



**EC project on Integration of  
Natural Water Retention Measures in river basin management  
The 2<sup>nd</sup> Danube Region Workshop, 23-24 June 2014  
*Bucharest, Romania***

## **Part II Blue-Green innovations in future cities' spatial planning**

**Prof. Dr. Čedo Maksimović. Imperial College London**  
**c.maksimovic@imperial.ac.uk**

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### **What we present**

**What is BGD**  
**Innovative paradigm**  
**From individual Ecosystem service to quantified interactions for better  
planning**  
**Demo projects**  
**Our (brave) partners and initial cases**  
**Invitation for collaboration**

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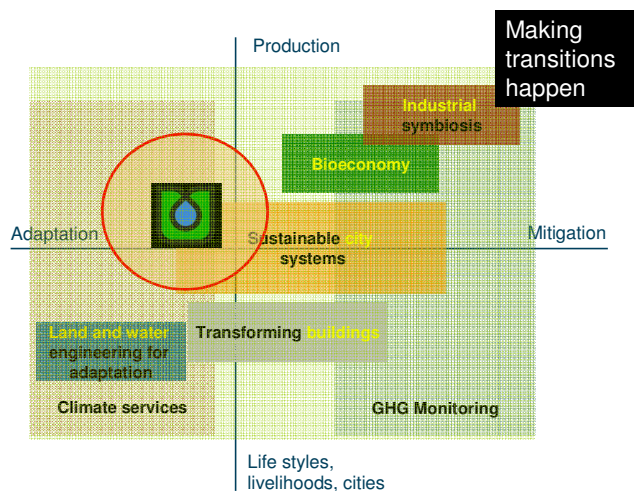


To BGD or not to BGD, that is not the question now

BGD deliverables customised to meet the needs of the future innovative spatial planning and design of new cities and retrofitting of the existing ones.

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## Thematic areas



Blue Green Dream project at the connexion of 4 platforms

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4

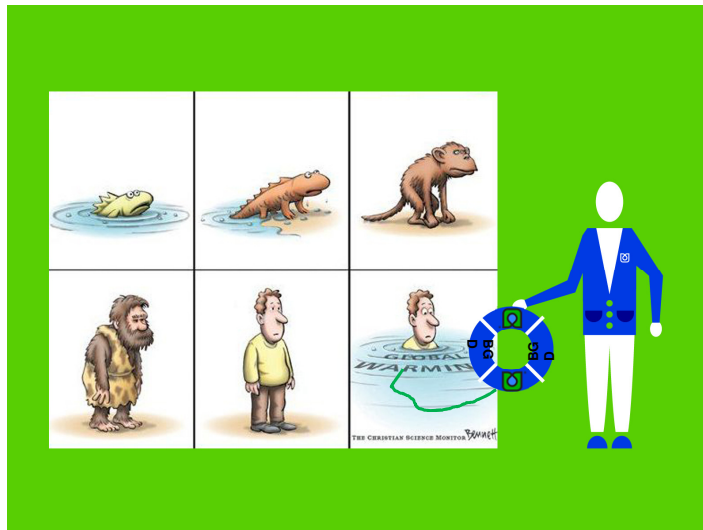


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## IMPACTS OF CLIMATE CHANGE

## ... AND MITIGATION



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## ISSUES

Urban creep, (London is losing the equivalent of 2.5 Hyde Parks of green space area/annum), poor drainage, floods and droughts, tidal surges, pollution of water bodies, urban heat islands, energy inefficient systems, poor ecosystems, human health issues.

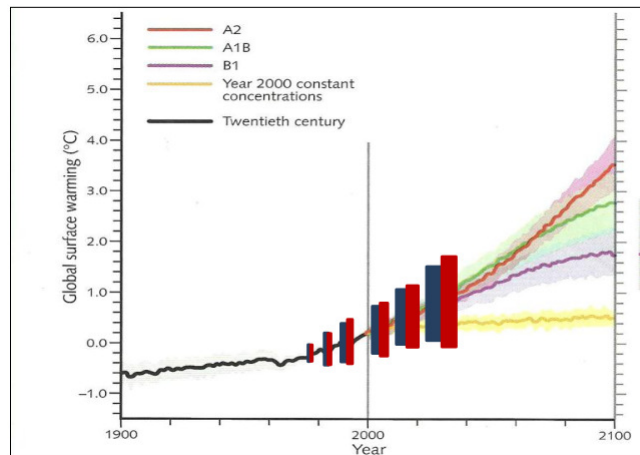
Climate Changes are likely to increase frequency and magnitude of weather extremes.

New Orleans, Seoul, Beijing, Fukushima, New York, ...

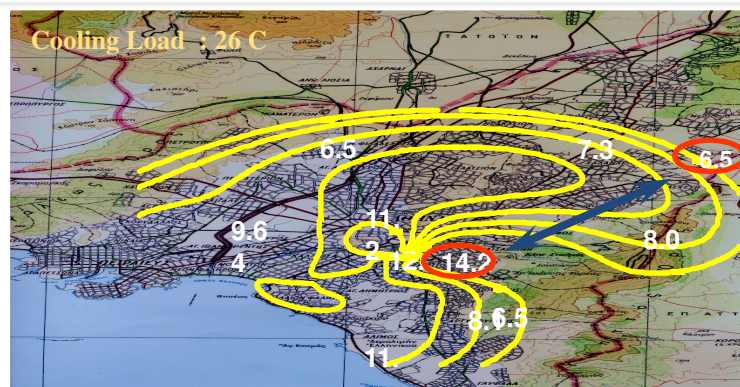
Who is next?

How long will London be "lucky" to avoid major catastrophe ?

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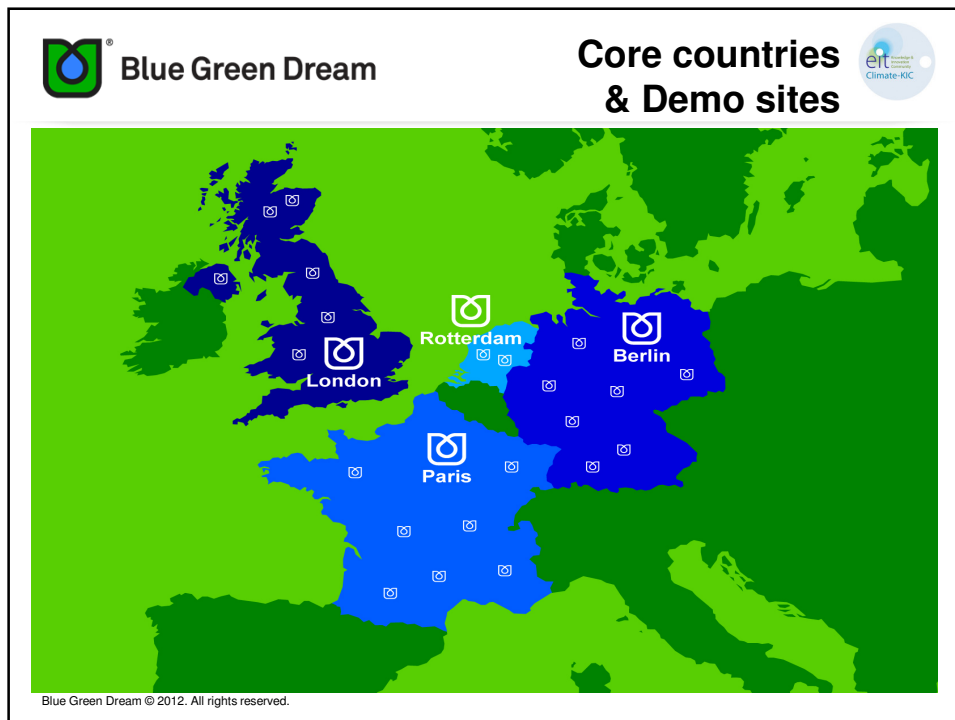
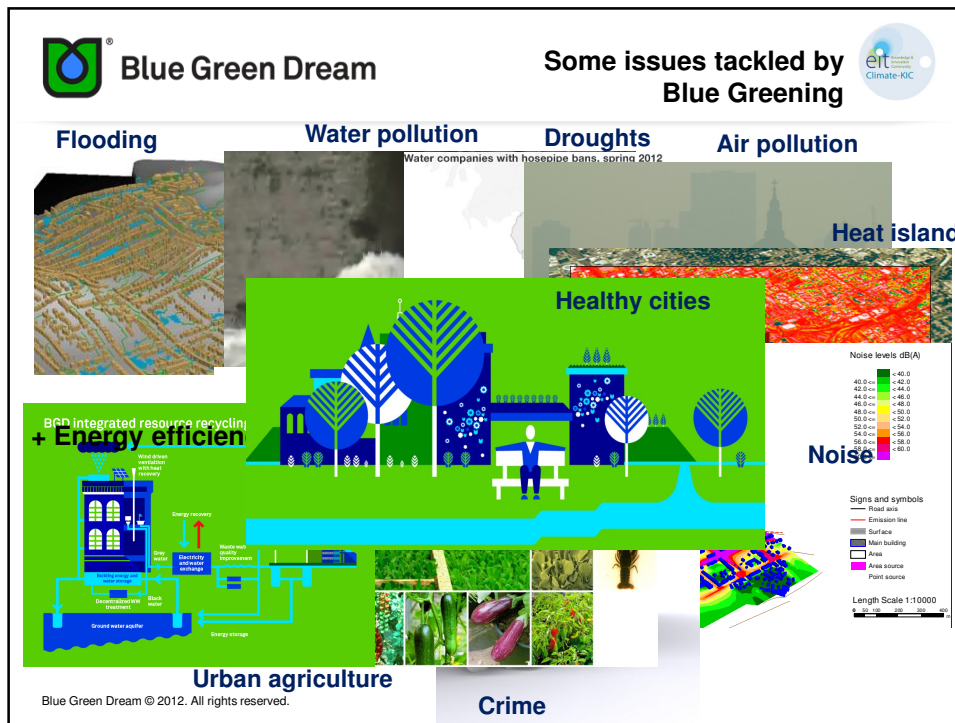
Urbanization leads to a very high increase of energy use. An 1 % increase in the per capita GNP leads to an equal (1.03), increase in energy consumption. However, an increase of the urban population by 1 % increases the energy consumption by 2.2 %, i.e., the rate of change in energy use is twice the rate of change in urbanization.

