



# Air Quality and Climate Benefits of Low-Carbon Sustainable Urban Transportation in the Kathmandu Valley, Nepal

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# Kathmandu Valley and Transport

**Population : 2.5 million and Growth rate: 4.3 % per annum** (CBS, 2011)

**Increased motorization :** Growth rate **12%** per annum, mostly private vehicles (DoTM, 2014)

**Traffic congestion: 46.2%** of the total nation's vehicles (DoTM, 2012/13)

**Heavy dependency on Fossil fuels:** Consume 60% of total petroleum product in Nepal (NRB, 2012)

**Highest share of GHGs and air pollutants Emissions** (Wecs,2010; Gautam,2006)

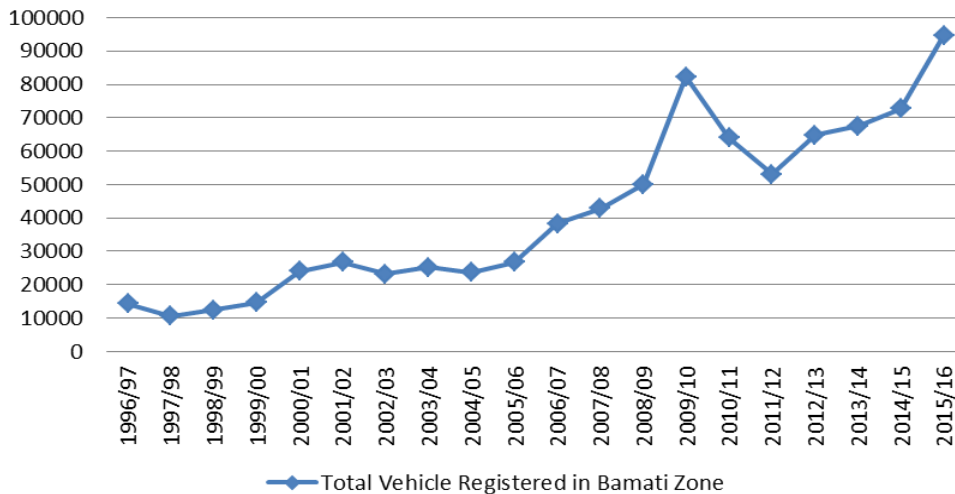
**Energy consumption:** Second highest (Wecs,2010)



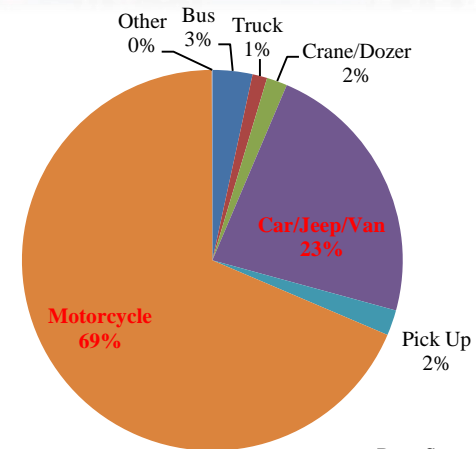
MAP OF KATHMANDU VALLEY  
*Traffic jam on a road in Kathmandu, November 2, 2016.*

*Photo: The Himalayan Times*

**Total Vehicle Registered in Bagmati Zone**



**Composition of Registered Vehicle in Bagmati Zone**



*Data Source: DOTM, 2015/16*

**Transport sector in developing phase:**



**Opportunities for transition into  
Low carbon sustainable transport (LCST)**

<b>Objective</b>	<b>Method</b>
To analyze the transport sector at Business as Usual and various Low Carbon Sustainable Transport Policy scenarios and associated emission in Kathmandu Valley	Scenario analysis using Long Range Energy Alternative Planning tool (LEAP) and use of recent emission inventory of Nepal (Sadavarte et. at., 2018)
To determine the most appropriate low carbon sustainable transport policy options for Kathmandu Valley	Policy review and Stakeholder Preference Survey: Delphi method

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“Developing a transport system that is **efficient, accessible, people-centric, affordable, reliable, safe, inclusive, environmental friendly, and climate and disaster resilient**” (National Sustainable Transport Strategy for Nepal, 2015).

“Economically viable infrastructure and operation that offers safe and secure access for both persons and goods whilst reducing short and long term negative impact on the local and global environment” (GEF-STLCT, 2010).



