

- Potential Beneficiaries
- Citizen
 - Expert
 - Municipality

Objective

A novel methodology supporting dynamic NBS performance tracking, consisting of analysis of NBS performance trends using time-series KPI datasets.

Ambition

Dynamic monitoring of NBS performance provides a holistic vision covering the needs of municipalities and related parties within the context of different urban challenges, targets and regulations.

Uses

- to assess pro-actively how the urban landscape can be transformed
- to improve the quality of life of citizens
- to improve the environment including soils and atmosphere to improve the assessment of carbon sequestration and climate change mitigation within the city
- to improve the performance measurement of particular NBS's for maintenance purposes
- to help with renovation of brownfield NBS sites and improved design of greenfield NBS sites.

Key Terminology

Time Frame

What time period the assessment should be made

Time Resolution

How often the dynamic assessment should be repeated

Time Series

An ordered sequence of values of a variable observed at equally spaced time intervals is referred to as a time series

Trend Analysis

Trend analysis (or trend-line analysis) is a special form of simple regression in which time is the explanatory variable

Steps in Time Series Trend Analysis for Dynamic Assessment

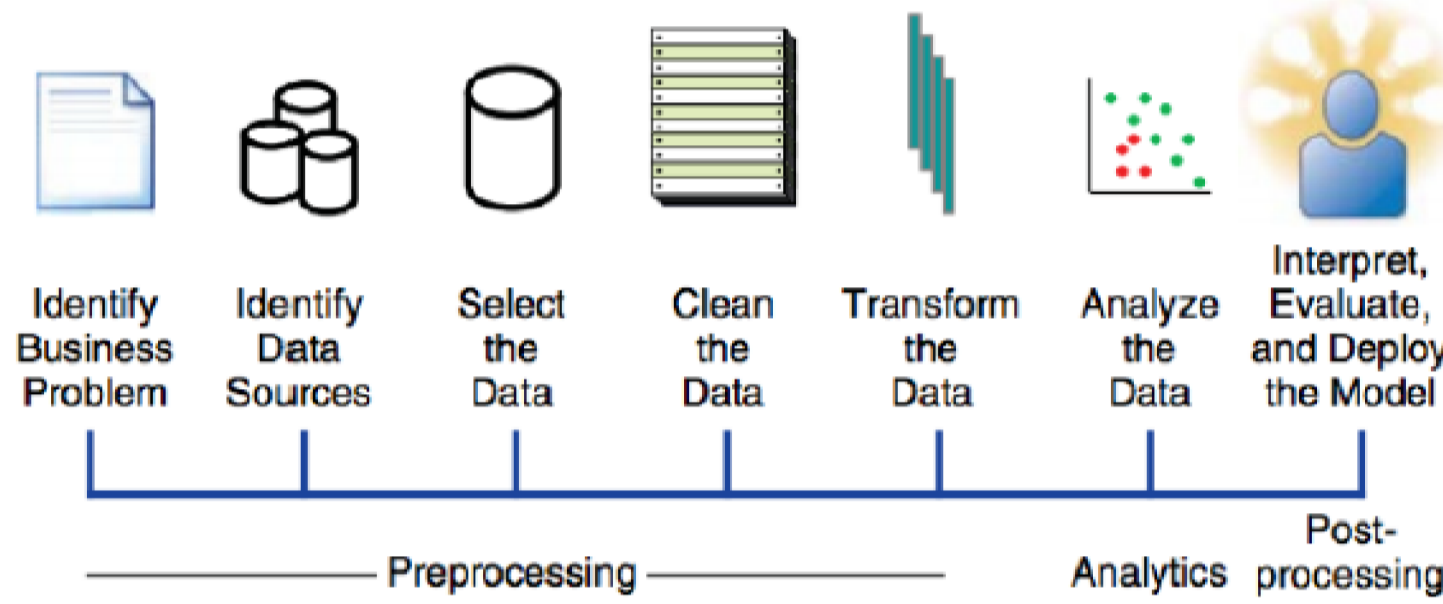


1 Time Frame and Time Resolution Setting

Topics	Environmental KPIs for Dynamic Assessment	Suggested Temporal Resolutions				
		Hourly	Daily	Monthly	Annually	... Years
Climate	Annual Carbon Sequestration				✓	✓
	Avoided GHG Emissions				✓	
Env	Common Air Quality Index(CAQI)	✓	✓		✓	
	Energy Efficiency	✓	✓		✓	
Resource	Per Capita Food Production Variability				✓	
	Cumulative Energy Demand	✓	✓		✓	
	Water Scarcity		✓		✓	
	Raw Material Efficiency			✓	✓	
	Specific Waste Generation		✓		✓	
LCIA Indicators	Efficiency of Valorisation as a Result of Recycling Processes				✓	
	Climate Change				✓	
	Ozone Depletion				✓	
	Acidification				✓	
	Eutrophication				✓	
	Resource Depletion				✓	
	Photochemical Ozone Depletion				✓	
	Human Toxicity				✓	
	Ecotoxicity				✓	
	Ecosystem Damages				✓	
Human Health Damages				✓		
Natural Resource Damages				✓		

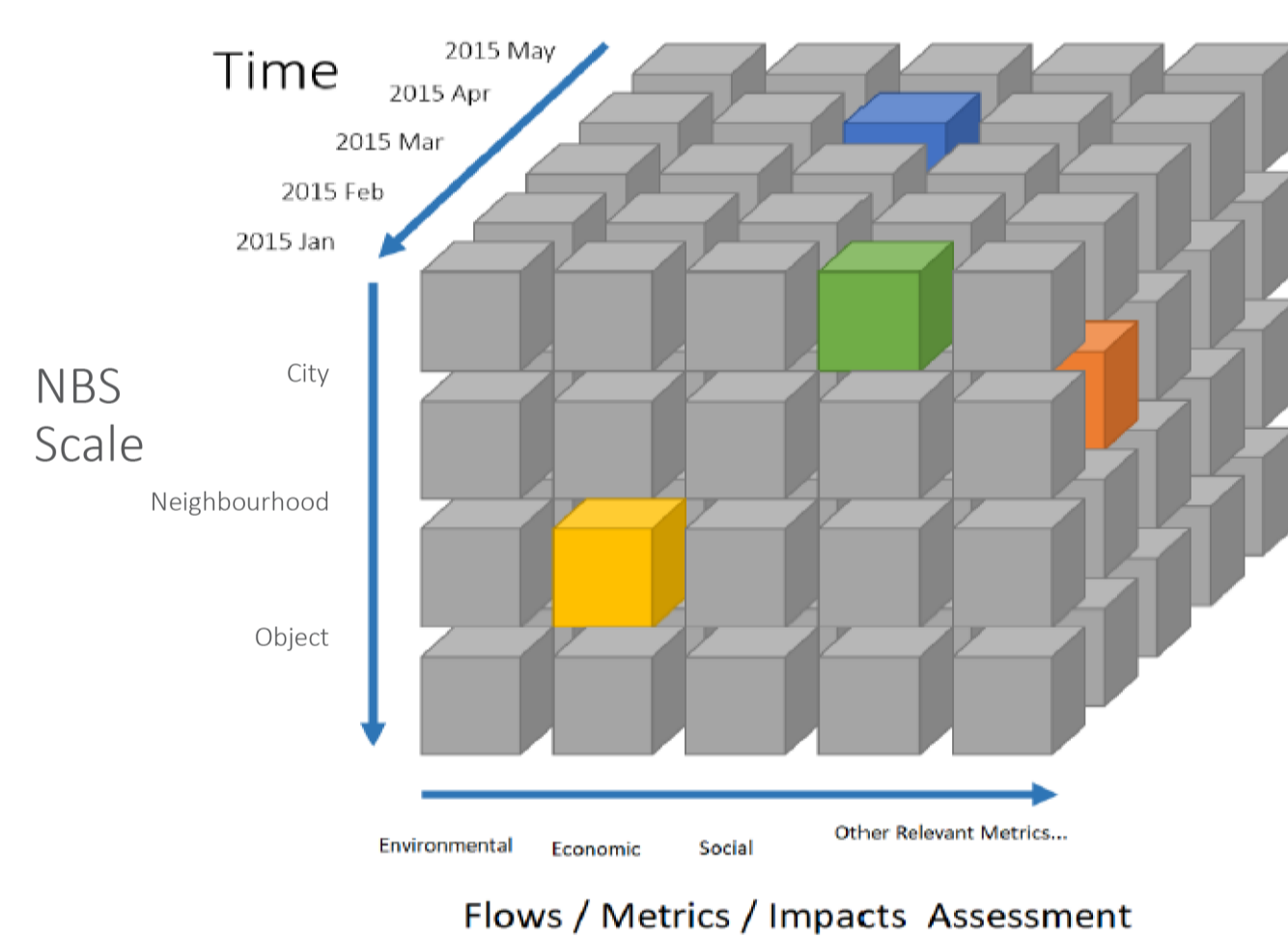
2 Baseline Data Establishment, what is the situation now?

