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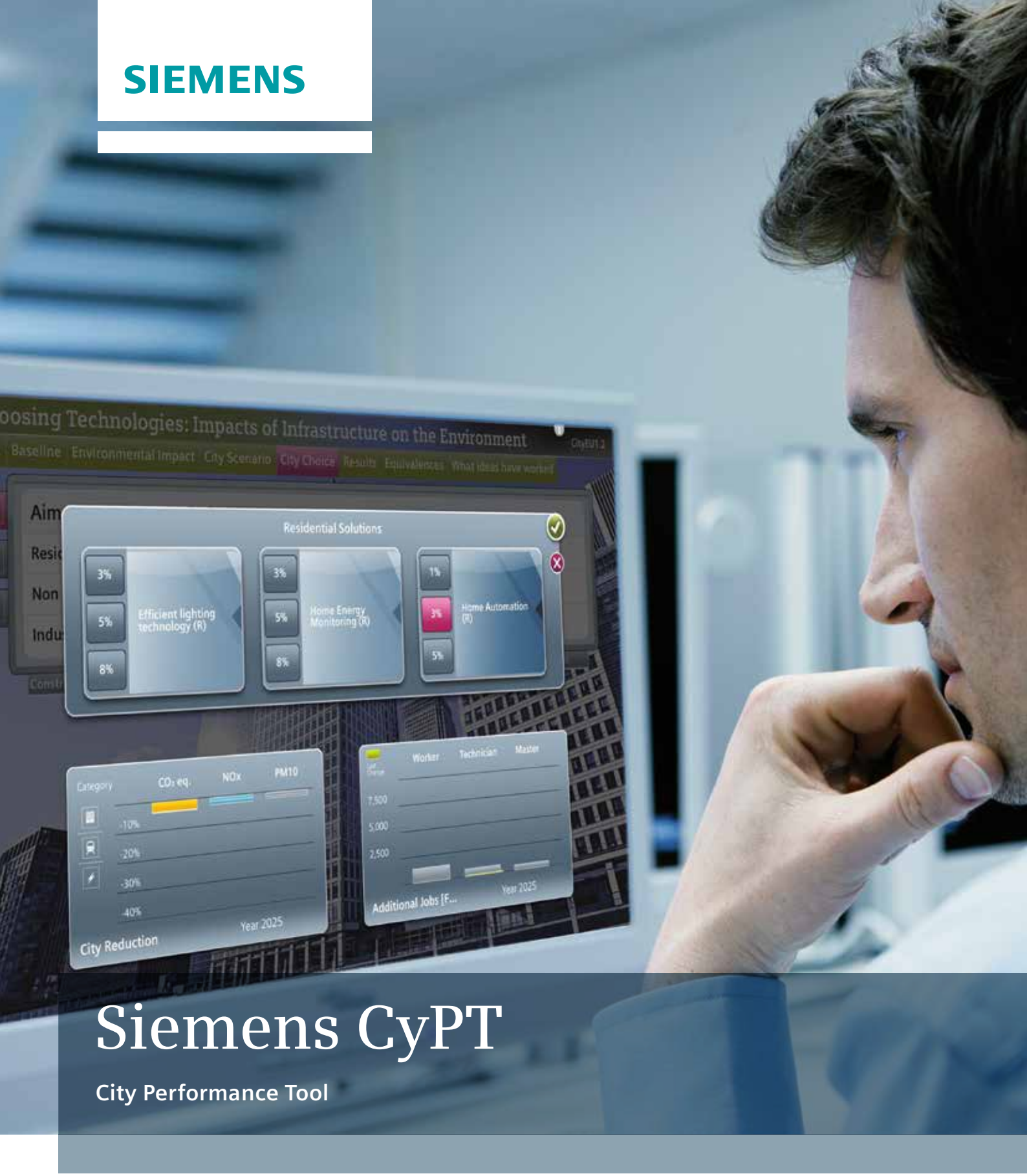

Siemens CyPT

City Performance Tool

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CyPT: Identifies the right technologies for your city

Modern cities have an increasingly vital role to play in finding new ways to protect the environment. Now urban decision makers can use the City Performance Tool (CyPT) by Siemens to select bespoke technologies that offer their own cities maximum environmental and economic benefits.

Using exclusive Siemens data on more than 70 transport, building and energy technologies, CyPT delivers a detailed insight into the CO_2 and air quality improvements you can achieve. It also identifies new local jobs each technology can create in your city.

The tool tracks reductions in emissions from any reference year as a result of technology implementations

What is the CyPT?

The City Performance Tool is a dynamic simulation tool which studies a series of more than 70 technologies from Building, Transport and Energy Technologies – at different time periods and implementation rates. It is designed to reduce the environmental impact of everyday activities in your city. It covers greenhouse gas emissions from buildings and transport, as well as air pollutants such as particulate matter (PM) and nitrogen oxides (NOx). It also looks at the creation of new local jobs to install, operate and maintain city solutions.

