of business buildings

Obstacles/restrictions:

Commitment of private owners is necessary.
Construction of existing buildings is often not strong enough.

Green wall – Inner city

Status	Implemented in 2010
Location	The Netherlands, Gelderland, City of Nijmegen, Inner city (Arsenaalgas)
Spatial info	Building; City centre
Measure type(s)	Green walls; Water retention; Urban texture
Contact	Ton Verhoeven, t.verhoeven@nijmegen.nl

Description and Aim

The green wall system is attached to one side of a building the municipality rents in the city centre. The wall measures 190 m^2 and consists mainly of different types of ivy. The wall is combined with a drainage system so water is provided when necessary.

The wall is made of multiple boxes above each other in which the plants are placed. In each box the plants grow on a railing of about 2 meters high and thus cover the wall behind.

Adaptation to climate change

Impacts will be mainly on the direct surroundings

Problems addressed:

Heat wave

Receptor(s):

Built environment

Aim of the project is to provide more green in the city centre that will help cool the direct surroundings and the building, clean the air and make the city more attractive.

Experiences

Functionality:

There are different systems available for making a green wall. It is therefore necessary to make the right choice for the situation. This takes time and many calculations to define the strength of the building or wall you want to use. Also designing a good system for the watering of the plants is an important part of this stage of the planning.
It is Important to choose the right plants, because after two years 50% of the used plants in Nijmegen died because of the severe winter temperature. But in the convention with the contractor, the municipality was insured against such a risk. Thus, the renewal of the plants had to be paid by the contractor.

Further synergies/benefits:

Further benefits are: saving energy by cooling a building, capturing fine dust and CO_2 from the air.

The green wall adds a green element to the inner city at a prominent location which makes public space more attractive and helps to communicate the municipality's strategy to become a sustainable city.

Costs:

About €140.000,- (190 m^2) for the green wall including the watering system.

Funding:

International: Future Cities.
Municipal: Programme "Green Allure Innercity".

Stakeholder involvement:

Owner and tenants (business) of the building.

Acceptance:

In general there are acceptance issues when installing green in such an innovative way. People (both inhabitants and politicians) discuss about the costs and the necessity of this type of green.

Obstacles/restrictions:

It can be difficult to convince the committee on building quality. The owner of the building has to agree with the project. The building must be suitable to carry the weight of the construction.

Green public courtyards

Status	Implemented in 2012
Location	The Netherlands, Gelderland, City of Nijmegen
Spatial info	Urban quarter/street; Inner city / city centre
Measure type(s)	Green open spaces; Water retention; Urban texture
Contact:	Ton Verhoeven, t.verhoeven@nijmegen.nl

Description and Aim

Some courtyards in the city centre of Nijmegen consist mostly of brick, are used as parking space and get very hot in summer. The Korenmarkt, a former parking lot was turned into a multi-functional nice green park where the citizens can relax, meet and play. As the stony surfaces were removed, the rainwater is now drained at the square and kept away from the sewer channel.

The adaptation target set is to reduce heat in these courtyards, to change hot, stone courtyards into cool, green-blue places.

Adaptation to climate change

Direct impact is less heat in summer in the direct surroundings. Also better storage of rainwater is a direct effect of more green in these courtyards.

Problems addressed:

Heat wave, heavy precipitation / flooding

Receptor(s):

Population, built environment, infrastructure

Experiences

Functionality/ Further synergies/benefits:

Making stony courtyards green adds space for water retention in case of storm water and rain and recreational area for citizens, e.g. children can play with a water artwork which also cools the square during periods of heat. It makes the inner city more attractive and liveable, especially in the surrounding of the adjacent houses. Opportunities are created to enhance biodiversity. Archaeological findings such as cellars, graves and a chapel are also displayed, providing evidence of its mediaeval history.

Costs:

Costs are very dependent on the site, the design and the communication process. There is no general price per m^2. The Korenmarkt costs about € 200,-/m². The costs for the construction of the park and the fountains are € 250.000, besides that much money was spent on archeology survey and the participation process.

Funding:

International and local. International: Future Cities. Municipal: Programme “Green Allure Innercity”.

Stakeholder involvement:

Housing corporations, citizens living close to the courtyards.

Acceptance:

To change the function of an inner city space from parking into green is a difficult process. People tend to value parking near their house higher than or as high as green. So it is important to take time to discuss these plans and let the inhabitants design the courtyard with the municipality so they are truly involved in the whole process.

Obstacles/restrictions:

Both parking space and urban green are important parts of the public space of a city. Plans to remove parking space to make a park can then lead to discussions that might result in keeping the parking space.

In another case Nijmegen didn’t succeed in greening the whole parking space but only a part of it because inhabitants and their housing corporation weren’t willing to pay more to park elsewhere.

Cool Nature Park

Status	Implemented in 2013
Location	The Netherlands, Gelderland,Tiel, Tiel East, 5 ha
Spatial info	Urban quarter; Residential area
Measure type(s)	Green open spaces; Water retention; Urban setting; Urban texture
Contact	Annemieke Spit, aspit@tiel.nl

Description and Aim

This former landfill was decontaminated in 2010 and was transformed into a park with a natural character where kids can play and learn about climate change and nature. The park will also become an integrated part of the climate dike (see specific Fact sheet). Due to the altitude, the park offers its public a unique view on the river Waal and the residential quarters of Tiel East. In the park, people find shelter from the sun and the heat on hot summer days. Since Tiel East does not possess much public green, the park makes the district a lot more appealing. In addition, kids are stimulated to play outdoors.

Adaptation to climate change

The measure contributes to the integral water scenario of Tiel East and approves the liveability in the area.

Problems addressed:

Heavy precipitation/ flooding, Heat wave, other (seepage water)

Receptor(s):

Population, built environment

Experiences

Functionality:

The Cool Nature park is part of the climate dike, one of the innovative water measure in Tiel East to increase the safety of the dike and reduce water nuisance caused by seepage water. Since public green is scarce in Tiel East, the Cool Nature park increased the amount of public green substantially, thus improving the liveability of the area.

The park also has a positive effect on the urban heat island effect which occurs in Tiel East and it offers shelter on hot summer days.

Further synergies/benefits:

The park improves the liveability, recreational possibilities and social coherence of the city quarter. People can meet while their children play. It is a known fact that kids play outdoor less than they used to. The park offers an attractive place for kids, stimulating them to play outdoors actively.

The park also offers possibilities for outdoor education by primary schools and kindergartens.

Costs:

Decontamination former landfill: approximately 1 million

Design and realisation of the park: €200.000

Funding:

Local, provincial, EU-INTERREG IV B-programme

Stakeholder involvement:

Primary schools Tiel East, HAS Den Bosch (design), constructor, Province of Gelderland, Municipality of Tiel

Acceptance:

The acceptance for the park is high since this park increases the possibilities for recreation and playing in the area. The design was made with the input of primary school children in Tiel East. Teachers of these primary schools are offered an educational program and a training to stimulate the use of the park.

Obstacles/restrictions:

None observed

Slowed run-off of rainwater

Status	Construction from 2013 on
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter/street; Residential area
Measure type(s)	Green open spaces; Water retention, water drainage, Urban water spaces – standing water
Contact	www.devloei.be

Description and Aim

In the residential quarter of “de Vloei”, the construction of the rainwater system is designed to have a minimum of surplus rainwater that has to be discharged. But depending on soil type, groundwater level, amount of pavements, usage, etc. there will be a surplus in rainwater on the scale of the quarter. Besides the surplus of the quarter there is also a surplus in the adjacent quarter. In case of surplus, it will be discharged slowly out of the quarter from the ponds in the public domain, so that there is no creation of floods in the regions downstream.

Adaptation to climate change

The measure addresses: Increased storm events during summer. Lesser total amount rainwater in summer. Increased amount of rainwater during winter.

Problems addressed:

Heavy precipitation / flooding, drought

Receptor(s):

Population, infrastructure, built environment, natural resources

Experiences

Functionality:

Less risk of flooding: when the rainwater tanks are full, the water flows into the wadi’s.
Less risk on running dry of the surface during periods of drought.
In Flanders, there is not much experience with keeping rainwater “above ground” i.e. not putting it in a separate underground pipe next to the pipe for the sewage water. In particular, it is not evident to bring the overflow of the underground rainwater tank back to the surface.

Further synergies/benefits:

Liveability: the surface water structure allows for social contact, playgrounds and recreation around the water system.
Ecology: a system of ponds and green structures allows for more species (plants and animals) to survive in a city structure.

Costs:

A standard sewage system costs 830€/m³. A system with wadi’s costs between 1.090-1.420€/m³. This is due to the fact that the wadi takes more place that cannot be commercialized anymore because it becomes urban realm.

Funding:

International/regional/funding by the De Vloei project partners.

Stakeholder involvement:

Municipality of Ieper, property development companies, consultancy agencies, constructors (on city quarter level).

Acceptance:

Social acceptance is in general not very high for wadi's and is a point of interest in the project. Information sessions about the project as an exemplar project.

Obstacles/restrictions:

Space: this measure needs space and even more space in the future to cope with more and heavier rainfall. Support for this must be developed.

Few consultants have experience with future impacts of climate change, and how to calculate this in.

Business park “Boytal”

Status	Implemented 2011 - 2012
Location	Germany, North Rhine – Westphalia, Bottrop
Spatial info	Business / Industrial park
Measure type(s)	Green open spaces; Water retention, water drainage
Contact	Matthias Stumpe, matthias.stumpe@bottrop.de

Description and Aim

Rainwater from an existing business site and a small wetland is disconnected from the sewer system.

About 1.5 ha wet land and 4.0 ha of sealed area are disconnected.

Aims are: Creating a buffer in the existing system for the rising number of heavy rain events. Strengthen the existing river system Boye. Reduce the amount of wastewater to save energy.

Adaptation to climate change

Due to more heavy rains in future there will be more often an overload of the existing sewage system.

Problems addressed:

Heavy precipitation / flooding

Receptor(s):

Infrastructure, natural resources

Experiences

Functionality:

Less risk of capacity overload in the sewage system and reducing the amount of energy for cleaning the clean rainwater by taking the rainwater out of the system,

Further synergies/benefits:

The project is located within the Innovation City Bottrop-Area. There will be a lot of energy efficiency and mitigation measures in the next ten years.

Costs:

around 400.000 €

Funding:

International and regional. Interreg IV B-programme, Zukunftsvereinbarung Regenwasser (Emschergenossenschaft)

Stakeholder involvement:

City of Bottrop, Emschergenossenschaft

Acceptance:

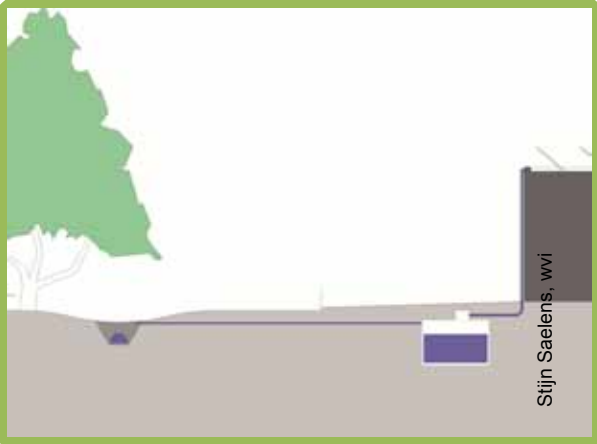
The problems of the existing system are very obvious, so it is not difficult to communicate that a new sustainable solution makes sense and is necessary.

Obstacles/restrictions:

Existing protected landscape, parallel planning from other organizations and water legislation occurred as obstacles in the planning process.

Use of rainwater

Status	Construction from 2013
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Building; Residential area
Measure type(s)	Water retention; water drainage
Contact	www.devloei.be



Description and Aim

A catchment for rainwater is obliged per house/block of apartments (individual rainwater tanks) which goes further than what is described in Flemish legislation. The use of rainwater is obliged for the toilet(s), washing machine, outside faucet, faucet in garage etc.. Also, in certain cases, the capacity of the rainwater tank has to be bigger than what is defined in the Flemish legislation.

Aims are buffering of rainwater on the level of individual plots to prevent flooding during more severe rainwater events (impact on city quarter level, city level and regional level), buffering of rainwater as reserve for periods of drought and sustainable water use.

Adaptation to climate change

The measure addresses the following changes: Increased storm events during summer. Less total amount of rainwater in summer. Increased amount of rainwater during winter.