(Mueller et al, 1992)



These two aims can be realized by the so-called **“Avoid-Shift-Improve”** strategy

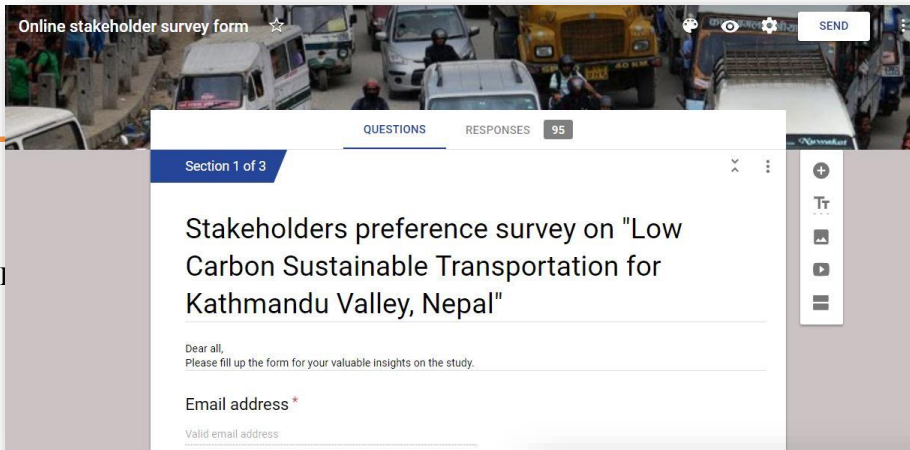
Tools	Examples
Planning instruments	Urban transport plans and regulations
Regulatory instruments	Weight restrictions, fuel standards, vehicle emission standards
Economic instruments	Vehicle and fuel taxes, road user charges, congestion charges and parking fees
Informative instruments	Awareness of alternative modes
Technology instruments	Development and inclusions of more efficient engines, fuels, vehicle design.

(Dalkmann and Brannigan, 2007)

## Two rounds of Survey with major stakeholders

1 Survey: Preference Survey

2 Survey: Judgement of first survey and further prioritization

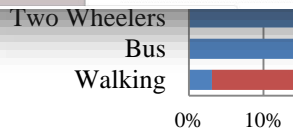
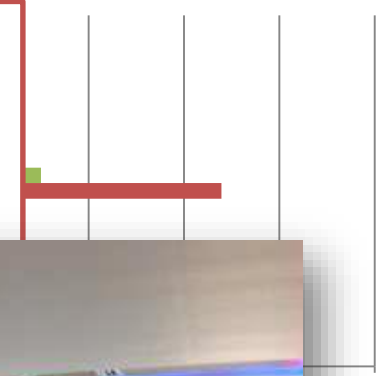


Review

### Satisfaction using transport modes

Current Transport

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- Long distance: more than 1 km
- Short distance: less than 1 km

- Long to medium distance: preference for cars
- Short distance: Walking
- Very few cycles and