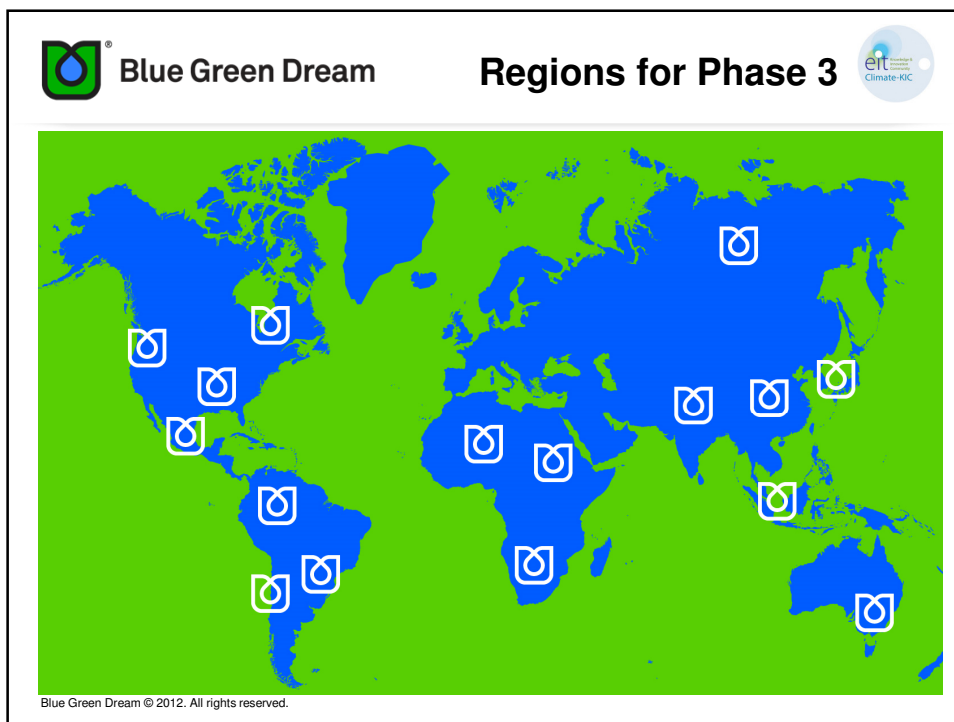
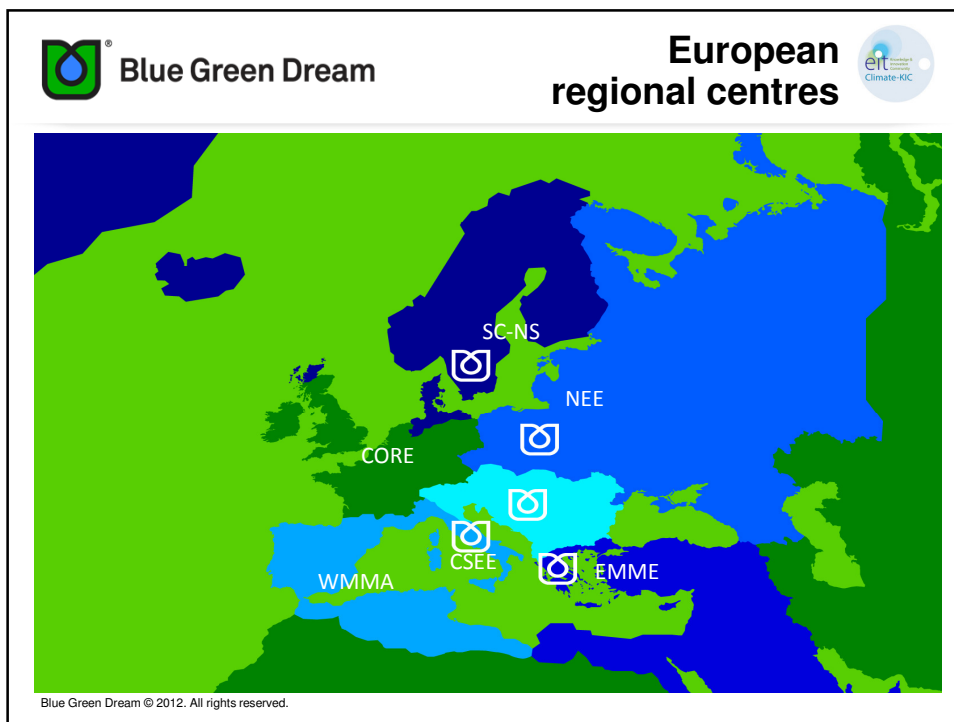
Comparison of the energy consumption per capita for the inner and outer parts of selected cities shows that the consumption in the inner part is considerably higher. Inner London presents to 30 % higher energy consumption per capita than the outer part of the city.

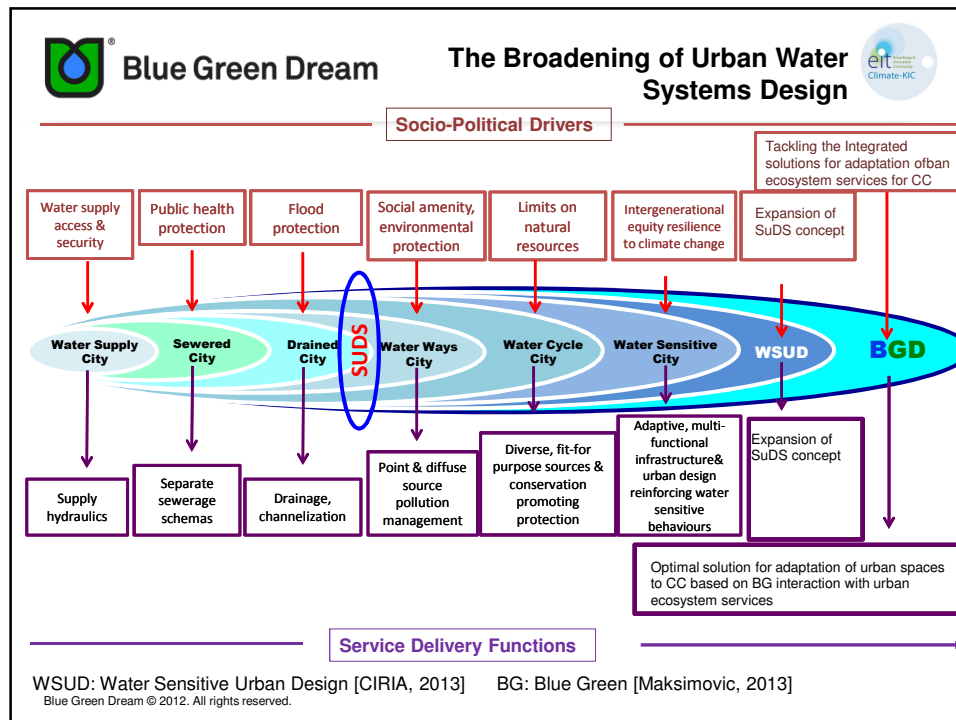
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Courtesy Prof. Asimakopoulou









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[Home](#) » [Research shows that billions of dollars could be hiding in wastewater streams](#)  
[WaterTech e-News Daily™](#) / [Municipal](#)

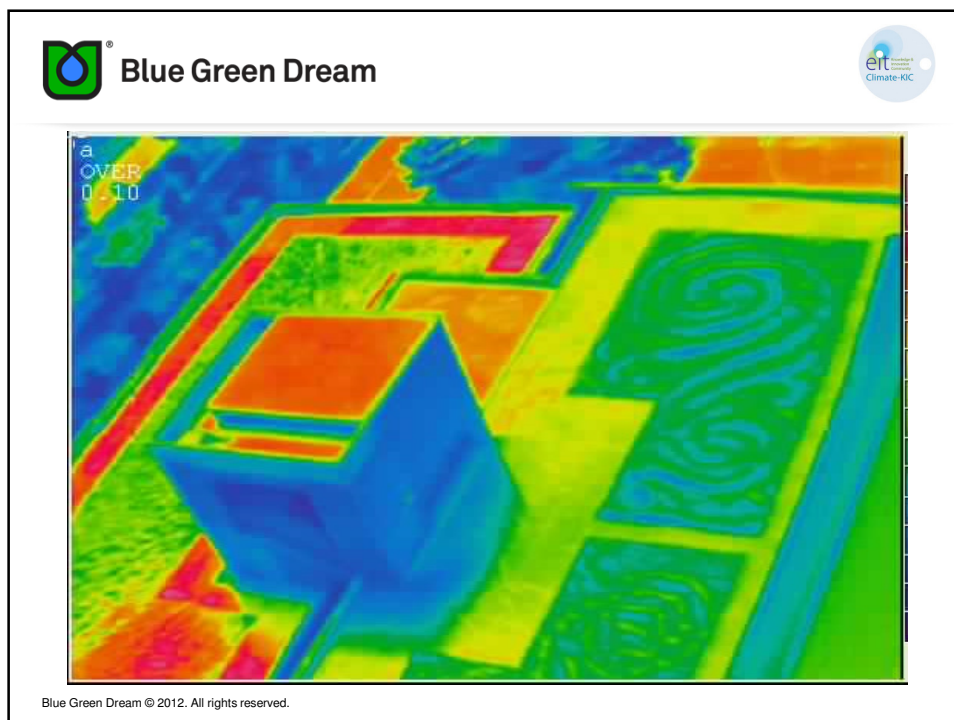
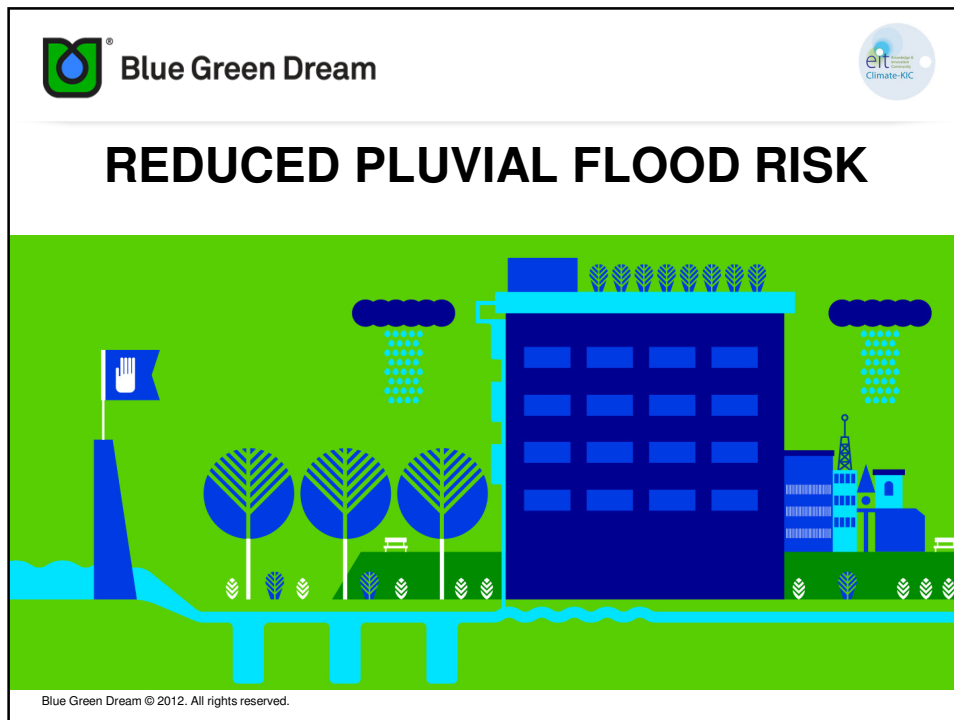
**Research shows that billions of dollars could be hiding in wastewater streams**  
 JUNE 17, 2014  
[No Comments](#)

BOSTON — With rising commodity prices, Lux Research has found that recovery of resources from wastewater streams is becoming increasingly feasible, especially oil, precious metals and industrial fats, oils and greases (FOG), according to a press release. Over the past decade, crude oil prices have risen nearly three-fold, while the value of precious metals has soared over 250 percent, making recovery of these commodities attractive.

Growing demand for biodiesel amid a restricted supply of feedstocks drives recovery of industrial FOG. However, current economics don't favor lithium and phosphate recovery, noted the release.