Problems addressed:

Heavy precipitation / flooding, drought

Receptor(s):

Population, natural resources (water)

Experiences

Functionality:

Less risk of flooding: the rainwater is collected in individual tanks per building.
There is availability of rainwater during periods of drought.

Rainwater tanks are compulsory in Flanders, although to a lesser extent. Lessons learned in Flanders: Rainwater tanks are effective, but only when the rainwater is used. The compulsory use is already enough to make rainwater tanks effective, the more elaborated use of rainwater at de Vloei makes the tanks even more effective.

Further synergies/benefits:

Sustainable use of water.
More use of rainwater means less use of drinking water (economic benefit). Avoid costs due to flooding.

Costs:

The average cost for a rainwater tank, pumping system and filters included is 2 000 €.

Funding:

In Flanders, no funding for rainwater tanks in new buildings.

Stakeholder involvement:

Municipality of Ieper (building permits), architects (design), individual builders, property development companies, residents (use of rain water).

Acceptance:

Social acceptance is high. Rainwater tanks are common use in Flanders
Information session for extended compulsory use. Plan advice for the builders.

Obstacles/restrictions:

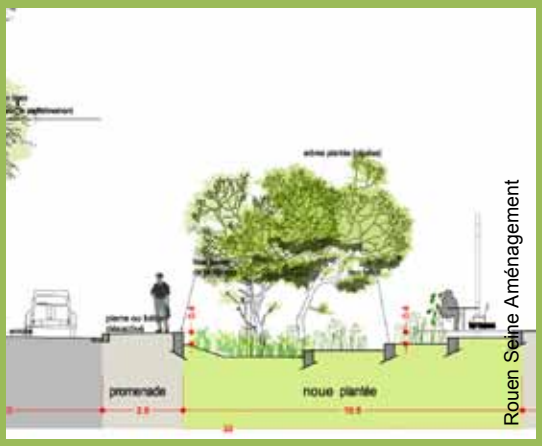
Heavy rainfall: Overflow is directed into the surface water system for infiltration and slowed run-off of rainwater.

Shortage in rainwater: automatic refill of a part of the tank with drinking water.

Contamination of rainwater (bird faeces, leaves, etc.). A system of filters removes leaves etc. No problem regarding microbiological contamination since the use of rainwater is not allowed for personal hygiene or in the kitchen.

Adapted rain water infrastructure

Status	Implementation (2011-2013)
Location	France, Seine-Maritime, Haute-Normandie, City of Rouen, “Luciline”
Spatial info	Urban quarter/street; Business/industrial park, Residential area
Measure type(s)	Green open spaces; Water retention, water drainage; Urban texture
Contact	contact@rouen-seine.fr



Description and Aim

The system includes 2 meters large ditches following the pedestrian paths, collecting the rain water from the roofs of private buildings and the paths. These small ditches converge in a large main ditch, called “le mail” of more than 4 000 m² that collect also the rain water coming from the roads. “Le mail” has storage and regulation functions and is generously planted in order to create a green core for the new district and purify the waters before the release in the river Seine.

The aim is adapting the new district in order to reduce the stress on the existing rain water network and increase water permeable surfaces compared to traditional solution.

Adaptation to climate change

Reducing the temperature during the summer in this new district (direct impact). Possibility to increase the biodiversity thank to the combination of vegetation (green structure- indirect impact) and water.

Problems addressed:

Heat wave, heavy precipitation / flooding

Receptor(s):

Population, infrastructure, built environment, economy (investors and property developers due an improved attractive area), natural resources

Experiences

Functionality:

Increase non-waterproof land in urbanized areas, increase vegetation and water presence in the city.

The implementation of the measure requires specific studies and the involvement of several stakeholders.

Further synergies/benefits:

The measure contributes to sustainability and life quality in the quarter, the water infrastructure consisting in new green areas.

Costs:

Infrastructure and vegetation costs.

Funding:

International and local. The studies are supported by ERDF fund with contribution of the city and Rouen Seine Aménagement, the land developer.

Stakeholder involvement:

Rouen seine Aménagement, the municipality of Rouen, the agglomeration government (CREA), state and local administrations.

Acceptance:

Information campaigns to public; regular working groups with local administrators, the department of the city and the CREA and politicians.

Obstacles/restrictions:

The ditches require maintenance that differs totally from the maintenance of a pipe. So probably the services in charge of the rain system management cannot maintain them and the green areas services will be in charge of it which is not the common way.

Infiltration of rainwater

Status	Construction from 2013 on
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter or street; Building, residential area
Measure type(s)	Green roofs, green walls, green open spaces; Water retention, water drainage
Contact	www.devloei.be

Description and Aim

At de Vloei infiltration of rainwater shall minimize run-off of rainwater on building and city quarter level. Measures are: Allowing green walls and obliging green roofs for some parts of the roofs; restricting pavements of individual building plots; informing about pavement materials that are water-permeable; overflow of the rainwater tanks towards the surface water system (wadi), with possibility of infiltration; restricting pavements in the public area; use of pavement materials that are water-permeable; infiltration of the surplus of rainwater in 'wadi's' including the necessary space for the future impacts.

Adaptation to climate change

The measures address: Increased amount of rainwater during winter, increased storm events during summer, lesser total amount rainwater in summer.

Problems addressed:

Heavy precipitation / flooding, drought

Receptor(s):

Population, infrastructure, built environment, natural resources

Experiences

Functionality:

Less risk of flooding: when the rainwater tanks are full, the water flows into the wadi's. Less risk on running dry of the surface during periods of drought.
The effectiveness of infiltration has to be specifically calculated for each project (depending on e.g. soil type, groundwater level, amount of pavements, etc.)
The infiltration of rainwater goes together with a qualitative green open space that allows for infiltration – pavements have to be reduced as much as possible.

Further synergies/benefits:

Liveability: The surface water structure combined with the green spaces allows for social contact, playgrounds and recreation.
Ecology: A system of ponds and green structures allows for more species (plants and animals) to survive in a city structure.

Costs:

Infiltration needs unpaved space and makes the public realm bigger than in a std development. In a std wvi-project the space that can be commercialized is in average 75%.
In De Vloei it is 54% (includes also other sustainability aspects). This makes quite a difference in the price to the end user. It is not possible to calculate the impact of infiltration alone.

Funding:

European funding/Flemish funding/funding by the De Vloei project partners.

Stakeholder involvement:

Individual builders and property development companies, architects, contractors), municipality of Ieper, consultancy agencies, contractors (constructions on city quarter level).

Acceptance:

Social acceptance is in general not very high for wadi's and is a point of interest in the project. Information sessions were held about the project as an exemplar project.

Obstacles/restrictions:

Space: this measure needs space (even more space in the future). Support for this must be developed.
Few consultants have experience with future impacts of climate change, and how to calculate this.

Water Vision

Status	Implementation
Location	The Netherlands, Gelderland, City of Nijmegen
Spatial info	Town; with all parts
Measure type(s)	Green open spaces; Water system – all types; Renewable energy; Urban setting
Contact	Ton Verhoeven, t.verhoeven@nijmegen.nl

Description and Aim

The Spatial Framework Water or water Vision is a report about the relation of the water systems and spatial planning in the city of Nijmegen. Part is also a management decision paper. The Water Vision is closely related to an "Underground Vision" which was made simultaneously.

The water vision provides input into the city's structure plan. It includes the ambition ladder (product of the Monash University Melbourne) that shows how the city of Nijmegen is growing from a water conscious city via a water sensitive city (present aim) to a climate sensitive city (future aim).

Adaptation to climate change

Heat-island-effects can be lowered by means of more water and green structures in the city.

Heavy rains ask for more water storage (infiltration as well as ponds) and this water can be used in times of drought.

Problems addressed:

Heat, heavy precipitation / flooding, drought, other (liveability neighbourhoods)

Receptor(s):

Built environment, infrastructure, population

Experiences

Functionality:

Integration of water management with spatial planning and city development delivers a different view on urban development then sectoral points of view. The city of Nijmegen is planning now to make also a Spatial Framework Green for an even better integral spatial planning.

The water vision provides a strategy on a city level. The next step in this process is to find out on the level of city areas how to create the integration of water demands/chances and city development. By doing this with all kinds of stakeholders a map can be made for the future development of that city area.

Further synergies/benefits:

Better adapt (create more water storage) then pay for damage afterwards of heavy rains.

Blue and green structures have also other benefits (recreational use, playing garden, slowing traffic infrastructure).

Funding:

Subsidy of Future Cities for hiring a consultancy. Cofinancing by the municipality.

Stakeholder involvement:

External: Water Board
Internal: many departments concerning spatial planning and city development in relation to water systems

Water Study "De Vloei"

Status	Study, Finished
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter or street; building; residential area
Measure type(s)	Green open spaces; Water retention; water drainage; urban water spaces – standing water
Contact	David Loeys, d.loeys@wvi.be, www.devloei.be

Description and Aim

The water study comprises investigations to keep the discharge of rainwater to areas downstream to the absolute minimum (which goes further than what legislation dictates), also in the future and to calculate what measures are needed to reach this goal. The study comprises:
1) an inventory (on hydrology, geology, legal regulations, present infrastructure for water, possibilities and problems in the area) paying attention to the adjacent quarter and its water problems.
2) Specific calculations regarding the planned buildings and pavements, current and future rains (including climate change), the possible use and infiltration of rainwater.
3) Proposed measures to bring the rainwater in a surface water network and minimize run-off towards downstream areas. Also solutions are given for the sewer water.

Adaptation to climate change

Problems addressed:

Heavy precipitation/flooding, Drought

Lesser total amount of rain water in summer. Increased amount of rain water during winter

Receptor(s):

Population, Infrastructure, Built environment, Natural resources

Aims: Minimise run-off of rain water to downstream areas, also in the future // Sustainable water use // Reduce the impact of periods of drought, also in the future

Experiences

Functionality:

After implementation of the results of the water study: Less risk of flooding; Less risk on running dry of the surface during periods of drought; See also structural fact sheets about implementing the results of the water study: Use of rainwater, slowed run-off, infiltration of rain water,

Further synergies/benefits:

Liveability: the surface water structure allows for social contact, playgrounds and recreation around the water system; Ecology: a system of ponds and green structures allows for more species (plants and animals) to survive in an urban area.

Costs:

56.600 €. The water study is more elaborated than in a standard project, which means an extra cost. If the proposed measures are implemented: avoid costs due to flooding; Social gain: quality of life rises

Funding:

European funding/Flemish funding/funding by the De Vloei project partners

Stakeholder involvement:

Study: All project partners of De Vloei, Consultant; Implementation of the results of the study: Individual builders and property development companies, Architects, Contractors, Municipality of Ieper, Consultants;

Obstacles/restrictions:

All project partners need to be convinced of taking climate change into account before realisation is possible and have to be convinced of bringing the rain water in a surface water network instead of underground pipes.
The consultant was not that experienced in the matter of climate change. It took guidance and extra work from the project partners to get all the needed information in the study.

Green-blue corridor

Status	Construction 2011 – 2012
Location	Germany, North Rhine-Westphalia, City of Kamen, Heerener Mühlbach
Spatial info	Town Residential area and business park
Measure type(s)	Green open spaces; Water retention, water drainage, Urban water spaces – flowing water
Contact	www.eglv.de/lippeverband

Description and Aim

Ecological improvement of the water body Heerener Mühlbach on 2.14 km (remove concrete bed and change into natural banks). Disconnection measures of about 80 private properties (roofs and paved area) on about 1,1 ha.

The aims are to reduce the volume of rain water of the combined sewer system and to improve the city micro climate within the “Green corridor strategy” in the city of Kamen: The ecological transformation of the water bodies in the Lippe catchment shall be combined with disconnection of storm water to create blue-green-corridors.

Adaptation to climate change

Urban heat island effect can occur in summer, flash floods tend to become more, more storm water is added to water body, so in summer the risk of drying out is reduced.

Problems addressed:

Heat wave, heavy precipitation / flooding, drought

Receptor(s):

Population, infrastructure, natural resources

Experiences

Functionality:

The water system will be much more robust after finishing the ecological transformation. The flood protection will be enhanced, and also the living quality will be risen.

Further synergies/benefits:

The ecological transformation of the water body will raise the living quality for the people: instead of having a canalized, concrete-bedded open waste water sewer behind their gardens, a nature-like water body will benefit the living environment. For some parts where the private gardens allow also space for public use, the area will be used also for recreation: public cycle ways will be built directly next to the water body.

Less water in the sewer system means less water which runs through a WWTP. This saves energy within the waste water treatment process as well as pumping costs.

