

LEADING RFID-BASED TOTAL SOLUTION  
SERVICE PROVIDER IN ETC  
AND SMART CITY







## Vision

FETC International is the leading RFID-based total solution provider in ETC and Smart City.

## Mission

Our mission is to work with our partners to enable the digital transformation acceleration through innovations in ETC and Smart City.

## Values

We enshrine "Trustworthy, Responsive, Innovation and Customer First" as our core values.

# Company Profile

FETC International Co. - one of the affiliated companies of Far Eastern Group- is the leading ETC and Smart City RFID-based total solution service provider. Founded by the Far Eastern Toll Collection Company (FETC), that has received many accolades including five international awards for its outstanding performance in qualities, services, operation KPIs, and sustainable business model. The innovative Public Private Partnership (PPP) model has also been recognized as a key successful factor to the Taiwan ETC program.

FETC International inherits FETC's ETC technical expertise and associated technology and services know-how. It is committed to work with its customers as advisor, solution and service provider. The goal is to build long-term partnership and enable the digital transformation through ETC and Smart City.



# Company History

FETC International Co. is the world's leading RFID-based total solution provider in ETC and Smart City. It is a wholly-owned subsidiary to its parent company, Far Eastern Electronic Toll Collection Company (FETC) in Taiwan, a global awarded ETC and ITS expert with more than a decade of experience in planning, implementation, and operation.

Since its establishment in 2004, FETC was officially commissioned by the Taiwan government to build and operate the ETC system and associated service operation for nationwide freeway network. In early 2006, FETC successfully launched Single Lane Free Flow (SLFF) ETC operation in 23 toll plazas. Later when RFID-based ETC technology was made available to the general public in 2012, the rapid increase in utilization rate allowed Taiwan Area National Freeway Bureau (TANFB) and FETC to migrate to distance-based and multi-lane free flow (MLFF) ETC in December 30th, 2013. Currently, more than 7 million car users traverse the 331 MLFF gantries generating more than 6 billion accumulated transactions. The Taiwan ETC system not only enables the implementation of Smart Transportation services but also allow Taiwan to enter a new age of digitalization and accelerate the realization of IoT.

FETC is one of the 200 affiliated companies in Far Eastern Group (FEG). FEG has always taken "trustworthiness" as the guiding principle of its business management and enshrined "Sincerity, Diligence, Thrift, Prudence, and Innovation" as its founding motto. FEG successfully develops and manages a variety of businesses in telecommunication, internet, and innovative technology segments.

# World Recognition

Taiwan ETC has garnered the world's recognition through several awards for its outstanding performance in qualities, services, operation KPIs, and sustainable business model. The innovative Public Private Partnership (PPP) model has also been recognized as one of the key factors to the success of Taiwan ETC program.



## IBTTA 2015 Toll Excellence Awards

Customer Service and Marketing Outreach, each year the award recognizes the very best international tolling projects and programs. The winner is awarded for its creativity and innovation that sets a new standard of excellence. Taiwan Area National Freeway Bureau and the program conducted by FETC won the award for rapid deployment of electronic, distance-based toll collection system with world's highest tolling accuracy rate of 99.97% and detection accuracy rate of 99.9%



## eAsia Awards 2015

First Prize among e-Business in private sector. eASIA Award has been announced by Asia Pacific Council for Trade Facilitation and Electronic Business (AFACT) every two years. The purpose of the e-ASIA Awards is to recognize the significance and great effort made within AFACT community and to encourage exchange of best practices. FETC won the first prize of e-Business in Private Sector among strong competitors from Iran and Japan. Taiwan ETC system is well recognized by its sustainable business model and high-level KPIs.



## IRF Global Road Achievement Awards

The International Road Federation's Global Road Achievement Awards (GRAA) is a one-of-a-kind competition to recognize innovative road projects and exemplary people that place the road industry at the forefront of worldwide social and economic development. FETC won the award under the traffic management and intellectual transportation systems category. Its innovative tolling system and technology set a highest bar on IoT and smart city program



## Winner of 2015 ITS World Congress Hall of Fame-Industry Award



Hall of Fame winners make a significant contribution to the ITS industry and are at the forefront of innovative technology solutions to global transport and mobility challenges. ITS recognized FETC's contribution to intelligent transport. As the ETC project is a collaborative program between the government and the private sector. This glory reaffirms the success of this Public Private Partnership (PPP).

## Finalist for 2015 R&D 100 Award in the Software/Services Category



R&D Magazine has announced the Finalists for the 53rd annual R&D 100 Awards, and Taiwan ETC is a finalist for 2015 R&D 100 Award in the Software/Services category! FETC is honored to compete with more than 300 international enterprises for the final 100 most innovative companies in technology and services.

