The City Councils of Penang launches Malaysia's first IoT-enabled Smart Parking Systems for more than 36,000 parking spaces

The Challenge

Penang 2030 is a vision of the Penang State Government to improve environmental, financial, and social aspects of urban life with smart city initiatives. As a Penang 2030 initiative, the City Councils of Penang (MBPP & MBSP) needed a Smart Parking solution to improve parking space availability and utilization for the community, reduce traffic congestion and CO2 emissions, and streamline parking payments for citizens.

The Solution

MBPP & MBSP worked with HeiTech Padu Berhad on a Smart Parking System for Penang's outdoor parking bays. An IoT-enabled surface mounted sensor in each parking bay, connected to the 0G Network, shares data to a dashboard confirming when a bay is occupied. The dashboard is visible to citizens via a mobile app and shows parking availability and processes payments.

The Results

Benefits of the Penang's Smart Parking System include:
- 50 percent reduction in the time needed for users to find parking
- 30 percent reduction in CO2 emissions
- More than 35 percent increase in parking fee revenues
- Insights to usage trends to help MBPP & MBSP plan future parking projects
- Parking Occupancy Analysis based on trend data
- User-friendly, Cashless Payment for COVID-safe parking.

0G Network Operator

Xperanti IoT is Malaysia's first and largest dedicated nationwide IoT network, providing Industrial IoT solutions through exclusive access to Sigfox's global 0G Network technology.
www.xperanti.com

Solution Partner

HeiTech Padu Berhad is a global ICT systems and technology service provider for government agencies and the commercial sector.
www.heitech.com.my

Customers

City Council of Penang Island (MBPP) & **City Council of Seberang Perai (MBSP)** Local City Council in Penang
www.mbpp.gov.my
www.mbsp.gov.my

sigfox CANADA

Sigfox Canada is the Sigfox 0G Operator in Canada
www.sigfoxcanada.com

OG UNITED NATIONS MEMBER

0G UN is the Global Association of 0G Network Operators, powered by Sigfox, the world's leading IoT service provider.

The City Councils of Penang (MBPP & MBSP) is responsible for urban planning, heritage preservation, public health, sanitation, waste management, traffic management, environmental protection, building control, social and economic development, and infrastructure maintenance for the state of Penang.

As part of its Penang 2030 vision, the MBPP & MBSP launched a smart city initiative with the goal of improving outdoor parking space utilization, reducing traffic congestion, and improving the convenience of parking payments for citizens. MBPP & MBSP utilize a contactless COVID-safe payment system for citizens which evidently comes in handy when the COVID-19 pandemic hit. The final requirement was to save council enforcement officers' time manually patrolling parking lots, checking infringements and issuing penalty notices. Both councils needed a cost-effective, low maintenance, reliable smart parking solution able to withstand the tropical conditions in 36,000 outdoor parking locations across Penang Island and the mainland .

Smart Parking System for Penang 2030

MBPP & MBSP engaged HeiTech Padu Berhad (HeiTech) to develop the system because of its proven track record of delivering mission critical systems and deploying smart ICT initiatives. HeiTech developed a solution connecting surface-mounted IoT-enabled devices in each parking space to a central dashboard via the Xperanti IoT 0G Network.

Xperanti IoT operates Malaysia's first and largest dedicated nationwide IoT 0G network, powered by Sigfox technology, the public, low-cost, low-power wide-area network dedicated to connecting industrial Internet of Things (IoT) devices over long distances.

Surface mounting the IoT-enabled devices in each space/lot takes less than 30 minutes. Each device is raised slightly above the road's surface and painted yellow to improve visibility for the public. The bright colour and raised surface alert the aged and vision-impaired as they walk in the vicinity of a parking space. Each mounted device comes in an IP67 weatherproof housing with a signal range of up to 20 km and equipped with long-life lithium battery which can last up to 10 years. This translates into a rugged sensor with long battery life and minimal maintenance on the operator's side.