Overview of the Analytics Process Model Data Treatment and Processing Steps



Before any analysis can take a place, a "cleaned" dataset needs to be created.

OLAP-Visual Example for NBS Datasets

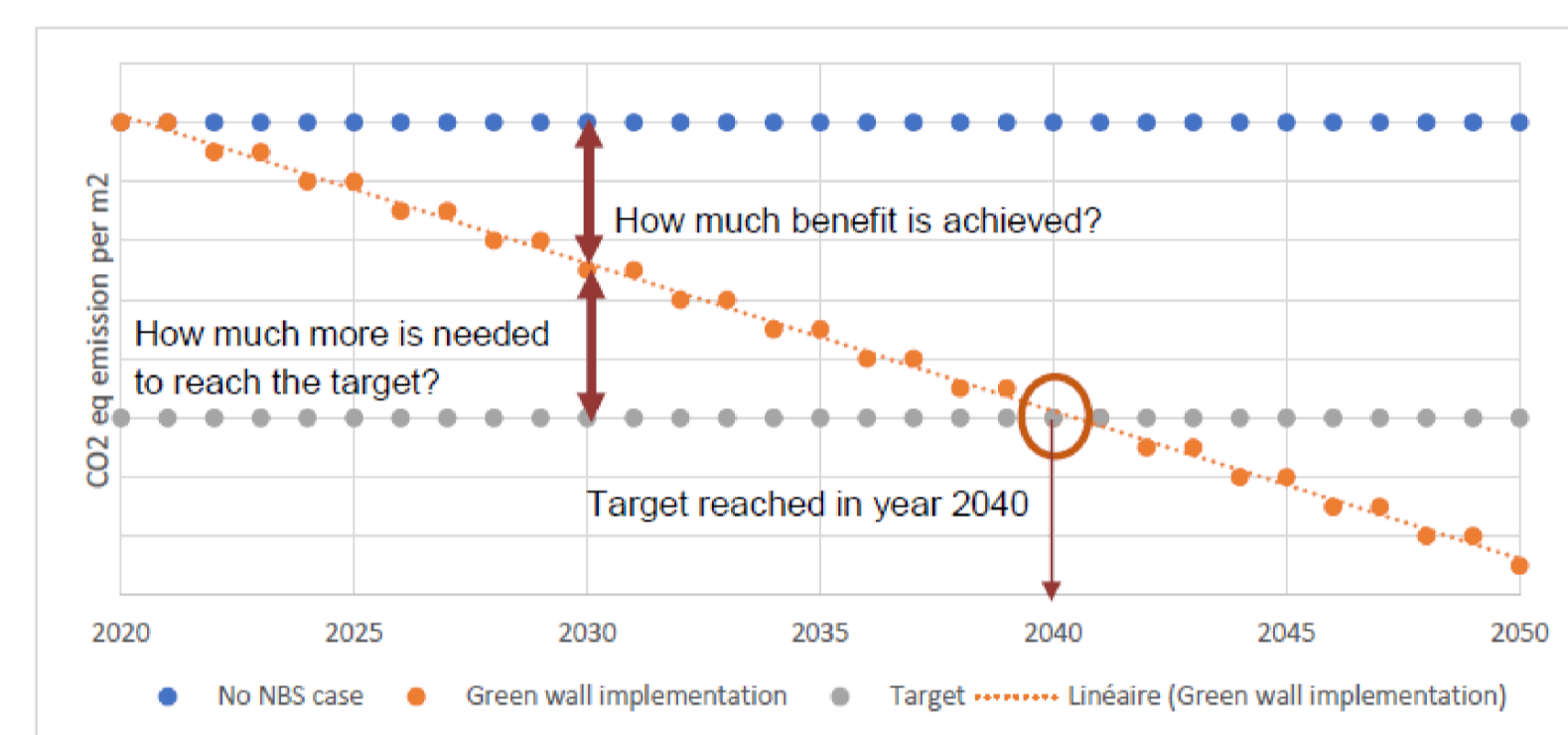


OLAP is to allow for retrieving values from time series datasets across multiple dimensions. It provides for a dynamic approach to data interrogation.