R&D Magazine's news release stated that "The Finalists were selected by an independent panel of more than 70 judges. often referred to as the "Oscars of Invention."

## 2017 WITSA Global ICT Excellence Awards in the Private Sector Excellence Category



The 2017 WITSA Awards was remarkable for its large number of highly qualified nominees, received from WITSA's network of ICT industry associations in 80 countries around the world. FETC has achieved the most successful Private-Public-Partnership Project in the ITS traffic management in the world; it has successfully developed RFID-based ETC total solution to turning traditional highway toll collection system into an integrated intelligent electronic toll collection (ETC) system for mobility management. This system is also used to manage traffic congestion on the nation's freeways and is a perfect demonstration of Internet of Things (IOT) which will allow for a more connected future.

# Partners

We rely on our partnerships with leading global technology providers. By working closely with these partners, we offer services as a reliable and long-term dependable RFID-based total solution provider in the rapidly changing ETC and Smart City industry.

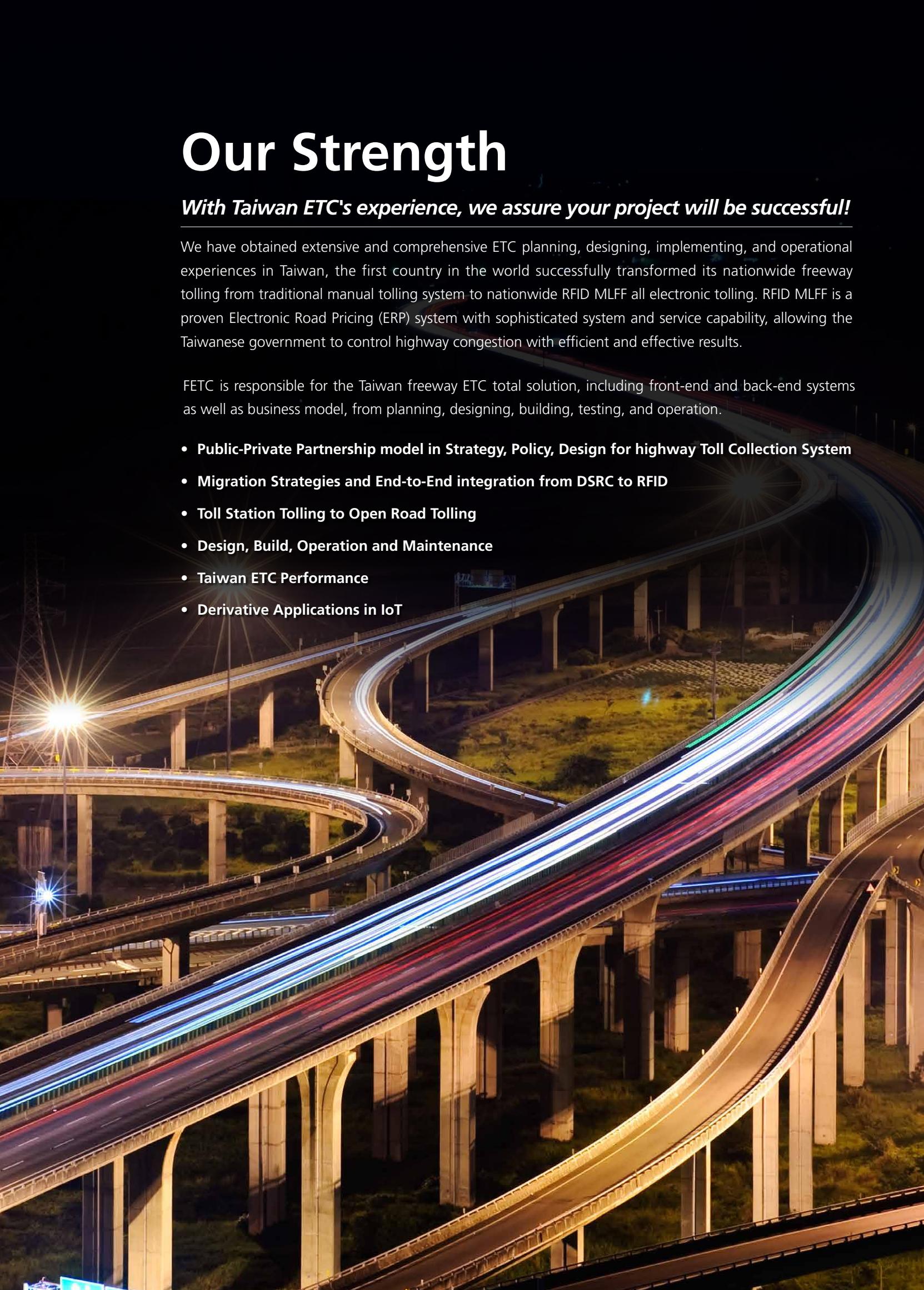
# Our Strength

***With Taiwan ETC's experience, we assure your project will be successful!***

We have obtained extensive and comprehensive ETC planning, designing, implementing, and operational experiences in Taiwan, the first country in the world successfully transformed its nationwide freeway tolling from traditional manual tolling system to nationwide RFID MLFF all electronic tolling. RFID MLFF is a proven Electronic Road Pricing (ERP) system with sophisticated system and service capability, allowing the Taiwanese government to control highway congestion with efficient and effective results.