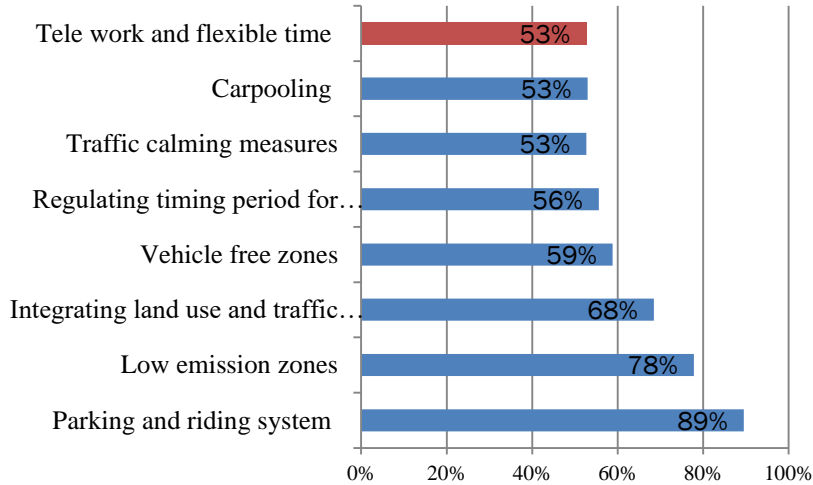


Participants at the 7th Kathmandu Sustainable Urban Mobility Forum

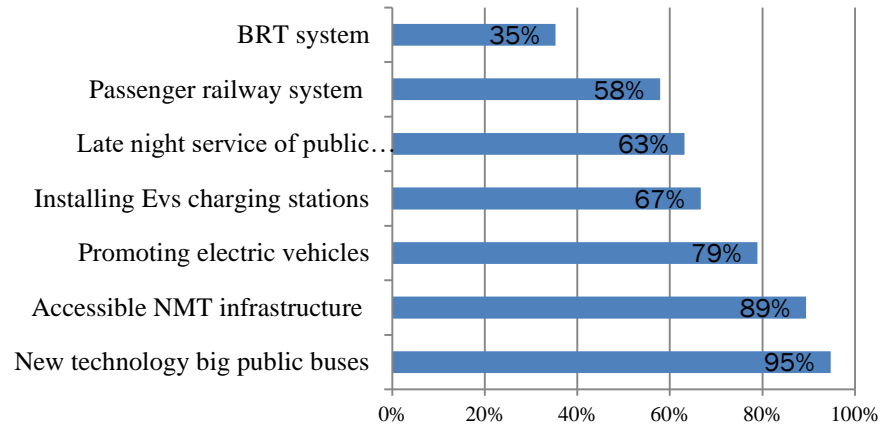


# Stakeholders preferences on various Avoid-Shift-Improve Policies

## Avoid/Reduce Policies



## Shift Policies



In all three strategies

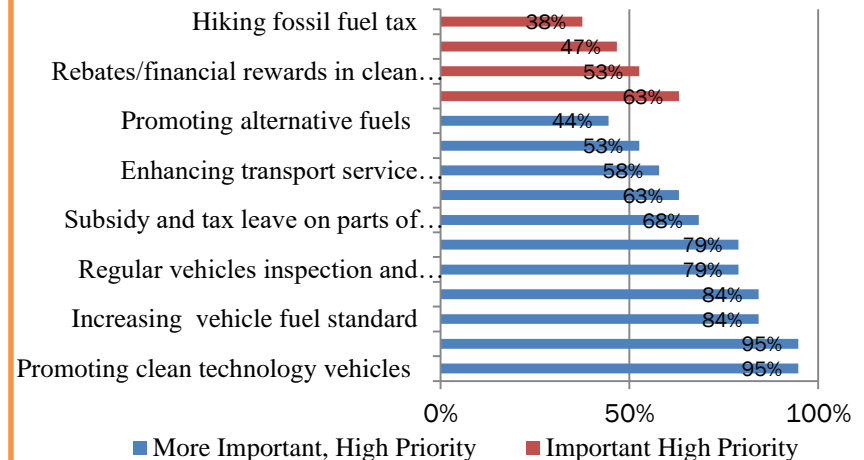
### ➤ High preferred policies:

cost effective policies related to improvisation of non motorized system, low emission zones, better mass transport options like BRT, Clean vehicles, regular vehicle inspection, fuel standard

### ➤ Less preferred policies:

economic polices like road pricing and parking charges and high budget projects like railways systems, cable car system

