

cyclomedia



Determining the value of mobile mapping in the geospatial economy

Peter ter Haar, UNWGIC 2022, 12 October 2022



Agenda

- Introduction
- About Cyclomedia
- Use Cases
- Determining the value of Mobile Mapping
- Next Steps



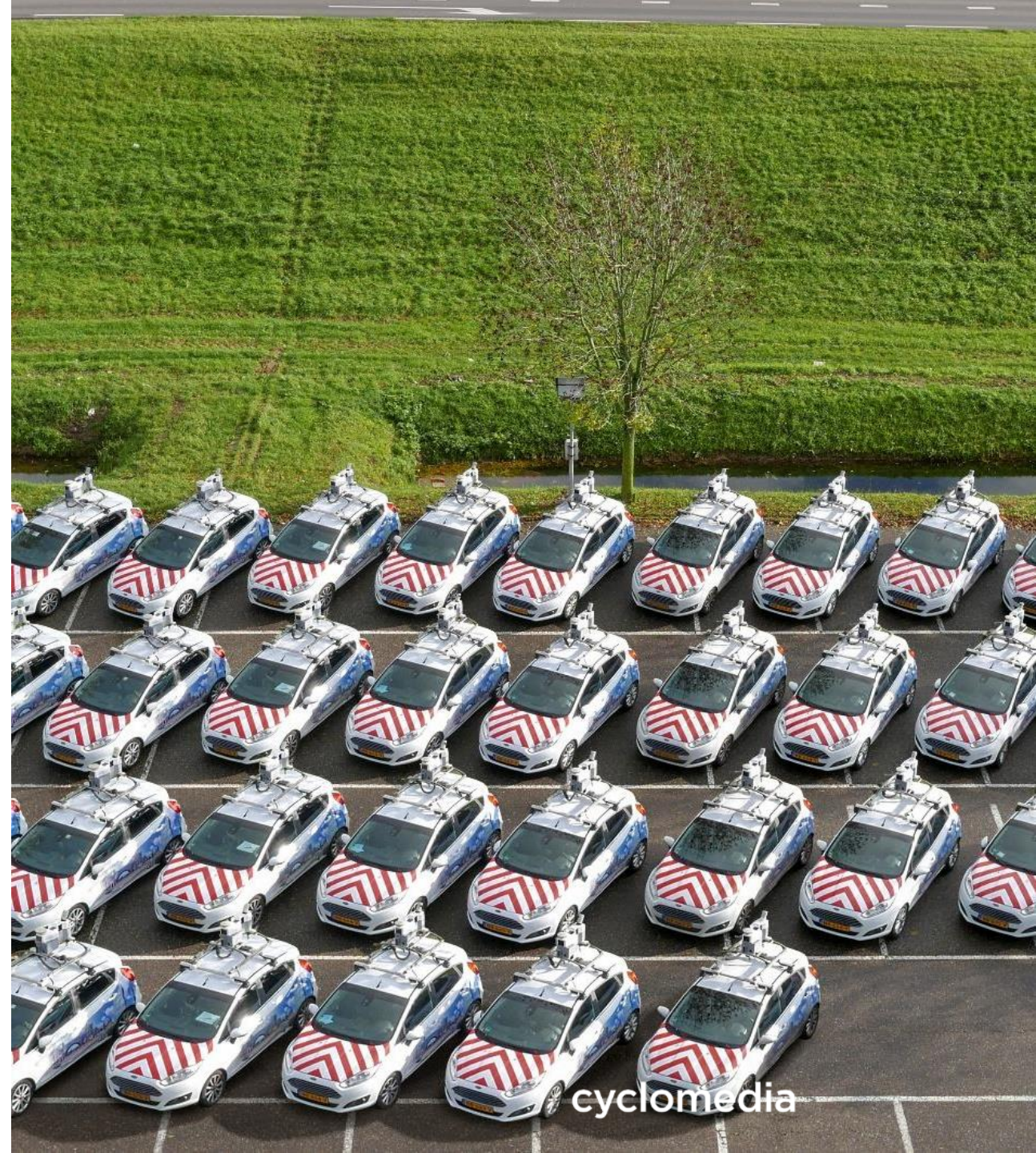
About Cyclomedia

Visualise a better world

Cyclomedia captures data from the real world and transforms it into valuable insights enabling you to understand the complexities of the environment around you.

With the world's most accurate 360° street-level visualisations, enhanced by innovative, AI-powered analytics, Cyclomedia delivers actionable insights that you can use today in order to build a better tomorrow.

Real data. True understanding. Big impact.





Facts & Figures



ESTABLISHED IN THE
NETHERLANDS (HQ),
US AND **GERMANY**.
UK Ownership

270



ENTHUSIASTIC AND
SKILLED EMPLOYEES

60



CARS & RECORDING
SYSTEMS

540,000
KILOMETERS



OF ROADS RECORDED
YEAR AFTER YEAR



> 80,000,000
IMAGE RECORDINGS
PER YEAR



> 600 MILLION
OF 360° PANORAMIC
PHOTOS (CYCLORAMAS)