FETC is responsible for the Taiwan freeway ETC total solution, including front-end and back-end systems as well as business model, from planning, designing, building, testing, and operation.

- **Public-Private Partnership model in Strategy, Policy, Design for highway Toll Collection System**
- **Migration Strategies and End-to-End integration from DSRC to RFID**
- **Toll Station Tolling to Open Road Tolling**
- **Design, Build, Operation and Maintenance**
- **Taiwan ETC Performance**
- **Derivative Applications in IoT**



## Public-Private Partnership model in Strategy, Policy, Design for highway Toll Collection System

For the purpose that freeway road users can pay tolls more effectively and equally neither stopping cars, nor using cash, National Freeway Bureau, MOTC, Taiwan, R.O.C. (NFB) programs a BOT/PPP project which is called "Private Sector Involvement in Development of Electronic Toll Collection System" with Far Eastern Electronic Toll Collection Co. (FETC). Considering the public acceptance issue, NFB planned two stages to achieve these goals. First ETC lane were launched in every toll Station since 2006.

### • The Objectives

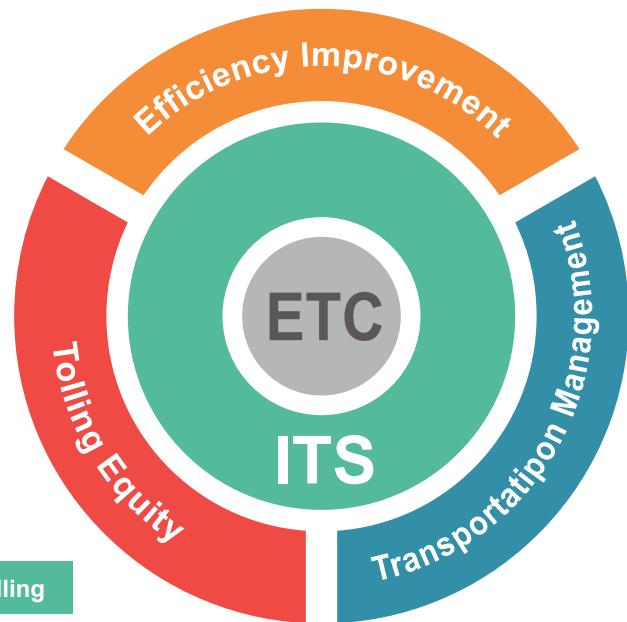
- Efficiency Improvement
- Tolling Equity
- Transportation Management

### • Social Benefits

- Petrol Saving > 120 million liters
- CO<sub>2</sub> reduction > 290,000 tons
- Time Saving > 375,000 hrs/ Day

### • The Achievements

Manual toll	→	All Electronic Tolling
Toll booth	→	Open road tolling
Pass-based charging	→	Distance-based pricing



## Migration Strategies and End-to-End integration from DSRC to RFID

- **The Year 2006-2012 : Introduced flat-rate pay-per-use IR DSRC ETC**

In 2006, FETC successfully launched flat-rate pay-per-use ETC among 23 toll plazas with IR DSRC technology, and the utilization rate had remained at approximately 40% for years, which was not sufficient to implement the policy – achieving a distance-based and multi-lane free flow (MLFF) nationwide ETC system.

- **The Year 2012-2014: Migrated from IR DSRC to RFID, from Barrier Base to MLFF**

Therefore, RFID was introduced to Taiwanese road users later on in 2012 and with a rapid growth of public enrolment. The ETC usage rate accelerated from 43% to 94% from May 2012 to Jan 2014 and the system was compatible with both IR DSRC and RFID coexisting operation. This 1.5-years migration process with well-planned rollout strategy and incentive programs allow sufficient ETC penetration and society readiness for TANFB and FETC introducing MLFF with 319 gantries to road users on December 30th 2013. All the efforts to seamless migration not only from IR DSRC on-board-unit (OBU) to RFID tag, but also from barrier-based tolling to MLFF have paid off. Currently more than 7 million users in Taiwan benefit from the ETC with more than 6 billion accumulated transactions.

