Policy, Operations and Technology Developments in ETC and ERP

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Agenda

- Company profile
- ITS Hong Kong
- Road User Charging: policy options
  - Urban and interurban tolling
  - Low emission zones
- Innovations
  - Policy
  - Operations
  - Technology
- Long-term trends: to 2050
- Summary and Conclusions

Company profile

- Hong Kong SAR based consultancy
- Systems design and operations strategy development
- Policy adviser to governments and transport authorities on Road User Charging (RUC) policies
- Advisor to asset managers and banks on tolling schemes
- Enforcement strategy development
- Expert witness services
- Training courses on plaza and ORT / MLFF design and operations

ITS Hong Hong (ITS-HK)

- Public and private sector members, including academics and consultants; contractors, suppliers and manufacturers
- Incorporated in 2000 to represents the HK SAR within the ITS field
- To provide a forum for the:
  - formulation of standards,
  - determination of user's requirements and solutions, and
  - examination of non-technical and institutional issues
- To encourage R&D of ITS technologies
- To advocate the importance and role of ITS to the general public and policy-makers

Road User Charging: policy options

- To provide access / new or upgraded infrastructure: toll roads
- Demand management / modal rebalancing:
  - Congestion charging and Electronic Road Pricing
  - Physical restrictive access zones
- Localised air quality improvements: low emission zones
- Usage-based taxation: truck tolling

…. *and many policy variants and complementary policies*

Road User Charging: urban and interurban tolling

To provide access / new or upgraded infrastructure: toll roads

> Tolled portion of TANFB routes, Taiwan
> Metro Manila Skyway (Manila, Philippines)
> Cross Harbour Tunnel (Hong Kong)
> Sydney Harbour Tunnel (Sydney, Australia)
> City Link and East Link (Melbourne, Australia)
> Costanera Norte (Santiago de Chile, Chile)

...and most of APAC countries, including Japan, China, Malaysia, South Korea and Indonesia.

Urban tolling

Cross Harbour Tunnel (northbound), HK

Interurban Multi-lane Free Flow (MLFF)

Fig: Oslo

Interurban Multi-lane Free Flow (MLFF)

