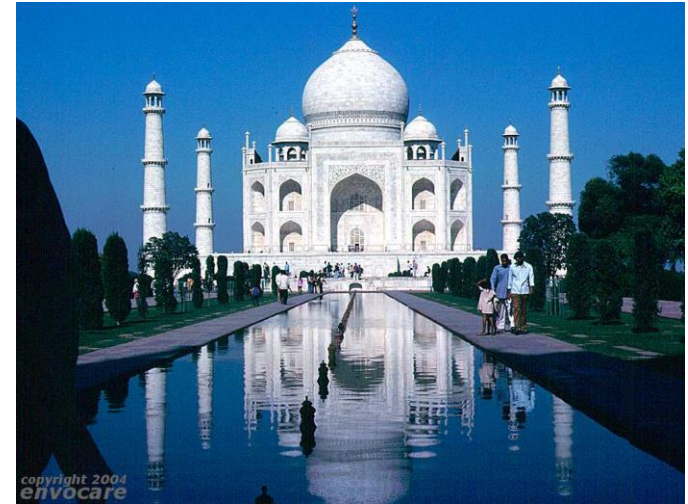


Cost effective tolling solutions India

Scott Stewart

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Group



Background

India

- Population: 1.2 billion
- Median Age 26
- GDP: \$1.3 trillion
- Growth 8% +
- GDP /capita \$3,400
- Urbanisation 30%
- Land sq kms 3.2 million

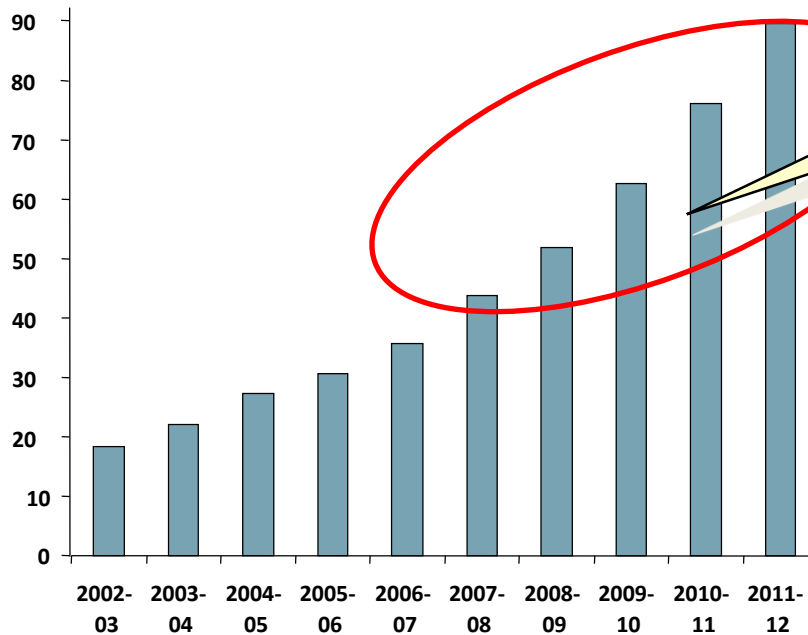
United States

- Population: 303 million
- Median Age 36
- GDP: \$14.6 trillion
- Growth 2.7%
- GDP /capita \$47,400
- Urbanisation 82%
- Land sq kms 9.1 million

Major transportation Infrastructure needs!

India – Infrastructure Req.

Infrastructure Spending (\$ billion)



Source: CMIE, Edelweiss, FICCI

Recent Investment in Infrastructure.

Majority of Infrastructure is through PPP's

India Highways Market

- National Highways and Major State Highways

- (NHAI)