## Toll Station Tolling to Open Road Tolling

- **The Year 2006-2012 : Introduced flat-rate pay-per-use IR DSRC ETC**

In 2006, FETC successfully launched flat-rate pay-per-use ETC among 23 toll plazas with IR DSRC technology, and the utilization approximately 40% for years, which was not sufficient to implement the policy – achieving a distance-based and multi-lane free system.

### Phase I: Y2006

Toll station ETC (hybrid with manual)



### Phase II: Y2014

Open road ETC



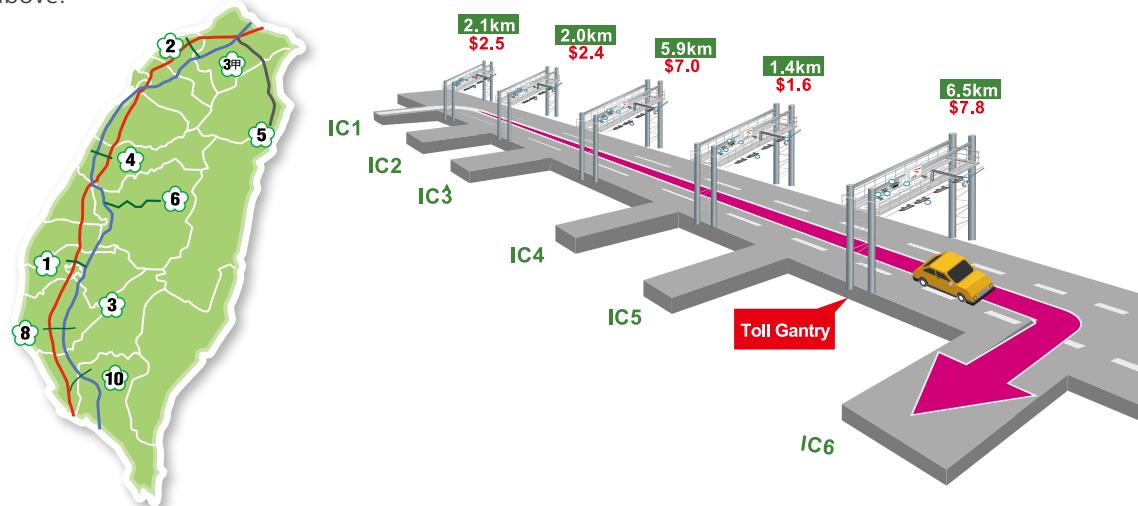
- Construct 23 toll plazas and 144 ETC lanes
- Extend ETC Lane by usage

- Construct 331 gantries and 1,345 lanes
- All ETC without manual toll

## Design, Build, Operation and Maintenance

- **Electronic Road Pricing**

This is a multi-lane free flow and distance-based ETC system which supports road pricing and various charging models are based on toll zones, transactions time, trip distance or a combination of the above.



- **Proven Field Performance in Accuracy KPIs While the Daily Transaction Volume Increased by 10 Times from Previous Flat-rate Pay-Per-Use ETC to Distance-based MLFF ETC**

Total Registered Vehicle & ETC Customer	7M Vehicles & 6.6M ETC Users
Total Length of Highways	1,000 km
ETC Daily Average Transactions	15 M
eTag Usage Rate	94%
ETC Usage Rate	100%
Tolling Accuracy Rate	99.999%
Successful Tolling Rate	99.97%
Vehicle Detection Accuracy Rate	99.98%
System Availability Rate	99.992%

- **Implementation & Project Management**

Fast Deployment of 319 Gantry (Around 1,300 Lanes) Within Just 10 Months with Zero Working Accident, High Quality and High-efficiency Performance

- Gantry Construction
- Road Side Unit (RSU) Installation
- Electromechanical Engineering
- Front-End to Back-End System Integration
- Transmission Network



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## ENABLE THE DIGITAL TRANSFORMATION ACCELERATION THROUGH INNOVATIONS IN ETC & SMART CITY

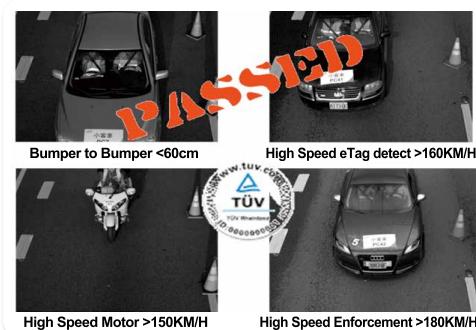
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### Taiwan ETC Performance