## Improve Policies

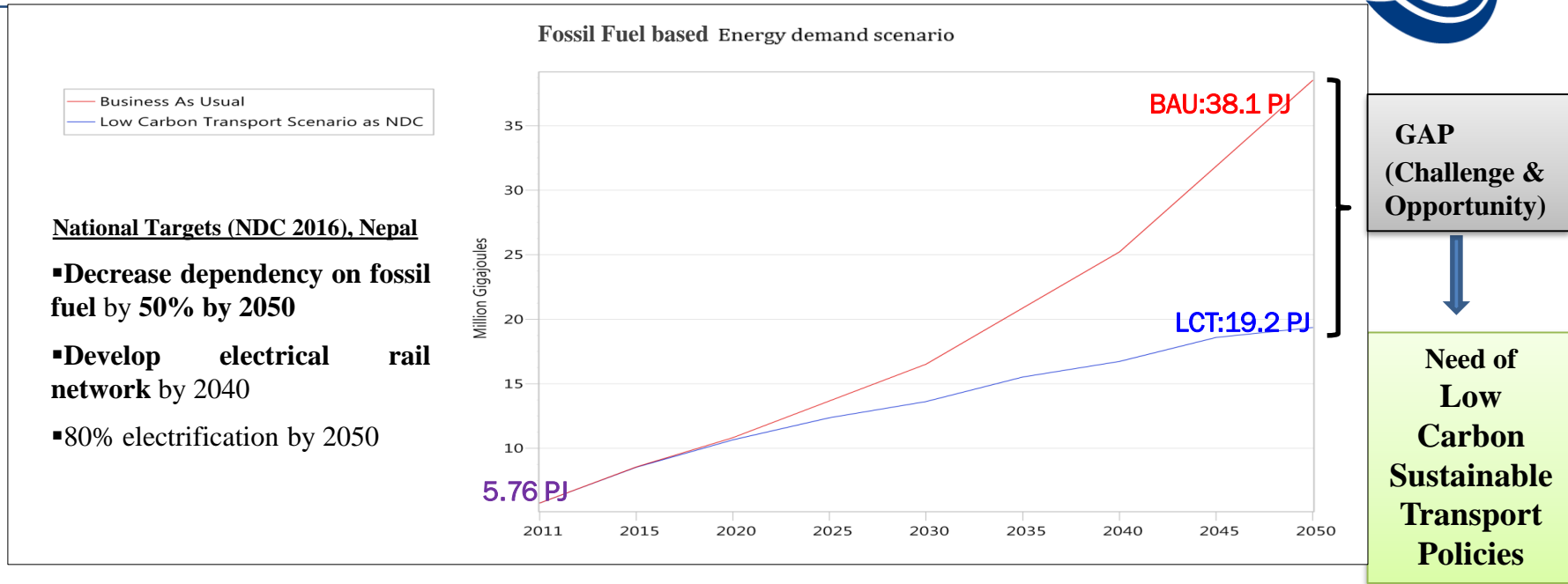


- Managing existing urban green islands and further enhancing it
- Prioritizing road safety in transport projects
- Considering disable friendly transport infrastructure
- Promoting research and development in transport
- Public consultation and awareness programs

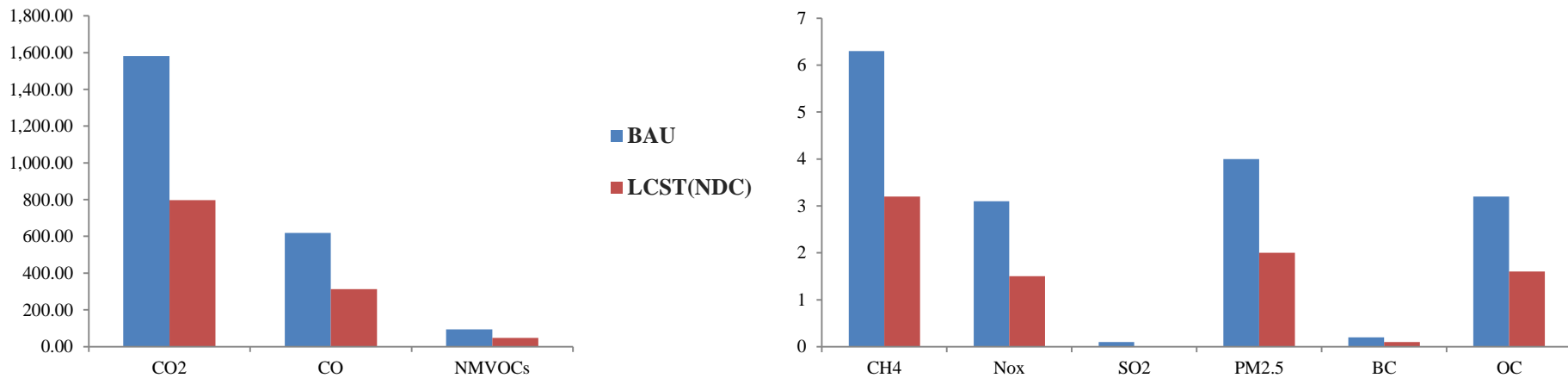
## Other Recommendations by Stakeholders

- ✓ **Retrofitting existing vehicles with the pollution control devices**
- ✓ **Provision of emission control measures in New Vehicles**
- ✓ **Strick implementation of traffic rules and regulations**
- ✓ **Implementation of new master plan on transport**
- ✓ **Improved co-ordination between various government agencies**
- ✓ **Adoption of actions from the government officials as a role model**

# Transport Energy and Emission Scenarios (BAU vs LCT)



## Emissions from Transport ( 1000't), 2050





## Next Steps

- Simulations of various policy options including NDC targets using LEAP model for the identification of appropriate options reducing travel demand, energy demand and emissions