"Many current wastewater streams contain resources worth billions of dollars of lost product and lost opportunity," said Tess Murray, research associate and author of the report titled, "Recovering Valuable Resources from Wastewater."

"As the value of resources rises, recovery technologies are beginning to make sense for even parts-per-million traces of materials such as precious metals and oil," she added

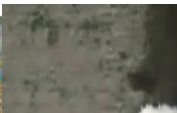


## Blue Green Wave at ENPC, Paris

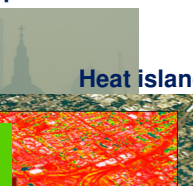


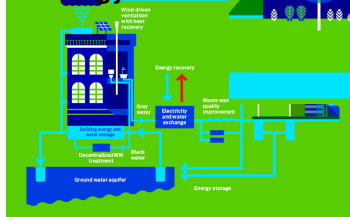
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**Flooding**

**Water pollution**

**Droughts**

Water companies with hosepipe bans, spring 2012


**Air pollution**

**Heat island**
**Healthy cities**

**BGD integrated resource recycling  
+ Energy efficient**

**Urban agriculture**

**Crime**

Noise levels dBA

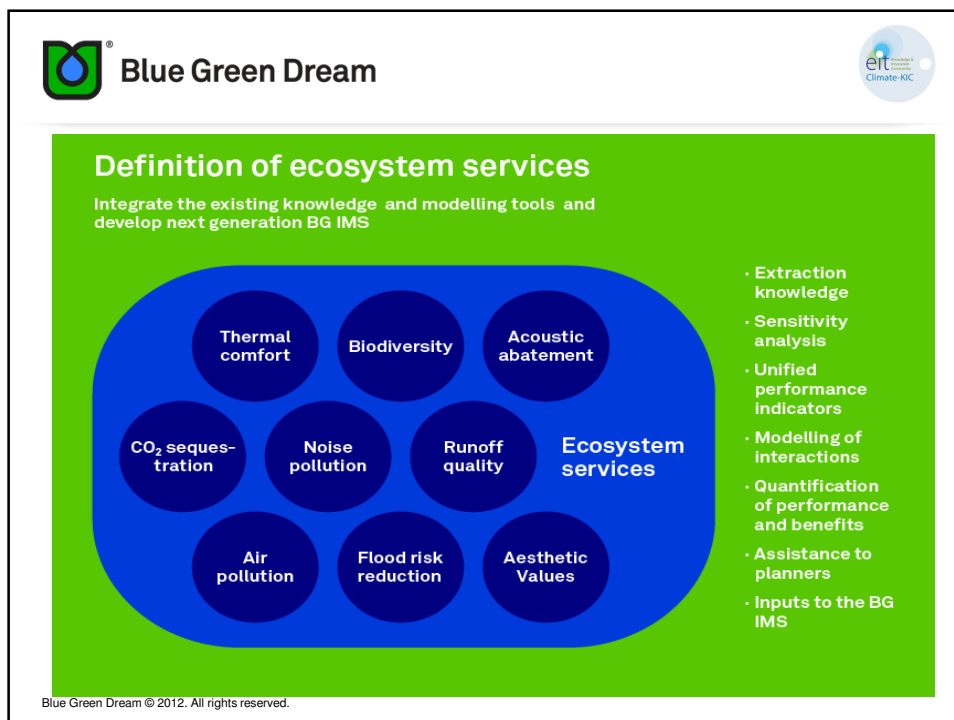
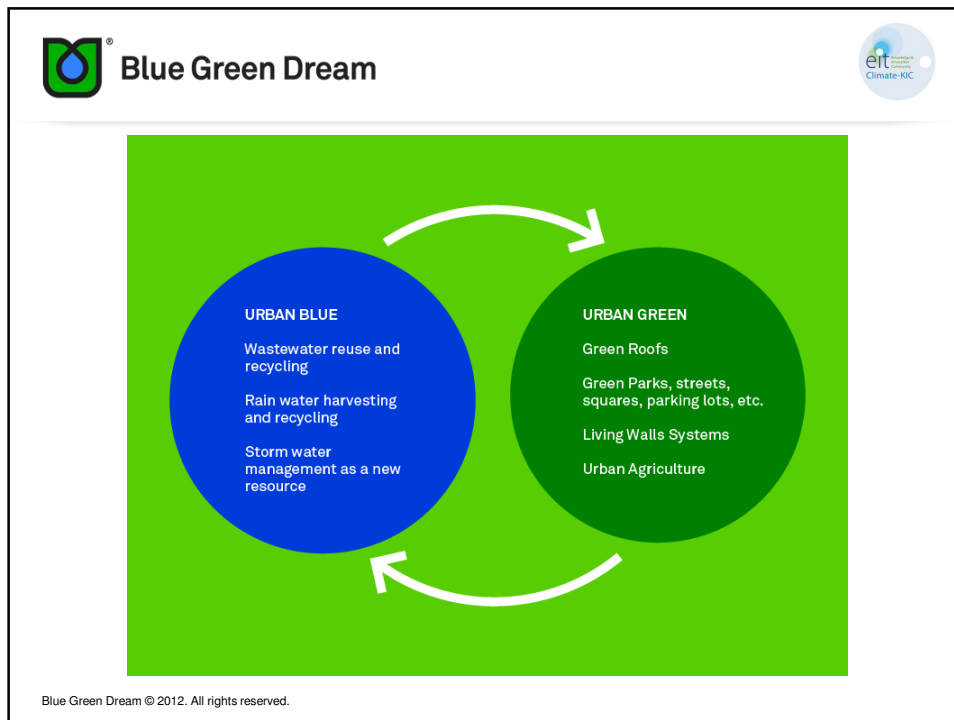
< 40.0
40.0 - 42.0
42.0 - 44.0
44.0 - 46.0
46.0 - 48.0
48.0 - 50.0
50.0 - 52.0
52.0 - 54.0
54.0 - 56.0
56.0 - 58.0
58.0 - 60.0

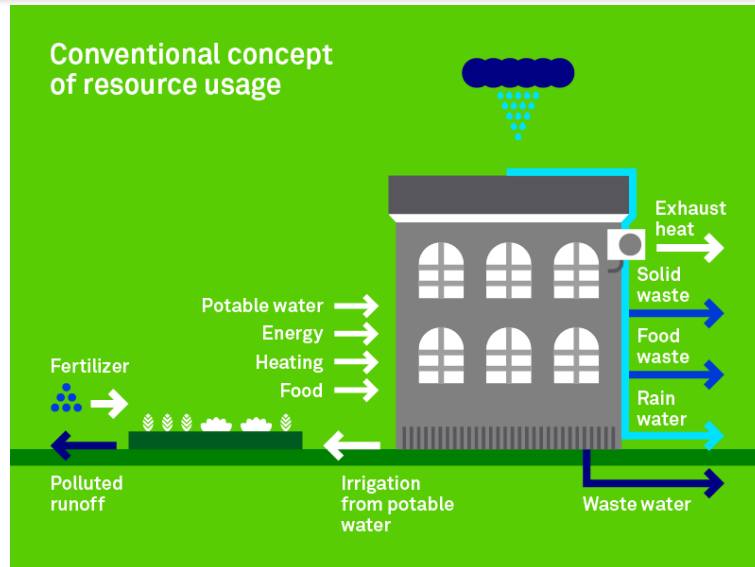
**Noise**

Signs and symbols

- Road line
- Emission line
- Surface
- Main building
- Area
- Area source
- Point source

Length Scale 1:10000



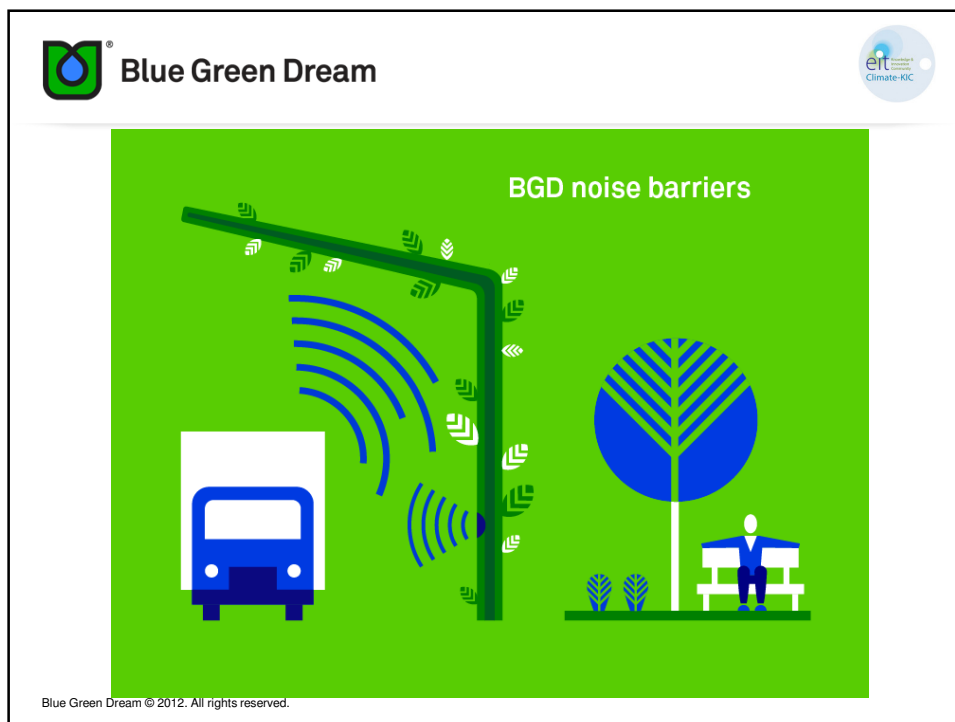
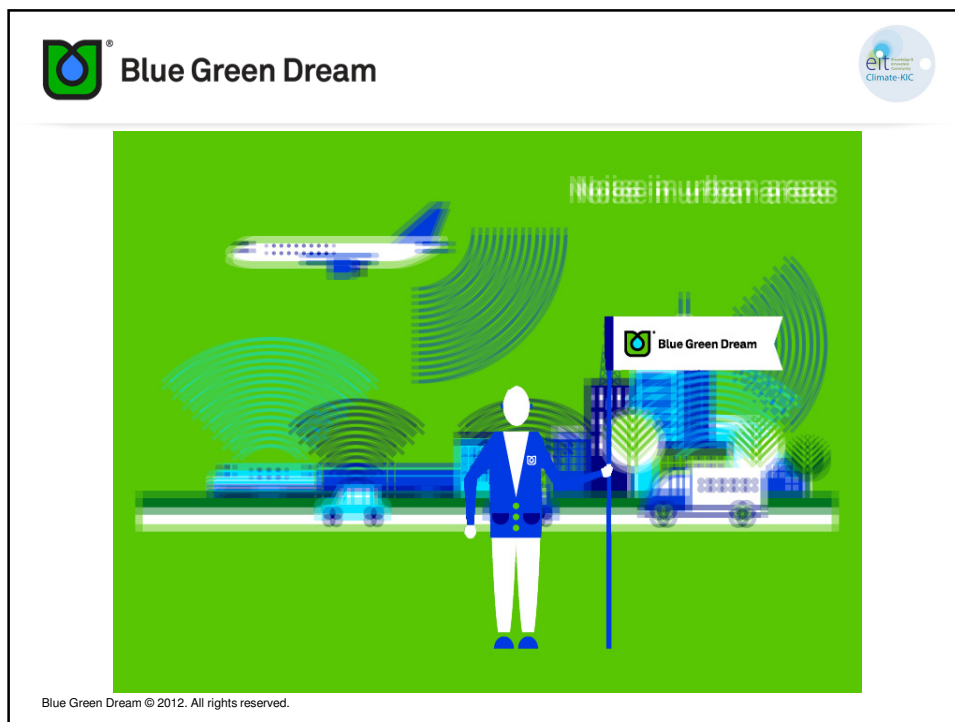