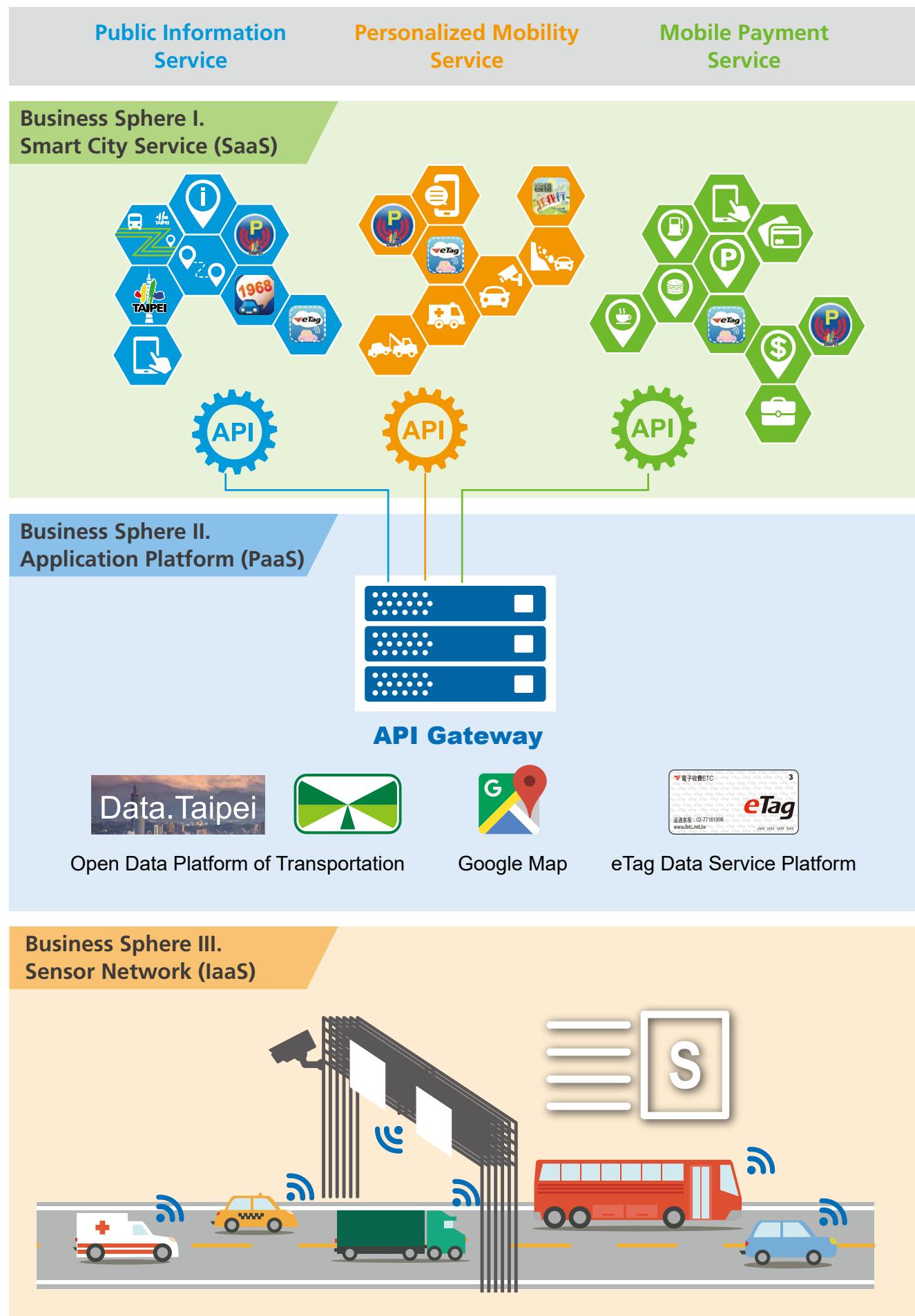
The system was certified by TÜV Rheinland

- High Speed eTag Deduction Module Test > 160 km/h
- High Speed Enforcement Module Test > 180 km/h
- Bumper to Bumper ETC Test < 60 cm
- High Speed Motorbike ETC Test >150 km/h



Audit period (2014/02/01~2014/04/30)	Audit result
Total Audit Transactions	4,805,610
Tolling Accuracy Rate	99.9999%
Vehicle Detection Accuracy Rate	99.9800%