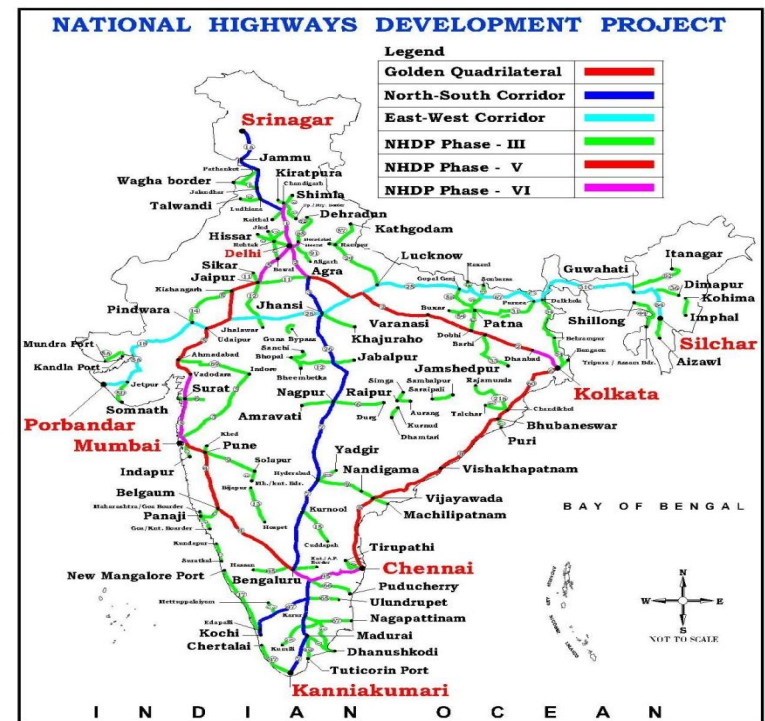
Network of 48,600 km

14,200 km upgraded to four lane

9,600 km under implementation

24,500 km to be awarded

- Continue with PPP – BOT &



The Concession Projects

- **Physical Characteristics**
 - 100 Kms
 - 4-6 lane highways
 - Construction as per International Standards
- **Concession Terms**
 - Build - Operate - Transfer (BOT)
 - 20 -30 years duration
- **Revenue -Tolling**
 - Concession company assumes financial risk (some government guarantees)
 - 1 toll plaza no closer that 50 kms
 - Typically toll Plazas are 10-12 lanes
- includes Highway Traffic Management Systems

Concessions

- No. of awarded **concessions** – 193
- Total investment – **US\$ 52 B**
- Projected growth of traffic – 12-15%

- Typical Concession period – 20 yrs
- **Toll** based on vehicle class (**length & type**) (e.g. Car – Rs 0.70 /Km or \$0.06/km)
- **Passes/Policies** to be supported

Daily Trips

Monthly passes

Discounted Trips for

Locals

Exempt users





Results





Results



Toll Challenges

- Concession incomes are dependent only on toll fee collection
- Vehicle class vs Vehicle type
 - No clear geometrical parameter defined
 - For **same vehicle** -- **Different classification** in different concessions
 - **New vehicle types** from growing automobile industry





Challenges

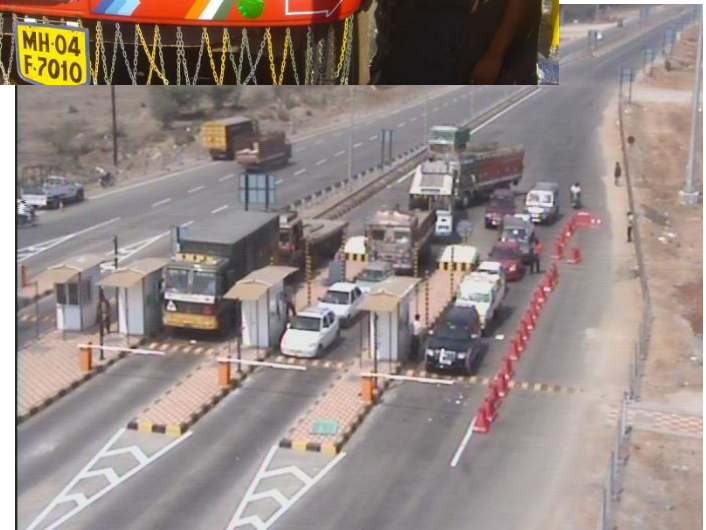


AP3 Temporary Toll System



Challenges

- *Labour is cheap*
 - *manual operations viable*
- *Concession companies want to minimize initial capital outlay*
 - *E.g. Cash register solutions*
- *Limited ETC deployment*
- **Leakage!!!**



Challenges

- Volumes
 - Rapid growth in demand
 - Project like Delhi Gurgaon have the highest traffic (close to **200,000 transactions** per day in a single plaza)– holds **world record in manual processing** (approx. 950 veh/hr)
 - *Handling of traffic volumes within acceptable processing time*
- **Leakage!!!**