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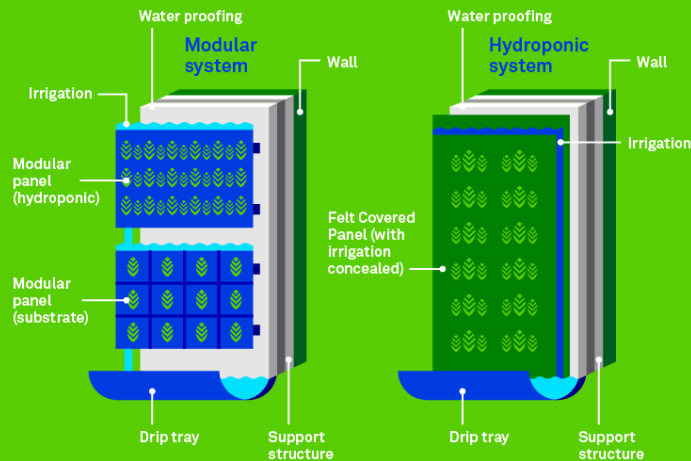




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### Guide to green walls



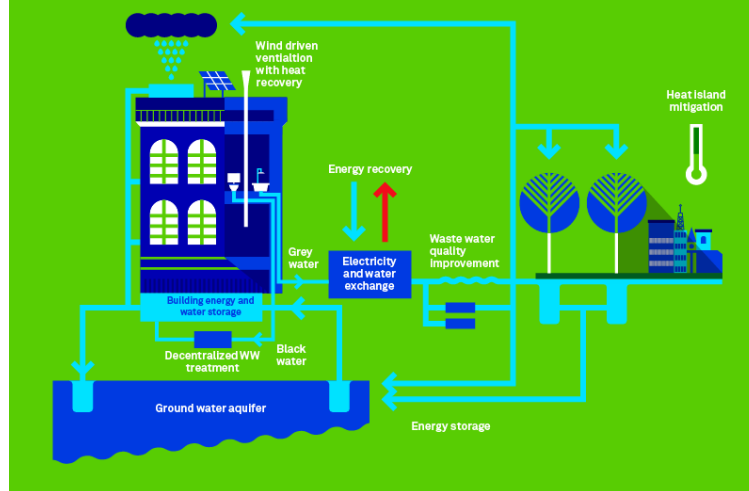
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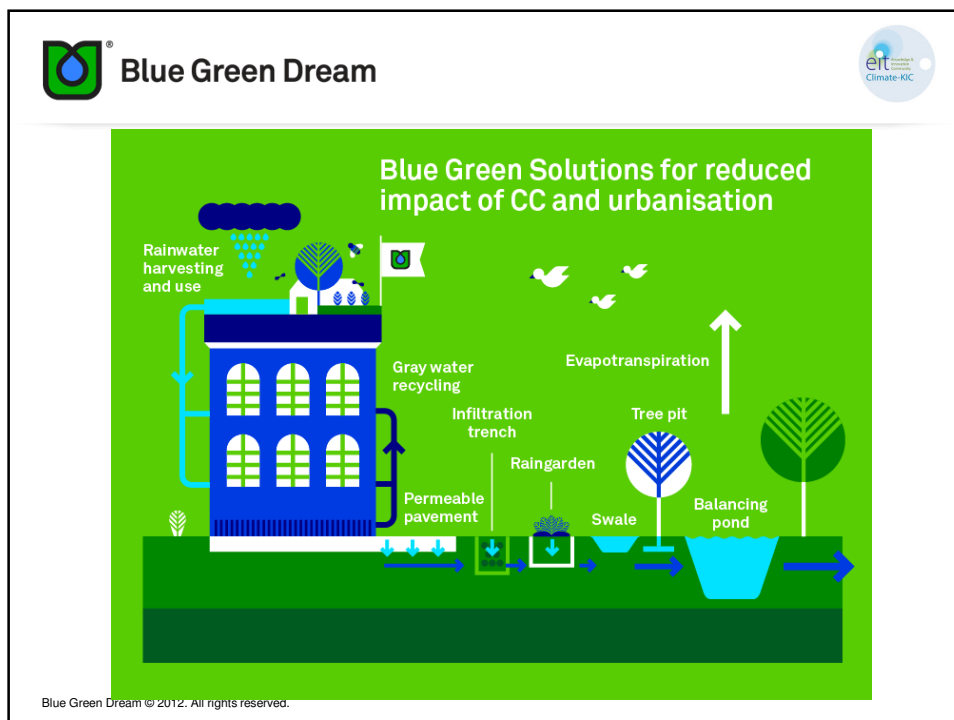
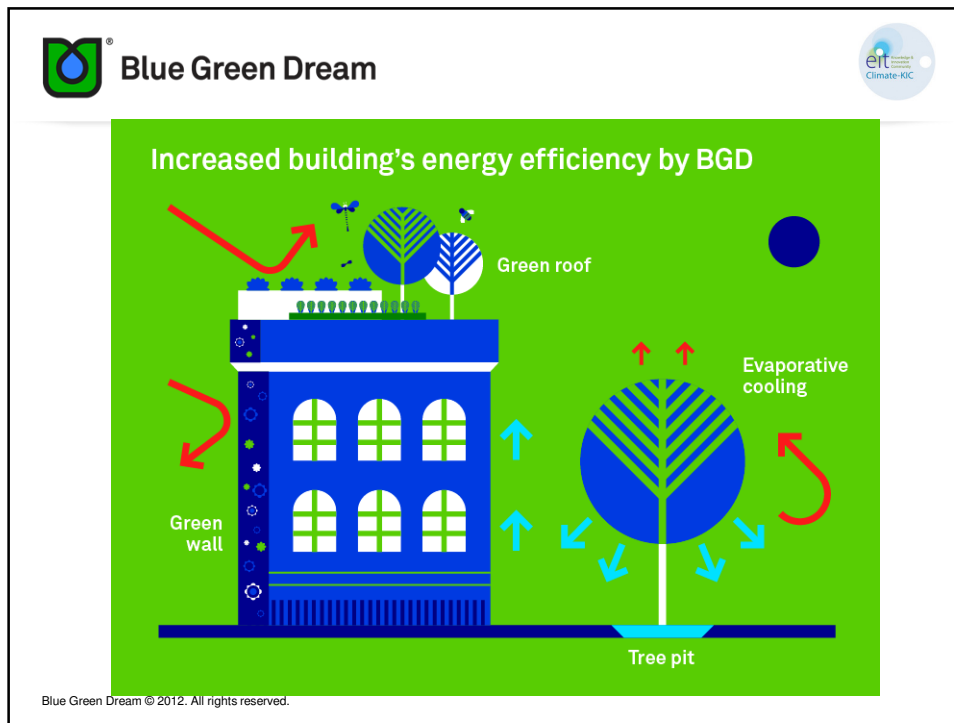
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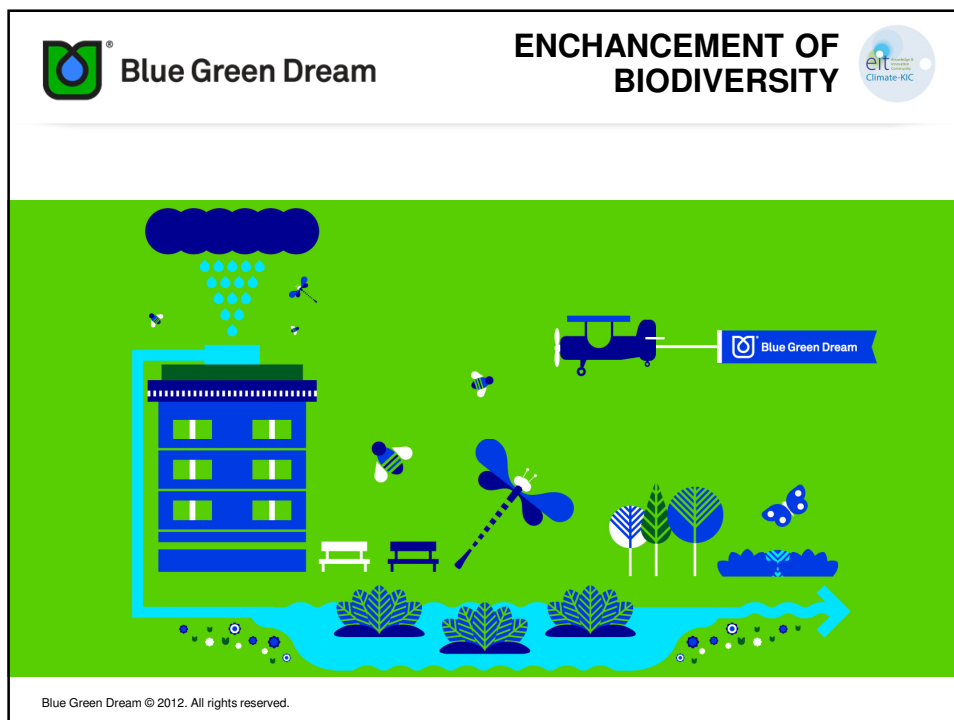
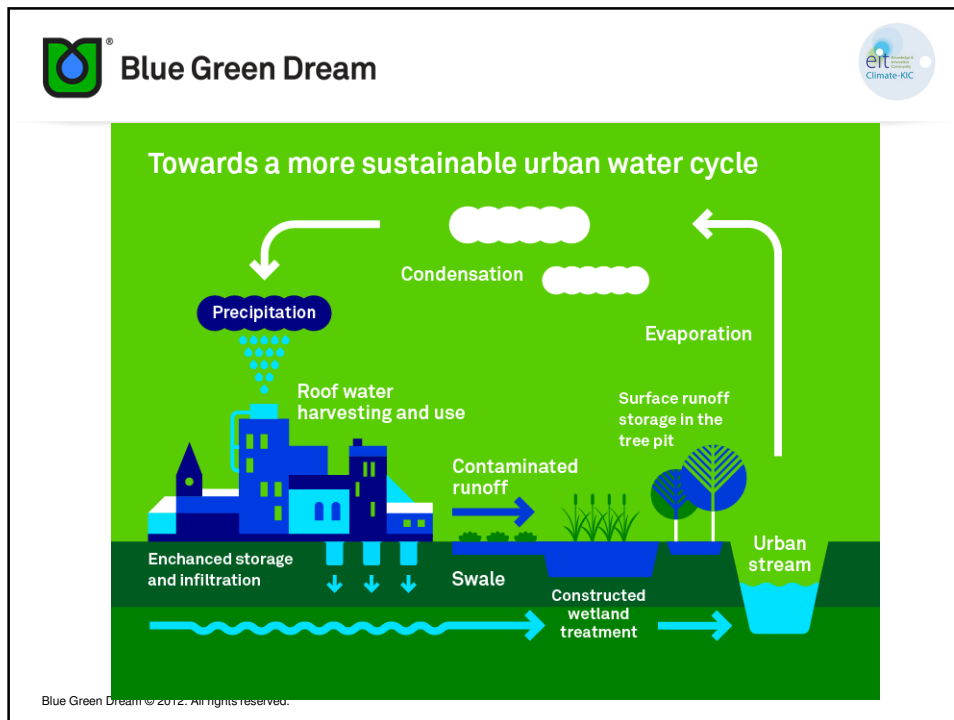