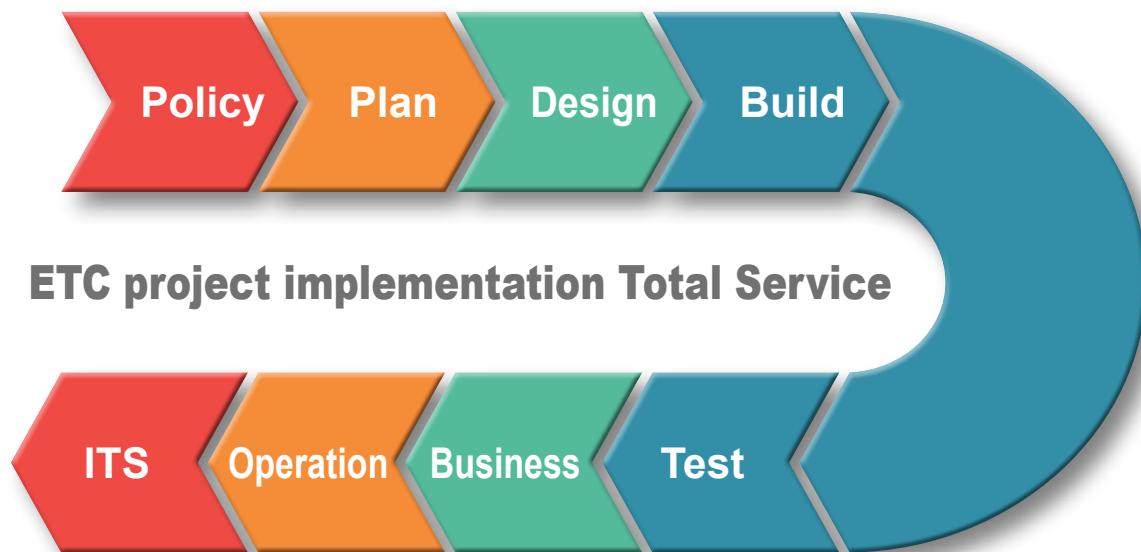
## Derivative Applications in IoT



# Our Solutions

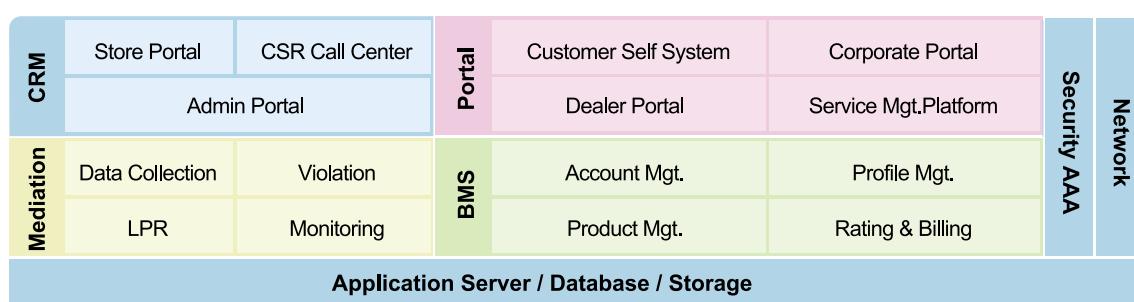
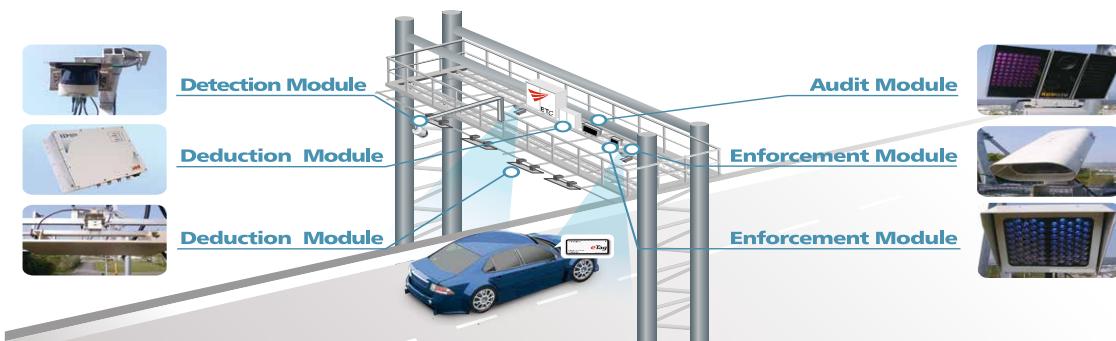
## Electronic Toll Collection

With Taiwan ETC's successful experience, we provide System Integration and Operation and Maintenance with the minimum CAPEX and OPEX requirements while keeping the highest performance level of the delivered solution to assure your ETC projects be successful!