Fig: R21 southbound, Pretoria, South Africa

Interurban Plaza-based tolling

Fig: Kuala Lumpur, Malaysia

Interurban plaza-based tolling: remove toll plazas

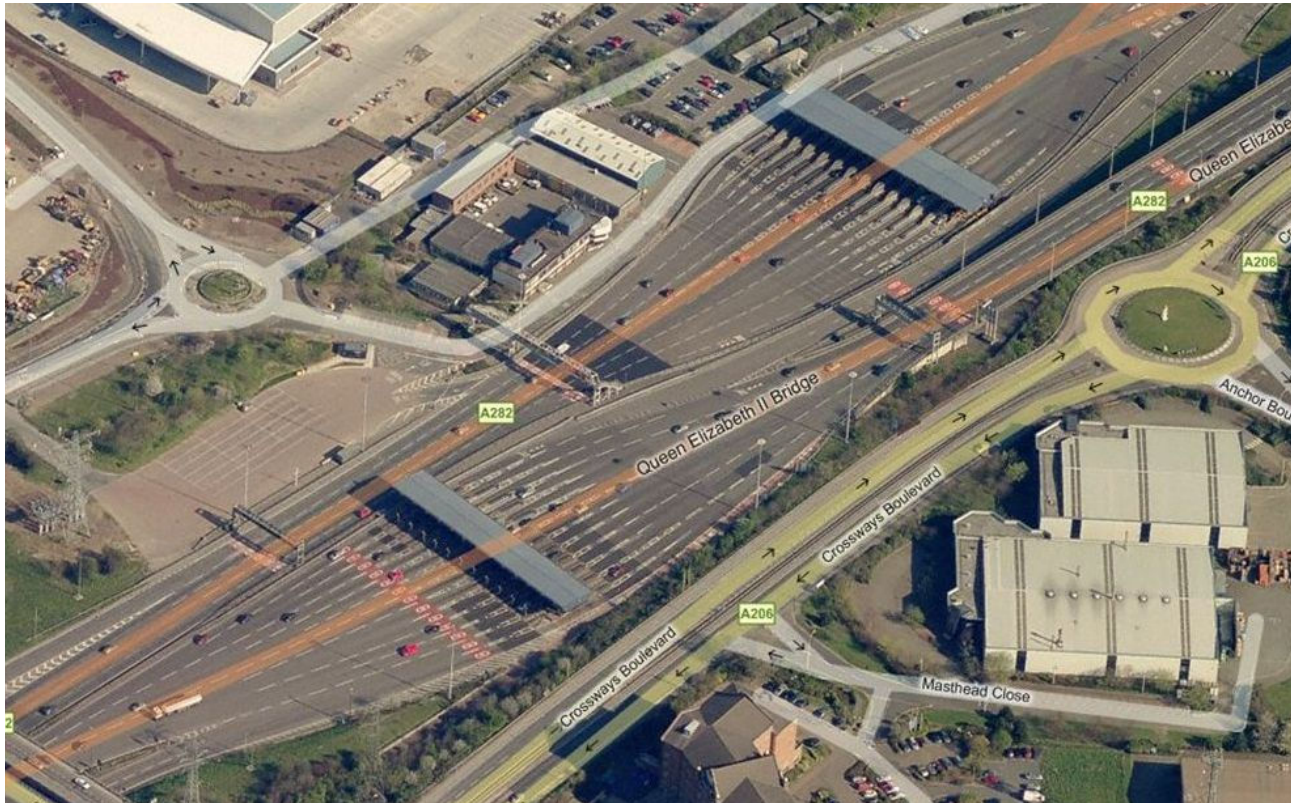


Fig: Dartford-Thurrock River Crossing, UK