> 1.5 MILLION
CLICKS PER WEEK



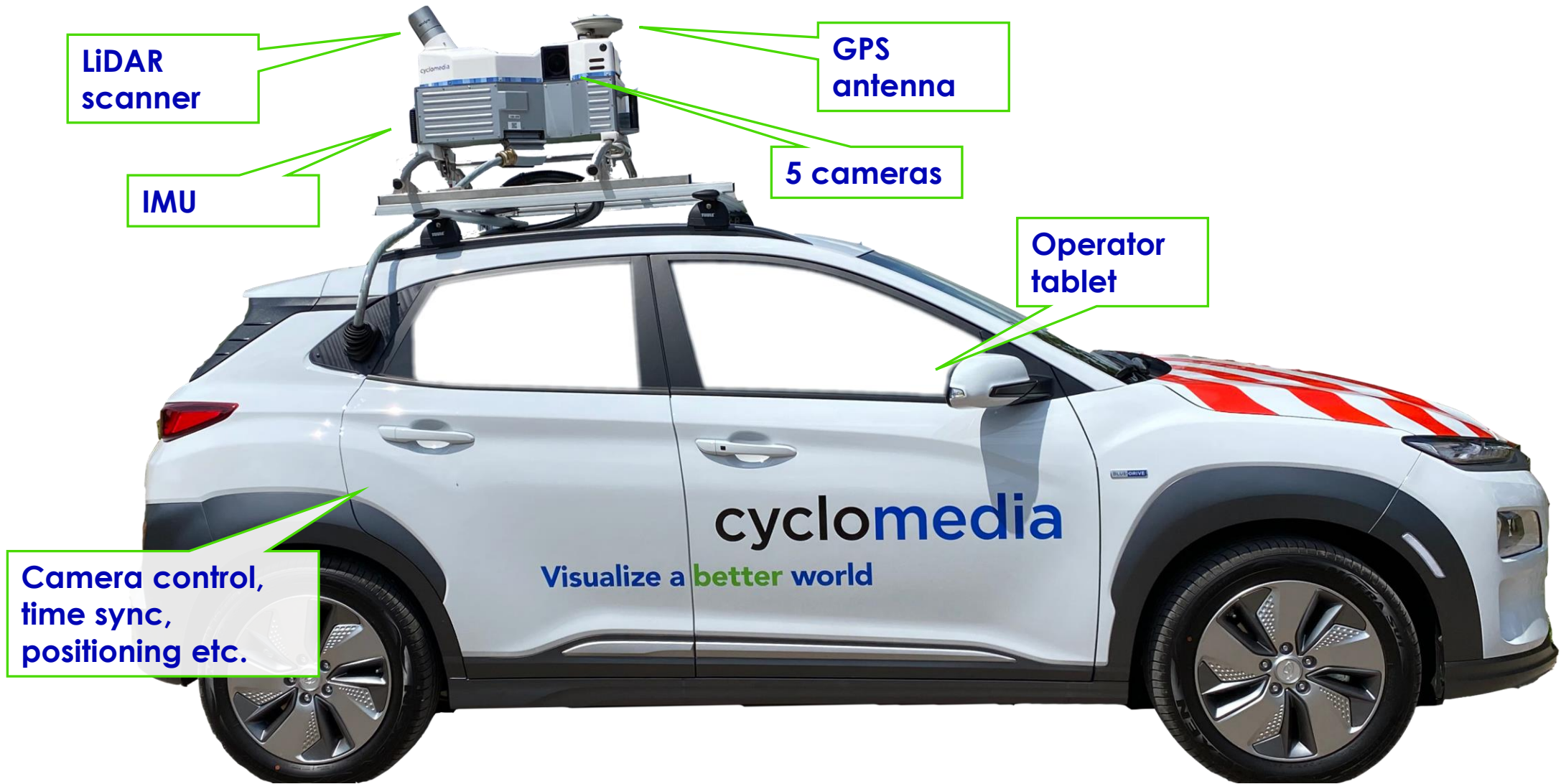
> 4.5
PETABYTES OF DATA IN
THE CLOUD



> 1,000
PROFESSIONAL
CUSTOMERS WORLDWIDE



HD-Cyclorama recording system ('DCR10L')



LiDAR scanner

GPS antenna

IMU

5 cameras

Operator tablet

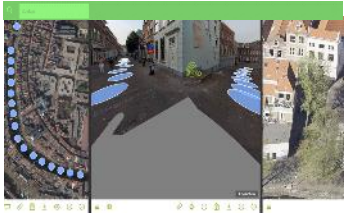
Camera control, time sync, positioning etc.

cyclomedia

Visualize a better world

Overview of Cyclomedia Technology

Street Smart Software



Realistic **3D walk-through** environments



Proprietary cloud platform to view, analyse and measure built environments

Insights360 Data Insights



Geo-referenced asset databases built by automated **feature recognition algorithms**