Costs:

In total about 4,3 Mio. € for the ecological transformation. The average disconnection costs are about 10 – 20 € / m².

Funding:

ERDF: 729.600 € , national funding: 691.500 €

Stakeholder involvement:

The water board Lippeverband, the city of Kamen, the district Unna, the regional authority Bezirksregierung Arnsberg, the local inhabitants.

Acceptance:

Public: The acceptance for the measure is very high – the future situation is very attractive for the people living next to the water body. During the construction work some disturbances are expected; the water board will care for a smooth construction process as much as possible.
Politics: The measure is highly appreciated in the local and regional politics.

Obstacles/restrictions:

Regarding the disconnection the water board has to consult individual inhabitants which needs a lot of time.

Water Square "Vogelbuurt"

Status	Design 2011, construction 2013
Location	The Netherlands, Gelderland, Tiel, Tiel East Vogelbuurt
Spatial info	Urban quarter/street; residential area
Measure type(s)	Urban water spaces – standing water Green open spaces
Contact	www.tiel.nl

Description and Aim

In the residential area "Vogelbuurt" (8 ha), a retention area in the shape of a water square is part of the integral water scenario which addresses the water problems of Tiel East. The design of this water square is ready.

The water square has to store at least 601 m³ water.

The aim was to achieve the best design for a water square in order to optimize the effect on water storage in combination with the use as public space and cooling area (urban heat island effect)

Adaptation to climate change

Calculated effect on the integral water scenario.
Cool areas in Tiel East prevents the use of air conditioners.

Problems addressed:

Heat / heat wave, heavy precipitation / flooding

Receptor(s):

Built environment, vulnerable groups

Experiences

Functionality:

Reduce flooding in an area of 7 ha.

Creating cool areas with water contributes to reducing the urban heat island effect.

Use of public space for water storage creates new opportunities.

Making water storage visible creates more social acceptance and raises awareness about the effects of climate change on a local scale.

Further synergies/benefits:

Water Square is also used as public space. Features on the square include playing areas for children and public staying areas.

Improving the liveability.

Costs:

€ 350.000 exclusive land price.

Funding:

International and local. Local: municipality, waterboard, housing corporation. Subsidy of Future Cities.

Stakeholder involvement:

Waterboard, Housing corporation, Inhabitants, School board, School children

Acceptance:

Supported by: Newsletter Tiel East, website, residents design evenings.

Obstacles/restrictions:

The site is not owned by the municipality. There is no basis for expropriation. Negotiations with the owner were successful but took more than 1 year.

Building location, orientation and footprint

Status	Implemented in 2010
Location	UK, East Sussex, St Leonhards on Sea
Spatial info	Building; Business/industrial park
Measure type(s)	Increase energy efficiency; Urban setting
Contact	sussexexchange.co.uk

Bob Mazzer / Sea Space 2012

Description and Aim

Combination of features for a new business building providing exchange facilities:

- Orientation of the building - glazed areas due south or north to optimise natural daylight and keep solar gain to a minimum (to minimise active cooling).
- Non flood plain location
- Depth and height controlled to promote natural ventilation; utilising exposed thermal mass and night time cooling to avoid active ventilation/air handling
- Below average U values keep heat inside a building through specific roof and wall construction
- Including green and brown roofs with ventilation advices (see specific Fact sheet) and rainwater harvesting/ use

Adaptation to climate change

To make the building more resilient during heat waves and extreme winters.

Problems addressed:

Heat wave, extreme cold, heavy precipitation/floods

Receptor(s):

Population, Built environment, economy

Experiences

Functionality:

Protection against extremes of temperature, heat wave and extreme cold. Helps the building be resilient to climatic extremes.

The implementation had to be planned carefully due to the sensitivity of the ground conditions and the links to the hydrology of the site.

Further synergies/benefits:

There are mitigation benefits to this project, and it is a demonstration of the technique that can be replicated elsewhere.

Drawing on good practice working with “enviro business”, the sector consortia for environment issues.

Increase opportunities for businesses of the surrounding business quarter and local residents.

Funding:

International, local; European INTERREG IV B-programme

Stakeholder involvement:

Client, investors, statutory authorities, local planning authority, local residents and businesses, local planning authority.

Acceptance:

Wider site promoted through a range of channels including, the highlighting of the various measures and the benefits of these for occupiers. E.g. printed media, website, presentations

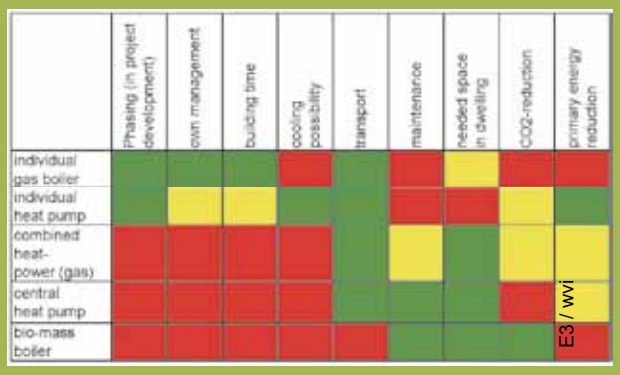
Obstacles/restrictions:

Sensitivity of adjacent site of special scientific interest and the supply of water into the local water courses and the positioning of the building needed to be taken into account during the hydrology study.

Appropriate standards for water to be re-used in particular areas, complying to regulations and standards governing water usage in buildings

Sustainable energy system

Status	Results of study
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter or street; Building, residential area
Measure type(s)	Increase energy efficiency; Renewable energy; Urban setting
Contact	www.devloei.be



Description and Aim

Investigation which energy system(s) for heating, production of electricity and production of warm water is most sustainable and attainable on the level of the city quarter

Preparing the implementation of the most sustainable and attainable system(s).

This study is made especially for the city quarter of De Vloei and takes into account the planned situation (e.g. number of buildings, type and density of the buildings, energy performance of each building,…).

Adaptation to climate change

Influences all climate change impacts due to the emission of greenhouse gases.

Problems addressed:
Heat, other like mitigation

Receptor(s):
Population, infrastructure, built environment, economy, natural resources.

Experiences

Functionality:
The aim is to use as much renewable energy as possible. This creates less dependency on central energy production systems (and fossil fuels/nuclear energy, from abroad).

Reduced emission of greenhouse gases (contributing to reaching European norms)

Out of the first two phases of the study for De Vloei it appears that a collective system on the scale of this quarter is not profitable. The best choice is an individual system per building or perhaps a cluster of buildings (heat pump and PV panels. In the extension, the best way to implement this is investigated.

Further synergies/benefits:
Link to mitigation: reduced greenhouse gas emissions due to the implementation of energy system(s) which use sustainable energy sources and are more efficient.

Costs:
Energy study for De Vloei: 101.000 €

Funding:
European funding/Funding by the De Vloei project partners.

Stakeholder involvement:
Municipality of Ieper, property development companies, consultancy agencies (study, design of the energy system(s)), contractors (construction and/or exploitation of the energy system(s)), residents (Design & use of buildings), architects (Design of buildings).

Acceptance:
Social acceptance is a very important point of interest in this project. In Flanders, the use of solar panels for production of warm water and/or electricity on an individual scale is accepted, other sustainable energy systems are more unfamiliar for the general public and local governments. Especially towards collective solutions resistance can be high.

Obstacles/restrictions:
The study means an extra step and cost in the project development, the project partners have to agree on implementing it.

Reduction of fossil energy use

Status	Start of operational phase: 2010
Location	Germany, North-Rhine Westfalia, Waste water treatment plant in the City of Bottrop
Measure type(s)	Increase energy efficiency
Contact	www.eglv.de

Description and Aim

The use of a residue of the scraping process, a unique proceeded fraction of the shredder light fraction for the conditioning process of sewage sludge instead of fossil coal. This fraction called shredder fibres are used in order to support the dewatering of the sludge and to set the caloric value for the incineration.

Reduction of fossil energies in the dewatering process of a waste water plant.

Adaptation to climate change

Problems addressed:

Other: Emission of greenhouse gas (GHG)

Receptor(s):

Infrastructure

Experiences

Functionality:

The emission of GHG is reduced significantly: it is envisaged to avoid 12,000 tons of fossil coal which sums up to an equivalent of 32,000 tons of CO_2 emissions per year at the WWTP in Bottrop

In general the replacement of fossil coal is possible. But the mixing in the incineration process was more difficult than thought, as the shredder fibres have different material characteristics. So the infrastructure at the WWTP had to be transformed. Once having done this, the process runs nicely.

Further synergies/benefits:

It is a mitigation measure, so reduction of CO_2 is main benefit.

Further benefit regarding sustainability:

Use a recycling material instead of fossil energy.

Further benefit regarding costs:

Shredder fibres are cheaper than coal.

Costs:

The test run was about 170.000 €, in total 410.000 € are budgeted.

Funding:

International, INTERREG IV B-programme

Stakeholder involvement:

Water board Emschergenossenschaft, public authorities, responsible for permits to run the process of sludge dewatering and incineration.

Acceptance:

From begin on it had to be proved that the costs for using the shredder fibres are the same or even less than using coal.

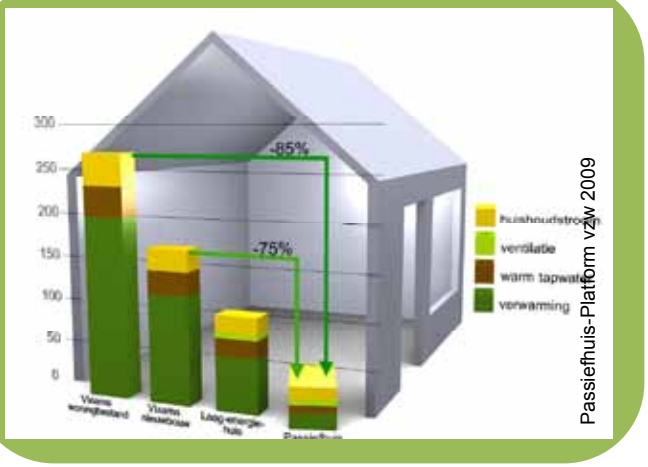
Also the technical feasibility had to be proved, as well as the guarantee that there are no negative effects on the environment while using the new material.

Obstacles/restrictions:

Need of enough shredder fibres at a short transport distance of the waste water treatment plant: The volume needed cannot be provided by the existing businesses – here new providers must be found at the market.

Low energy and passive houses

Status	Implemented from 2013 on
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Building; Urban quarter or street, Residential area
Measure type(s)	Increase energy efficiency; Urban setting
Contact	www.devloei.be, www.passiefhuisplatform.be



Description and Aim

At de Vloei every builder is obliged to the construction of a low energy home as a basic requirement, with the aim to have a number of passive houses in the quarter. Points of interest to achieve such buildings are insulation, ventilation, passive solar design, passive cooling, cold spots, air tight building envelope, etc.

During the planning process of the quarter, the project developers pay attention to the orientation of the plots and the zone of the plot on which can be built.

Adaptation to climate change

Problems addressed:

Heat / heat wave, other like mitigation

Higher temperatures during summer.
Mitigation: less exhaust of greenhouse gases (less heating, no cooling).

Receptor(s):

Population, built environment

Experiences

Functionality:

Adaptation to heat waves:

Creating good living conditions with lesser energy use for heating in winter and no energy use for cooling in summer, even when temperatures are rising in summer.

Further synergies/benefits:

Better living conditions in the houses (less overheating during summer, better air quality, better ventilation, less heating needed during winter).

Costs:

Cost for building a low energy or passive house are 10 to 15% higher than for a standard building.

Funding:

Federal government: funding and lower taxes.
Flemish level: funding (through electricity network manager). Local funding (Ieper): for sustainable building techniques (e.g. heat pump, solar collectors, insulation, …)

Stakeholder involvement:

Municipality of Ieper (building permits), urban planners (design), architects (design), constructors (construction), residents (design and use of buildings), property development companies (design of buildings).

Acceptance:

Social acceptance is growing. Low energy standards are more accepted than passive house standards.

To raise acceptance:
For persons within the project: information sessions and study visits for growing support. For persons outside the project: presentations about De Vloei.