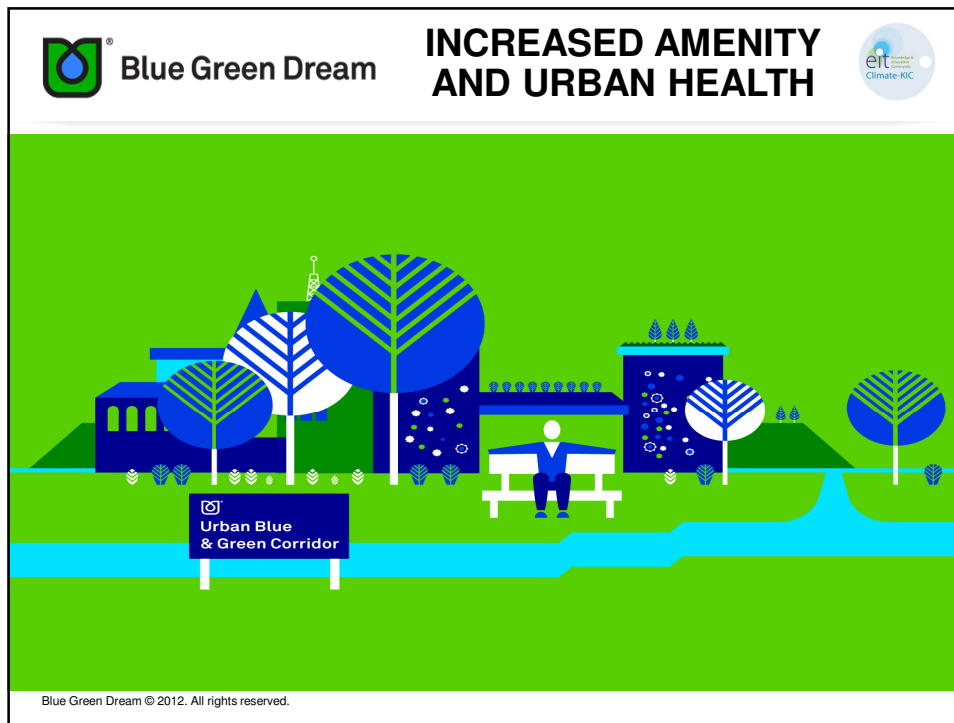
### BGD integrated resource recycling



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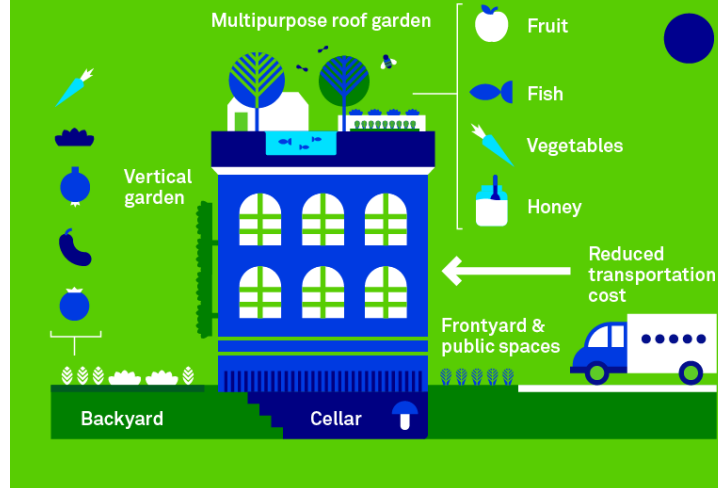








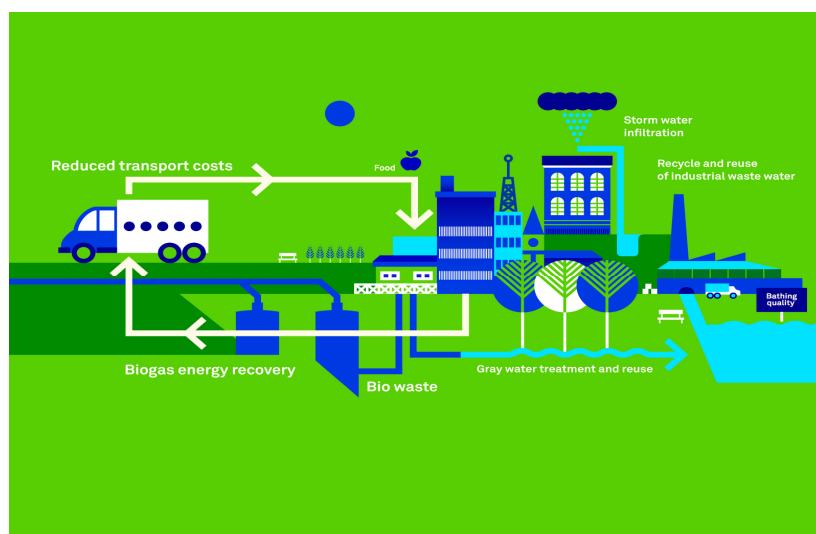
## Urban agriculture



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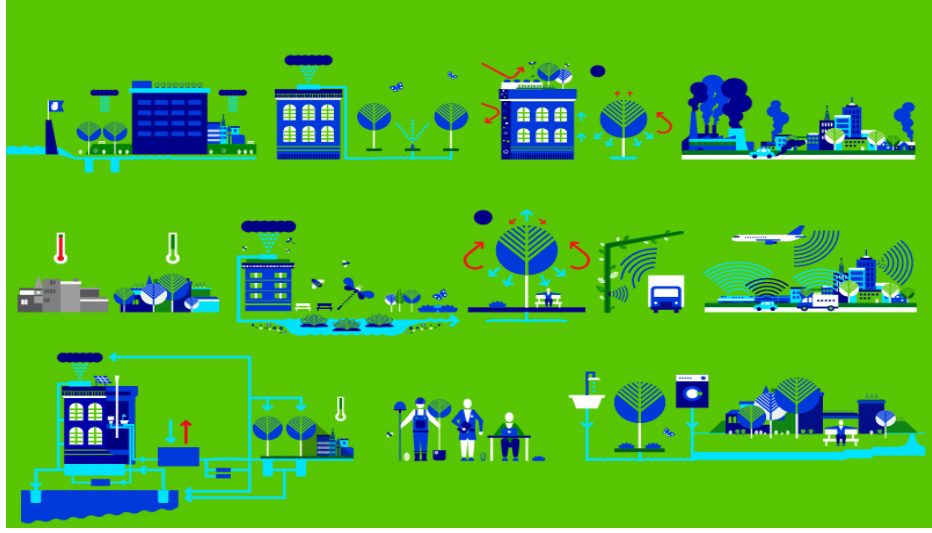


## Storm water / wastewater / solid waste recovery



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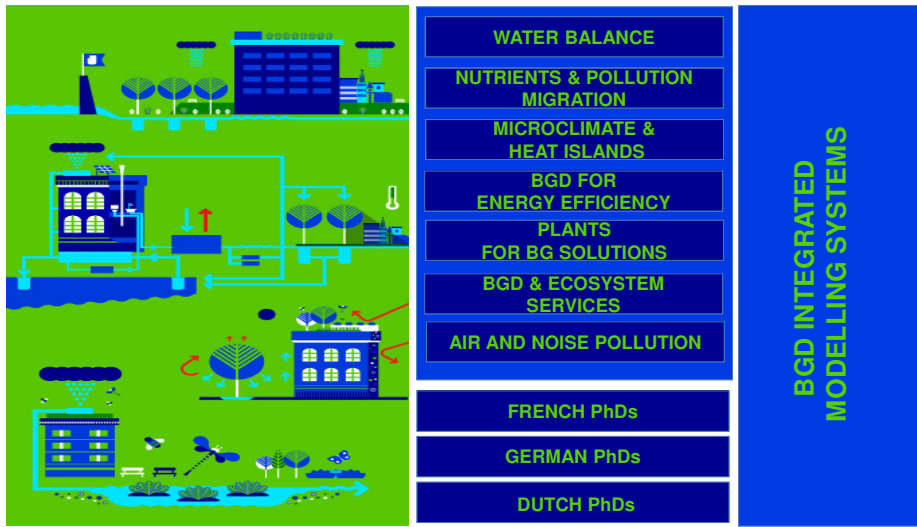
**Blue Green Dream** **Interactions of urban ecosystem services**



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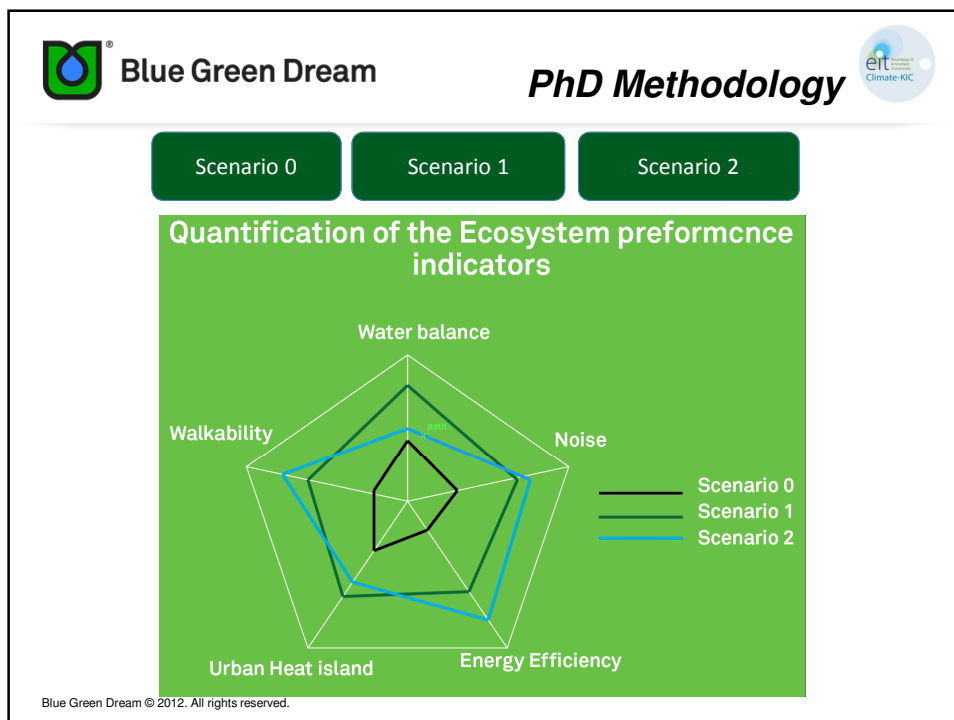
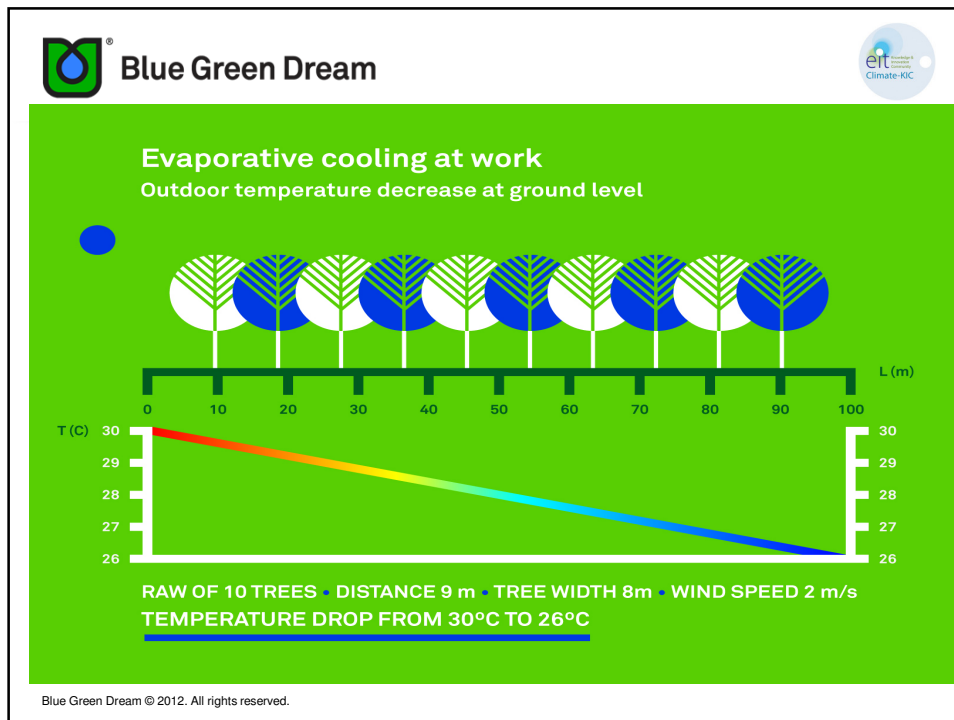
**Blue Green Dream**