Automation of manual processes and **data management**

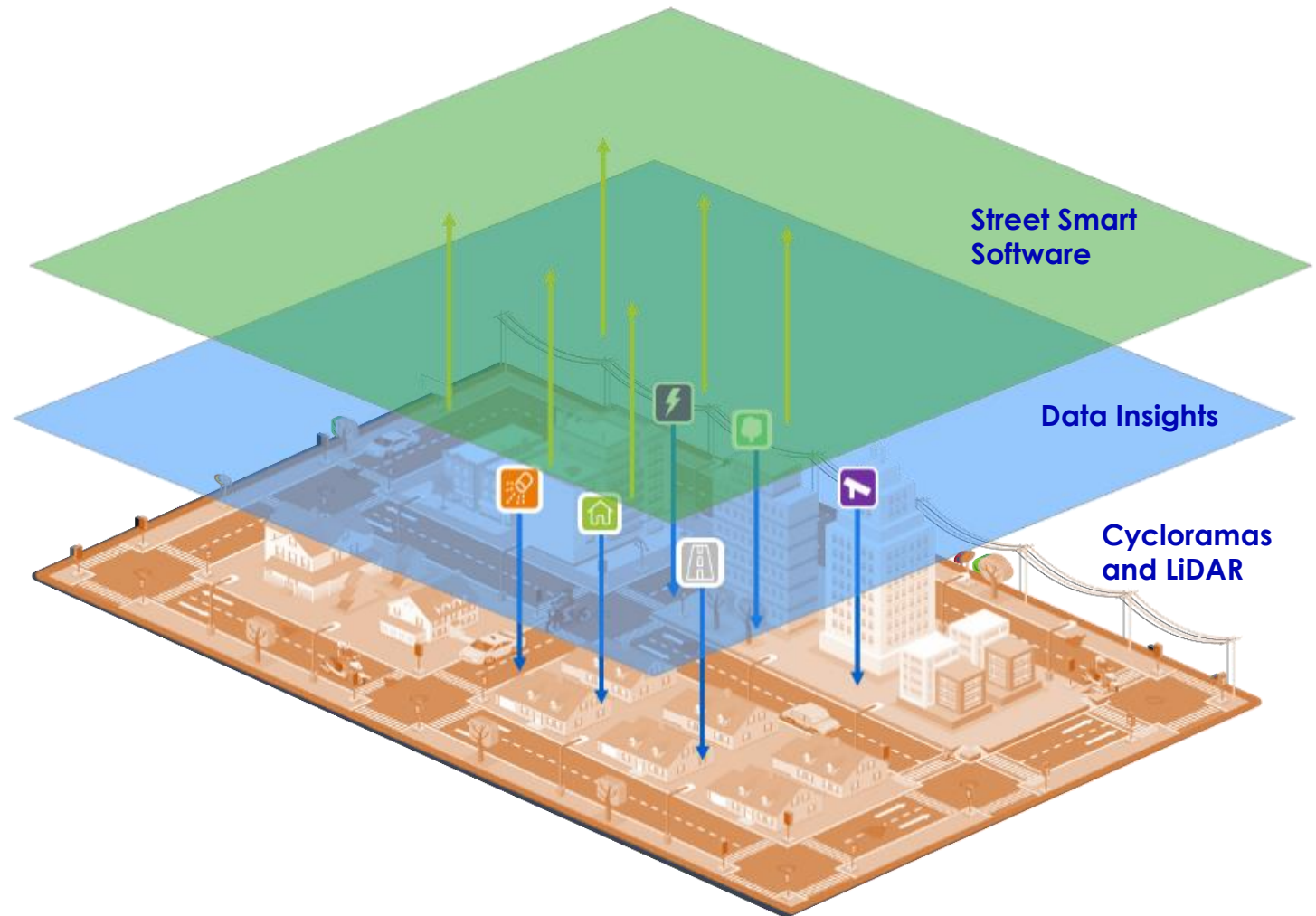
Cycloramas & LiDAR Point Cloud



360° panoramic **street-level** imagery data (and LiDAR point clouds)



Exceptional degree of **geometric** and **locational accuracy**, at scale



Data Capture

Cyclomedia captures and records visual data in public spaces, using a **special patented camera system**, which is mounted on vehicles. Driving at normal speeds, it **creates 360° panoramic images and captures LiDAR data**.

- **HD-Cyclorama Resolution**

- 100 MPx (14.400 x 7.200 pixels)
- Pixel size: 0,025 °

- **Standard Position Accuracy**

- Average standard deviation < 10 cm:

- **Processing at scale**

- More than 60 vehicles
- 1 month cycle time



8 meters from recording location!



Data Insights

Cyclomedia uses proprietary feature extraction software to **extract information from LiDAR and imaging data**. You can **quickly and cost-effectively** collect a large **inventory of assets**.

All assets visible from public roads can be detected





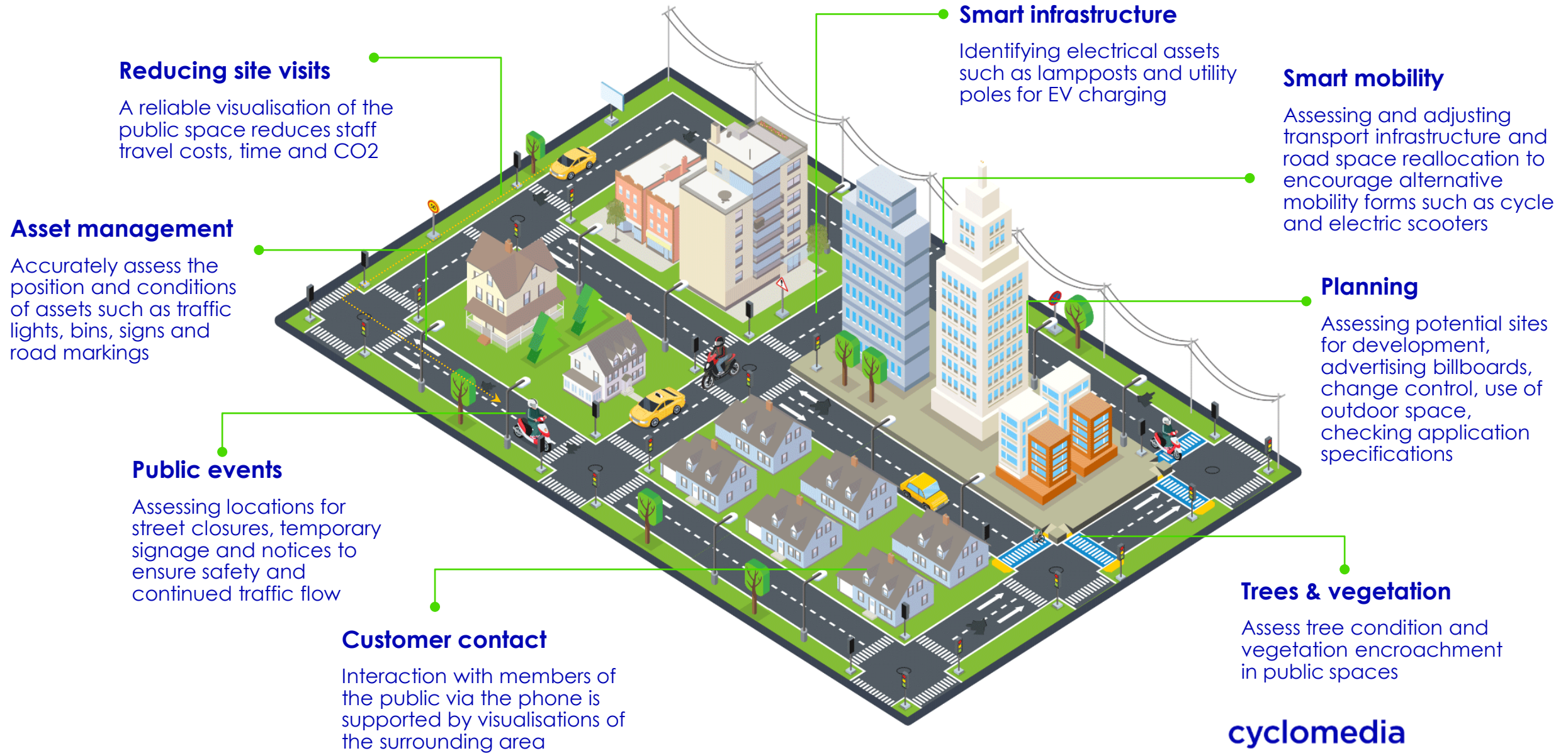
Data Visualization

Cyclomedia captures and provides various types of visual data. The imagery, LiDAR point clouds and other data are accessible through **Street Smart, our interactive web viewer.**