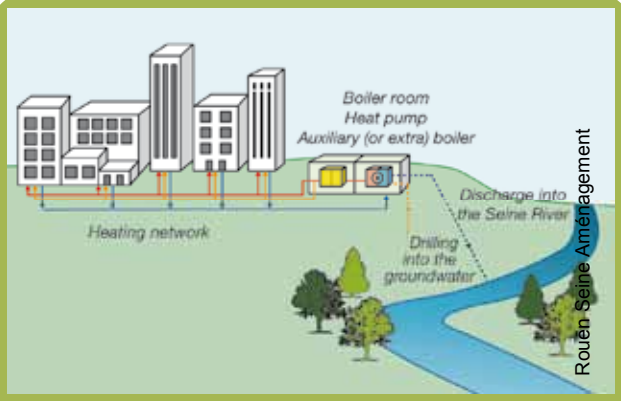
Obstacles/restrictions:

Higher price at the moment of building the house.
Lack of experience with architects, contractors.

A better energy performance of a building than what is obliged through Flemish regulation can only be obliged through the selling conditions set by the project developer. It might be possible that in the near future municipalities in Flanders will receive some legal authority on the matter.

Renewable energy at "Luciline"

Status	Inplementation (2012-2013)
Location	France, Seine-Maritime, Haute-Normandie, City of Rouen, Luciline's district
Spatial info	Urban quarter or street; Business/ industrial park, Residential area
Measure type(s)	Urban water spaces – flowing; Renewable energy; Urban setting
Contact	contact@rouen-seine.fr



Description and Aim

A heating network using geothermal energy is implemented in the restructured district of Luciline in the city of Rouen in order to cover the needs in heating and hot water. Steps:

- A historic and documentary survey
- Drilling campaign (summer/ winter) at 20 to 70m depth below surface level to test the heat potential of the water
- Simulation of the future needs in heating and hot water
- Economic analysis
- To launch competition between different firms
- To assign the delegate of the public service
- Implementation

Pre-condition are residential and office buildings with low energy consumption. Connection is compulsory for property owners/inhabitants. The water used as geothermal source is discharged in the blue-green public water surface network.

Adaptation to climate change

The overall aim is to limit the impact of urban areas regarding the changing climate and so protect the future population and in the same time to offer less expensive energy over the time. Low energy consumption buildings (with excellent insulation) are at the same time more resilient against hot and cold weather conditions.

Problems addressed:

Heat wave, extreme cold, other: mitigation of greenhouse gas emissions.

Receptor(s):

Population, infrastructure, built environment, economy, natural resources

Experiences

Functionality and further synergies/benefits:

The measure is part of a combined approach to develop a residential and business quarter, which is sustainable in all aspects of transport, water, green and energy.
Besides lowering CO_2-emissions the development of the geothermal heating network contributes to an attractive urban living environment through energy reduced cost and through circulation of surface water.
At this site other renewable energy sources revealed disadvantages: Biomass proved to involve too many implementation constraints and the site was less favourable for using wind power. The solar potential was estimated to supply half of the energy needed.

Costs:

The implementation of renewable energies requires financial support of public institutions. The benefits are expected in a longer time.

Funding:

INTERREG IV B-programme, National environment agency (ADEME), City of Rouen

Stakeholder involvement:

Rouen Seine Aménagement, municipality of Rouen for the research and the legal editing and administrative for the management of the resource, future promoters who will construct on the area and the operating firms implementing the heat network.

Acceptance:

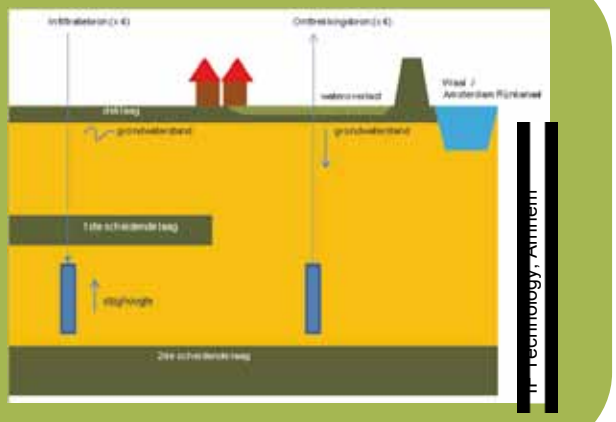
To raise acceptance: communication activities to building developers; Information campaigns to public; regular working groups with local administrators, technical department and politicians

Obstacles/restrictions:

The shallow ground water geothermal energy is a new technology which involves experimentation cost.

Cold-heat storage

Status	Study
Location	The Netherlands, Gelderland, Tiel, Tiel East
Spatial info	Urban quarter
Measure type(s)	Water retention, water drainage; Renewable energy
Contact	Annemieke Spit, aspit@tiel.nl



Description and Aim

The possibilities for the combination of cold and heat storage for new development with tackling local groundwater problems were investigated. There are good possibilities to combine this form of sustainable energy with lowering groundwater levels locally and furthermore decontaminate a local groundwater pollution. A business case points out which techniques are available and if implementation is financially possible. The business cases focus on 2 options: the area for new development on the so-called “climate dike” of Tiel (approximately 400 houses) and the development of a retail park in the industrial area of Latenstein.

Adaptation to climate change

Cold and heat storages can be used to lower groundwater levels locally, thus combining a sustainable measure for new development with the improvement of the liveability in the existing neighbourhood.

Problems addressed:

Heat wave, extreme cold, other: high ground water levels

Receptor(s):

Built environment, population, natural resources

Experiences

Functionality:

Implementing energy aspects in tackling of water problems in Tiel East. Groundwater levels can be lowered by 60 cm locally, preventing water nuisance now and in the future. A groundwater pollution can be decontaminated, making new development possible. The inside temperature in houses can be kept at a comfortable level using cold and heat storage and helps to limit the monthly costs of inhabitants.

Further synergies/benefits:

Link to mitigation: Cold and heat storage and the possible use of residual heat contribute to lowering CO_2 levels. Furthermore this measure can solve water problems in the existing neighbourhoods, improving the liveability. Expecting warmer summers due to climate change, the demand for cooling will increase. The cold and heat storage system will keep houses comfortable and will prevent the use of air-conditioning systems.

Funding:

International (INTERREG IV B-programme) and local.

Stakeholder involvement:

Local industries, project developers, municipality, water board, province.

Acceptance:

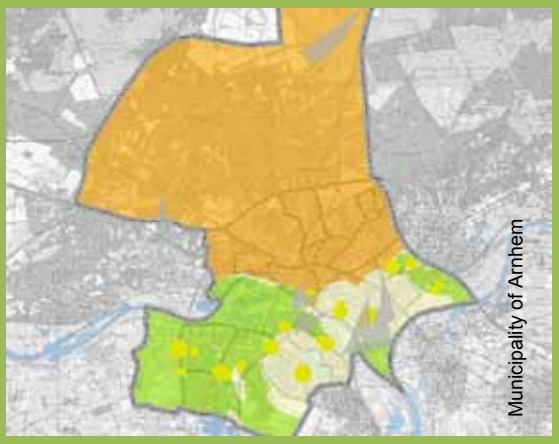
Project developers are/will be actively involved by the municipality. The national interest for this project helps to get project developers involved (publicity).

Obstacles/restrictions:

This combination of sustainable energy and water problems is innovative, concerns many stakeholders and is therefore not easy to achieve.

Cold-heat storage suitability map

Status	Study completed in December 2009
Location	The Netherlands, Gelderland, Arnhem
Spatial info	Town
Measure type(s)	Water drainage; Renewable energy;
Contact	Marion Visser, marion.visser@arnhem.nl



Description and Aim

Preliminary assessment of the suitability of the soil for cold-heat storage.

The Arnhem soil contains three aquifers. All three aquifers are rated in suitability for cold-heat storage, of which three maps are made.

The first aquifer is rather thin, and has little potency for (large) cold-heat storage systems. The second aquifer has quite large potency, but contains a lot of iron in some parts of the city, which might obstruct the storage systems. The third aquifer is considered as the best aquifer for cold-heat storage, and is already used for this purpose by about 40 different systems. Based on the three maps, also three 'floor space index maps' were made, indicating how many m^2 floor space can be provided with the potency of cold-heat in the aquifers.

Adaptation to climate change

Cold-heat storages are used instead of fossil energy to warm and cool buildings. Therefore they contribute to reduction of CO_2 emissions. Furthermore, the inside temperatures in houses can be kept at a comfortable level by using cold-heat storage, which is an adaptation measure, e.g. during heat waves. The costs of the storage systems on the long term are lower than using fossil energy.

Problems addressed:

Weather parameters: indirect.
Via mitigation: Heat wave, heavy precipitation / flooding, drought, storm

Receptor(s):

Built environment, economy, natural resources, population

The aim is to define opportunities and possibilities for cold-heat storage systems in the city.

Experiences

Functionality:

By having an overview of suitability of the soil and aquifers for cold-heat storage, the city of Arnhem wants to facilitate and persuade area developers and other parties to install cold-heat storage systems for their buildings.

The results of the study prove to be very useful and they facilitate all kinds of stakeholders in designing and balancing the costs and benefits of cold-heat systems. Based on the cold-heat suitability maps, a master plan for cold-heat storage is made for the city centre of Arnhem, taking into account the energy demand of the planned future buildings.

Further synergies/benefits:

Mitigation: cold-heat storages contribute to reduction of CO_2 emissions.

Costs:

20.000€ for the assessment study

Funding:

International and local. ERDF and municipality budget.

Stakeholder involvement:

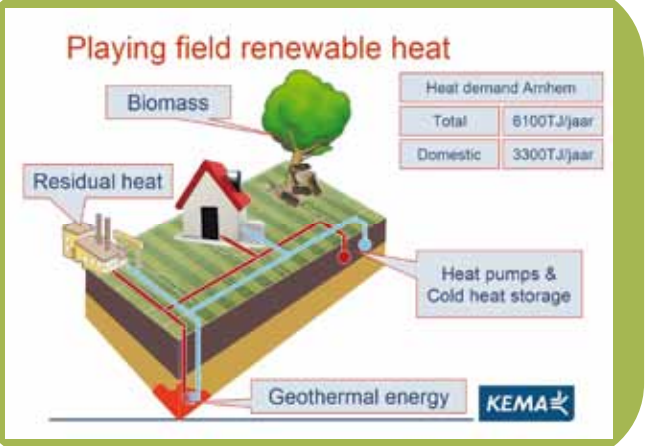
City soil experts, city water experts, province, city planners

Acceptance:

Not necessary, the study contains facts and figures.

Energy map and –strategy

Status	Study was completed in December 2009
Location	The Netherlands, Gelderland, Arnhem
Spatial info	Town;
Measure type(s)	Renewable energy; Urban setting
Contact	Marion Visser, marion.visser@arnhem.nl



Description and Aim

Inventory study resulting in digital maps on which the energy demands (electricity and gas) per city quarter are shown and a set of maps with the potential supplies of renewable energy (wind, solar, biomass, hydropower) within the city boundaries. The maps are stored in a design table (MapTable). Calculation modules in the table allow an indication of CO_2 reduction, investment costs and payback time of intended measures giving the possibility to weigh different energy scenarios in, e.g. site planning processes.

The energy strategy for a CO_2 and energy neutral city contains recommendations for measures on short/ longer term, sets priorities, based on economic, climate costs and benefits.

Adaptation to climate change

Renewable energy is used instead of fossil energy to warm and cool buildings and provide electricity. This contributes to the reduction of CO_2 emissions.

Problems addressed:

Weather parameters: indirect
Through mitigation: heat/heat wave, heavy precipitation / flooding, drought, storm

Receptor(s):

Built environment, economy, natural resources, population

The aim is to gain understanding of the supply and demand of (renewable) energy in the whole city and using this knowledge to take measures and tempt others to take measures, which reduce CO_2 emissions.

Experiences

Functionality:

Having an overview of renewable energy potentials allows to facilitate and persuade area developers and other parties to switch from fossil energy to renewables. The more renewables used, the higher the reduction of CO_2 emission.

The energy maps and energy study are used in all kinds of projects: renovation and new building projects of housing companies, site planning and area development, restructuring of business areas.

Further synergies/benefits:

The gained knowledge in this study can be used at site planning, renovation of city quarters or restructuring business areas, to reduce CO_2 emissions and select the best sustainable energy systems.

Costs:

60.000€

Funding:

International and local. ERDF and municipality budget.

Stakeholder involvement:

City energy experts, city planners, city economic experts, province, city region, government department, science institutes, housing companies, electricity companies, engineering consultants, property developers, disposal companies.

Acceptance:

In several meetings stakeholders were mobilised to work together on the target 'CO_2/energy neutral city' using the MapTable.

Obstacles/restrictions:

It concerns a lot of stakeholders and cooperation between them to achieve the target of an CO_2 / energy neutral city.