Interurban plaza-based tolling: remove toll plazas

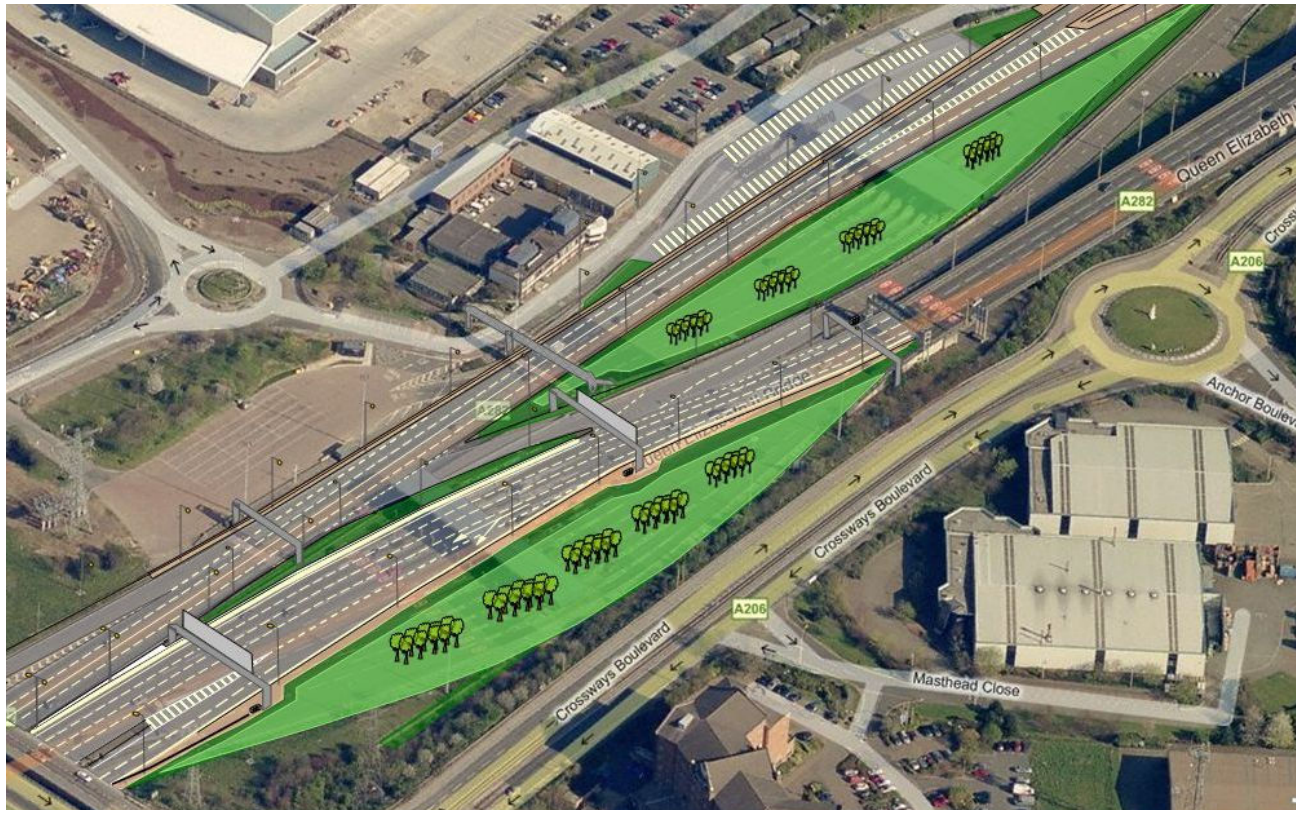


Fig: Dartford-Thurrock River Crossing, UK

Road User Charging: Urban congestion charging

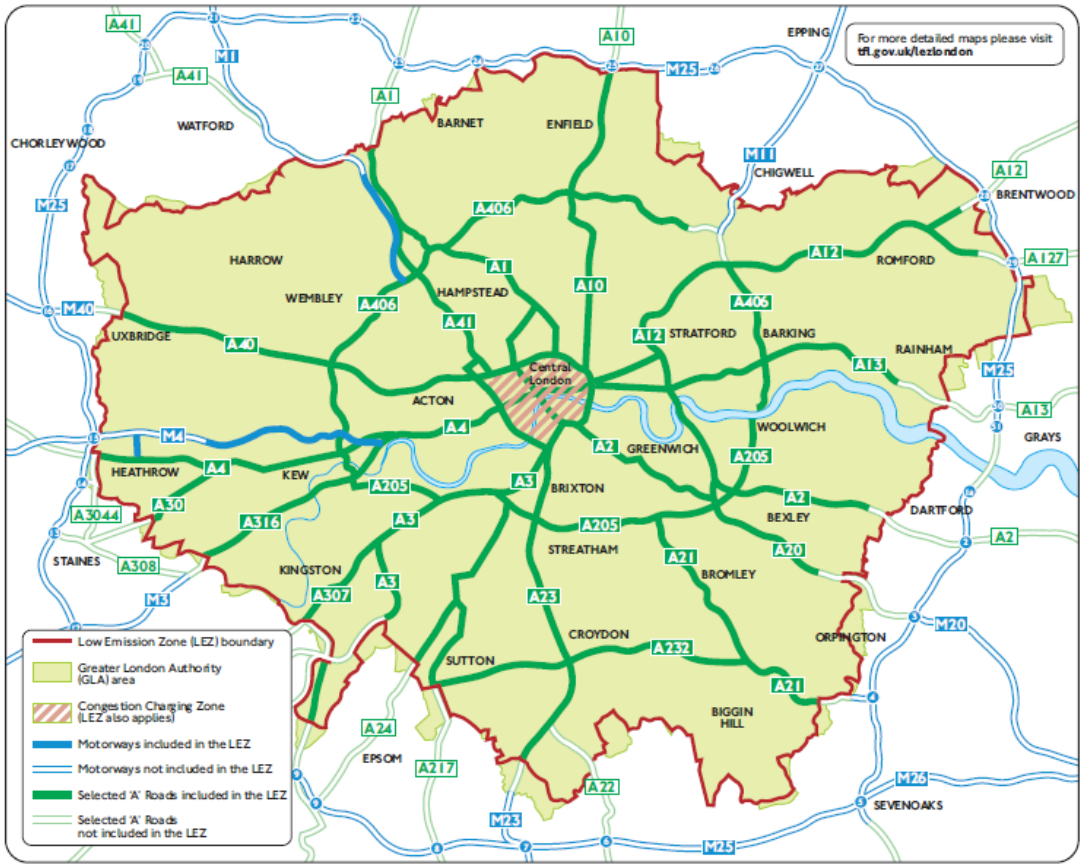
London congestion charging (entry point)