The **Street Smart API** allows the data and software functions to **be integrated into the systems and applications across your entire organization.**



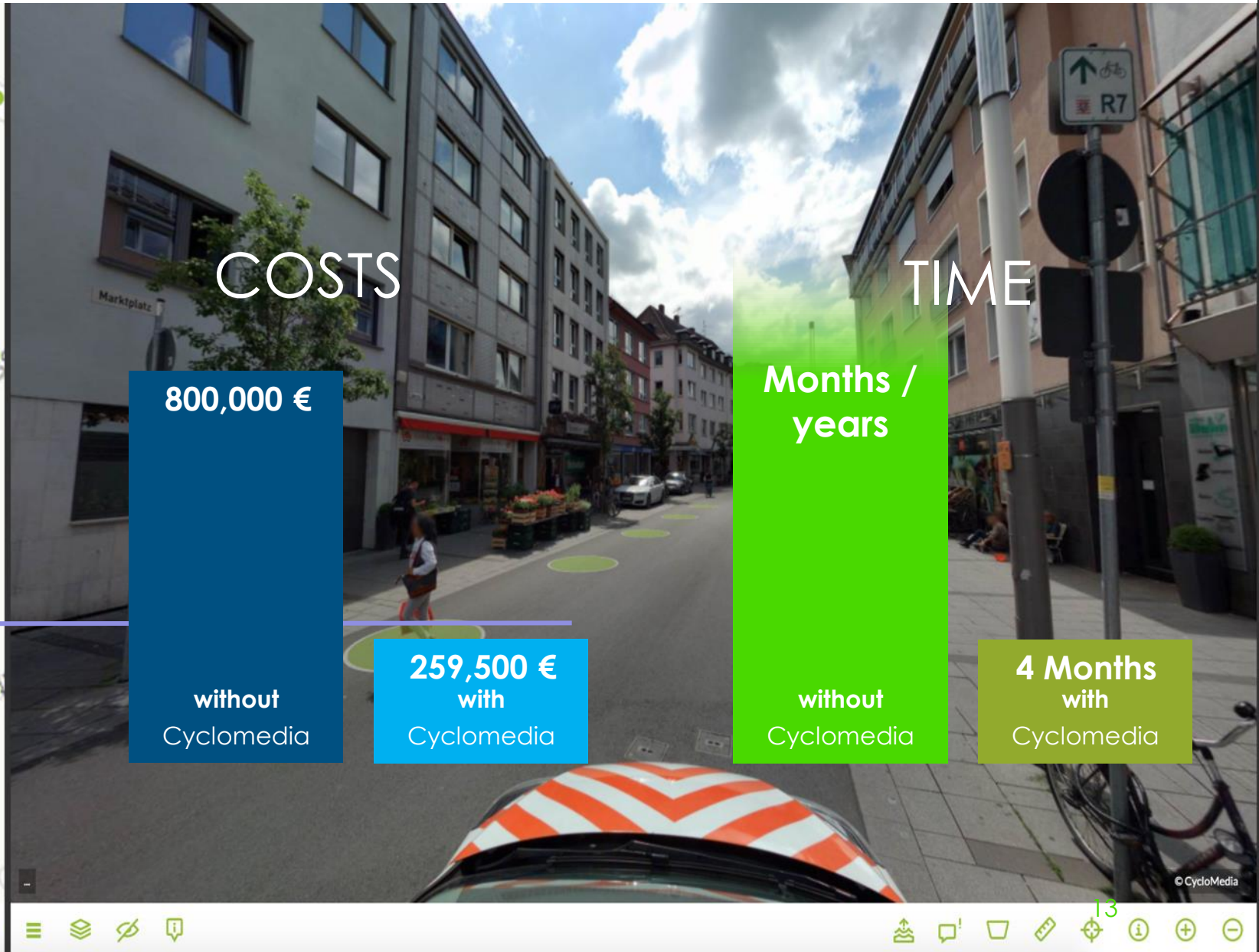
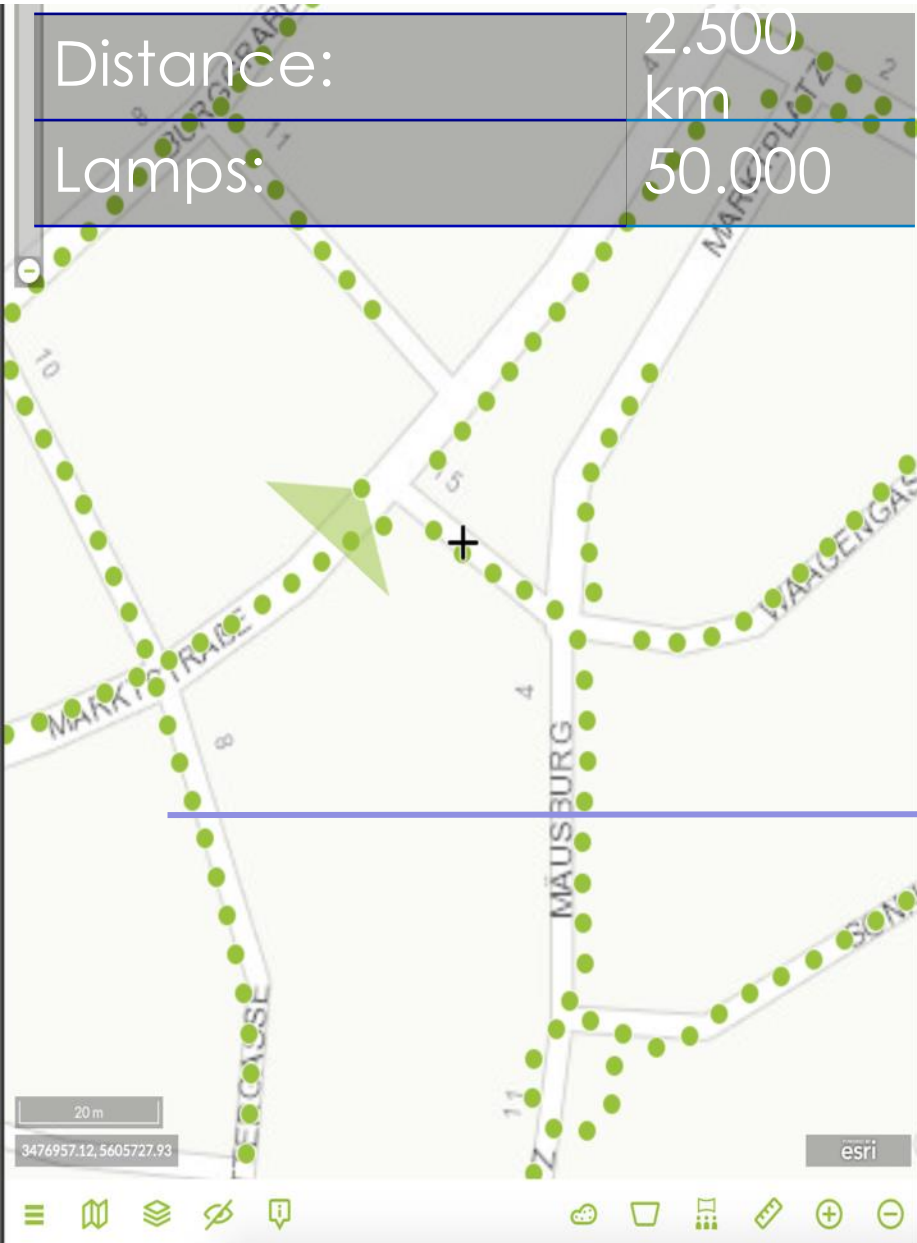
A digital twin of the city serves many use cases