3 Target Setting, what do we want to improve and by how much?



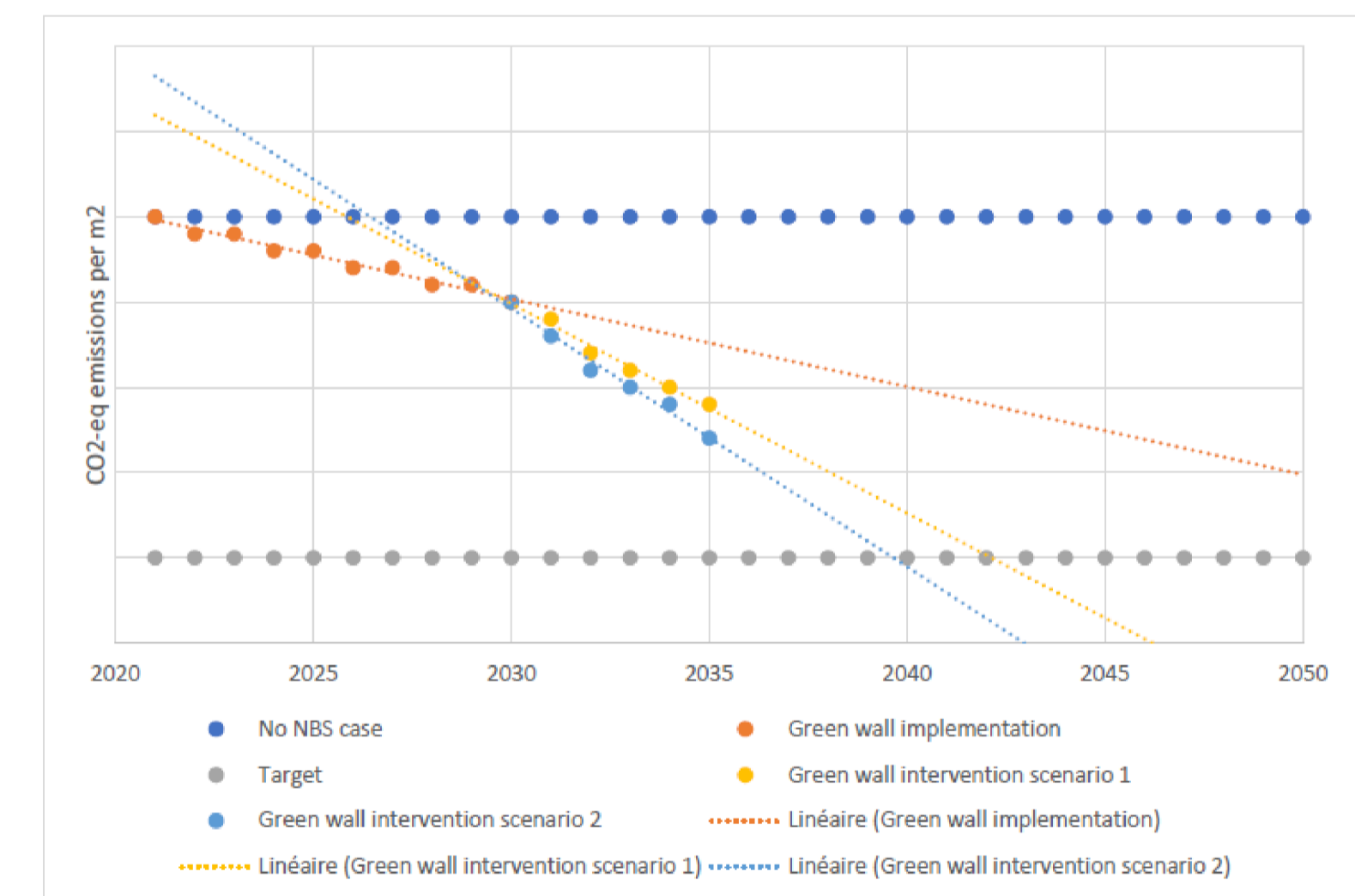
4 Time-Series Future Trend Analysis



5 Analysis of Trends with Targets: Comparison of the targets with the performance and how much has improved from the baseline

