

# CURBING INNER-CITY POLLUTION

## Congestion Charging in Stockholm

The world's first charge-to-account system entirely based on ANPR.

Q-FREE\_CASE\_STOCKHOLM



### 3. Stockholm



The Stockholm Congestion Tax System reduced air pollution by 10%, traffic by 20-25% and travel time by 30%. The solution from Q-Free is the world's first fully automated videobased tolling system based on Automatic License Plate Recognition. For commuters this means no vehicle equipment, no cash, no coins and no stopping.

#### CHALLENGE

The Stockholm authorities introduced the Congestion Tax System primarily due to environmental concerns, aiming to reduce inner city traffic pollution. To ensure that citizens would welcome the charging system, the authorities not only had to enhance the city's public transport but also to convince motorists that the system was reliable and fair. It therefore had to handle variable charges based on congestion levels: high charges at peak traffic periods and zero charges at low traffic periods.

#### SOLUTION

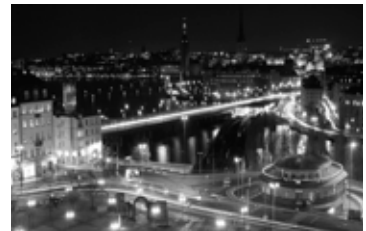
These challenges meant that Q-Free's solution had to operate flexibly and

flawlessly. The groundbreaking video cameras equipped with ANPR software were the key component in the solution: they send decoded number plate strings and photos of the plate itself in real-time to a central system that accurately determines the correct tax liability for each car owner.

#### GROUNDBREAKING TECHNOLOGY

The Stockholm Congestion Tax System was the world's first fully automatic congestion charging system solely depending on the use of automatic number plate recognition from video images. A DSRC roadside system is also installed but is used only for the purpose of future interoperability with other EFC systems. This meant that Q-Free's solution had to deliver extremely high vehicle detection performance and outstanding automatic read rate from the images. Our Automatic Number Plate Recognition (ANPR) system reads more than 96 percent of all vehicle images automatically with an error rate of less than 0,01 percent. Only a minute fraction of the system's 400 000 daily images need manual attention.

The Congestion Tax System has been welcomed by Stockholm's citizens and is widely acclaimed as a groundbreaking inner city antipollution measure.



#### FAST FACTS

NAME OF CUSTOMER

Vägverket

COUNTRY

Sweden

COMPLETION DATE

2005

#### FOR MORE INFORMATION

SALES DEPARTMENT

sales@q-free.com

<http://www.q-free.com>

#### ROADSIDE SOLUTION

MULTI-LANE FREE FLOW CONFIGURATION

ANPR Vehicle Detection System (VDS)

Vehicle Enforcement System (VES)

ETC Radio System (ETCRS)

ETC Roadside Controller (ETCRC)

#### CENTRAL SYSTEM

Stockholms Central System solution is provided by IBM. Q-Free handles transaction flow securely from all roadside installations to the secure premises of the Central System.