**What is the total value of
mobile mapping in the
geospatial economy?**



Use case: Lighting Inventory vs traditional survey



Methodology

Blog

Geospatial Commission

Organisations: [Geospatial Commission](#)

Measuring the value of location data: a step by step guide.

[Hayden Greenfield, Assistant Economist Faststream, Geospatial Commission](#), 21 September 2022 - [Data](#), [Data Standards](#)



Credit Image: Dirtymono, Shutterstock.

In December 2021 the Geospatial Commission published a [blog](#) highlighting the importance of location data, why it is so difficult to value, and the Geospatial Commission's commitment to publishing guidance on how to

Search blog

About the Geospatial Commission

The Geospatial Commission advises government on the most productive and economically valuable uses of geospatial data.

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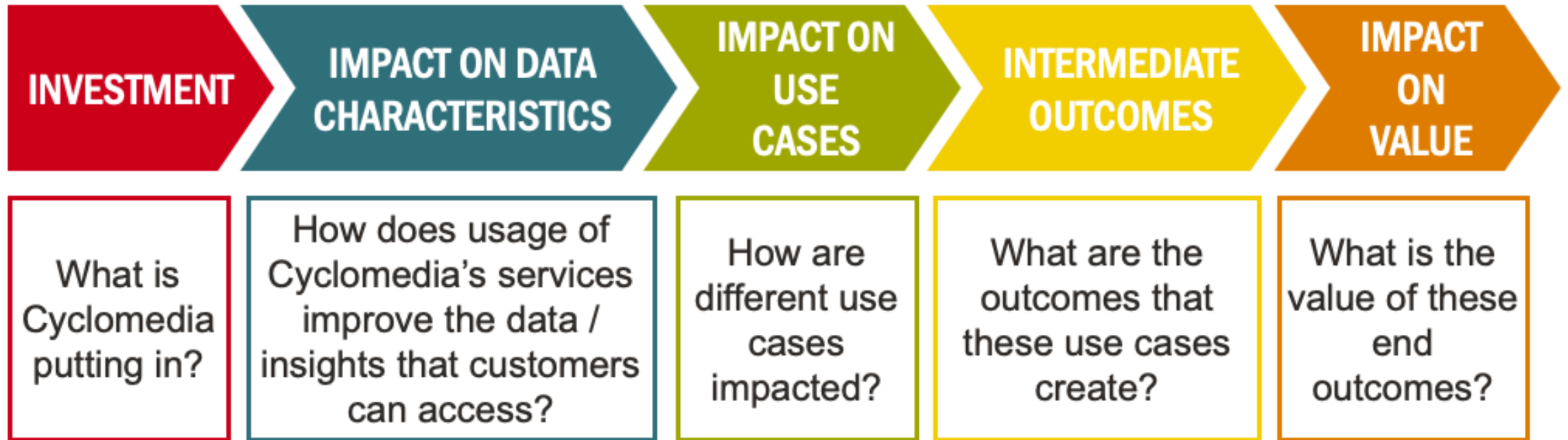
Recent Posts

[Measuring the value of location data: a step by step guide.](#), September 21, 2022