Emissions Reduction: Low Emission Zones

- A targeted vehicle access policy to improve air quality in a geographically defined area
- Benefits road users and non-road users
- Europe: 70 cities and towns, incl London, Stockholm(1), Milan and 47 *Umweltzones* (environmental zones) in Germany
- Tokyo: LEZ since 2003
- Soeul: car free days since 2007
- Hong Kong, trials relating to buses in 2013

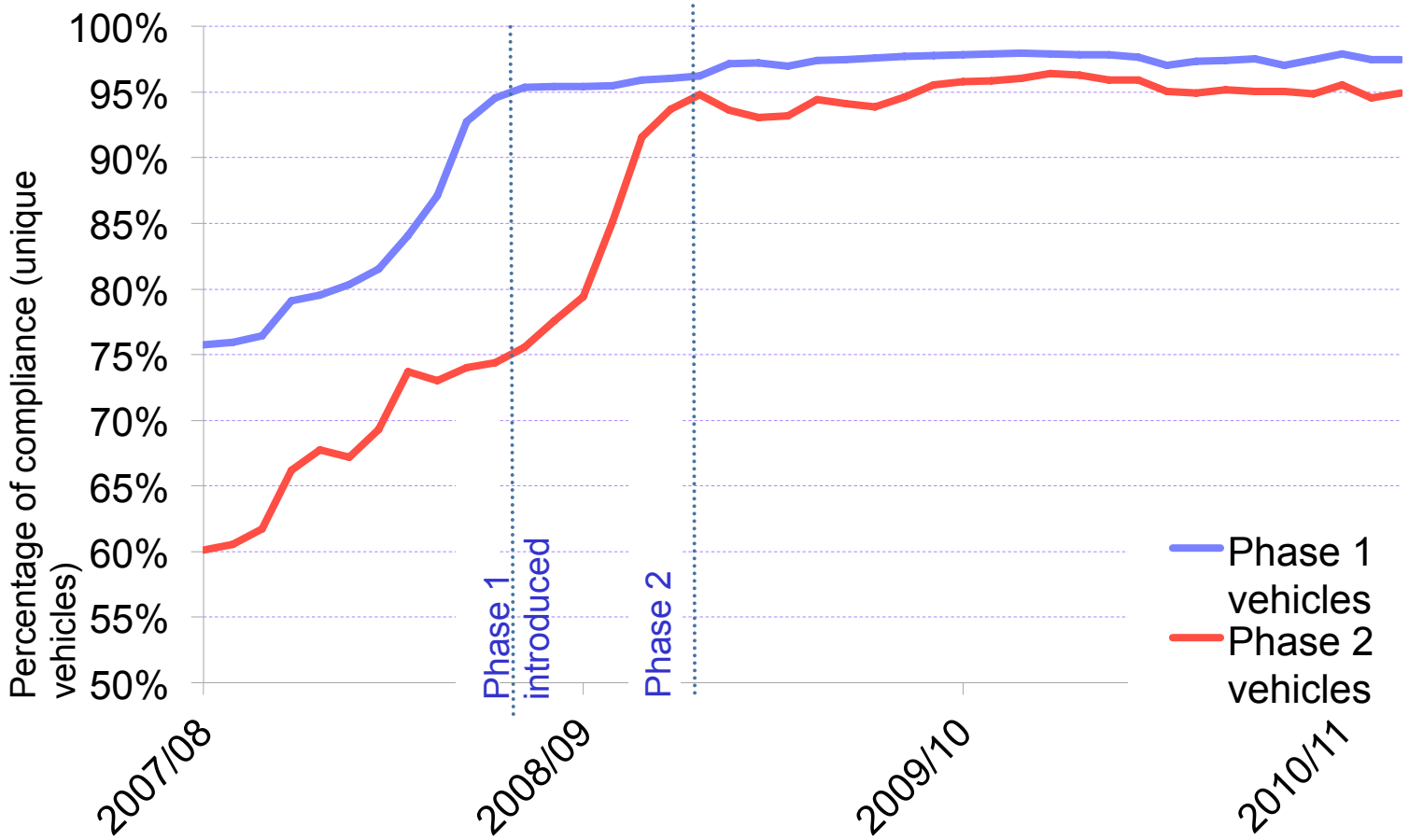
- (1) combined with general demand-based policy regime

