Electronic Tolling Systems

The technology is now proven and has been implemented worldwide. However it is not yet without problems, particularly in enforcement and in ensuring uninterrupted operation. More than one system is available however. The European Union/International standard for vehicle to road side communications has been adopted by competing manufacturers and is in use in Austria and Australia for example, while the United States has a different technology. This problem can be significant -- for example in Malaysia two different technologies are in use by different toll road providers (one operating with a microwave system and another, infrared). The international standard is based on microwave technology.

Complete electronic operation is only viable where the number of occasional users is small. Where there are a large number of occasional users, or they are entering the system at a large number of locations, the complications can be large. Hence making sure that the systems in place to collect revenue are able to deal with both occasional users and to enforce penalties against those who intentionally fail to pay is important.

The different pieces of equipment required for an electronic toll system include:

1. The "in-vehicle" tag -- a unit placed in the centre of the vehicle windscreen, behind the rear view mirror. This can be either a basic identification tag, or it can be a more complex smart-card which gives more enforcement options. The tags cost around US$30.

2. A tag to overhead beacon communication system.

3. Equipment overhead to detect the vehicle, capture the registration number, and classify the vehicle by length, height and width. This equipment includes an electronic camera to capture the registration number.

4. Roadside computers linked into a central database, so that both successful and unsuccessful tag reading can be notified to the central database. The information will also be able to distinguish between those which are unsuccessful because there was no tag and those where the tag is not functioning or perhaps where the tag has been tampered with in some way.

The central database can then arrange billing and draw attention to follow up on non-payment. To prevent a situation in which users with faulty tags are billed for payment evasion (and thereby perhaps alienated from using the system), the computer requires that cases of non-payment from non responding tag are checked before penalties are levied.
Typical equipment prices for different types of toll collecting lane are:

- Manual lane US$ 55,000
- Tag lane US$ 50,000
- Plaza computers US$ 10,000
- Control centre US$ 1,000,000