Strategy for the underground

Status	Implementation
Location	The Netherlands, Gelderland, City of Nijmegen
Spatial info	Region, town with all parts
Measure type(s)	Green open spaces; Water drainage, water retention; Renewable energy
Contact	www.milieujaarverslagnijmegen.nl

Description and Aim

A vision for the city on how to protect and use the natural resources (deep underground) for sustainable development. Solutions are based on smart technical green/blue and energy combinations to achieve an optimal application and use of the underground. The main question is "What can the underground contribute to the sustainable development of the city of Nijmegen?" balancing in the long term between the 3 P's: People, Planet & Profit. Aim is a pleasurable and healthy living in the city of Nijmegen in a good environment and flourishing economy.

The report Benefits of the Underground gives information to city planners and project developers where and how to use energy storing in the ground (in water tables). Aim is to promote and make underground energy accessible.

Adaptation to climate change

The renewable energy of the underground is used in hot summers to provide cool temperatures in buildings. In cold periods the stored warmth in the ground (stored in water tables) is used in buildings.

Problems addressed:

Heat / heat wave, heavy precipitation / flooding, drought

Receptor(s):

Built environment, population

Experiences

Functionality:

The spatial framework underground will be part of the "Structure Vision". This is an instrument for city planning and guidance for city (re)developing projects. For an optimal development spatial planning (above ground) has to be linked to the underground conditions and possibilities.

Further synergies/benefits:

Energy saving, saving costs of soil cleaning.

Funding:

International and local. Subsidy of Future Cities for hiring a consultancy. Cofinancing by the municipality.

Stakeholder involvement:

Water Distribution Company, water board, regional and city planners and architects, archaeologists, green planners.

Obstacles/restrictions:

Changing legislation is necessary and takes long time; a policy needs to be backed up by law otherwise stakeholders are free to make choices and can decide not to take any adaptation measures.

Ambition note for "De Vloei"

Status	Study (finished)
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter/street; Building, residential area
Measure type(s)	Green structures - all types; Water systems – all types; Energy efficiency and Mitigation; Urban structure – all types
Contact	www.devloei.be

Description and Aim

The ambition note for the Ieper project sums up all of the ambitions the local project partners (municipality of Ieper, social housing company Ons Onderdak and West Vlaamse Intercommunale (wvi)) agree on concerning sustainability. Ambitions are described on 2 levels. Ambitions on the basic level have to be achieved in order to be able to talk about a sustainable project, ambitions on the plus level go further.

The more general regional guideline sums up all possible sustainable measures concerning sustainability that wvi can suggest to municipalities for projects with wvi. This document is to be used as a starting point for discussion and agree on what is achievable.

Adaptation to climate change

All themes of sustainability are addressed: social aspects (people), ecological aspects (planet), economical aspects (prosperity) and aspects concerning the process.

Problems addressed:

Heat / heat wave, heavy precipitation / flooding, drought, storm

Receptor(s):

Population, infrastructure, built environment, economy, natural resources

Experiences

Functionality:

The ambition note and regional guideline give information about the overall need for dealing with climate change and its impacts and give possible measures which make projects more resilient.

Integrating sustainability from the very first step of a project creates possibilities that are hard(er) or impossible to implement in a later stage of the project.

Further synergies/benefits:

Link to mitigation: In several themes of the documents reduction in emissions is the goal (e.g. theme energy and theme mobility). Overall, the ambition note and regional guideline aim at integrated sustainability (people, planet, profit, process).

Costs:

ca. 43.000 €

Funding:

International/funding by the De Vloei project partners. European funding for the draft of the regional guideline; funding from Europe and the De Vloei project partners for the ambition note for De Vloei.

Stakeholder involvement:

Ambition note for Ieper: municipality of Ieper, the province of West Flanders, the social housing company Ons Onderdak, wvi.

Regional guideline: municipalities in West Flanders within the project area of wvi (54), wvi.

Acceptance:

The regional guideline was sent to all municipalities and well received, some municipalities made further inquirements.

Obstacles/restrictions:

Getting overall sustainability accepted is very difficult thus a lot of communication with stakeholders is necessary.

Climate dike

Status	Study/realisation planned 2014-2015
Location	The Netherlands, Gelderland,Tiel, Tiel East, from harbour to Amsterdam Kanaal
Spatial info	Town; Residential area
Measure type(s)	Green open spaces; Urban water spaces – flowing water (seepage water); Urban setting
Contact	Annemieke Spit, aspit@tiel.nl

Description and Aim

A climate dike is a very wide dike that combines safety aspects, (flooding) and the reduction of waternuisance (seepage water) with multiple use of land.

To protect Tiel East from flooding in the far future due to climate change, a strengthening of the current dike is necessary. Instead of heightening the dike, Tiel wants to create a dike that is very wide. This not only strengthens the dike but it also creates possibilities for multiple use of land and it reduces the problems caused by seepage water.

Adaptation to climate change

River level rising. The climate dike improves the safety of Tiel East. It alters the length of the path of the seepage water. It adds more green to the area.

Problems addressed:

Heavy precipitation / flooding, storm, other: seepage water, lack of green

Receptor(s):

Built environment, economy, infrastructure, population

Experiences

Functionality and further synergies/benefits:

The climate dike improves the safety and increases the liveability if the area (10 times better, 100 times safer). It creates space for new sustainable houses in an exceptional area.

The climate dike also helps to reduce the constant flow of seepage water by 6% which causes less water nuisance in the urban quarters behind the dike.

The climate dike in Tiel East will be the first in The Netherlands. It is also a Dutch national pilot project of builing in flood plains.

The Cool Nature park is part of the climate dike and offers space for recreation, more green public space, a playground and a place to cool down during hot days.

Costs:

Estimated at € 500.000 for external experts and € 7 million for investments.

Realisation is planned in 2014-2015.

Stakeholder involvement:

Province, Rijkswaterstaat, waterboard, municipality of Tiel, project developers.

Acceptance:

The social acceptance of the climate dike is higher than it would be in case of just heightening the dike. The inhabitants of Tiel East clearly see the benefits of building on top of the climate dike and the creation of more recreational space.

Obstacles/restrictions:

Legislation (water related) is a problem, high investments, and difficult negotiations with project developers.

Urban planning

Status	Several studies
Location	Belgium, West Flanders, Ieper, De Vloei
Spatial info	Urban quarter or street; Building, residential area
Measure type(s)	Green structures - all types; Water systems – all types; Energy efficiency and Mitigation; Urban structure – all types
Contact	Stijn Saelens, s.saelens@wvi.be

Description and Aim

In the development of a residential quarter in Ieper, in all phases of urban planning sustainability is taken into account as a factor in the process. In Ieper it concerns the masterplan, the visual quality plan, the infrastructure plan, the allotment plan with its regulations and the owner structure plan. By doing so, integration of sustainability on city quarter level is guaranteed, as well as it is made easier for future individual builders and property development companies to build sustainable.

In addition, some sustainable measures require space within the project (e.g. rain water system above ground) so these aspects have to be implemented in the plans.

Adaptation to climate change

The overall aim is the realisation of sustainable projects. Good urban planning is a constraint to be able to implement the measures. These measures also contribute to adaptation as well as mitigation.

Problems addressed:

Heat / heat wave, heavy precipitation / flooding, drought

Receptor(s):

Population, infrastructure, built environment, natural resources

Experiences

Functionality:

Less flooding and less impact of flooding.
Less impact from heat waves & droughts.

By introducing sustainability from the very early stages of the project more sustainability aspects are easier to realise; some of the adaptation and mitigation measures can thus be implemented more easily, effectively and/or with lesser costs.

Further synergies/benefits:

Link to mitigation: reduction in emissions is one of the goals (e.g. theme energy and theme mobility).

Funding:

European funding/Flemish funding/funding by the De Vloei project partners.

Stakeholder involvement:

Municipality of Ieper, property development agencies, the Flemish government (approval of plans), urban planners, consultancy agencies (planning process).

Acceptance:

Through communication actions (presentation at seminars, conferences, study visits, …)

Obstacles/restrictions:

Getting overall sustainability accepted is very difficult thus a lot of communication with stakeholders is necessary.

Integrating sustainability into a project is a learning process. The first projects thus take more time and encounter some new/practical problems.

The person(s) who integrate sustainable measures have to keep up with new and innovative techniques in several domains. This asks for permanent education.

PART IV: FACT SHEETS ON RAISING AWARENESS MEASURES

Energise Hastings

Measure by	Local Authorities, Hastings Borough Council with other partners
Coverage	Local, Hastings & St Leonards, neighbouring Boroughs
Measure type(s)	Inform / Consult / Co-produce
Contact	Chantal Lass, class@hastings.gov.uk www.energyshare.com/energise-hastings/

Jane Dodson, Hastings

Description and Aim

The forum is called “Energise Hastings” and brings together developers, architects, energy companies, residents, Sussex Coast College Hastings, Hastings Trust, Hastings Borough Council and a school to promote energy efficiency and use of renewables in buildings.

Aim:

Change behaviour:
To increase the uptake of energy efficiency and renewable measures in the town, to reduce carbon emissions and help alleviate fuel poverty locally, through giving advice and developing projects, including training.

Target group(s), Message, Instruments

Target group(s):

Businesses, inhabitants, networks
Local businesses and local community including residents and community groups

Message:

As national government policy changes, to share good practice, communicate grants available and funding mechanisms. Also to co-produce projects and provide advice and training.

Used instruments:

Inform and consult about the changes and co-produce projects and provide advice and training.

Experiences

Combination with other measure:

The eco-retrofit training manual, a technical training manual and video how to renovate a Victorian terraced property in an eco-friendly way with adaptation and mitigation measures such as insulation, is a key resource to assist in the training element. Open days at the property in Cambridge Gardens show the results of the eco-retrofitting. Also links to Enviro 21 project as helps to encourage businesses into the town to take up the eco business units and use the Sussex Exchange.

Follow up:

Projects are underway and in development, so the forum is working! For example, solar panels are to be fitted on a school, and energy advice has been piloted at the local development trust.

Good-practice:

The good practice is bringing together private, voluntary and public sector partners to develop the work, and the sharing of good practice by people who have had renewables and energy efficiency measures installed.

Sustainable stormwater management

Measure by	Water board, Emschergenossenschaft
	Germany, NRW, Catchment of Emscher river
Coverage	Regional
Measure type(s)	Inform / Consult / Co-produce
Contact	www.emscher-regen.de

Description and Aim

Future convention for storm water: a regional convention to disconnect 15% of storm water from the sewer system in 15 years. The possibilities of disconnection are broad, and are summarised in the term “sustainable stormwater management”.

In the discussion how to face extreme rainfall events due to climate change sustainable stormwater management is one option to act proactively at the “source”, rather than investing in technical, cost-intensive end-of-pipe solutions such as higher dikes or bigger sewers.

Aim:

Change behaviour:
Awareness raising, initiation for disconnection, support

Target group(s), Message, Instruments

Target group(s):

Professionals at local authorities in the Emscher catchment, property owners next to the water bodies

Private house owners, housing companies

Message:

Sustainable stormwater management saves your money

Used instruments:

Use opinion (and money as financial incentive)

Experiences

Combination with other measure:

Directly related to structural measures in the water system

Good-practice:

The easiest way to convince private property owners to disconnect their paved areas from the sewer system is to show best-practice examples. With media such as a newsletter or the website www.emscher-regen.de these best practice-examples can be spread nicely.

Enviro21 business park

Measure by	Local authorities, Hastings Borough Council
Coverage	East Sussex, Hastings, ENVIRO21
Measure type(s)	Inform / Consult / Co-produce
Contact	www.sussexexchange.co.uk

Description and Aim

Public consultation with a view to raise awareness of the first phase of the Enviro21 sustainable business park development and the development of the Sussex Exchange.

The project will create approximately 20,000 m² of work and office space encourage around 600 jobs. In addition the Sussex Exchange will provide conference, meeting, exhibition/education and restaurant facilities.

Aim:

Secure public support in order to gain planning consent.

Target group(s), Message, Instruments

Target group(s):

Local community both businesses and local residents as well as special interest groups and statutory stakeholders such as the local planning authority.

Message:

Enviro21 Innovation Parks incorporates the latest technologies and materials to make best use of natural resources and renewable energies. As far as possible the buildings will be future proofed in order to adapt to climate change.

Used instruments:

Website (Ongoing), Public Exhibition, Youth Workshop, Presentations to councillors, council officers, special interest groups and businesses. (October 2007) Residents Information Sheet (August 2007)

Experiences

Combination with other measure:

Directly linked with the development of Sussex Exchange building.