> *"*
>
> *Penang's Smart Parking System is a world-class example of how Xperanti connects IoT devices to create powerful value for governments, businesses, and communities. The 0G Network's low-cost, low-power, reliable connectivity helps Malaysian organizations use the IoT to realize a more efficient, sustainable, smart future. With over 95 percent 0G network coverage across Malaysia, Xperanti is ready to connect IoT devices for public and private sector organizations and transform their operational efficiency.*
>
> *Murray Hankinson, Chairman, Xperanti*

How the Penang Smart Parking System works

When a vehicle enters the parking space, the sensor detects its presence and instantly updates the central dashboard via the 0G Network that the area is occupied. The central dashboard is available to users via a smartphone application, giving real-time visibility of parking availability at their destination. The app is widely available in Huawei App Gallery, Google Playstore and Apple Appstore for Android and iOS smartphones. Based on patterns of car park usage, the app also gives users insight into typical parking availability at the expected arrival time at their destination.

Once a user parks in the space/lot, the app enables contactless real-time payment with an e-wallet to process digital transactions. Eliminating the need for users to leave their vehicle to manage parking coupons. The app sends real-time notifications to users when parking time is about to lapse. If a user needs to extend the parking period, the app supports remote, real-time payments. Finally, the app offers the option to view and pay for monthly parking passes and parking fines.

A central dashboard provides MBPP & MBSP facilities management teams access to reliable, fast updates on parking space utilization and trend data. These insights improve decision-making around Penang's future car parking facilities. Data-based information on parking space utilization and payment status allows MBPP & MBSP to conduct targeted enforcements which saves officers' time and cost of manual patrolling and issuing parking fines.

"
With just a click, users can easily navigate to parking spots. This app will make driving and parking convenient and reduce traffic jams. The low-cost, easy installation, long battery life, and reliable 0G network connectivity make this eParking solution a powerful smart city use case. As the largest 0G Network deployment globally, we hope this partnership with the Penang government makes Penang a reference point for the whole country and maybe even other countries.

Abdul Halim Md Lassim, Executive Vice-President, HeiTech Padu

Small data delivers big outcomes for Penangites

Since the Penang Smart Parking System (PSP) launched in August 2019, more than 600 users have downloaded the mobile app, and user adoption has been significant. The PSP provides Penangites with a fast, easy parking experience, resulting in a 50 percent reduction in time needed to find a parking space. Reducing the time required for drivers to find a parking spot minimizes the number of vehicles on the road creating pollution and traffic congestion.

Faster parking saves time and fuel spent searching for vacant lots around Penang. With fewer cars on the road, CO_2 emissions have lowered by as much as 30 percent. The PSP also gives the MBPP and MBSP the flexibility to ensure priority parking is available for those who require it most, including emergency vehicles.

The convenience provided by the payment and enforcement components of the PSP helped the councils collect parking fees and fines more effectively, which improved MBPP and MBSP parking revenue by more than 35 percent. The two councils plan to re-invest these revenues into developing more digital transformation projects to benefit Penangites and consolidate Penang's position as the leader in Malaysia's smart city initiative.

The future of Penang's Smart Parking System

Understanding that not all citizens can access digital technology and smart devices, HeiTech also developed the PSP eCoupon. The eCoupon bridges the digital gap to help underserved or digitally immature citizens manage parking and fees via 422 registered agents.

The PSP solution is one of 73 smart projects across Penang. The Penang Government is committed to continually exploring ways to benefit citizens through integration with other smart city initiatives and realise its Penang 2030 vision. That commitment includes upgrading, extending, and improving the PSP modules and features as requirements evolve.

"
We are happy (that) Penangites adapt well to technology and hope Penang is used as a lab for various tech initiatives by interested parties. The sensor technology makes it convenient for Penangites and visitors to find a parking lot and make a cashless payment. I hope other states will regard Penang as a pioneer of smart initiatives, such as Penang Smart Parking.

YAB Chow Kon Yeow, Chief Minister of Pulau Pinang