A Comprehensive On-Street Parking Guidance System

RheinEnergie AG is a regional energy supply company based in Cologne, the fourth biggest city in Germany. Being one of the largest energy providers in Germany, RheinEnergie supplies approximately 2.5 million people with electricity, gas, water, and heat. The company strives to provide the best possible services to the people and industries in the region while also including steps to protect the climate in its strategy. Due to its importance, the project was supported by the German Federal Ministry of Transport and Digital Infrastructure.

The Case

Approximately 800 outdoor parking spaces are available to the many inhabitants and visitors of one of Cologne's liveliest districts, Nippes. The parking situation, however, is less than ideal with drivers circling the area repeatedly looking for available parking spaces. Together with Cleverciti, the energy provider RheinEnergie aimed to improve the quality of life and reduce emissions in the neighborhood by putting in place an innovative parking management system. CleverciticSensors and LED displays, as well as a mobile app, were introduced to provide real-time, turn-by-turn guidance to drivers, helping them find a parking space in less time.

"This sophisticated smart parking deployment is part of an effort to increase sustainable development to achieve greener environments in our smart city,"

Dr. Andreas Cerbe, CTO of RheinEnergie AG.

The Challenge

Like other big cities, Cologne is suffering from high CO_2 emissions that regularly exceed EU norms. Up to 52% of those emissions are caused by inner-city traffic. According to researchers, parking search traffic makes up about 30% of traffic emissions—emissions the city intends to reduce by 50% by 2030 as part of the Smart City Cologne project.

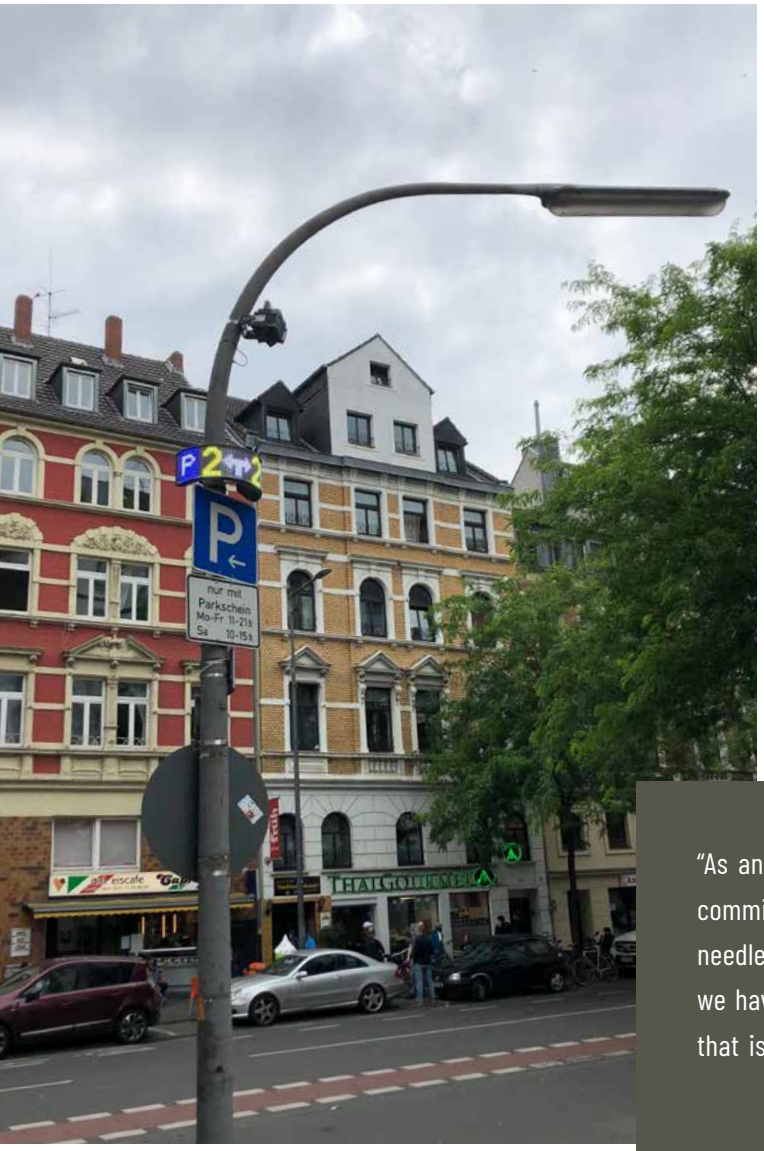
Portion of traffic that research has shown to be the result of parking search.

The district of Cologne-Nippes is one of the busiest and most densely populated ones in the city—and it is here that RheinEnergie wanted to implement a smart parking solution. In an area as busy as Nippes with shops, a daily market, schools, and many residents, drivers waste large amounts of time looking for available spots among the 800 outdoor parking spaces, which is not only a stressor to them but also to the environment.

Not having reliable historical and live data to refer to, city administrators were unable to get a comprehensive picture of the parking situation in Nippes.

The Target

By optimizing the use of parking spaces in the area and putting a traffic management system in place that would eliminate unnecessary search traffic, RheinEnergie wanted to not only significantly reduce traffic and CO_2 emissions but also improve the quality of life in the neighborhood. To achieve this, parking technology was required that would guide drivers to the closest available parking space at every critical decision point.