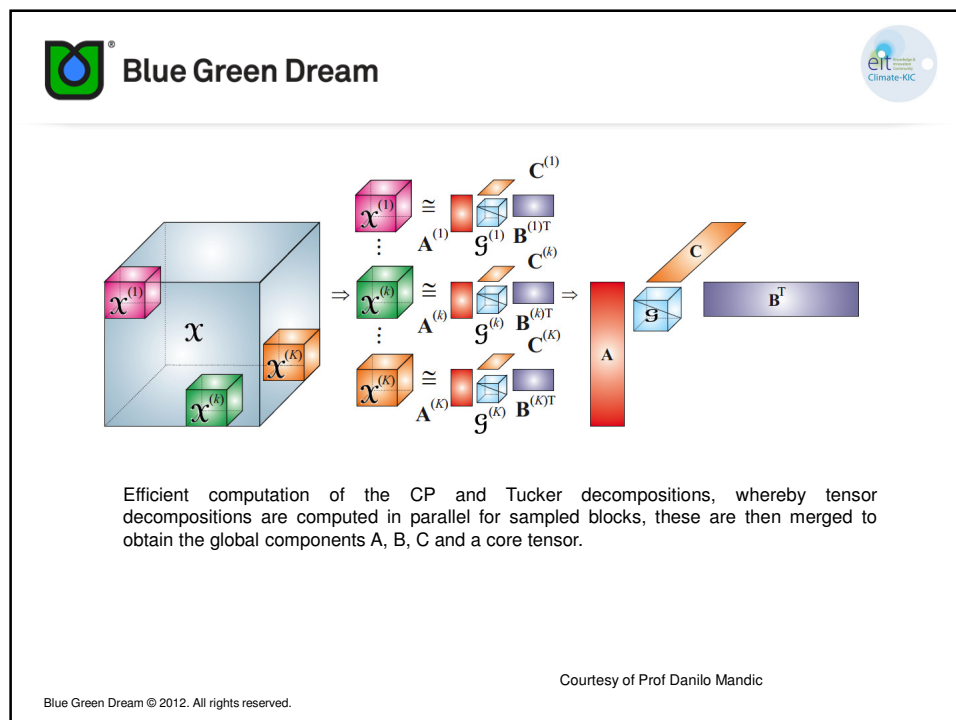
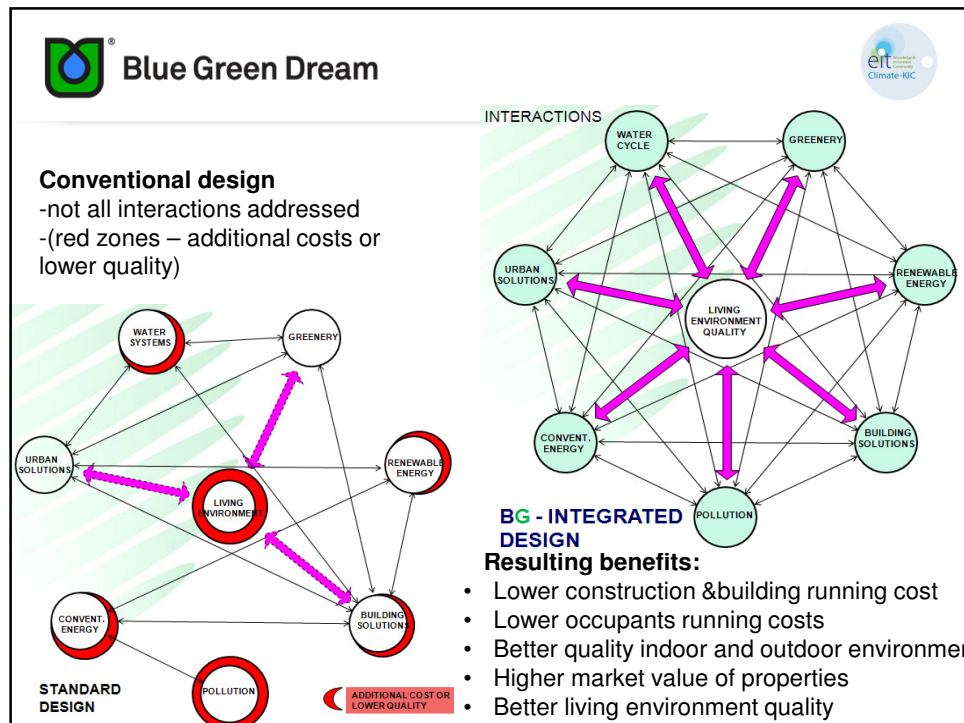
**CLIMATE KIC PhD RESEARCH => BGD INTEGRATED MODELLING SYSTEM**



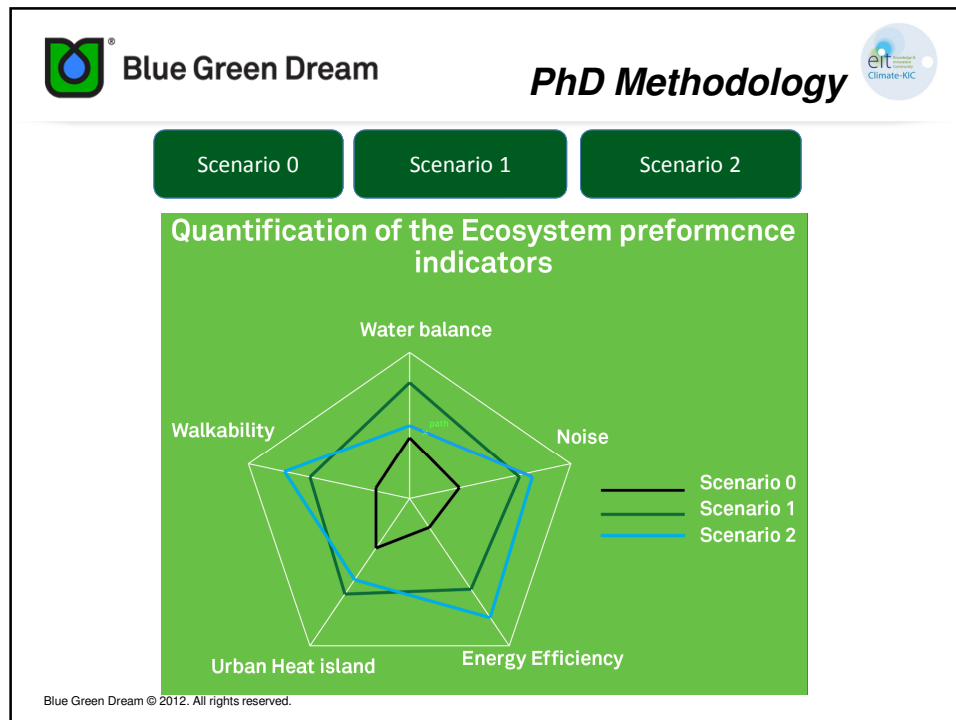
WATER BALANCE	<b>BGD INTEGRATED MODELLING SYSTEMS</b>
NUTRIENTS & POLLUTION MIGRATION	
MICROCLIMATE & HEAT ISLANDS	
BGD FOR ENERGY EFFICIENCY	
PLANTS FOR BG SOLUTIONS	
BGD & ECOSYSTEM SERVICES	
AIR AND NOISE POLLUTION	
FRENCH PhDs	
GERMAN PhDs	
DUTCH PhDs	



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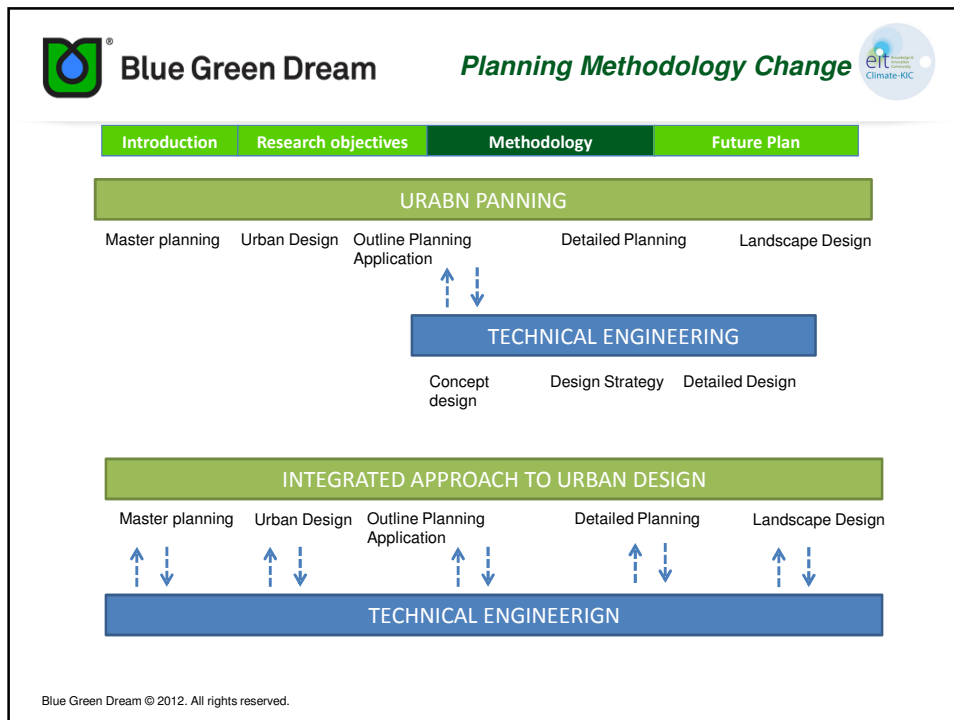
$$\begin{matrix} \boxed{\mathbf{X}} \\ (I \times N) \end{matrix} \cong \begin{matrix} \boxed{\mathbf{T}} \\ (I \times R) \end{matrix} \begin{matrix} \boxed{\mathbf{P}^T} \\ (R \times N) \end{matrix} = \sum_{r=1}^R \begin{matrix} \boxed{\phantom{t_r}} \\ \mathbf{t}_r \end{matrix} \begin{matrix} \boxed{\phantom{p_r^T}} \\ p_r^T \end{matrix}$$

$$\begin{matrix} \boxed{\mathbf{Y}} \\ (I \times M) \end{matrix} \cong \begin{matrix} \boxed{\mathbf{U}} \\ (I \times R) \end{matrix} \begin{matrix} \boxed{\mathbf{Q}^T} \\ (R \times M) \end{matrix} = \sum_{r=1}^R \begin{matrix} \boxed{\phantom{u_r}} \\ \mathbf{u}_r \end{matrix} \begin{matrix} \boxed{\phantom{q_r^T}} \\ q_r^T \end{matrix}$$