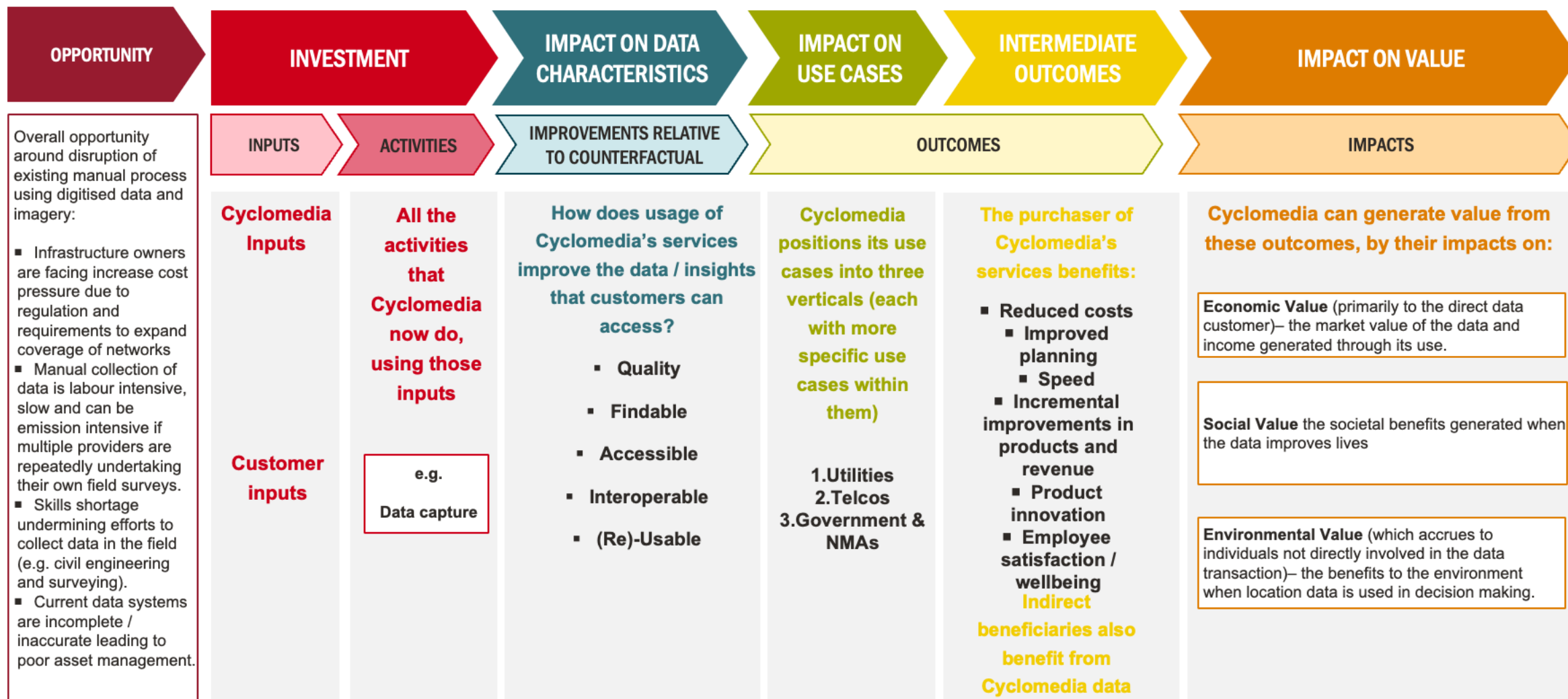
[Construction Playbook: Why the](#)

- Methodology developed for the UK Geospatial Commission
- <https://geospatialcommission.blog.gov.uk/2022/09/21/measuring-the-value-of-location-data-a-step-by-step-guide/>

Frontier Economics Logic Model



Logic Model for Cyclomedia Data



Logic Model: Utilities market

STRAND DESCRIPTION

Electricity, gas, water/ sewage, and lighting infrastructure owners use Cyclomedia data to better understand area mapping and the location and characteristics of assets. We have identified two primary use cases for this strand. In both cases Cyclomedia allows utilities asset owners to undertake activities more effectively or at a lower cost.

INTERMEDIATE OUTCOMES

Maintenance of existing assets

- Cyclomedia data can allow utility infrastructure providers to assess the condition of assets.
- This can inform preventative maintenance and allow for optimised asset lifecycle management.
- Cyclomedia insights can allow for simulation modelling of weather events' impact on assets.

Supporting rollout / implementation of new assets

- Cyclomedia data can allow utility infrastructure providers to better plan expansion projects by allowing for the selection of the optimal route / implementation site for new assets and in doing so avoid costly delays. For example, knowing to start digging away from nearby tree roots. This work is often done by Tier 1 contractors (main target for Cyclomedia)
- This data can save time and improve accuracy by ensuring all partners are relying on the same single version of the truth.

END OUTCOMES

Economic: reduce lifecycle maintenance costs. Better planning leads to reduction in likelihood of losses in the event of flooding etc.

Social: Improved asset maintenance leads to more reliable utility network performance which benefits electricity, gas and water consumers.

Environmental: Improved asset maintenance reduces leaks and wastage.

Economic: faster delivery of capital investment projects (reduced time spent contracting, faster collaboration with Highways Authority as can be done virtually) reduces overall spend. Utilities are monitored on customer satisfaction, and fewer site visits means fewer complaints and consequently an economic benefit to those firms.

Social: reduction in disruption associated with construction, individuals receive more reliable utility service. This is especially important for utilities due to customer utility scores.

Environmental: Planning of construction projects can take into account areas of high environmental importance to ensure any damage is avoided / minimised.

Utilities Use Case: Electricity connections

- Significant energy transition
- 40% of connection cost is survey and site work related
- Connections require multiple site visits
- 200% increase YOY in connection requests
- Utilities are penalised for slow response



alliander

5,800,000 Active connections

1,530,601 Gas house connections completed between 2017 and 2019

1,943,596 Electricity house connections completed between 2018 and 2020

Case Study Netherlands



Logic Model: Telco

STRAND DESCRIPTION

Combined service providers and other infrastructure owners are maintaining and upgrade their fixed and mobile networks. These providers need to maintain quality of service or create a competitive advantage. Cyclomedia data (e.g. on the location and characteristics of telephone poles) can be used to reduce physical site visits and automate routing of new networks.

INTERMEDIATE OUTCOMES

END OUTCOMES

Planning: use of Cyclomedia data as part of the planning process by network strategists to inform rollout and subsequent modification. Relates to both mobile 5G networks and fibre.

Maintenance: use of Cyclomedia data by engineers to inform management and maintenance of existing sites (across both 5G, fibre and existing assets).

Placement of new 5G cell sites

- Cyclomedia data allows for assessment of sites remotely to determine the potential of candidate locations for 5G antennas.
- Detailed information on site geography is needed (e.g. local street furniture / potential obstructions).