Follow up:

The process created commitment since the planning consent has subsequently been granted by the local authority.

Twinning – international capacity building

Measure by	Future Cities project partners
Coverage	Areas of Future Cities-activities: NWE-countries, International
Measure type(s)	Inform / Consult / Co-produce
Contact	www.Future-Cities.eu


Hans van Ammers, Arnhem

Description and Aim

Staff (2-3 persons) of Future Cities partners engage intensely in a 1-2 day workshop discussing a concrete measure and developing plans further. Practical experiences are exchanged and advice is given across borders different countries.

Aim: Change knowledge – change attitude

The aim is to foster the direct and problem-oriented exchange of practical experiences and to find solutions by consulting between local/regional authorities and water boards from different countries.

Target group(s), Message, Instruments

Target group(s):

Administration staff: regional, local authorities/organisations

Project partners from the Future Cities-project: persons from different departments of the organisations

Message:

The know-how of different organisations from different countries can contribute effectively to improve a measure/plan or solve a problem.

Used instruments: Use opinion – use facts

Printed information, presentation, site visits, moderated co-producing sessions with the “map-table”, etc. :
To explain the adaptation measures/plans and procedures to the other project partners, to learn from each other and to develop a measure further or make it transferable.

Experiences

Combination with other measure:

Concrete twinning sessions were held about structural measures (see fact sheets, e.g. green roofs, Heerener Mühlbach) and the communication tool “Maptable”.

Good-practice:

The twinning method is a valuable communication tool to dig deeper into a concrete topic which is of interest for at least two project partners to exchange their know-how. This can be enhanced by combining the know-how of the project partners with input from external experts (“views from different angles and different interest”).

For the practical development a “twinning request” is formulated by one partner describing topic and solutions sought for. Partners interested in the same theme or having further knowledge and experience about the topic in question respond.

The hosting partner organises the meeting with adequate instruments. In order to make the results of the meetings available a “twinning report” is written by all participating partners which covers the results of the meeting but also the lessons learned by each project partner.

Efforts have to be made related to the time needed for travelling and meeting.

Follow up:

According to the different themes the twinning activities are followed up by integrating the advice given in the plans or procedures.

The network for twinning activities was build up during the funded period of the Future Cities-project. After the end of the funding, twinning exchange is most likely to go on by e-mail contacts. One e-mail-twinning took place while the Future Cities-project was running.

Cooperation with professional schools

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	Local area of “De Vloei”, Ieper
Measure type(s)	Consult / Co-produce
Contact	www.sieu.info

Description and Aim

Two professional schools worked together with the city of Ieper and wvi. One of the schools made demonstration models for insulation of walls for low energy and passive houses, the other school made a light plan for the new quarter.

Aim:

Change knowledge – change attitude – change behaviour
Directors, educators and pupils realized that the school programmes can focus more on sustainability than they do at this very moment.

Target group(s), Message, Instruments

Target group(s):

Population: age groups, young people
Professionals: professional schools
It were the youngsters that did the work and made YouTube movies and websites concerning their assignment.

The professional schools in Ieper realize through this cooperation that sustainability should become more present in the school programmes.

Message:

Raise awareness for sustainable construction and quarter development.

Used instruments:

Opinion – emotion – facts

Experiences

Combination with other measure:

Structural fact sheets: Urban planning, Ambition note for “De Vloei”

Follow up:

One of the schools continued working with the city of Ieper and the social housing company to make a refurbishment plan for an old farm in the De Vloei site.

Light plan that can be used if more worked out in detail - The insulation models are now used by the city of Ieper for raising awareness for sustainable construction.

Costs:

Only staff costs which were little as wvi only had to explain to the schools what the De Vloei partners wanted as result.

Green Allure inner city Nijmegen

Measure by	Local authorities, Municipality of Nijmegen
Coverage	Local, City of Nijmegen
Measure type(s)	Inform / Co-produce
Contact	Veroniek Bezemer, v.bezemer@nijmegen.nl

Description and Aim

The project “Green Allure inner city Nijmegen” (GAB) aims to establish more green space in the city centre in order to improve public space and local climate. An idea-book was made in which different types of innovative green suitable for the inner city are described. In the next phase several of these projects were realised such as green roofs, a green wall, trees in streets, a park etc.

The inner city has less green compared to the rest of the city and there also the heat island problem in the summer is more observed.

Aim:

Change behaviour
Involve the target groups in the city’s green projects, inspire target groups for their own green projects. For projects involving green in public spaces Nijmegen always asks local stakeholders to participate in the design process.

Target group(s), Message, Instruments

Target group(s):

Politicians: local; Administration staff of local authorities; Population: inhabitants of inner city; Professionals housing corporations.

Message:

Message included the targets and the fact that the participation was needed because the city doesn’t own all the buildings (for example for green walls and green roofs) in the inner city.

Used instruments:

Opinion: Both inhabitants and businesses in the inner city want more green (as known from surveys).

Facts: Presentation and excursion for local politicians. Actively approaching building-owners, housing corporations and businesses to ask for their participation. Publications on internet and in local newspaper.

Experiences

Combination with other measure:

Addressing and supporting the development of green structures: green walls, green squares, green roofs.

Follow up:

The project succeeded in realising many projects, large and small. Also inhabitants came forward with their own ideas for green walls which the municipality installs and inhabitants maintain. For some projects consent by the local building committee was needed. For most projects consent was received.

Good-practice:

The idea-book worked well in order to present general ideas which find their definite place in the next phase. In that way you can work flexible.

Obstacles:

Obstacle in working this way is that you don’t work with a vision or a spatial structure and people can find that confusing. In the case of the Nijmegen inner city there is too little space to really define a continuous green structure so we worked with the concept of creating different spots of green.

Costs:

Costs are very different for all the projects. Small projects consisted of planting climbing-plants at facades and guiding them with a simple steel wire on the wall. The biggest projects are constructing a green wall and making a park. These costs are about 700,-/ m² for the green wall and 200,-/m² for the park.

Study & site visits

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	Local area of “De Vloei”, Ieper
Measure type(s)	Inform / Co-produce
Contact	Eveline Huyghe, e.huyghe@wvi.be

Description and Aim

Study and site visits to exemplar projects for own staff, politicians, administrations to use best – practices/knowledge in the own projects.

Aim:

Change knowledge – change attitude
To visit good examples of sustainable city development for own use.

Used instruments:

Opinion – emotion – facts
Site visits with guide and presentations of good examples.

Target group(s), Message, Instruments

Target group(s):

Politicians: local and regional level

Administration staff: local and regional authorities/organisations (Own staff, West Flemish local authorities, province of West Flanders)

Population: Inhabitants, property owners housing

Message:

To show and explain how a sustainable city quarter can be developed and how policy can underpin sustainability.

To show that realising a sustainable quarter is feasible without loss of comfort and in an affordable way – to get people to think of sustainability in another way than only looking at the possible costs.

Experiences

Combination with other measure:

Structural fact sheet: Ambition note for “De Vloei”

Raising awareness fact sheets: Information sessions on sustainability; Information exchange; Interactive website

Follow up:

Contacts with other organisations can be made and more specific knowledge exchange can be set up.

In Ieper it contributed to a higher level of support. Also other municipalities start thinking about sustainability in new city quarters.

Good-practice:

Knowledge gain through visiting exemplar good working examples.

Obstacles:

Only interested people take part in these study visits. How can other people be reached?

Monitoring of results:

Knowledge and best practices were used in the ambition note and regional guidelines. The Ieper city council approved the ambition note; it is used for the planning and development of the new quarter.

Costs:

Subscription for study visit
Costs for organising the site visits (bus, catering, invitations, speakers, etc.)
Staff costs for the organisation of the site visits

Involvement of local partners

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	Regional/Local area of “De Vloei”, Ieper
Measure type(s)	Inform / Co-produce
Contact	Eveline Huyghe, e.huyghe@wvi.be

Description and Aim

The development of the sustainable residential quarter started with the draft of an ambition note (see fact sheet ambition note), in which the local project partners agree on sustainable measures that will be implemented in the project.

Before plans for the project area were drafted, a workshop was organised for all project partners (owners of land in the project) together with experts (e.g. consultancy agencies). Divided over several groups, people held discussions on well-defined topics. This made the ambitions clear for everybody and solutions on how to implement the ambitions were found.

Also further on, in the planning phase, workshops are organised to prepare decisions on the project.

During the project, regular newsletters inform all of the involved persons on the progress of the project. The newsletters also give a good overview on how the project was addressed, which can be useful for other projects.

Target group(s), Message, Instruments

Aim:

Change knowledge – change attitude – raise support for sustainable measures

Co-production – creation of partner involvement

Target group(s):

Project partners, Administration staff: local / regional authorities / organisations, Politicians: local level

Message:

Raise awareness and involvement when you want to implement sustainable measures successfully.

Used instruments:

Use opinion - facts
Presentations, ambition note, workshops, newsletters

Experiences

Combination with other measure:

Structural fact sheets: Ambition note for “De Vloei”, Urban planning

Communication fact sheet: Study & site visits

Good-practice:

The method allows for exchanges of experiences/ knowledge and is practical in a decision-making process.

Workshops are a useful instrument: they are interactive and produce results in a time-efficient way.

Newsletters give a good overview on the process.

Obstacles:

Availability of all of the partners for regular meetings - time consuming

Keeping interest for a process that takes several years

Costs:

Staff costs (meetings, writing newsletters)

Educational programme

Measure by	Local authorities,Municipality of Tiel
Coverage	Local; Tiel East
Measure type(s)	Inform / Co-produce
Contact	Ine van den Hurk, ivdhurk@tiel.nl

Description and Aim

Educating children and raising their awareness about climate change is important and can help to make future generations more knowledgeable and thus more adapted to climate change. In 2011, the municipality of Tiel, in the Netherlands, created the educational program ‘Wie, Wat, Water’ (or: ‘Who, What, Water’) on climate change and water for the city’s primary schools. The programme gradually narrows its scope from global to local effects in the eastern part of Tiel and it highlights the green- and water measures that are being taken there. While raising awareness to climate change in a fun way, the programme also creates understanding for the water measures that will be taken in Tiel.

One of the difficulties in raising awareness to climate change is that it’s a global problem, with large scale impacts, but huge uncertainties in exact local effects. However adaptation measures have to be taken locally, and for people to understand and accept these measures, climate change has to be made local and tangible. In Tiel school children are educated about climate change, which builds a bridge between understanding the need for adaptation to climate change and accepting local adaptation measures.

Target group(s), Message, Instruments

Target group(s):

Population: Inhabitants of Tiel, Schoolchildren

Message:

Climate change is a global problem, adaptation by taking local by taking local measures is necessary.

Used instruments:

Educational programme 'who, what, water' with 3d map with teacher explanation and assignments.

Experiences

Combination with other measure:

Structural fact sheets: Water Square “Vogelbuurt”, Green Roofs “Latenstein”, Climate dike, Cool Nature

Follow up:

The educational programme is continuously available for primary schools and is distributed by a local foundation for sustainability that lends out educational materials by order of the Muncipality of Tiel.

Obstacles:

None

Costs:

€ 3.700 in total including € 500 for the 3D maquette

Watergame

Measure by	Municipality of Tiel, The Netherlands
Coverage	Local, Tiel, Tiel East, national (more Dutch sites available)
Measure type(s)	Inform / Consult
Contact	www.watergame.nl/Welkom.html A. Spit, aspit@tiel.nl

Description and Aim

The Watergame is an interactive computer game that simulates the local water problems and the consequences of possible measures. Four organisations (Waterboard, Municipality, project developers and housing associations) have to work together to solve current water problems and prevent problems in the future. Tiel East is one of the pilot locations in the Watergame but other locations with different situations can be chosen as well.

Aim:

Change knowledge, change attitude
The aim was to influence the process of finding an integral solution for the water problems in Tiel East by creating insight in each other's interests and to create awareness that water problems can only be solved by an integral approach and working together.

Target group(s), Message, Instruments

Target group(s):

Professionals (planners, housing corporations, waterboard), Population (inhabitants, ambassadors)

Message:

Waterproblems can only be solved by an integral approach and working together.

Used instruments:

Use opinion, use emotion, use facts
The Watergame is based on facts and figures regarding the real situation in Tiel East and projections on the effects of new development. The opinion of the stakeholders and concerned inhabitants influences the way the game is played.

Experiences

Combination with other measure:

Structural measures to adapt to water problems.