The model calculates the environmental and economic impacts of individual technologies at different implementation levels. In transport, for example, CyPT assesses how a technology would reduce demand (reduce parking search traffic), shift the mode (public transport instead of cars) or improve efficiency (automated trains).

The model is based on life cycle assessment methodology and builds upon Siemens' technology expertise and global databases of deep vertical process knowledge. New jobs that would be created are based on reference projects or economic studies in the transport, building and energy sectors of different regions.

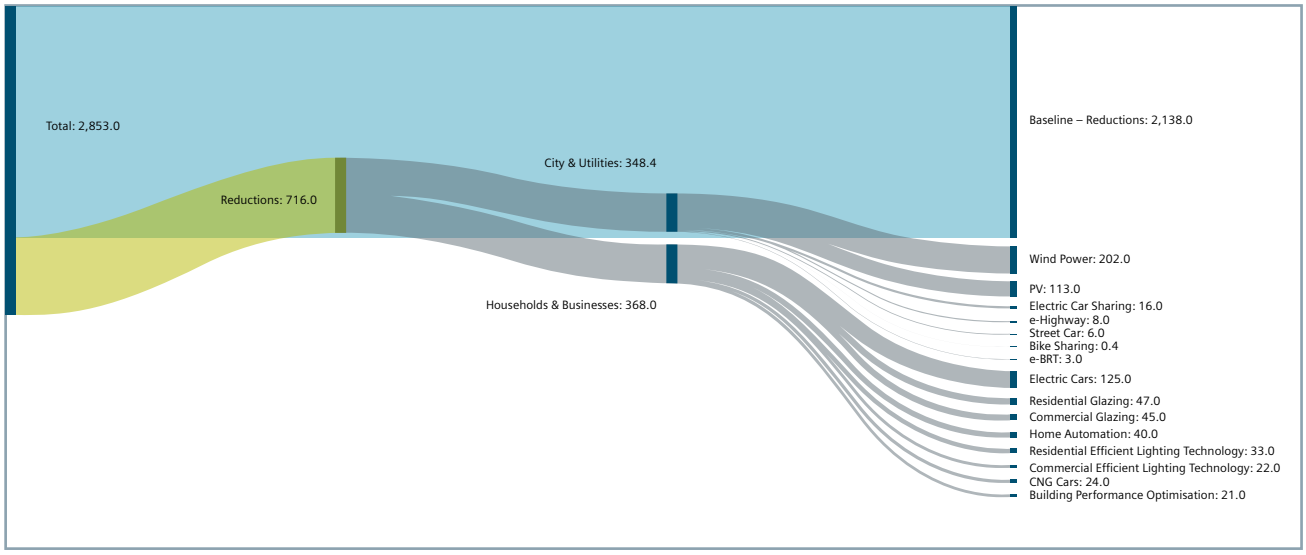
Where can it be used?

This versatile leading-edge simulation tool can be used in many different decision-making scenarios. It can determine the implementation rate needed for your city to meet its future environmental targets. It can also measure the impacts of a city's strategic plans, and compare traditional methods with state-of-the-art technologies for their benefits and value for money.

CyPT takes city leaders beyond best practice technology solutions. It works from your city's individual baseline to identify technologies to match specific needs. No need to follow the rest of the market: the CyPT approach empowers city leaders to focus on appropriate technologies that will provide win-win solutions for your unique urban challenges. CyPT identifies the exact technologies you need to improve and enhance your city for Buildings, Transport and Energy.

Who can use it?

The dynamic CyPT tool can illustrate to city decision makers, from the mayor to the most junior city staffer in the planning, transport, economic development or environmental policy departments, the impacts that their collective decisions could have on their city's environment and ability to create local jobs. The CyPT provides environmental results relative to the amount invested, and it can enable city managers to prioritise projects based upon their likely environmental and economic impacts. It can offer city managers a roadmap towards meeting carbon emission targets, clean air standards and local job growth.



Example one of technology levers: In the example above, a city's annual greenhouse gas emissions can be reduced from 2.8Mt of CO_2e to 2.1Mt using 15 technologies. The CyPT can help a city identify which technology has the greatest greenhouse gas reduction potential.

The technologies are presented in three categories related to their capacity to reduce energy demand in cities.