Fibre route planning optimization

- Fibre cables need to connect to radio network and/or homes and nodes to the network. To lay new fibre detailed information on the geography of the proposed routes as well as existing network infrastructure and demographic data is needed. Cyclomedia data can be used for this purpose (and also to validate completed work).

Asset maintenance





- Review of asset condition to inform inventory and maintenance plans for assets. For example, Cyclomedia data can be an alternative for tower companies to physical in person site surveys. For tower companies specifically, Cyclomedia data can highlight where these providers can add space for more capacity.

Economic: infrastructure owners can avoid the need for costly in-person site surveys accelerate timelines for 5G rollout. Reduced cost from more accurate equipment planning
Social: End users can access new networks faster.
Environmental: Fewer visits leads to lower levels of emissions

Economic: reduced cost by eliminating need for surveys, and from more accurate equipment purchase/rental planning. Optimal planning of routes mean that work can be undertaken faster as construction is focused on areas where cost will be lower.
Social: End users can access new networks faster.
Environmental: Planning of construction projects can take into account areas of high environmental importance to ensure any damage is avoided / minimised.

Economic: For Tower companies, if space can be found in antennae's, can result in revenue increase. Reduce lifecycle maintenance costs for all types of asset. Reduced supply outages (which result in penalisation for Telcos).
Social: More reliable network performance which benefits companies and individuals using Telco services, due to faster resolution of issues and less outages. Can also lead to reduced network churn.
Environmental: Improved asset maintenance reduces leaks and wastage.

Telco Use Case

Value Driver		Business Goal	Example Case	Value potential ¹
	Site visits Reducing of time consuming & costly physical site visits (incl. drone surveys)	Accelerate rollout Improve margins	<ul style="list-style-type: none"> Validating fiber routes against real situation Assessing site accessibility 	~50-80% site visit reduction
	Engineering effort Reducing manual design/ engineering efforts through automation of (part of) these steps	Accelerate rollout Improve Margins	<ul style="list-style-type: none"> Automating FTTH routing Automating cell site location spotting 	~90% engineering time reduction
	Predictability Increased quality of design work and fit with reality	Improve margins	<ul style="list-style-type: none"> Pre-fab façade-mounted fiber cables Construction day preparation (e.g. better preparation, right equipment) 	~33% cost reduction from rework
	Scalability Reduce ramp up time	Accelerate rollout Process standardisation	<ul style="list-style-type: none"> Hopper of construction packs ready for build Financial control 	Reduced time to market

Logic Model: Government

STRAND DESCRIPTION

Wider public sector customers is also a key focus for Cyclomedia data and solutions. This can cover both local and national administrative bodies. Below we have included the three most prominent current use cases. Other uses cases will emerge more strongly in the coming years and generate additional value.

INTERMEDIATE OUTCOMES

END OUTCOMES

NB: Governments will often use the data for more than one use case. For example, the data purchased initially for taxation purposes can be used again for asset management.

Uncovering further taxation or fine sources

- Cyclomedia data can fill knowledge gaps in existing tax base inventories, and potentially open up further routes for taxation in the future.
- For example, item identification (billboards (UK), non-domestic property (UK), terraces, parking drives) or measurement for taxation purposes, or misuse of land/property (unlicensed HMO, change of building use, encroachment of public space)

Optimise transport and mobility infrastructure

- Cyclomedia data can allow utility infrastructure providers to improve transport and mobility services, through assessment and adjustment.
- Data allows for better for future expansion, particular for Smart Mobility (EV's, PLEV (bikes and scooters) active transport (bikes and walking) and safer roads.

Asset inventories and maintenance

- Cyclomedia data can allow public sector bodies maintain and update asset inventories (traffic lights, road signs etc.) accurately in order to determine maintenance plans. Also public spaces can be monitored and potential issues flagged, for example, public parks, vegetation encroachment onto public roads, road surface issues.
- This can inform preventative maintenance and allow for optimised asset lifecycle management. Cyclomedia insights can allow for simulation modelling of weather events' impact on assets.

Economic: Direct economic value from taxation raised. Valuation raised from taxation can be used on construction, which in turn can have other economic benefits..

Social: End users will benefit from the use of raised taxation on public services.

Environmental: Reduced encroachment of public space can have environmental benefits if the activities were harming biodiversity.

Economic: Reduced time commuting has a direct economic benefit. Reduced cost from less in person planning visits.

Social: End users can access better, improved transport services. Reduced road traffic accidents and contribution to "Vision Zero".

Environmental: Better public transportation leads to more journeys, and potential less in cars (more carbon intensive). Benefits from "Green" infrastructure rollout, EV charging points, EV public transportation.

Economic: Reduced cost of maintenance of the assets and public spaces. Improved risk understanding for planned building works near vegetation can result in reduced cost for these building projects.

Social: End users are less likely to face unplanned interruptions in their use of public spaces and buildings, due to unforeseen damage. Less accidents due to improved asset and road surface management.

Environmental: Biodiversity benefit from 'active' management of public green spaces. For example, can manage tree assets to reduce biodiversity loss.

Government Use Cases

>20 departments use mobile mapping in New York City

- **Department of Buildings & Department of Transportation:** Code information and inspection (e.g. extract curb cuts assets, sidewalks, billboards and sidewalk buckets)
- **Fire Department and Police Department:** situational awareness, pre-planning, and intelligence gathering
- **Department of Finance:** tax assessment



Logic Model: National Mapping Agencies

STRAND DESCRIPTION

Outside of the three verticals, Cyclomedia also targets National Mapping Agencies (NMA) due to far-reaching data needs facing these agencies. A NMA is a company responsible for producing nationwide mapping data, often with strong links to government and elements of public goods in the data they provide.

INTERMEDIATE OUTCOMES

Contribution to national change programmes

- NMAs will in some cases want to provide a “single source of truth” for new types of data that are now required for the first time at a national scale to provide an aggregated common view. For example, this could include understanding geospatial position of each lamppost to facilitate deployment of connected vehicles or road widths across the country to understand the potential for new active travel interventions. This could ultimately contribute towards the increased effectiveness of national digital twins.