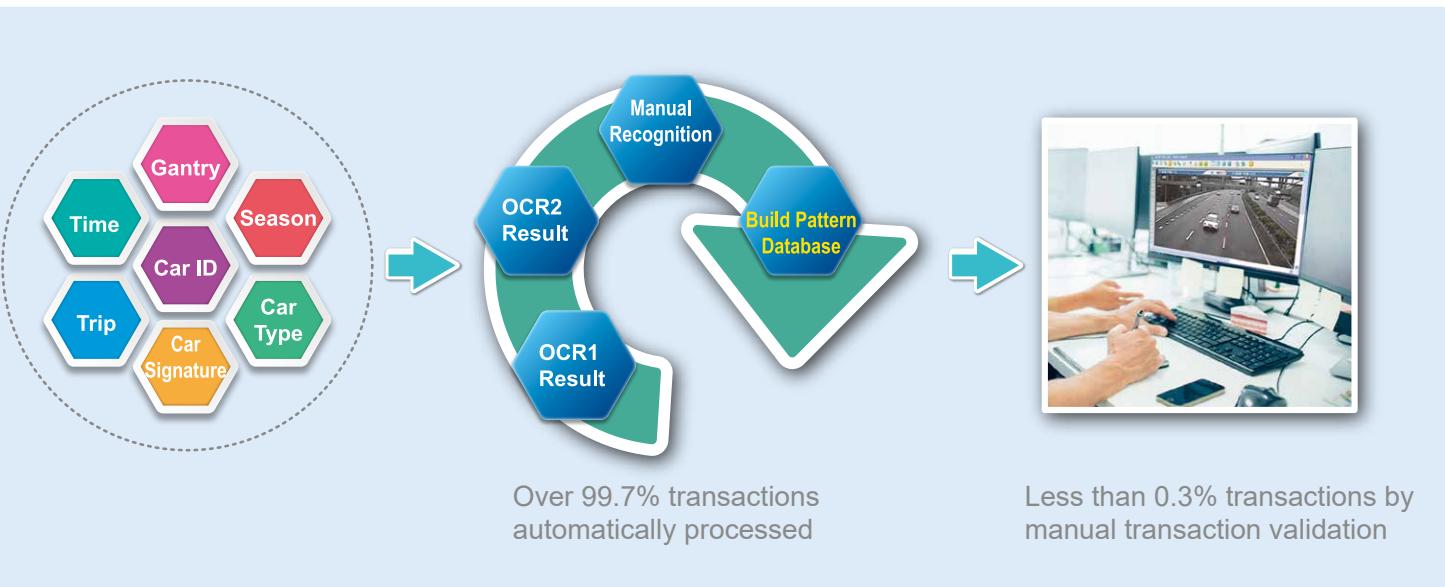
### • Front-end System

- Toll Station Tolling with barrier
- Toll Station Tolling without barrier



## Enforcement & Transaction Validation

By FETCI's intelligent ANPR system, over 99.7% transaction are processed automatically, less than 0.3% transactions Validated by manual.



## Back Office Management Solution

Back-end System



## System Operation, Maintenance and Monitoring

Our System Operation and Maintenance applications provide easy and smooth operation:

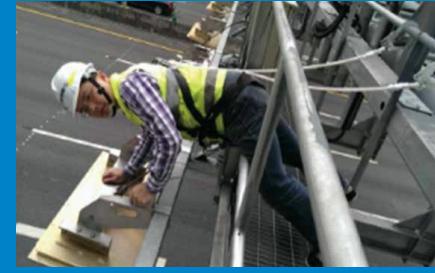
- **System Monitoring and Trouble Ticketing**

- System Monitoring
- Service Desk



- **Back office Applications**

- Parameters, Tariff Plans and Lane/Plaza Definitions
- Online transfer of Tariff Tables to Plazas
- Online transfer of White and Black lists to Plazas
- Rating (AVI based fare calculation)
- Online transfer of the AVI based rated transaction to the Banks
- Reporting (Statistical and Financial)
- Commission



- **Violation and Notification**



- **Web Based Customer Self Care**



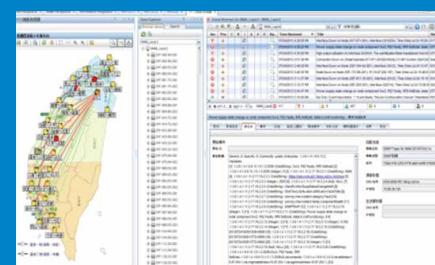
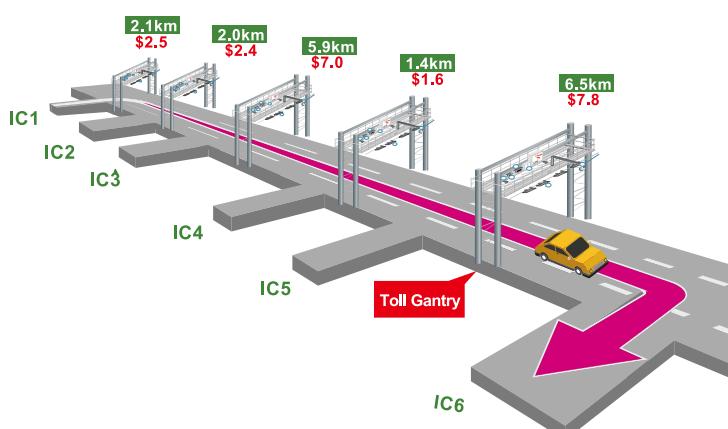
- **Lane Applications**