Follow up:

The watergame is still used by several organisations as an example of interactive process instrument.

The game is teaching material for students at the Landscape & Environment Management school in Delft and Rotterdam.

Good-practice:

The watergame has proven to be a very useful instrument to create awareness. It is a user friendly, interactive instrument. In Tiel the game played an important role in the development of the integral water scenario for Tiel East. The water game is still being used frequently by other organisations and by Tiel (in workshops). The game has been translated into English to make it available for foreign partners.

Costs:

The game cost € 275.000 in total; Tiel contributed € 50.000 to develop the Tiel East pilot location.

Guideline Climate Change

Measure by	Water board, Emschergenossenschaft
Coverage	Local, regional, city of Essen
Measure type(s)	Inform / Consult
Contact	www.eglv.de

Description and Aim

The catchment area of the Emscher is one of the most densely populated regions throughout Europe. The water board Emschergenossenschaft establishes a “Guideline Climate Change” for its own actions. The coherences of climate change, water cycle and the water board's activities are explained in an easy way. Furthermore, the following questions have to be answered: What are the main effects of climate change for a water board? Which of the present activities of a water board help to adapt to the local effects of climate change and which other activities could decrease the consequences on the water cycle?

Aim:

In a first step: change attitude, later: change behaviour
Development of a regional guideline climate change for adapted operation and management of a water board to assess planned actions.

Target group(s), Message, Instruments

Target group(s):

In a first step: own staff of water board’s administration, later: also the members of the water board (can be politicians and staff of local authorities, or professionals at businesses, or inhabitants living next to our water bodies).
Development of a regional guideline climate change for adapted operation and management of a water board to assess planned actions

Message:

The water board takes on the regional responsibility for the inhabitants of the Emscher catchment – therefore we deal with the topic climate change and check, how we might be affected by the impacts of climate change, and what we can do to mitigate and adapt. A main message shall be: What can you do as individual person and as staff member of a water board within your daily work to deal with climate change?

Used instruments:

Use facts and opinion: Information via print product

Experiences

Combination with other measure:

Structural measures in the water system, mitigation measures

Follow up:

An English summary is available to spread the content also to European partners.

Good-practice:

The guideline has already had first results during the development process: while dealing with the different topics how the water board can contribute to mitigate and adapt to climate change, further possible adaptation and mitigation measures have been generated which are followed by the water board.

Interactive website

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	Local area of “De Vloei”, Ieper
Measure type(s)	Inform / Consult
Contact	www.devloei.be

Description and Aim

The website www.devloei.be is an interactive website where the project and its aims are explained and where the citizens of Ieper can give their opinions, suggestions, exchange their knowledge and experiences. The idea is also that people influence each other for changing attitude and behaviour.

This website can also be of use for other municipalities that want to develop sustainable quarters and convince the inhabitants of the value of it. Results of studies and planning can be downloaded.

Aim:

Knowledge – attitude – behaviour
The website is an instrument to give information about the progress of the project and general information concerning sustainability. It allows for knowledge exchange between citizens and experts influencing in this way each other to change attitudes and behaviour.

Target group(s), Message, Instruments

Target group(s):

Population: inhabitants, property owners housing

The website wants to reach the general public and municipalities that are interested in working on sustainable projects but also wants to be an exchange platform for people who will live in the new quarter.

Message:

Inform inhabitants (of Ieper) of the different phases in the development of the new quarter – develop for them an exchange platform.

Used instruments:

Opinion – emotion – facts
Facts are used in the description of the phases of the development. People can use the website to give their opinions and to help each other with problems/give suggestions.

Experiences

Combination with other measure:

Structural fact sheets: Ambition note for “De Vloei”, Urban planning

Communication fact sheets: Information sessions on sustainability, Information exchange, Study & site visits, Cooperation with professional schools

Follow up:

Wvi and the city of Ieper divide the task to adapt the website and to control/evaluate the responses/questions of the citizens.

Good-practice:

The website is a forum/platform for the exchange of knowledge, experiences and best practice.

Obstacles:

An interactive website can become a place where people can put comments that are not constructive. Therefore evaluation/control always will be necessary.

Monitoring of results:

The success of the website will depend on the constructive attitude of the people using the forum.

Costs:

For development of the website: € 10.000,- plus staff costs for the continuous adaptation of the website and for control/evaluation of the comments.

Climate change conferences

Measure by	Water board, Emschergenossenschaft and Lippeverband Germany, NRW, catchment of Emscher and Lippe
Coverage	Local, Regional
Measure type(s)	Inform / Consult
Contact	www.eglv.de

Description and Aim

Meeting / conference to inform the members of the water board Emschergenossenschaft and Lippeverband about climate change and the consequences for water management, inviting the members to undertake common activities.

Aim:

Changing attitude, Information

Target group(s), Message, Instruments

Target group(s):

Administration staff and professionals from the members of the water boards

Municipal members of Emschergenossenschaft and Lippeverband

Message:

Common and regional coordinated actions are necessary to find suitable solutions to adapt to climate change in the sector of water management

Used instruments:

Use facts and opinion
presentation, poster, face to face contact, brochure

Experiences

Combination with other measure:

Structural measures in the water system

Follow up:

Future Conferences and meetings are planned under the topic climate change. The regional involved actors are networking intensely on this topic, as it is getting more and more relevant for daily work in planning, urban development and water management

Good-practice:

The direct communication with the local and regional stakeholders is essential for the adaptation to and mitigation of climate change. Very often the language of scientists has to be translated in order to develop the need for action on local level. Conferences and meetings have shown that this translation can be done on interdisciplinary events.

Obstacles:

Costs depend on numbers of participants and level of invited stakeholders: between 150 € and some thousands € per event.

Plan Advice Team

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	Local area of “De Vloei”, Ieper
Measure type(s)	Consult
Contact	Stijn Saelens, wvi, s.saelens@wvi.be

Description and Aim

The Plan Advice Team advices on how to implement obligatory building prescriptions but also focuses on sustainability that can be implemented on a voluntary basis. Through giving this advice the partners want to stimulate sustainable building and living and show the advantages in order to convince the individual builders.

Aim:

Change attitude – Change behaviour
The aim of this action is to influence the individual builders and to help them implement the obligatory building prescriptions in the best possible way. Another task of these teams is the sensibilisation of the builders concerning the non obligatory sustainability aspects to try to convince them to implement these on a voluntary basis.

Target group(s), Message, Instruments

Target group(s):

Population: inhabitants, property owners housing
Professionals: housing corporations, experts in the team

Message:

The city of Ieper wants to help citizens with achieving the necessary sustainability for their plans and houses.

Used instruments:

Facts – Emotions

The city of Ieper evaluates the building plans against the sustainability ambitions outlined in the ambition note and the building prescriptions.

Experiences

Combination with other measure:

Structural fact sheets: Ambition note for “De Vloei”, Urban planning

Raising awareness fact sheet: Information sessions on sustainability

Good-practice:

The instrument was already successfully used in a wvi project (Heulebrug in Knokke)

Obstacles:

- Finding means to pay the people in the team
- Discussion on pro’s and con’s of keeping the evaluation of the plan voluntary or obliging it. In De Vloei it was voluntary.

Costs

Staff costs, cost for expert(s)

Facing up to Climate Change Seminar

Measure by	Local Authority of Hastings, East Sussex
Coverage	International
Measure type(s)	Inform
Contact	www.hastings.gov.uk

Description and Aim

A seminar to share good practice on climate change adaptation.

Aim:

To change attitudes
By demonstrating what is already being done and what is possible.

Target group(s), Message, Instruments

Target group(s):

Professionals (project development), Politicians (mostly local)
Planners, policy makers and other professionals e.g. architects

Message:

We can face up to climate change and have already started, here is how to continue.

Used instruments:

Use facts, Use opinion
Presentations, workshops and question and answer sessions; part of the day was filmed and this can be viewed along with all presentations on the Hastings Borough Council website.

Experiences

Combination with other measure:

This was a pre-cursor to the development of the local climate change adaptation plan and helped to raise awareness and pave the way for more work.

Follow up:

Attendees are kept informed of future developments and a seminar followed on 17 June 2011 ‘Hastings 2066’ Footsteps into the Future.

Following the Hastings and St. Leonhards town-wide climate change strategy was developed with a range of local partners, including residents, business, the community sector and public agencies.

Good-practice:

It was useful to promote the Future Cities work to a wide, regional audience. Feedback was positive, and participation in wider climate change planning for the town has now gained momentum with the loose network of people attending.

Climate campaign "Our green heart"

Measure by	Local authorities, Municipality of Nijmegen
Coverage	Local, City of Nijmegen
Measure type(s)	Inform
Contact	www.hetgroenehert.nl/digitale-balie info@hetgroenehert.nl

Description and Aim

Climate campaign "Our green heart" is a local climate campaign to raise awareness with citizens for the problems of climate change and how to deal with them. In the climate campaign we focus on reaching people in their daily behaviour and to inspire them to be more sustainable. The campaign had a lot of fun items and easy to use solutions for at home so it wouldn't be hard to participate.

Aim:

Change knowledge, change attitude, change behaviour
The aim for change in behaviour was set at 3% reduction of energy consumption per year in Nijmegen.

Target group(s), Message, Instruments

Target group(s):

Population, inhabitants, property owners housing, age groups

Message:

Climate change should not stop at raised awareness "in the head", but should also have a place "in the heart" of people so they act more sustainable.

Used instruments:

Opinion, emotion, facts
Events, promotional material: clothing, website, posters, banners, free-cards, advertisements, promo-teams, contests.
Climate and energy market where people can get information on how to save more energy in their home.

Experiences

Combination with other measure:

Structural measures such as green structures, especially green roofs by means of subsidy.

Follow up / Monitoring of results:

The campaign was successfully adopted by the target groups. In fact, after 3 months of campaign 38% of the citizens had heard of it and 80% said to be prepared for action.

Good-practice:

For every campaign it is important to have a good plan to work with. The Green heart has started a few years ago and has grown ever since (even into a climate-shop) but the basic message is still strong.

Information sessions on sustainability

Measure by	Regional Association, West – Vlaamse Intercommunale
Coverage	Local area of “De Vloei”, Ieper
Measure type(s)	Inform
Contact	Eveline Huyghe, e.huyghe@wvi.be

Description and Aim

To support the development of sustainable residential quarter “De Vloei” in Ieper information sessions are organized to inform well-defined target groups about a well-defined sustainability aspect. In the first sessions general information about sustainability is given. In later sessions more specific and practical information is given.

Aim:

Change knowledge – change attitude
Information on a sustainable way of city growth. Different key themes are addressed by expert(s) (groups) to explain impacts / advantages / disadvantages / possibilities.

Target group(s), Message, Instruments

Target group(s):

Population: inhabitants, property owners housing, networks/lobbyists (locally); Politicians: local level

Mayor, aldermen, local councillors, local advisory boards (on environment and nature, on spatial planning), citizens

Goal: local people get to know how De Vloei is conceived and clarify expectations for future inhabitants and local politicians.

Message:

Depending on the topic – the message is well-defined and is meant for all persons that work on the topic or will live in or around the new city quarter.

Used instruments:

Use facts
Presentation, Question and Answer sessions, Giving best practice

Experiences

Combination with other measure:

Structural measures: Ambition note for “De Vloei”; Urban planning

Raising awareness measures: Information exchange; Study & site visits; Interactive website

Follow up:

The information sessions were not evaluated.

Good-practice:

Best – practice: knowledge and best practice from experts was shared with the target groups

Obstacles:

An information session gives information to the target group. The effect of the information sessions is not known.

Only interested people come to these sessions: how can we reach the others?

Costs:

Rent of meeting room, catering (if applicable), reimbursement of speaker/expert

Water awareness

Measure by	Local authorities, Municipality of Arnhem, The Netherlands, Gelderland, Arnhem
Coverage	Local
Measure type(s)	Inform
Contact	Hans van Ammers, hans.van.ammers@arnhem.nl

Description and Aim

The ultimate aim of the project is to improve water quality in a very cost-effective way and to obtain a better operation of the sewer system. Expensive technical intervention (technical measures) would then be no longer necessary. An improved operation of the sewer system and better water quality result in a lower cost increase for the residents. Residents often are not aware of the consequences when they throw things into the toilet or down the sink that do not belong there. When water or sewage projects were carried out, residents received an illustrative small WC booklet about what may and may not go into the sewer. Residents were also invited to take a look at sewage treatment and sewage pumping stations to see what happens to their wastewater. These tours were fully booked and also received high media attention.