Nationwide data capture efficiency

- Some NMAs are lacking the skills and capacity to fulfil their data obligations. Currently this is outsourced to local engineering companies in some cases. This can be very expensive, and using Cyclomedia instead of these surveyors could be cheaper in some cases.

END OUTCOMES

Economic: Potentially large economic benefits if mobile mapping data can lead to more effective / faster / better targeted interventions which are themselves facultative by multiple partners all having access to national data which previously would not have been feasible to collect. These economic benefits depend on the specific use cases within this category (e.g. micro mobility, active travel, decarbonisation of energy systems).

Social: range of potential health benefits from increased active travel / promotion of safer connected vehicles.

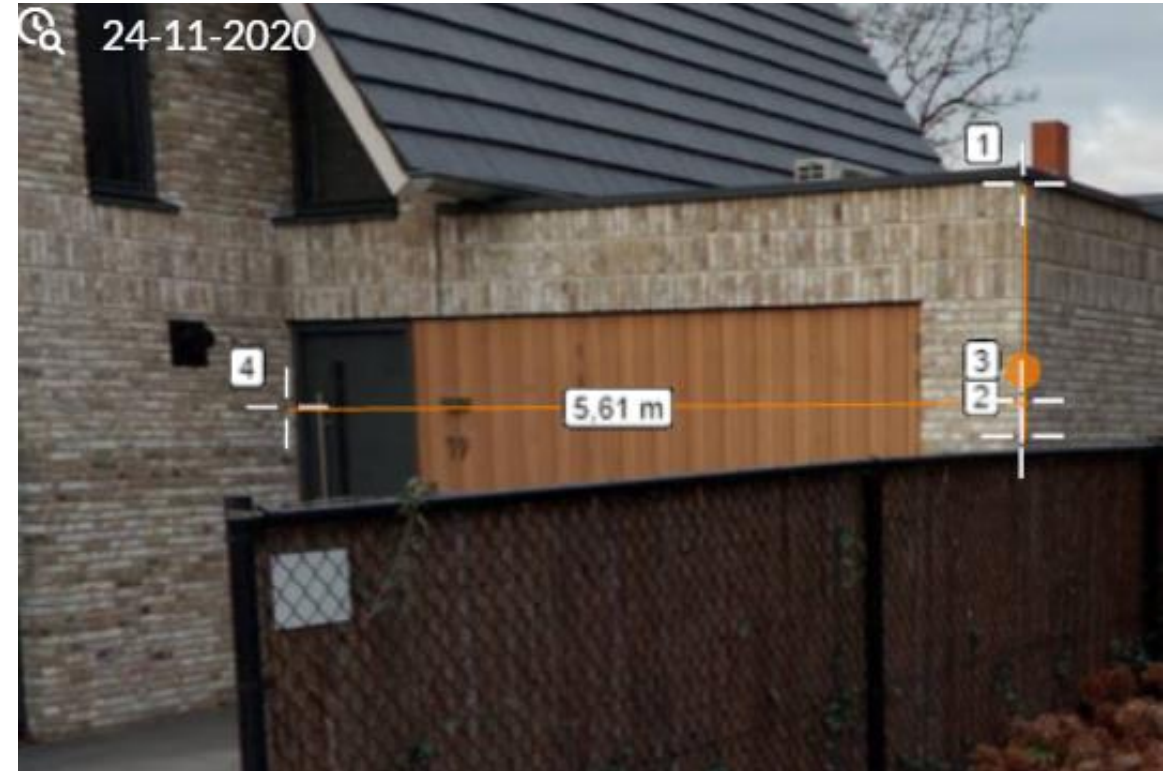
Economic: Use of Cyclomedia’s data instead of costly local engineering contracts. Results in a potential cost saving due to inefficiencies.

Social: Could mean that NMA data is more recently leading to better policy decisions and improved outcomes.

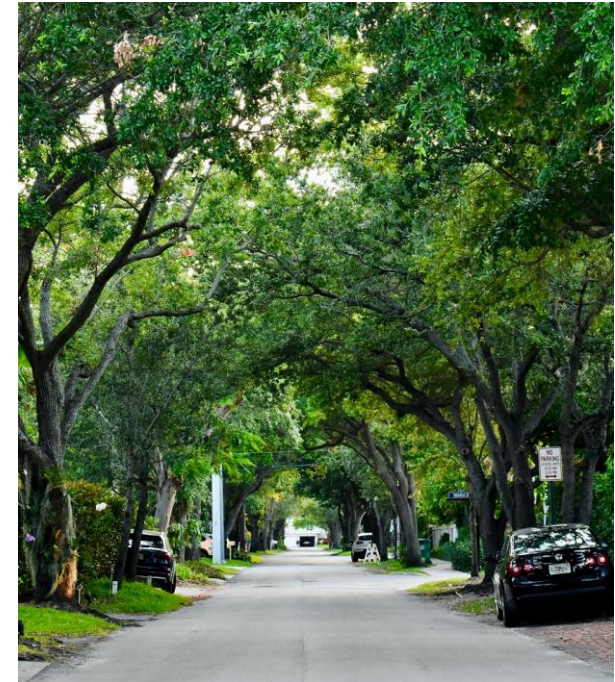
Environmental: Potential for lower carbon footprint from widespread usage of Cyclomedia dataset vs multiple local engineering companies

NMA Use Case

- Kadaster, the Netherlands' Cadastre, Land Registry and Mapping Agency
- > 20 teams use street level imagery daily
- Work preparation of survey teams
- QA of parcel and border mapping
- Desk based high quality survey



NMA Evolution: contributing to national change programmes



Next Steps

- Confirm use cases
 - High potential impact
 - High stakeholder interest
 - Good benefit evidence
- Use external interviews to dive into depth into chosen case cases
- Quantify use cases
- Model impact:
 - Economic
 - Environmental
 - Social
- Publication (likely at GWF Rotterdam 2023)

The background is an aerial photograph of a city grid, overlaid with semi-transparent blue and green color washes. The blue wash covers the left side, and the green wash covers the right side, creating a gradient effect across the map.

Thank You

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