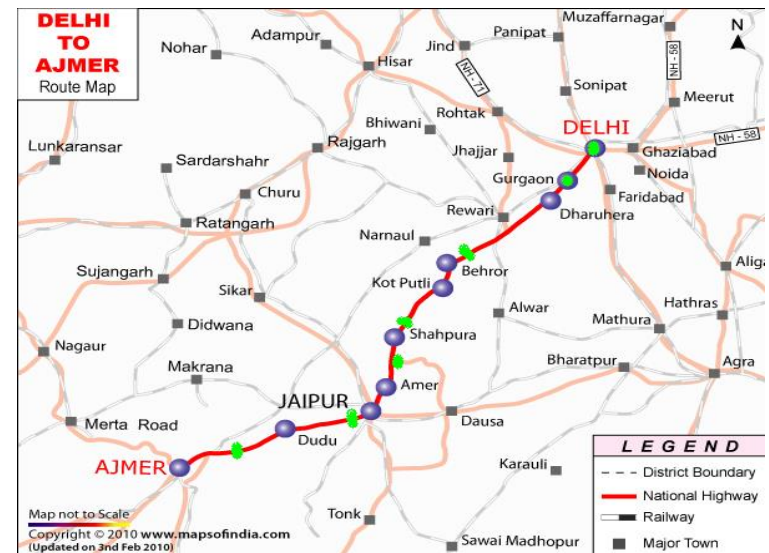
Upcoming Challenges/Opportunities

- **Growing no. of concessions**
 - Larger concessions e.g. 50-250 km recent concessions
- **Standalone toll plazas**
 - No central clearing house
 - No policies for pass sharing with nearby concessions
- **Potential for Effective ETC!**
- **Need Interoperability!**

E.g. Delhi – Ajmer (approx 350 km)

Total 7 Plazas

Three concessionaire



ETC ?

- **Critical Component**
 - Plaza operations
 - Deployments not government endorsed.
- **NHAI considered a number of transponder options**
 - Japanese, CEN
 - Was a long term review process
- **6C tag recently accepted**
 - Low cost
 - Now being deployed

ETC Challenges

Operational

- Cash Users in ETC lanes
 - reduces throughput

Back office Interoperability

- A priority with the accelerated concession program

Concessionaire perception

- In beginning
 - **Less capital intensive tolling** solutions
 - Use cheap labour
 - **Minimalist design**
- With more BOT concessions and experience
 - **Need of central reporting**
 - Need of a more secure and “**cost effective**” tolling system to reduce leakages

Cost Effective Toll Solutions

– Action?

System Design/Architecture

- **Systems + Operations**
 - jointly to address some – e.g. manually entering license plate instead of LPR
- Integrated AVC and TLC
- Lane **design/layout** to **save** equipment –
- **No self serve lanes**

Cost Effective Toll Solutions

Hardware

- Use of **local products** –
 - Servers, controllers,
- Improvement of available local products – signs
- Minimalist design
 - Local standards
 - » E.g. simple mounting arrangement
 - Local fabrication
- Design for harsh environment
- Minimal maintenance

Cost Effective Toll Solutions

Technology

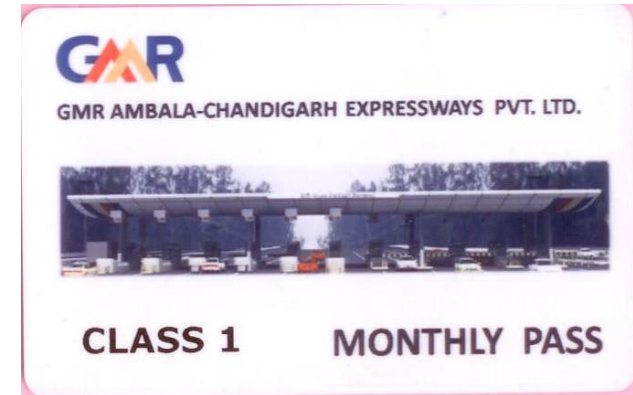
- Smart cards for dealing with passes/policies (very cost effective)
- **RFID** based solutions

Implementation

- **Local team**
- Extensive training of local team for on-going support

ETC

- 6 C



GMR Ambala Chandigarh Toll System



Conclusions

- Toll systems in India must be low cost but effective;
 - Cost of labour
 - Financial framework
 - Leakage
- Manual toll collection satisfies many current needs
- Future priorities
 - Expanded roll out of ETC
 - **Framework for Interoperability!**



Thank You

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