Aim:

Improve awareness, consciousness of the effects of (human) behaviour on the water quality and operation of the sewage system and sewage treatment plant

Target group(s), Message, Instruments

Target group(s):

Residents, citizens

Message:

“Make sure your own sewage system is properly connected to the municipal sewage system / use the sewage system properly (don’t use it as a garbage bin)”.

Used instruments:

Letters house-by-house, supporting website, booklet with information about misuse of sewage system, invitation to visit sewage treatment plant (to see what the effect is of misuse) and sewage pumping station (idem)

Experiences

Combination with other measure:

Water system

Follow up:

Common practice at mayor sewage renewal projects

Obstacles:

none

Monitoring of results:

Monitoring has been done by as long people before and after they received information about sewage knowledge. Significant improvements are shown. This does not mean however that effective behaviour lasts.

Costs:

50.000€ (project management) + 40.000€ (booklet, meetings etc.)

Information exchange

Measure by	West-Vlaamse Intercommunale, Belgium
Coverage	International/national/regional, Local area of "De Vloei", Ieper
Measure type(s)	Inform
Contact	Eveline Huyghe, e.huyghe@wvi.be

Description and Aim

The development of the sustainable residential quarter "De Vloei" in Ieper receives a lot of interest: articles are published, presentations are giving on different occasions. Sometimes wvi organises the study events, sometimes wvi is invited to present the project or specific aspects of it. These articles/presentations have different target groups e.g. experts, private companies, the Flemish authorities, local/regional authorities in Belgium and in other countries and are customized accordingly.

To exchange information with people involved in similar projects, wvi organised a knowledge exchange-day.

The type of forum varies, e.g. local/regional, regional/national and international.
The themes are well-defined and focus on a specific aspect.

Message:

To inform how the "De Vloei" project is being conceived from the very first planning phases until actual sustainable building and living and to learn from others.

Target group(s), Message, Instruments

Aim:

Change knowledge

To spread the experiences from the "De Vloei" project to enable the exchange of experiences and knowledge with other organisations/municipalities.

To make known that De Vloei is an exemplar project

Target group(s):

Administration staff: local / regional / national authorities / organisations, Politicians: local level, Professionals: constructors, planners

Through the publication of articles and participation at different forums (concerning different topics) a wide range of target groups is reached to inform about the work that is being undertaken in Ieper De Vloei.

Used instruments:

Use opinion - facts
Presentations by wvi and other De Vloei project partners.

Experiences

Combination with other measure:

Structural measures: Ambition note for "De Vloei"; Urban planning

Raising awareness measures: Study & site visits

Follow up:

Improved exchange experiences/knowledge with other organisations/municipalities.

Good-practice:

The method allows for exchanges of experiences/ knowledge with other organisations/municipalities

Obstacles:

Information exchange is time consuming (preparation & travel time & presentation time)

Costs:

Travel costs for wvi speakers and staff time

Special edition of "Journal Green" about Nijmegen

Measure by	Local authorities, Municipality of Nijmegen
Coverage	National, City of Nijmegen
Measure type(s)	Inform
Contact	www.vakbladgroen.nl

Description and Aim

Special edition of "Vakblad Groen" (Journal Green) about Nijmegen. "Journal Green" is a national monthly journal/magazine about urban green and landscape. Target group for the journal are policy makers, landscape designers, public space designers and city builders. Cities can make a special edition of the magazine (with extra circulation) about their city to use as promotion or information.
In the Nijmegen-edition we explained about the Nijmegen approach to urban green in which we use a broad perspective like health, climate, environment, social issues, water and nature. We send the Nijmegen-edition to different departments within the municipality, to adjacent municipalities and local NGO's.

Aim:

Change knowledge
Promotion of green policy and green projects in Nijmegen.

Target group(s), Message, Instruments

Target group(s):

Professionals, Politicians, Administration staff, Planners, Professional schools

Message:

This is the way Nijmegen works on urban green.

Used instruments:

Opinion, facts
wrote articles on different subjects concerning urban green in Nijmegen.

Experiences

Combination with other measure:

Structural measures: Green roof "De Tweeling"; Green roofs – Town Hall; Green wall – inner city

Raising awareness measures: Green Allure inner city Nijmegen

Follow up:

We distributed close to 500 copies.

The promoter of the urban green division, Plant Publicity Holland, also ordered an extra circulation of 500 copies to send to their members (businesses working in the plant, trees and gardener division) as an example of a real green city.

Monitoring of results:

Nijmegen is now more known as green city that has innovative green ideas and projects.

Costs:

The costs depend on the magazine and the extra circulation you want. Furthermore there are costs because you need time to write the articles.

Presentation of Luciline programme to potential investors

Measure by	Local authorities, Rouen Seine Aménagement, France
Coverage	National, City of Rouen, Luciline's district
Measure type(s)	Inform
Contact	contact@rouen-seine.fr


Rouen Seine Aménagement

Description and Aim

The measure consisted in a one day conference, where local politicians explained the urban project and informed on the different and complementary scales of implementation (from master plan to the building), the environmental and social issues of the project. The investors could collect a “competition dossier”, necessary to propose a complete methodological and financial offer to realise a construction in the project.

Aim:

Change attitude

The aim is to increase awareness on the project within the investors, and bring them to share its values on order to ease the implementation.

Target group(s), Message, Instruments

Target group(s):

Professionals

The measure targets the investors and property developers.

Message:

Promote the ambitions of the planning operation within the professionals, in order to have qualified and informed developers operating.

Used instruments:

Use facts

Conference, Press pack, Website, Investor’s competition dossier, USB Keys

Experiences

Combination with other measure:

As envisaged by the masterplan: structural measures: Green structures; Adapted rain water infrastructure; Renewable energy at “Luciline”

Follow up:

This was the launching of the promoters' competition and about ten offers were deposited.

Good-practice:

Large participation to the conference (150 persons). 91 “competition dossiers” collected. 10 offers received of good quality.

Obstacles:

The measure requires certain organisation delays and costs.

Monitoring of results:

Web site was maintained.

Costs:

The only cost were for the press pack, USB keys, implementation of the website and working time.

Energy Market "Green Living"

Measure by	Local authorities, Municipality of Nijmegen
Coverage	Local, City of Nijmegen
Measure type(s)	Inform
Contact	www.hetgroenehert.nl/digitale-balie info@hetgroenehert.nl

Description and Aim

Energy Market 'Green living' was organised to inform inhabitants how to save energy in their own home. In this market 38 businesses presented their products and advice so inhabitants could see what they can do for their own home. The businesses presented solar panels, green roofs, energy saving advice. There also were architects and some NGO's like Transition Towns.
The market was organised on a Saturday in the city centre of Nijmegen and had free entry.

Aim:

Change behaviour
Inform inhabitants about ways to save energy in their own home so that they will actually start taking measures.

Target group(s), Message, Instruments

Target group(s):

Population: Inhabitants of Nijmegen

Message:

It is necessary to save energy in context of climate change. We have to act now, so start in your own home.

Used instruments:

Facts: concrete ways to save energy, how to implement them, what they cost, how much energy they will save.
The market was an opportunity for inhabitants to get a lot of information on saving energy in one place. They had the opportunity to see different ways to save energy and speak with experts and businesses to see what types of measures are suitable for their own home.

Experiences

Combination with other measure:

Structural measures: Green roofs were part of the market display.

Follow up:

Approximately 700 inhabitants visited the market.

Costs:

Costs were about €20.000,- (including facilities, hours, external advice).

ABOUT FUTURE CITIES

The urban heat island effect in summer or particularly wet winters with increased flood risk are phenomena which have a tremendous impact on urban and regional living conditions. This is where the impacts are felt and the adaptation measures have to be implemented "on the ground". Rising temperatures and weather extremes like floods and storms can be detrimental for the quality of life in our towns and cities – challenges we have to face. Our urban city regions must be prepared to cope with the effects of climate change as city structures and the urban living environment are especially vulnerable.

"Future Cities – urban networks to face climate change" - a project in the framework of the INTERREG IV B NWE programme, led by the German water board Lippeverband: the project aims at making city regions in North-West Europe fit to cope with climate change impacts. The Future Cities strategy combines selected strategic key components of the urban environment – green structures, water systems and increasing energy efficiency – for a proactive transformation of urban structures. As public bodies are frequently responsible for urban water management and green structures in cities, they also have the possibility to design and implement adaptation measures within the existing urban infrastructure.

Since the beginning of the project in 2008, the project partners have developed and implemented:

- Common evaluation methods for climate proof city regions – the "Future Cities Adaptation Compass"
- Action plans to enable the participating regions to adapt their strategies in a concrete manner
- Combined measures: selected construction solutions in pilot projects
- Targeted awareness raising methods and campaigns with decision-makers and disseminators.

Future Cities is part of the Strategic Initiative Cluster of North-West Europe *SIC adapt!*: "Adaptation to the spatial impacts of climate change" which makes available the experience of eight projects including over 90 partner organisations.

SIC adapt!

Future Cities
urban networks to face climate change

The Future Cities partnership includes water boards, urban administrations, planning associations and project developers in North-West Europe. The geographical scope of the partnership covers densely populated areas in river catchments or directly at the coast.

The Future Cities partners are: Lippeverband/DE (Lead Partner), City of Arnhem/NL, Emschergenossenschaft/DE City of Bottrop/DE, Hastings Borough Council/UK, South East England Partnership Board/UK (formerly), Sea Space (Hastings and Bexhill Renaissance)/UK (formerly), City of Nijmegen/NL, Rouen Seine Aménagement/FR, City of Rouen/FR, City of Tiel/NL and West-Vlaamse Intercommunale/ BE.

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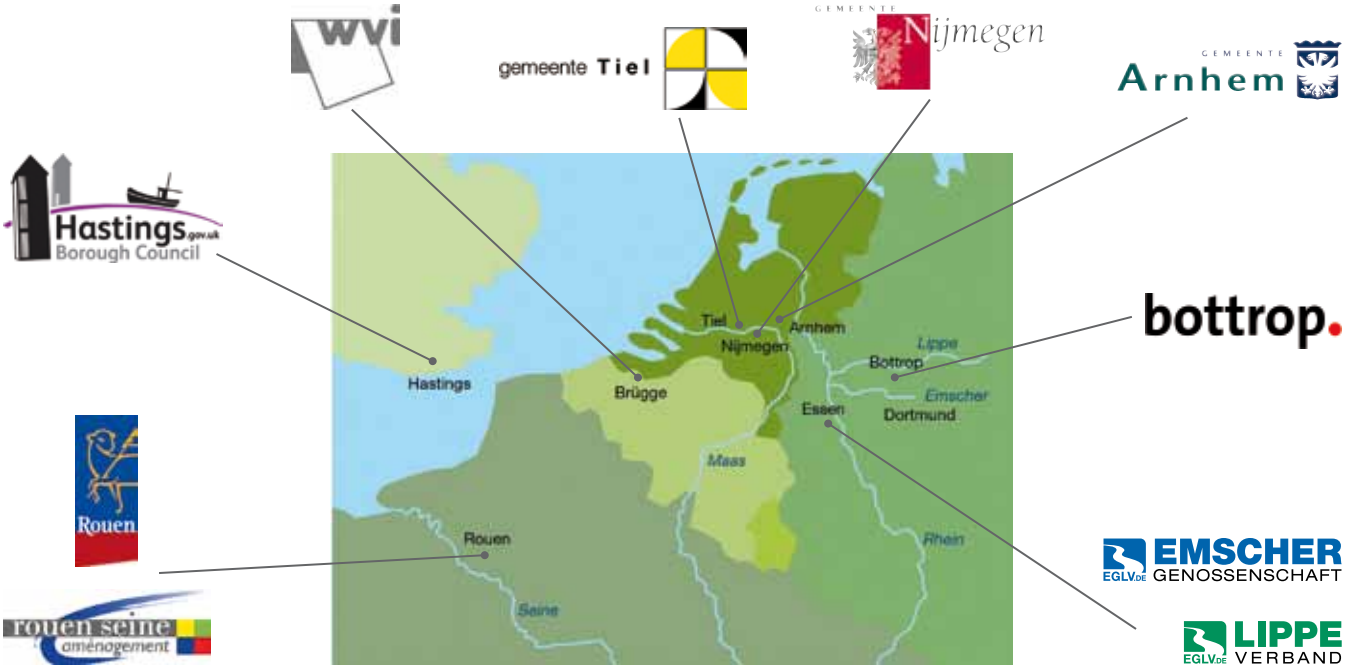

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