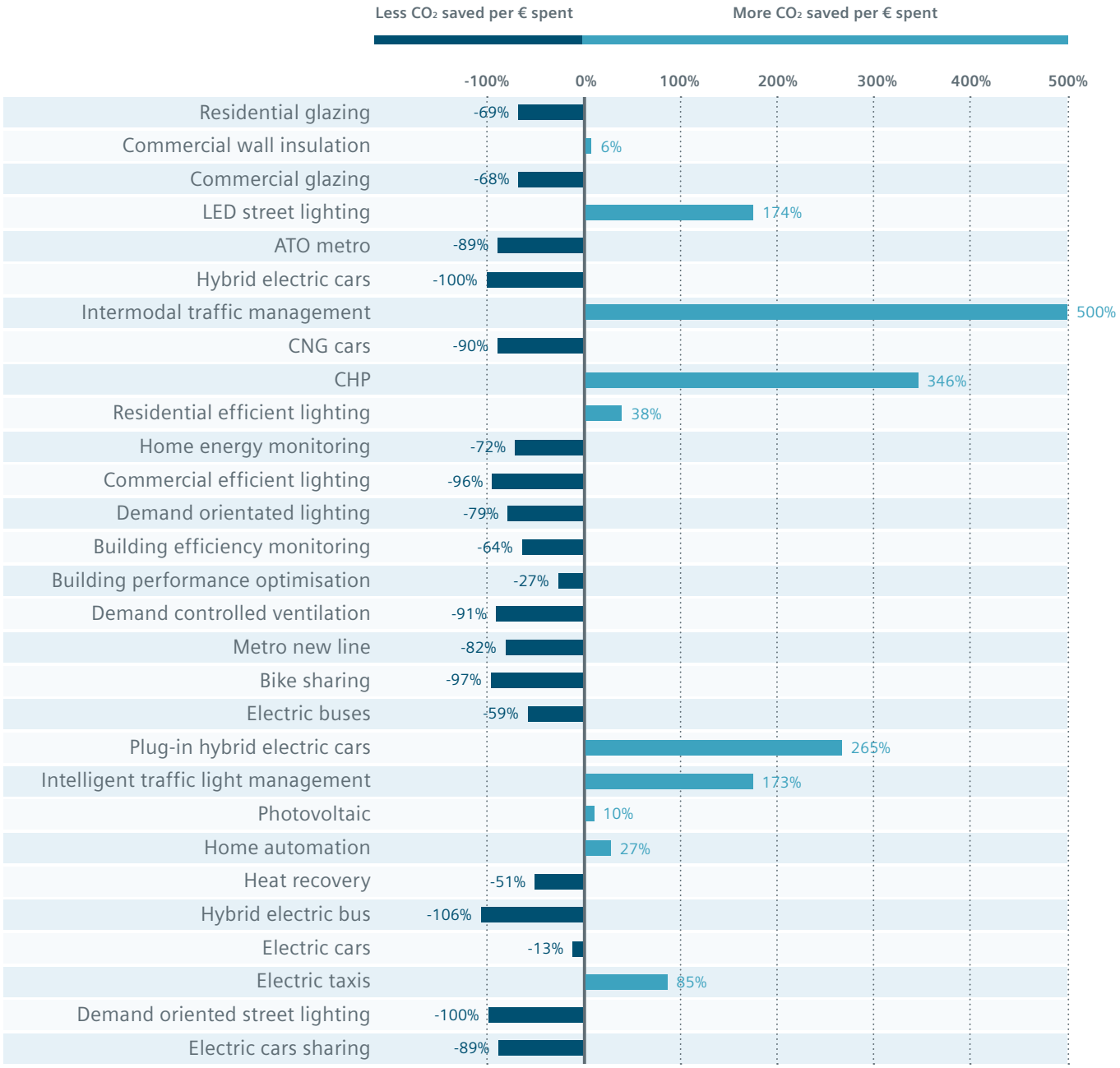
The first category works at the energy production level, demonstrating how photovoltaic installations, combined heat and power, and wind power can replace more carbon intensive energy sources such as coal.

The second category includes LED street lighting and commercial efficient lighting, reducing energy demand by replacing less efficient technologies such as standard street lamps.

Finally the third category of technologies create modal shifts in transport. For example, by implementing public transport solutions such as new metro lines or e-buses, the city can reduce energy consumption by removing cars from the roads.

Over 400 data points are collected for the city's baseline in either metric or imperial units

Example two of technology levers: The chart below is used to compare the cost efficiency of a technology saving CO_2 compared to wall insulation. Wall insulation is used as a benchmark in this illustration and set at the 0% mark in the middle of the diagram. Technologies in light blue – to the right of the zero benchmark line – save more kilograms of CO_2 per euro than wall insulation. In this situation there are 10 technologies that save CO_2 more cheaply than wall insulation.



Interactive and impact-driven

The city's baseline is assembled with over 400 data points such as the city's transport modalities and its electricity generation mix

Users can select low or high implementation rates for each technology and track the economic and environmental benefits that accrue

The CyPT process

At the beginning of the process, data is collected on your city's energy, buildings and transport infrastructure to customise the CyPT model. This is at a very generic level using city data publicly available mostly from statistics, studies, and transport or household surveys.