To avoid civil work on the surface and minimize disturbances in the neighborhood, the parking guidance system would have to be installed using the existing infrastructure of lampposts provided and managed by RheinEnergie.

In addition, civic authorities and parking operators required an end-to-end solution to minimize internal administrative efforts as well as comprehensive parking data about occupancy rates, peak times, and peak areas.

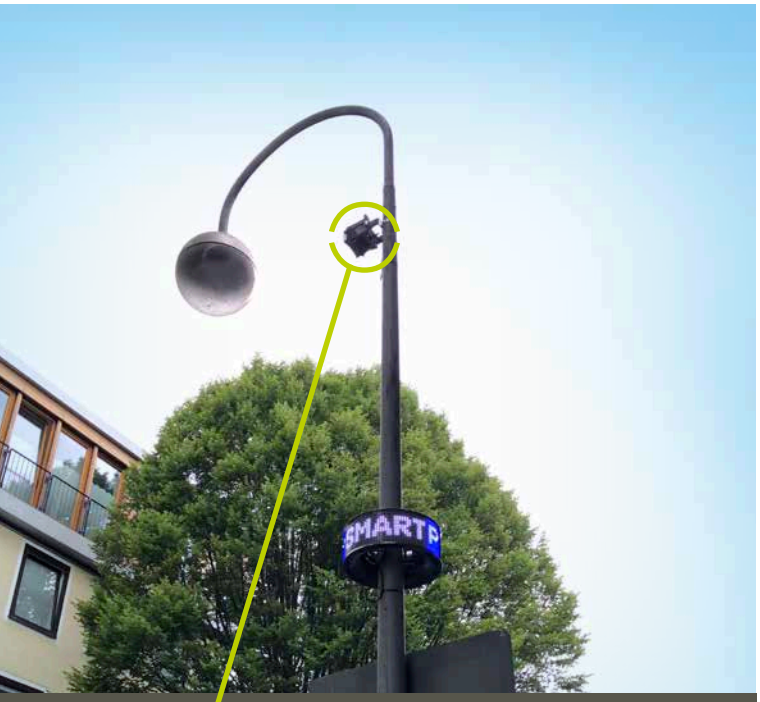
"As an organization focused on minimizing environmental impact, we are committed to achieving reductions in greenhouse gas emissions, eliminating needless traffic, and increasing energy efficiency. To achieve these goals, we have worked closely with Cleverciti to design a smart parking solution that is proven to reduce emissions and ease traffic throughout the area."

Dr. Andreas Cerbe, CTO of RheinEnergie AG.

The Cleverciti Solution

To provide drivers with a reliable overview of available parking spaces, 89 ClevercitiSensors were installed by RheinEnergie under the supervision of Cleverciti, providing accurate real-time information on the number, location, and direction of free spaces based on AI and deep learning algorithms. The information is relayed to 27 Cleverciti CIRC™ LED guidance displays located at each relevant intersection, helping to guide drivers to the most convenient parking spaces.

In Cologne, one sensor covers up to 20 parking spaces and takes less than an hour to install.



CleverciticSensor

CleverciticCirc360

Existing lampposts provided by RheinEnergie were used to install the ClevercitiSensors, thus avoiding civil work and allowing for an easy and fast installation process. The location of the LED displays, their geographical layout, and guidance logic were developed in close cooperation with the customer.

Up-to-date details on available parking spaces are not just visible on the CIRC guidance displays but can also be viewed in the free mobile application that provides drivers with additional information about occupancy per parking space category (e.g. disabled or delivery), guidance, and links to payment services.

The ClevercitiCockpit allows RheinEnergie to watch the actual occupancy status per parking space, the duration of parking events, the technical status of each device, and the real-time view of each of the CIRC guidance displays. This way, valuable data can be analyzed to form the basis for future infrastructure decisions.

The Result

With the newly installed guidance displays, drivers can now avoid searching for available parking for extended periods of time, improving their overall experience and reducing vehicle emissions. On-site test drives have shown that parking search time can be reduced by 45% by providing information about the location of available parking space through the Cleverciti system as opposed to a random search. At the same time, the distance driven could be reduced by 41%. In the process, 145 test drives were carried out during the day on weekdays at three different locations and at a parking space occupancy rate between 95 and 99%.

Prior to the installation of the Cleverciti solution, the occupancy rate was at 88% between 10 am and 6 pm on weekdays. This result was based on the measurement of 10,000 parking spaces/events. After the Cleverciti guidance system had been deployed, the parking capacity usage increased by nearly 8 percentage points to 96%.

In other words, two thirds of parking spaces that previously remained unoccupied can now be found by drivers, meaning that the limited outdoor parking capacities are being used in an optimal way with the Cleverciti Sensors providing real-time information about each individual parking space. This data can also be used by city officials to further optimize the parking management in Nippes itself and in other parts of the city.

<2 years return on investment

Optimally using the available capacity will mean increased revenues for the city. This factor alone leads to a positive financial ROI on the system in less than two years – even before taking into account the other advantages of emission reduction, time savings for residents and visitors alike, and the increased payment compliance rate that results from improved service.

By using the existing infrastructure, no extra costs were incurred for civil work, and inconveniences to residents were kept to a minimum. The internal administrative effort for the customer is small with Cleverciti providing an end-to-end-solution as well as remote maintenance and running the system for RheinEnergie.

45 % reduction in parking search time

66 % Of previously unused spaces are now filled