

Hybrid Infrastructure Solutions

Katharina Schneider-Roos Global Infrastructure Basel Foundation (GIB)



AGENDA

- **1. Introduction to GIB**
- 2. Hybrid Infrastructure
- 3. Case Study 1: Life Elia project
- 4. Case Study 2: Green Tram Tracks Basel





Global Infrastructure Basel Foundation (GIB)

Meeting the challenge of designing, implementing and financing sustainable and resilient infrastructure projects



What is hybrid Infrastructure?

<u>Hybrid Infrastructure</u> is an asset or system that is intentionally designed to comprise both natural and built components that complement each other to provide services to society whilst benefiting the natural environment.



Relationship between Natural, Grey and Hybrid Infrastructure





Characteristics of Hybrid Infrastructure

Characteristic	Grey	Hybrid	Natural	
Intentionally designed	Always	Always	Sometimes	
Artificially constructed	Always	Always	Sometimes	
Contains 'natural' components	Rarely	Always	Always	
Provides environmental co- benefits	Sometimes	Always	Always	
Provides social co- benefits	Often	Often	Often	
Provides economic co- benefits	Often	Often	Often	
Climate change adaptation potential	Low – Medium	Usually high (Context dependent)	High	
Ik nature			Infrastructure	

Basel -

Examples



(Credit: http://www.life-elia.eu)

CASE STUDY 2: Green tramlines



(Credit: J. Jurik)







Project data

- **Objective:** applying innovative vegetation management techniques to create ecological corridors along the routes of the high voltage lines in Belgium and France.
- Duration: 2011 2017

(Credit: http://www.life-elia.eu)







Management options

1. Traditional Management (Rotary milling) Consists of slashing and grinding thick vegetation leaving a clear cut.

2. Alternative Management (Hybrid Solution) → Combination of <u>Electricity</u> <u>Infrastructure</u> system and <u>natural</u> <u>features</u> such as water ponds, trees, bush, peatlands, moors and meadows.

Global)

Hybrid Characteristic		Comment
Intentionally designed	1	
Artificially constructed	~	Yes (for example, the whole transmission system infrastructure, as well as ponds, educational information panels, observation towers, fence).
Managed/ operated/ maintained through human intervention	1	
Contains 'natural' components	✓	Trees, vegetation, flowery meadows.
Provides environmental co- v benefits		Creates a new habitat for different species of birds, lizards, amphibians and insects. Also, provision of pasturage for wildlife (game and others).



Hybrid Characteristic		Comment		
Provides social co-benefits	~	Creates visually appealing green environment and therefore may increase citizen acceptance towards the construction of new transmission lines.		
Provides economic co- benefits	✓	The project can contribute to the local economy by attracting more visitors. Enhancement of the local biodiversity is also a significant contributor to the regional economy.		
Feasible in urban environment	×	No (This approach is only applicable in the countryside).		
Cost-effective	~	Innovative vegetation management method leads to a significantly shorter time for costs to break even, between 3 to 9 years. Furthermore, it would be 1.4 to 3.9 times cheaper than traditional vegetation management (rotary slashing) after 30 years.		







- Objectives: Installation of grass tramline in certain sections of the Basel Transport Operator network to protect tram infrastructure from climate change related impacts and expand green spaces in the city of Basel.
- Why hybrid Infrastructure: tram infrastructure (tramlines) and natural feature (layer of soil & grass)





Costs

Financing

Kanton Basel (Public Finance) Asphalted tracks

Green tracks are estimated to be approximately 15-20% cheaper than asphalt)

Green tracks

Green tracks are 30-40% more expensive than gravel.

Gravel tracks









Hybrid Characteristic		Comment
Intentionally designed	~	
Artificially constructed	~	
Managed/ operated/ maintained through human intervention	√	
Contains 'natural' components	~	Layer of soil and grass.
Provides environmental co-benefits	✓	The lawn increases rainwater retention; provides an insulating and cooling effect (through evapo- transpiration); reduces the heat island effect in the <u>inner city</u> area; and acts as a pollutant binder.
Provides social co-benefits	~	Noise reduction in individual cases by up to 3 dB(A) compared to gravel tracks, resulting in higher population acceptance; increased quality of life and a healthier environment.





Hybrid Characteristic		Comment
Provides economic co-benefits	√	See 'Risk mitigation' below.
Feasible in urban environment	~	Yes, where the tram lane is reserved for trams. Not suitable where cars also share the traffic lane. Usually appropriate in less dense urban areas.
Cost-effective	~	See 'Financing' section below.
Risk mitigation potential	~	Medium (reduces the risks related to the track in- frastructure). The lawn has an insulating and cool- ing effect for the tracks, giving protection from direct sunlight and heat, which can result in distor- tion of the tracks in extreme cases.
Climate change adaptation potential	√	High (reducing heat island effect and flash flood cloudburst, increasing the thermal tolerance of the tracks during heat wave events).



Resources

- 1. Analysing the business case for NBS (Deliverable 7.2, ThinkNature Project)
- 2. WBCSD, 2015. The business case for natural infrastructure.
- 3. <u>http://www.gib-foundation.org</u>
- 4. <u>https://platform.think-nature.eu</u>
- 5. <u>http://www.life-elia.eu/en/</u>





Thank you

E-mail: <u>katharina.schneider@gib-foundation.org</u>

Website: <u>http://www.gib-foundation.org</u>