Around 300 city-specific data points are used for three main sectors: electricity, heating, and cooling demand for buildings; passenger and freight transport demand; and the transport network. The Siemens CyPT Manager pre-fills data from public city's or Siemens' sources, working closely with city officials.

Once all the data is collected, the CyPT Manager calculates the environmental baseline for your city based on activities in the three sectors.

This baseline has three KPIs – PM10 and NOx (air quality) and CO_2e emissions – which are also projected into the future based on a business-as-usual scenario and your own city's demand projection (if available).

This calculation delivers a basic understanding of the root causes of emissions in your city's buildings and transport. Comparing the results with your own targets it identifies future needs and improvement areas. The CyPT Manager also calculates the city-specific impacts of individual technologies.

Benefits for Cities

The impact-driven tool delivers real numbers and works based on already existing infrastructure in each city. In workshops the impacts of energy, buildings and transport levers on improving air quality, reducing CO_2e emissions, and creating local jobs in installation, operation and maintenance are studied.

Levers can be applied at different implementation rates for specific building categories (residential, non-residential – hospitals, education, public administration, etc.), passenger and goods transport (bikes, cars, buses, trams, metro, trucks, etc.), transport infrastructure (lighting, traffic and parking management, etc.), or energy (generation, transmission and distribution).

Building levers apply an annual implementation rate to a city's existing building stock. Energy and transport levers are applied at a certain rate aimed at a specified target.

Levers can be pre-selected based on results, and city-specific plans and policy can also be considered to generate a valuable mix of solutions. A range of impacts can be studied based on a single lever and its implementation rates, comparing options, or combining several levers in one or more sectors.

A specially developed CyPT app visualizes the effects of individual levers on a city, its buildings and its transport system. It also provides excellent support for the workshops by comparing scenarios created using different technologies and implementation rates.

Reports both long and short term benefits

Modern cities constantly need to balance long-term targets such as reducing greenhouse gas emissions with shorter-term aims such as improving air quality and creating jobs. All too often, lack of public support means long-term objectives are sacrificed for more immediate needs.

CyPT takes on the challenges of this balancing act by helping decision makers to recognise and select technologies that offer win-win solutions. CyPT highlights the benefits from key performance indicators to enable city leaders to deliver long-term advantages strongly linked to short-term gains.

Cities can maximise CyPT results by identifying the most cost effective solutions for improving air quality and reducing greenhouse gas emissions. By studying capital and operational investments across the lifespan of each technology, CyPT can report on kilograms of CO_2e as well as PM10 and NOx levels for every euro spent.

The CyPT helps you avoid investing in technologies that work on paper but cannot deliver the same results in your city. By carrying out a CyPT assessment, you can find exactly the right technologies for your city's needs, both long and short term.

Infrastructure strategy report

When data collection, baseline and impact calculation, scenario definition and modelling are complete, the CyPT Manager drives the writing process for the infrastructure strategy report.

This comprehensive illustrated report explains in detail the benefits of different infrastructure scenarios on a city's carbon emissions, air quality and new jobs. The report type is governed by findings and priorities set during the CyPT process and refined in the workshop, as these four questions demonstrate:

One:

"What is the optimal mix of technologies to get balanced KPI improvements?" – report focuses on a benefit-based conclusion.

Two:

"What technology implementation rates are needed to meet air quality targets?" – focuses on recommended implementations for selected KPIs.

Three:

"What are the job and carbon emission impacts of a city's transport plan and how do these compare with other sector plans?" – tests planning options.

Four:

"How do traditional city technologies compare with the latest solutions?" – compares existing technologies with the next wave.

A 'deep dive' analysis of selected levers or urban districts may follow the infrastructure strategy report on a consulting or project basis.

Moving beyond carbon

"There is growing anecdotal evidence from cities across the world that comprehensive, publicly accountable and integrated efforts to improve environmental performance go hand-in-hand with enhanced economic dynamism. The City Performance Tool uses an extensive dataset to quantify some of those causal relationships. It uses applied economic tools to capture whole-economy dynamic effects pertinent to the evolution and development of high performing world cities."

Professor Dimitri Zenghelis, Co-Head of Climate Policy, Grantham Research Institute, London School of Economics

"There is currently no perfect tool for measuring the sustainable development of cities due to the inherent complexity of the task. The City Performance Tool of Siemens shows a way forward by going beyond a simple carbon footprint. The inclusion of further pollutants (PM10 and NOx) and further sustainability dimensions (cost efficiency and job creation) goes definitely in the right direction."

Professor Dr. Matthias Finkbeiner, Chair of Sustainable Engineering, Technical University, Berlin

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