# THANK YOU

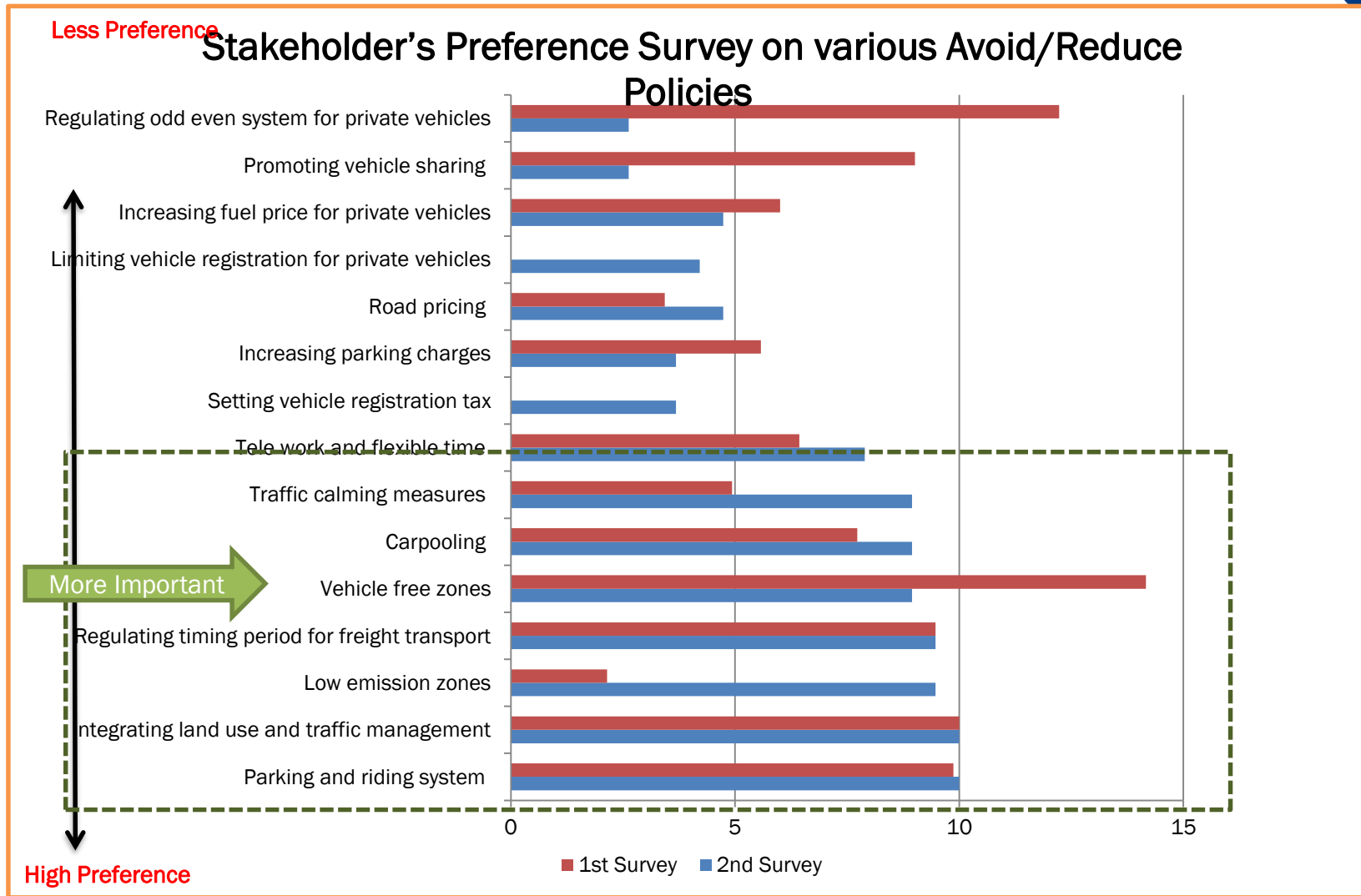
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- Extra slides