- Generating Entry/Exit Data
- Real-time transfer of the data to Plazas
- Lane Control Functions (AVI, OCR, AVC, Tag reading, etc.)
- System Availability Rate > 99.992%
- 365 days \* 24 hours operation
- 7 maintenance offices for 321 toll sites



## Electronic Road Pricing

Road pricing and various charging models are designed based on toll zones, transactions time, trip distance or a combination of the above.



## RFID Based solutions for Parking & Access/ Border Control

A range of products and technologies are employed in our eParking and access control solutions with Passive RFID & ALPR technologies. The system detects all sorts of cars and had a high accuracy. It works indoors and outdoors and needs little maintenance. A typical Parking management system would include the RFID readers, open entry gate automatically without time-delay, CCTV cameras, and the necessary IT infrastructure.



## Intelligent Transportation System with RFID

Smart transportation will be a key aspect of future smart city management. ETC and value-added traffic information services are key smart transportation applications. On a basic ITS architecture, a diverse range of application services can be offered.

For traffic data collection, a typical ITS application would include the RFID readers and antennas installed on intersections which could output traffic volumes, speed and travel time.



## Video Surveillance & ALPR

- **Automatic License-Plate Recognition (ALPR) & Manual License-Plate Recognition (MLPR)**

- Daily 15 million transactions, 99.6% identified by eTag & ALPR, only 0.4% identified by MLPR.
- MLPR process the plates which are unclear, invalid, modified, improperly located, bending, glare, and so on.

## Professional Services

- **Electronic Tolling Policy & Public Procurement Related Consultancy**

- ETC System Standardization Consulting Service
  - *Data Exchange for Multi-operators*
  - *Toll Clearance & Settlement*
- Centralized Tolling Agency (Operator) Structure Design & Tendering Preparation Service
- Government Regulation & Statutory Support Recommendation
- Procurement Models Consultancy (Public-Private Partnership Model, Design-Build-Operate-Maintain Model...etc.)
- ETC Implementation / Migration Planning
- Electronic Road Pricing Implementation Planning

- **System Performance & Toll Revenue Assurance Services**

- System Verification & Validation Service
- End-to-End Security System
- Transaction Validation Service
- Risks Management
- Disaster Recovery Planning
- System Performance Improvement Services

- **System Implementation & Improvement**

- System & Operation Diagnosis
- Total Solution Planning
- Total Service Improvement Planning
- ETC1.0~4.0 Migration Planning
- End to End System Design & Implementation
- Intelligent Lane Control System
  - *IT Applications (Billing/ ALPRI Violation Management/ Portal/ Service Platform)*
  - *Assets Management & Maintenance Scheduling System*
  - *Centralized Monitoring System & NOC System*
- Project Management & Supervision
- RFID Based Applications

- **Investment Assessment**

- Feasibility Study
- Financial Assessment Study
- High Availability for ETC Infrastructure Guideline Design
- Fiber
  - *Data Center*
  - *Facilities & M&E*



## Windshield Tag

- Windshield Tag With Printing



- Windshield Tag Clear



- For mounting on windshield of vehicle.
- Validated to work in high speed MLFF environment (Taiwan) / up to 160km/hr
- Has been tested and operated in Taiwan for more than 4 years, under constant high temperature exposure and high usage volume.

## License Plate Tag

- License Plate Tag, Aluminum Version



- License Plate Tag, PC Version



For mounting with vehicle license plate. Ruggedized design for higher performance and long lasting than traditional headlamp tag.

## Hand Hold Reader (HHR)



Used to inspect and validate whether Tag is able to perform in a roadside environment under normal operation.

## Authentication Authorization Encryption (AAE)



This product is installed in the roadside cabinet, connecting road side Reader and roadside system. Based on encryption authentication method to confirm whether tag is valid.

## Intelligent ETC Lane Controller



This product can be mounted in toll station or toll gantry in order to process data from RFID (AVI), ANPR (VES), and VD modules. This product compiles and matches transaction data and is the core part of ETC systems.

# Smart Highway



# **FETC International Co, Ltd.**

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