The basic PLS model performs joint sequential low-rank approximation of the matrix of predictors  $\mathbf{X}$  and the matrix of responses  $\mathbf{Y}$ , so as to share (up to the scaling ambiguity) the latent components — columns of the score matrices  $\mathbf{T}$  and  $\mathbf{U}$ . The matrices  $\mathbf{P}$  and  $\mathbf{Q}$  are the loading matrices for predictors and responses, and  $\mathbf{E}$  and  $\mathbf{F}$  are the corresponding residual matrices.

Courtesy of Prof Danilo Mandic

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Tempelhof Airport - Berlin

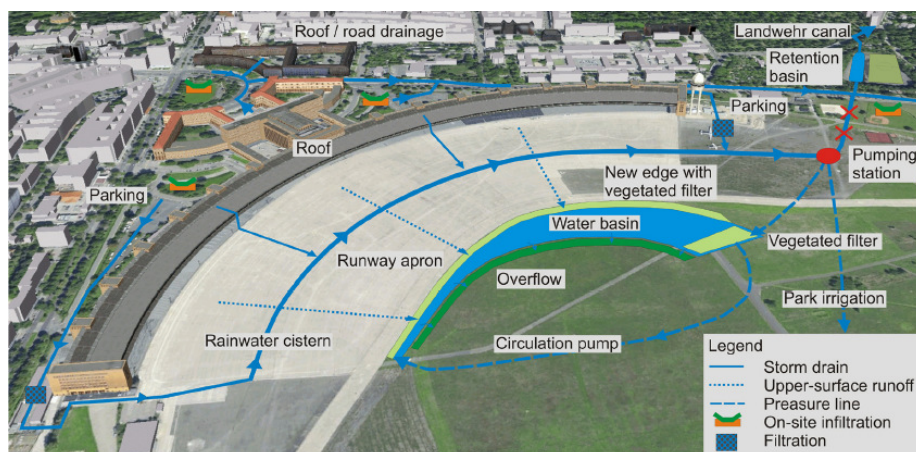


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Tempelhof Airport - Berlin

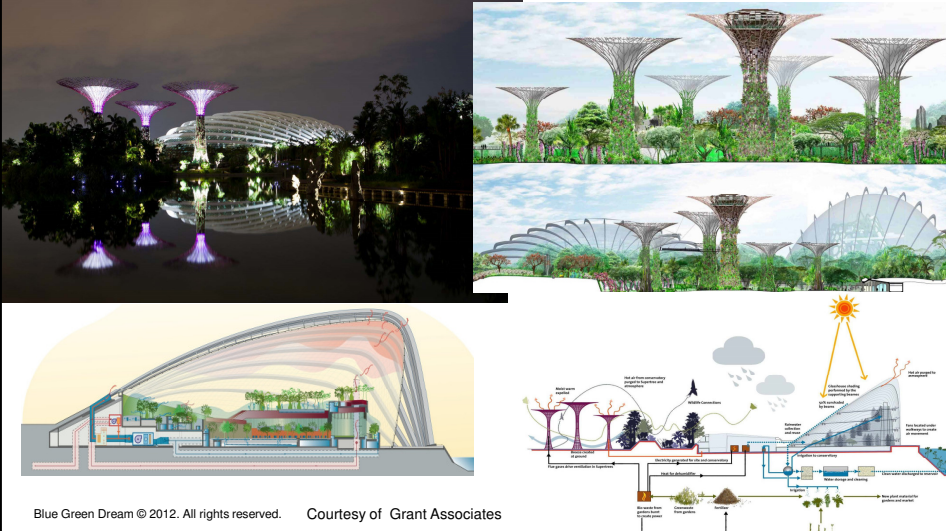


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Courtesy of Dr. Heiko Sieker

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**New demo – Gardens by the Bay**



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**HOLLAND PLAIN**

**Comments on wind utilization**



**G ROSE DIAGRAM - SINGAPORE**

Trees as barriers

This building is a barrier to winds penetration

This building corner is a barrier to winds penetration

These trees are missing to provide shade and free cooling

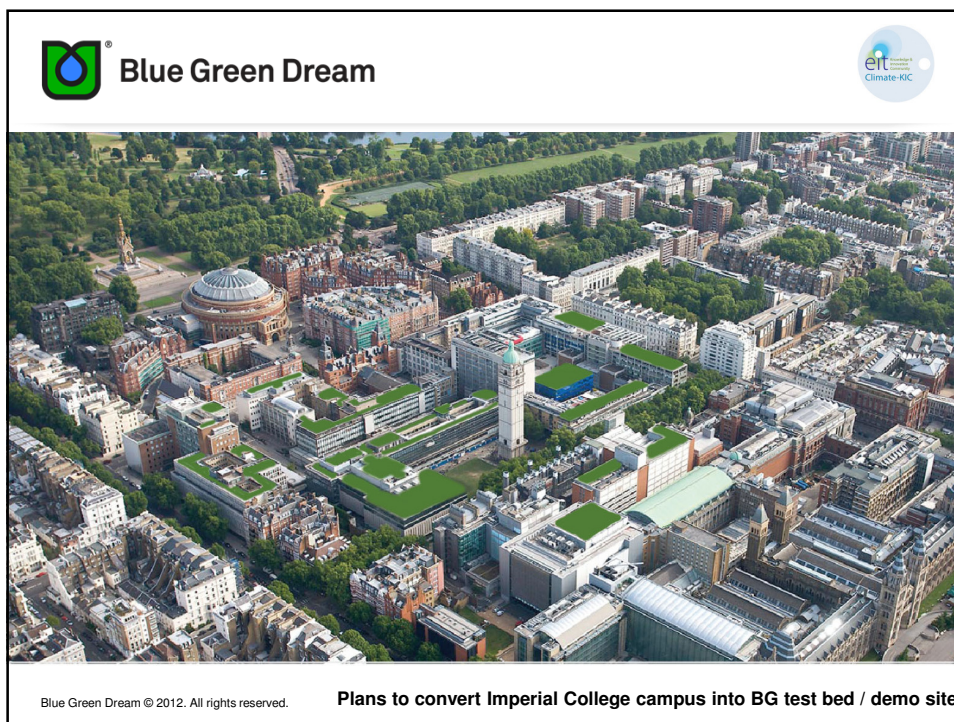
Required trees lineup for free cooling

these trees are not shading pedestrians

these trees are shading pedestrians

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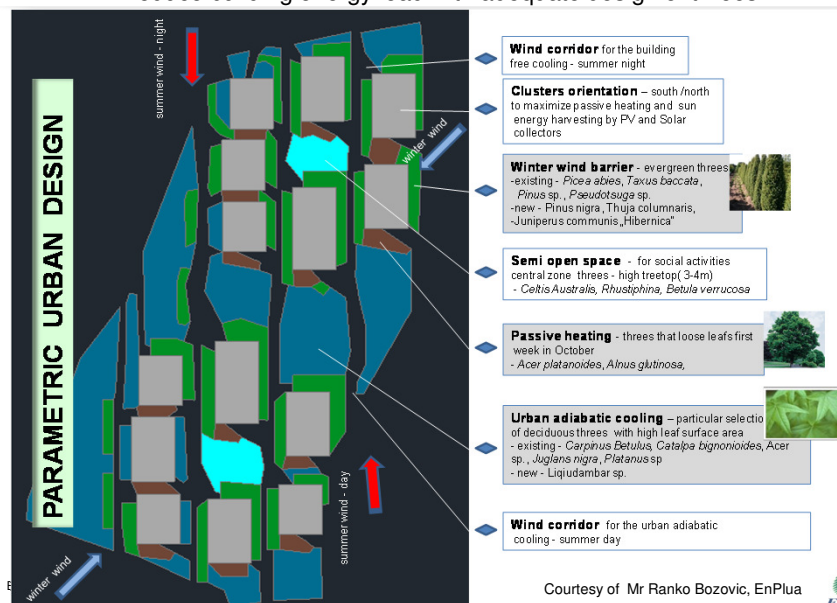