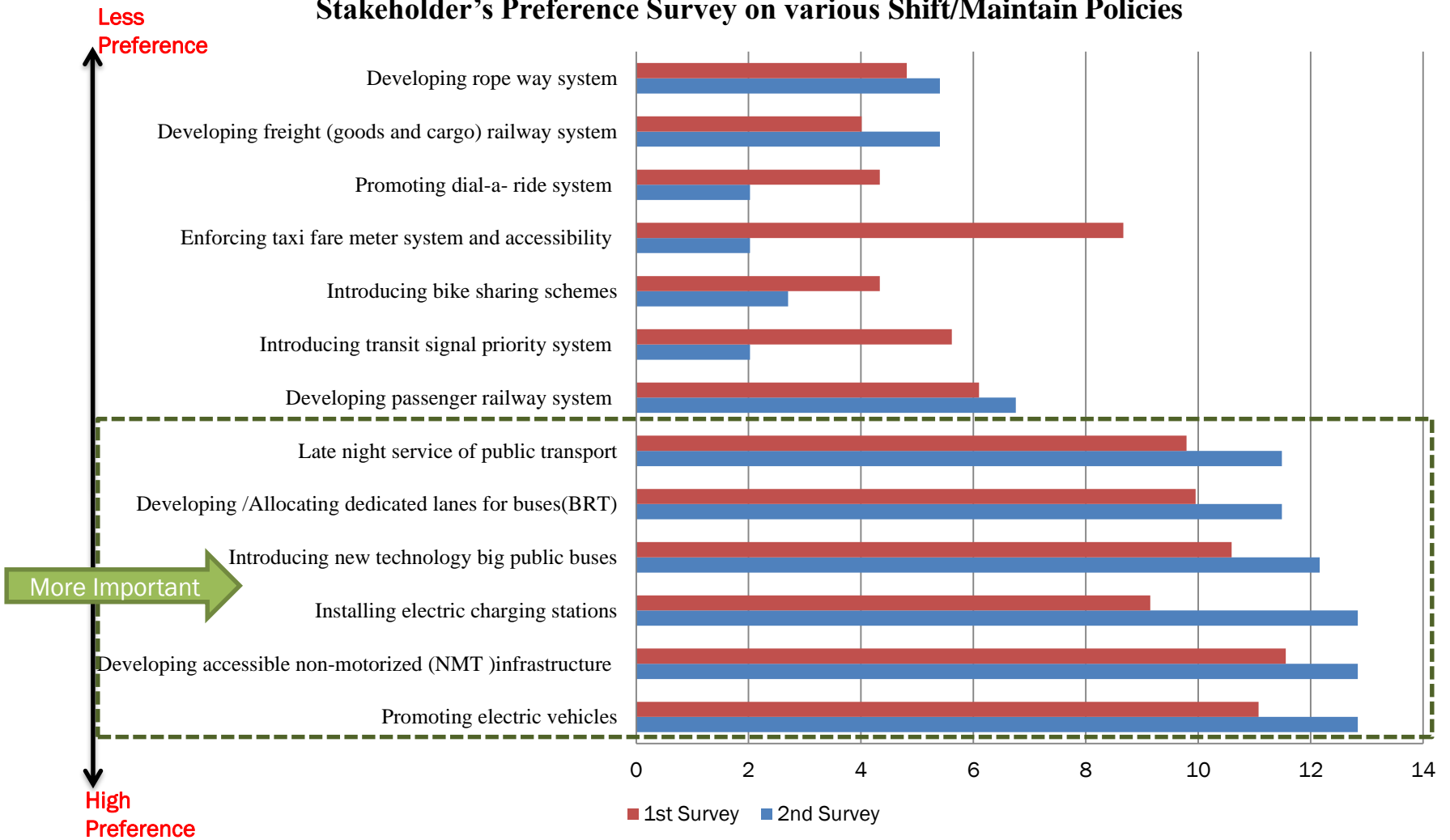
# Existing Transport Policies and regulations

Policies/Regulations	Ministry /Body
National Transport Policy 2001	Department of Road
Environment Friendly Transport Policy 2014	Ministry of Physical Infrastructure and Transport
Final draft of National Sustainable Transport Strategy, 2015	Ministry of Physical Infrastructure and Transport
Fourteen Three Year Plan 2016/17-2018/19	National Planning Commission
National Urban Development Strategy, 2017	Ministry of Urban Development
National Energy Strategy, 2013	Water and Energy Commission Secretariat
Climate Change Policy, 2011	Ministry of Environment
Bank Monetary Policy, 2017	Nepal Rastra Bank
National Ambient Air Quality Standards, 2012	Department of Environment

**Avoid/Reduce:** Effective travel demand management can help to improve traffic system efficiency by avoiding or reducing the need of travel.



### Stakeholder's Preference Survey on various Shift/Maintain Policies



**Improve:** Improving vehicle and fuel efficiency can help to increase energy efficiency of transport mode and vehicle technology.

### Stakeholder's Preference Survey on various Improve Policies