Low Emission Zones: London



- 1580 sq kilometers
- Operates 24 hours every day
- Selective targeting
- Progressive introduction
- Pre-registration
- Enforcement using cameras

Low Emission Zones: London



Low Emission Zones: Seoul

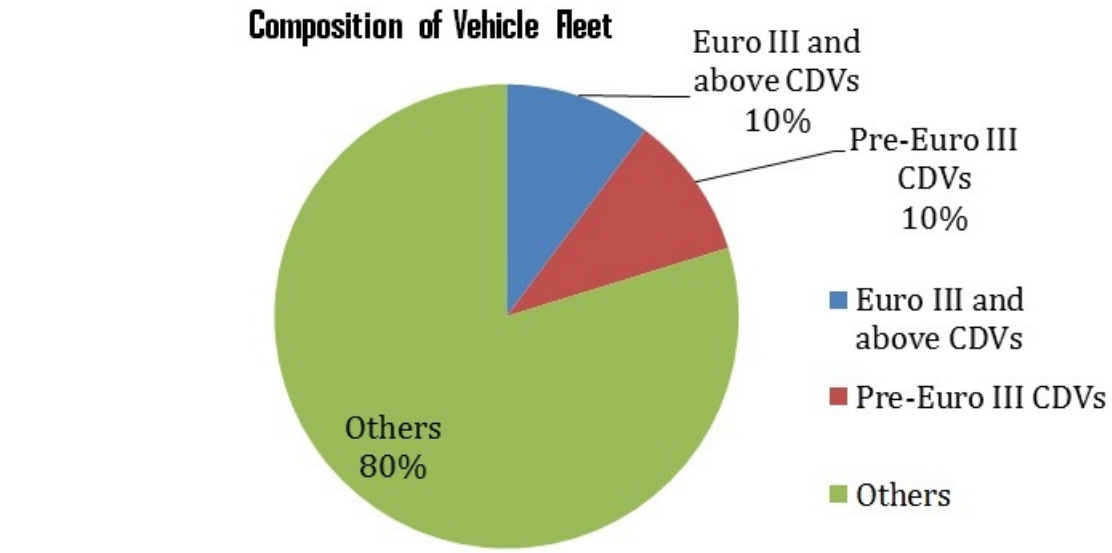
- Car-free days
- Reduced Co2 annually by 12%
- Reduced traffic volume by 7%
- Increase in operating speed of 13%
- US$600m savings in fuel cost
- Targets non-commercial vehicles
- Voluntary with incentives (discounts on fuel and public transport)
- 30% of eligible vehicles participate

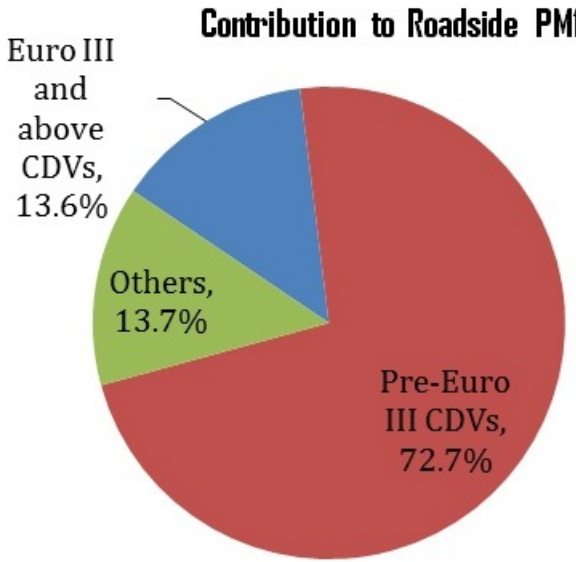
- Source: *UNEP: Reducing Emissions from Private Cars: Incentive Measures for behavioural change*