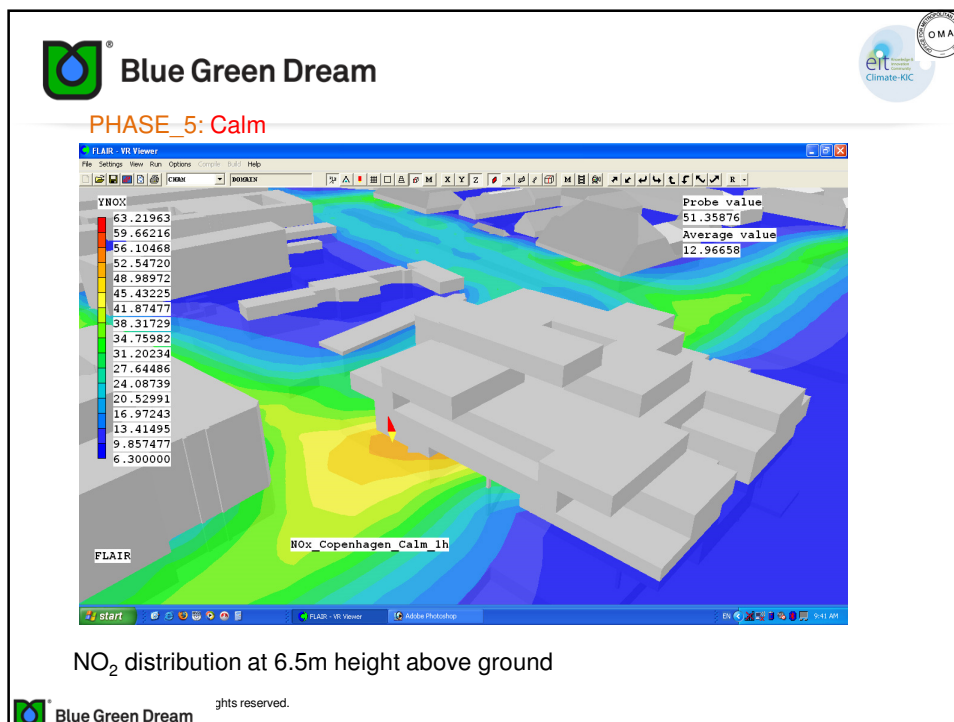
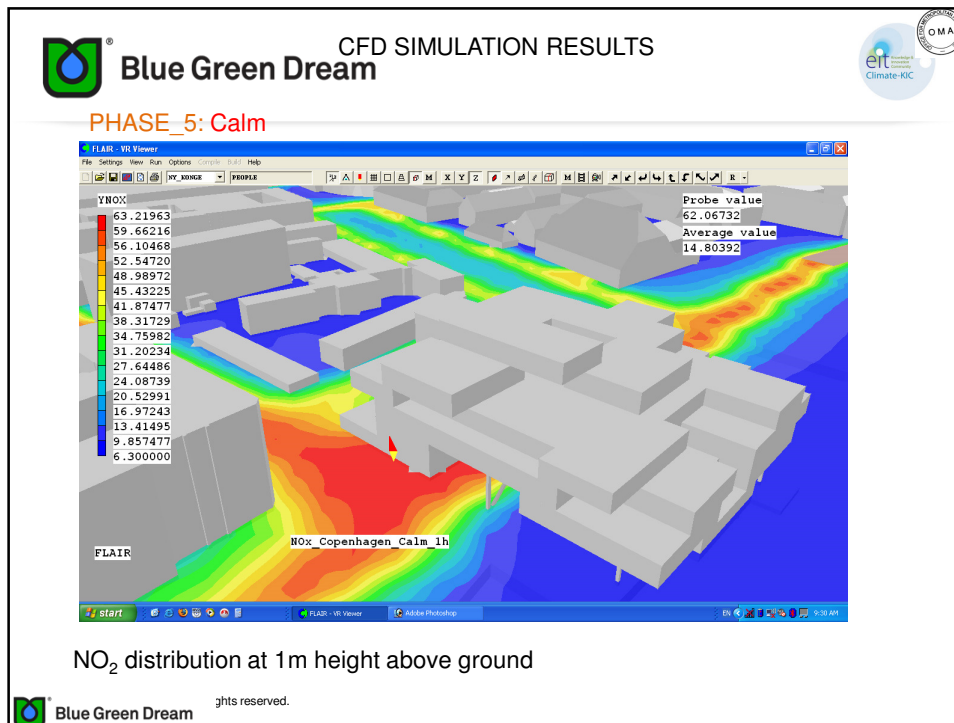
## Our (brave) partners and initial full scale cases

OMA \_ Rem Koolhaas  
 Andrew Grant Associates  
 Herreros Arquitectos \_ Juan Herreros  
 Njiric + Arhitekti \_ Hrvoje Njiric  
 EnPlus \_ Ranko Bozovic

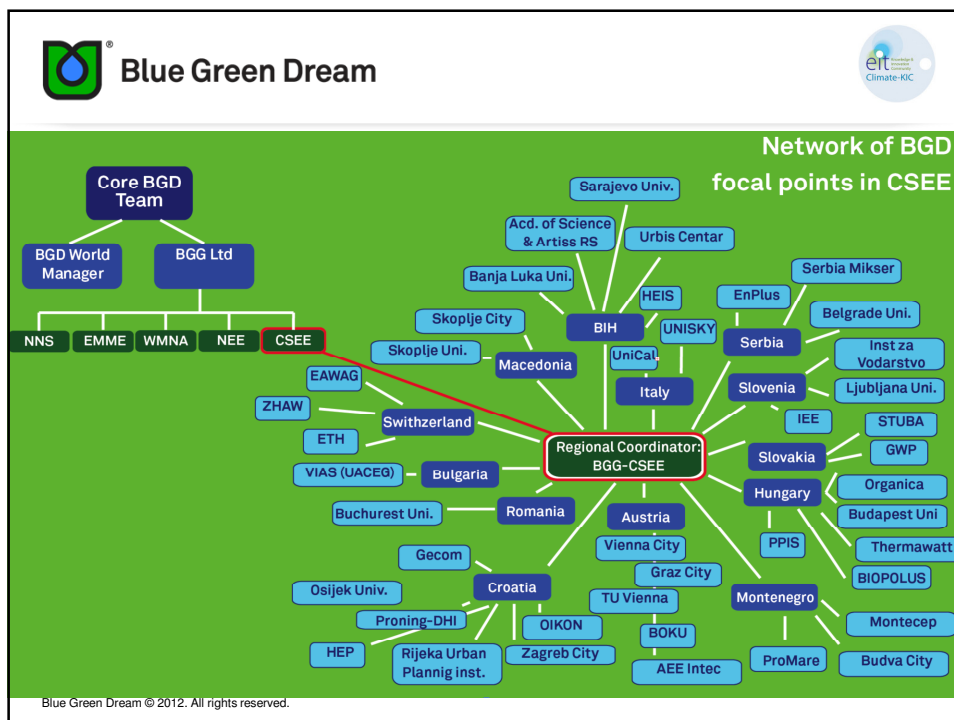
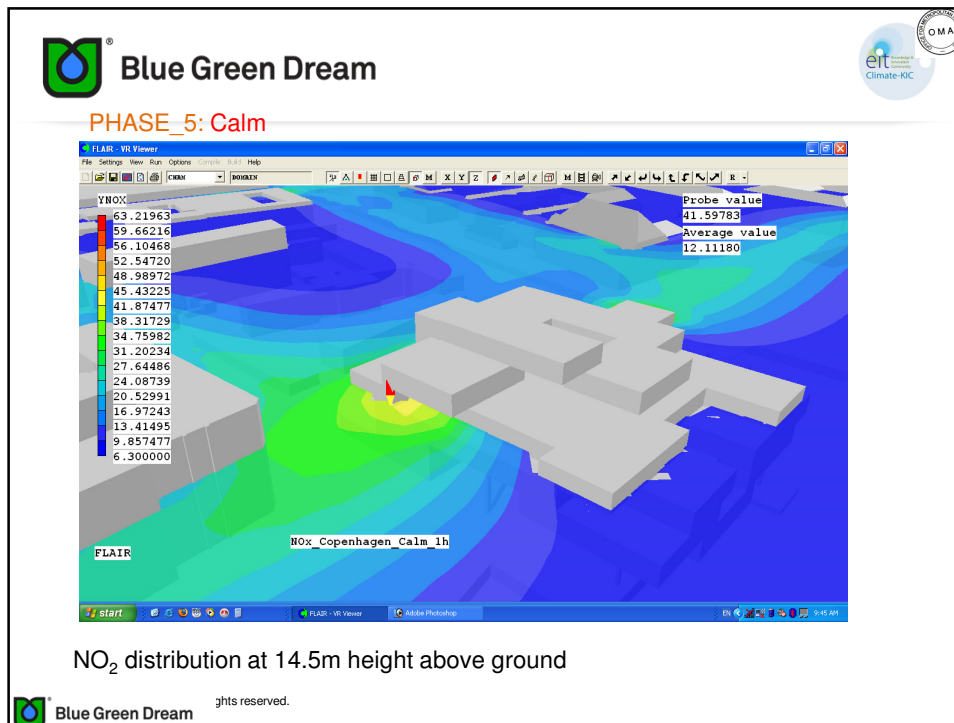
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### Reduce building energy load with adequate design of threes

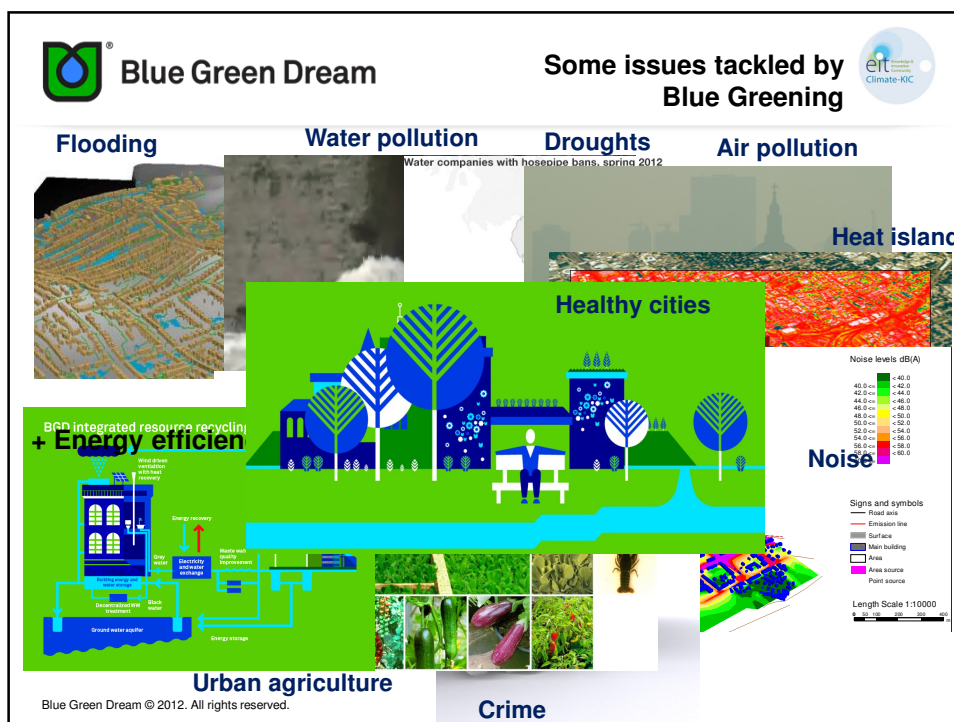






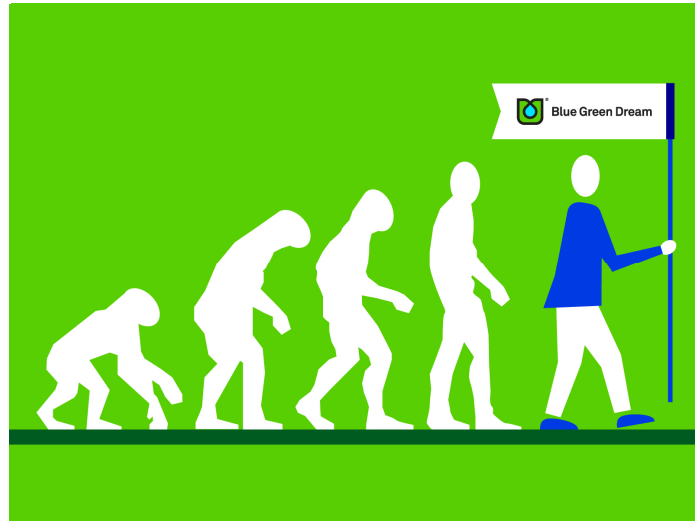








## EVOLUTION ... BGD ... NEW ERA IN HUMAN CIVILISATION DEVELOPMENT



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## Contact details

**Prof. Čedo Maksimović** [c.maksimovic@imperial.ac.uk](mailto:c.maksimovic@imperial.ac.uk)

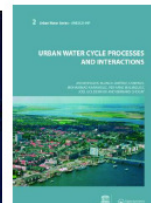
<http://www3.imperial.ac.uk/people/c.maksimovic>

Urban Water Journal <http://www.tandfonline.com>

Urban Water Book Series <http://www.routledge.com/books/series/UWS/>

Blue Green Dream project <http://www.bgd.org.uk>

RainGain project <http://www.raingain.eu/en>



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