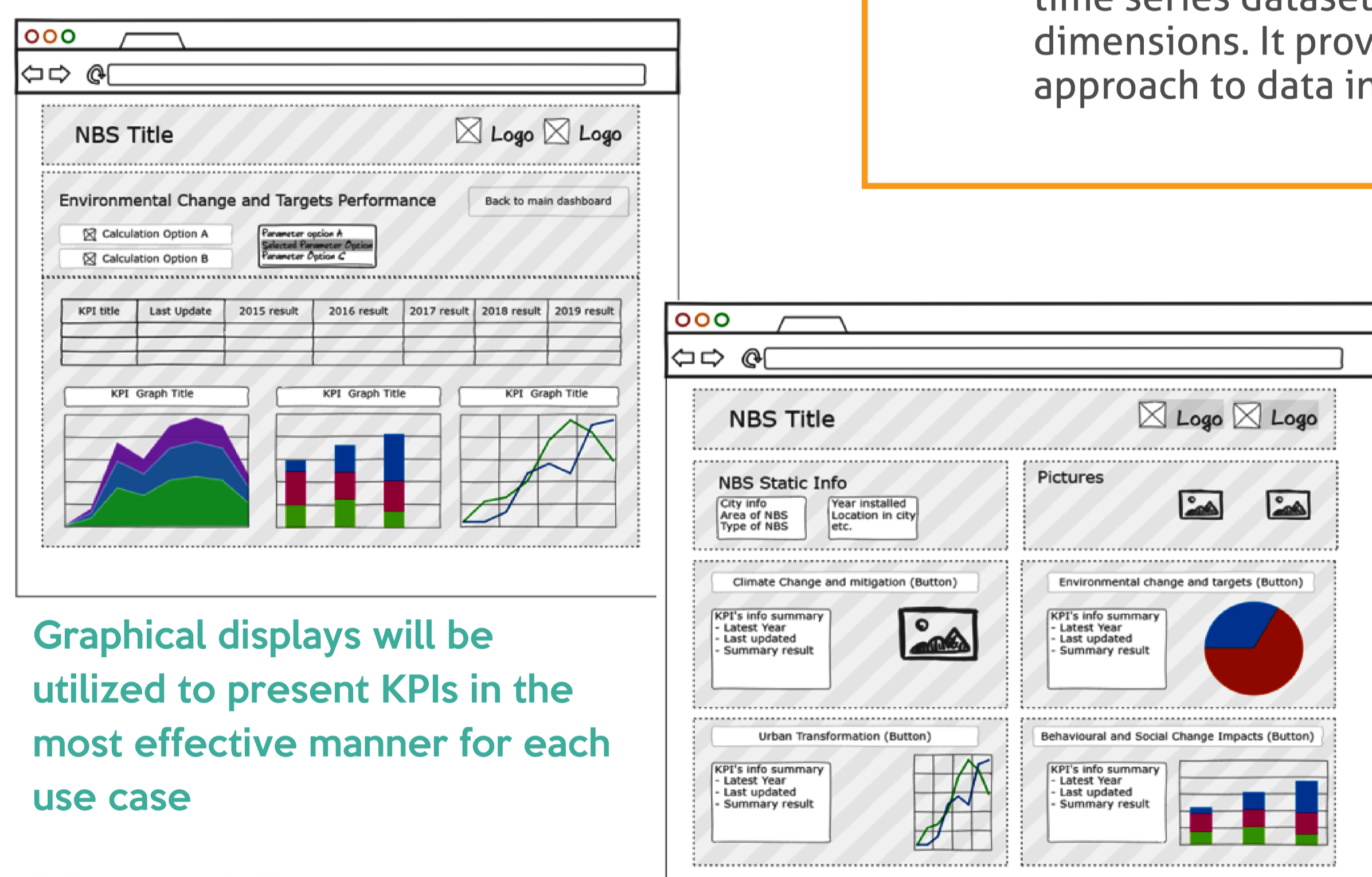
- Climate Targets
- Waste Reduction Targets
- Air Emission Targets

OLAP enables analysts, managers and executive to gain insight into data through fast, consistent, interactive access and facilitates decision-making about future actions.



The gap between the NBS performance obtained through KPIs, and the target levels can help the decision makers and planners to understand what rate of improvement is necessary to close the gap. This is achieved via intervention strategy.

VISUALIZATION Sample Dashboard Layouts



Graphical displays will be utilized to present KPIs in the most effective manner for each use case

Conclusion

Dynamic evaluation of NBS performance is a novel methodology providing a holistic vision covering the needs of municipalities and related parties within the context of different urban challenges, targets and regulations.

Further studies for this novel approach considering such parameters like data availability, quality, complexity, expertise, uncertainty, time interval, random trend variations and TRL of monitoring equipments will strongly support the robustness of the methodology.

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