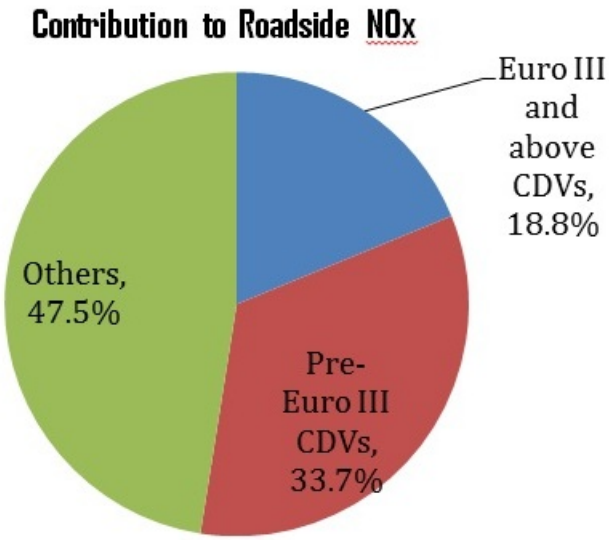
Low Emission Zones: Hong Kong

Pollution Sources	**SO_2**	**NOx**	**RSP**	**VOC**	**CO**
Public Electricity Generation	17,800	27,000	1,010	413	3,310
Road Transport	286	32,700	1,340	7,900	47,600
Navigation	16,900	35,000	2,260	3,660	11,400
Civil Aviation	299	4,350	54	396	2,530
Other Fuel Combustion	268	9,520	778	849	5,100
Non-combustion	N/A	N/A	898	20,500	N/A
Total Emission (Tonnes)	35,500	109,000	6,340	33,700	70,000

Low Emission Zones: Hong Kong







Innovations: policies

- Introduction of low emission zones – generally publicly acceptable
- Recognition that mix of policies and complementary measures needed (e.g. improve quality and scope of public transport)
- Move towards provision of roads as a regulated utility
- Link domestic emissions reduction targets to individual choice of mode and timing
- Meaningful, understandable policies that accommodate tolls, taxes and charges
- Replacement of fuel tax with distance-based charges

Innovations: operations

- Interoperability: one tag, one account, any road
- Multiple-payment channels to reduce effort and cost of payment for road use
- Efficient escalating penalty image-based enforcement regime
- Multiple charging ‘products’ customised for each user category
- Added-value services: parking guidance, lowest emissions routing, intermodal transfer assistance, etc.
- Incentive-based performance management to allocate operating risk to subcontractors

Innovations: technologies

- Improved, in-vehicle location measurement (GPS, Glonass, Galileo, Compass) enable time place distance (TDP) measurement in urban environments at greater accuracy
- Mobile information provision enables informed travellers at lower cost
- Improved maps enable improved location based services
- Improved petro engine technologies reduce emissions and fuel usage
- New micro-payment systems for lower cost and more secure payment for road services
- Telepresence to reduce need for travel

Long-term trends

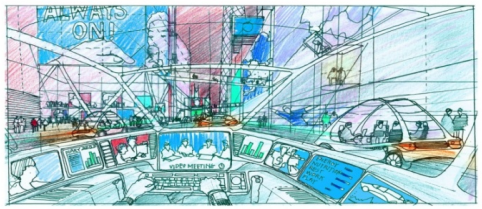
Long-term trends - to 2050

- Climate change
  - Increasing awareness and evidence of transport contribution
  - Respiratory health impacts
- Shortage of public sector funding
  - Increasing use of private sector funding
- Increasingly outdated fuel tax regime:
  - Improving fuel consumption of vehicles
  - Alternative non-petro propulsion methods
- Increasing congestion in urban environment:
  - GDP growth linked to traffic growth
  - Aspirational car ownership in developing countries
- Increasing use of nomadic technology and ITS

Accepting of intelligent infrastructure

Good Intentions

Perpetual Motion



High impact transport

Low impact transport

Tribal Trading

Urban Colonies

Resistant to intelligent infrastructure

Summary & Conclusions

- Broad array of policy options that fill the public sector funding gap and can equalise demand across modes
- Trends point towards a ‘user pays’ future
- Replacement of fuel tax towards distance-based charging, enabled by new in-vehicle technologies (reflecting Taiwan’s strength in telematics)
- Choose the future and decide how to get there

Thankyou!

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