

The Energy and Resources  
Institute



# Benefits of Cycling in India: An Economic, Environmental, and Social Assessment

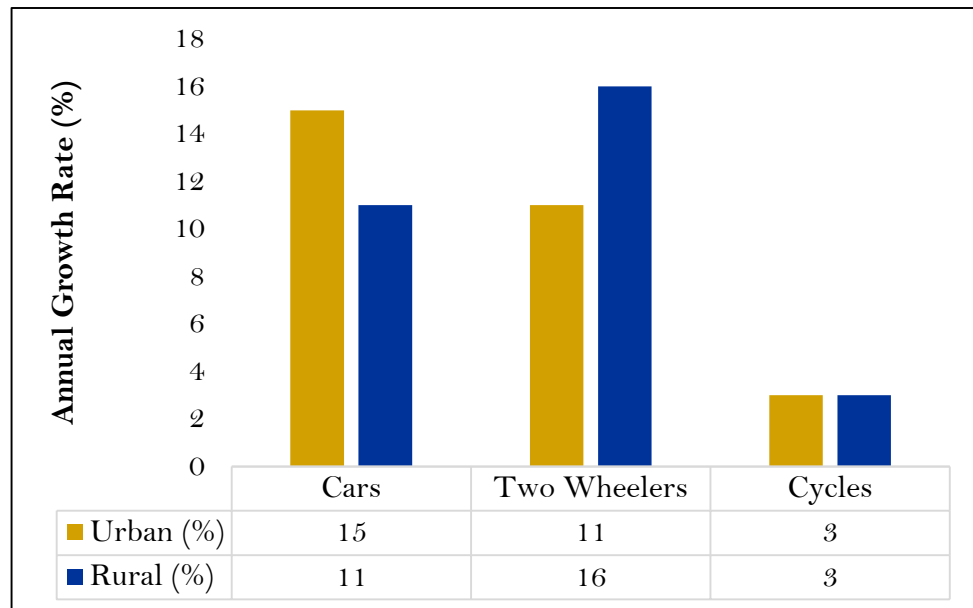
Study supported by  
**All India Cycle  
Manufacturers'  
Association  
(AICMA)**



January 11, 2019  
Report launch event,  
India Habitat Centre,  
New Delhi

# Increasing Private Vehicle Ownership

- Two-wheeler and car ownership increased at a CAGR of 10.1% between 2006 and 2016
- Two-wheelers account for 73.5% of the total registered vehicles fleet in the country
- Share of households owning cycle increased from 44% to only 45%



Between 2001-2011, household bicycle ownership increased at an annual average rate of 3% while ownership of two-wheelers and cars increased at a much higher rate



# Importance of Cycling for India



A sustainable mode of transport with zero emissions: *Need of the hour*

Can solve the problem of **congestion** and **increasing energy consumption**



An active mode of transport that promotes **healthy lifestyle**

Mode that provides **accessibility** and **supports livelihood**



Promotes **gender empowerment**

Addresses the issue of low female **school enrolment**



# Economising the Benefits: International Cases

## Bicycle Industry, EU-27 (2016)

- Increased sales of bicycles and cycling equipment can boost the growth of other related industries
- A doubling of bicycling mode share from 7.6% to 15.3% increased the retail turnover in EU-27 by more than €27 billion

## World Bicycle Relief (WBR) - Accessibility Improvements

- WBR, argues that the provision of bicycles increases student attendance and academic performance by 28% and 59%, respectively.
- It also increases the patient visits of healthcare workers by 45% and provides a safer mode of transport for women

## Cycle to Work Scheme, UK

- Started in 1999, the scheme has attracted 1 million workers till now
- Average work trip of 7 km
- Tax exemption benefits to employers to loan bicycles and safety equipment
- Annual CO<sub>2</sub> emission reduction of 0.13 MT ~ average annual CO<sub>2</sub> emissions of 24,000 households in the UK

## Portland, Oregon, USA (2011) Fuel Savings

- Three cycling mode share targets: 15%, 20%, 25%
- Four-wheeler trips < 3 miles
- Fuel Savings: \$143, \$180, \$218 million by 2040

## Netherlands (2013) Health Benefits

- 74 minutes of cycling per week can prevent 6,500 premature deaths
- Annual Savings of €19 billion with an investment of only €0.5 billion
- Benefits equivalent to 3% of country's GDP



# Analysis of Work Trips in India

- Analysis is based on 2011 census data on “Other Workers by Distance from Residence to Place of Work and Mode of Travel To Place of Work”
- The workforce data is projected for the year 2015-16 in order to obtain more recent estimates

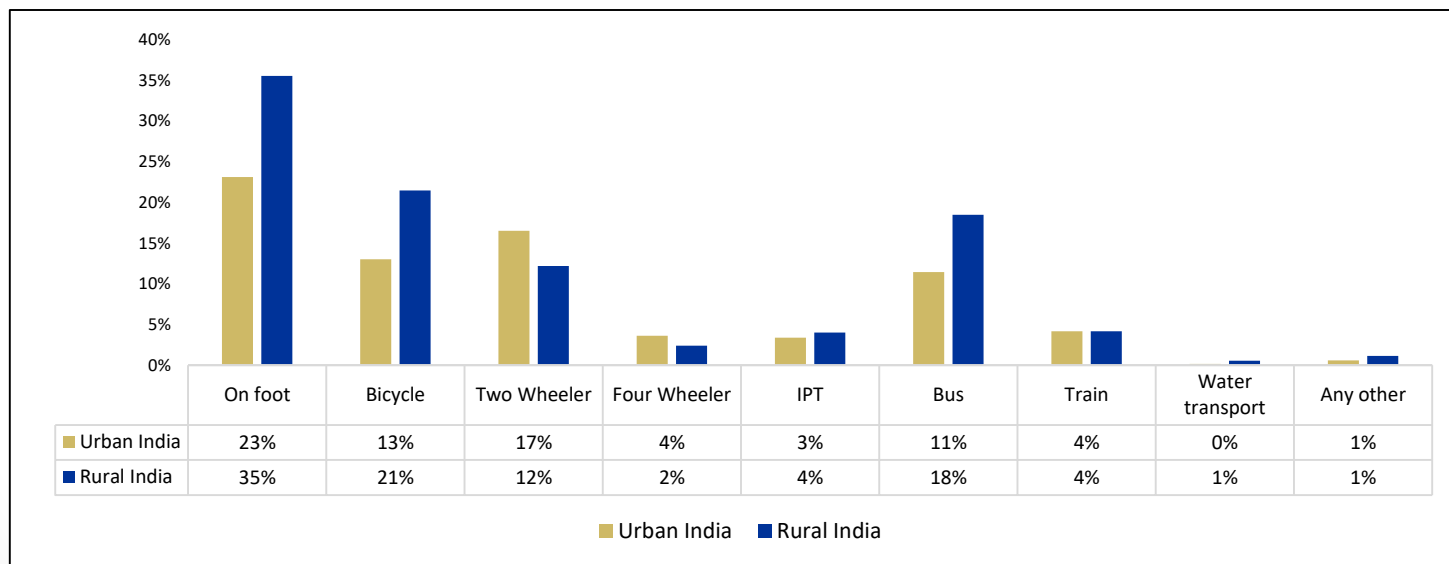
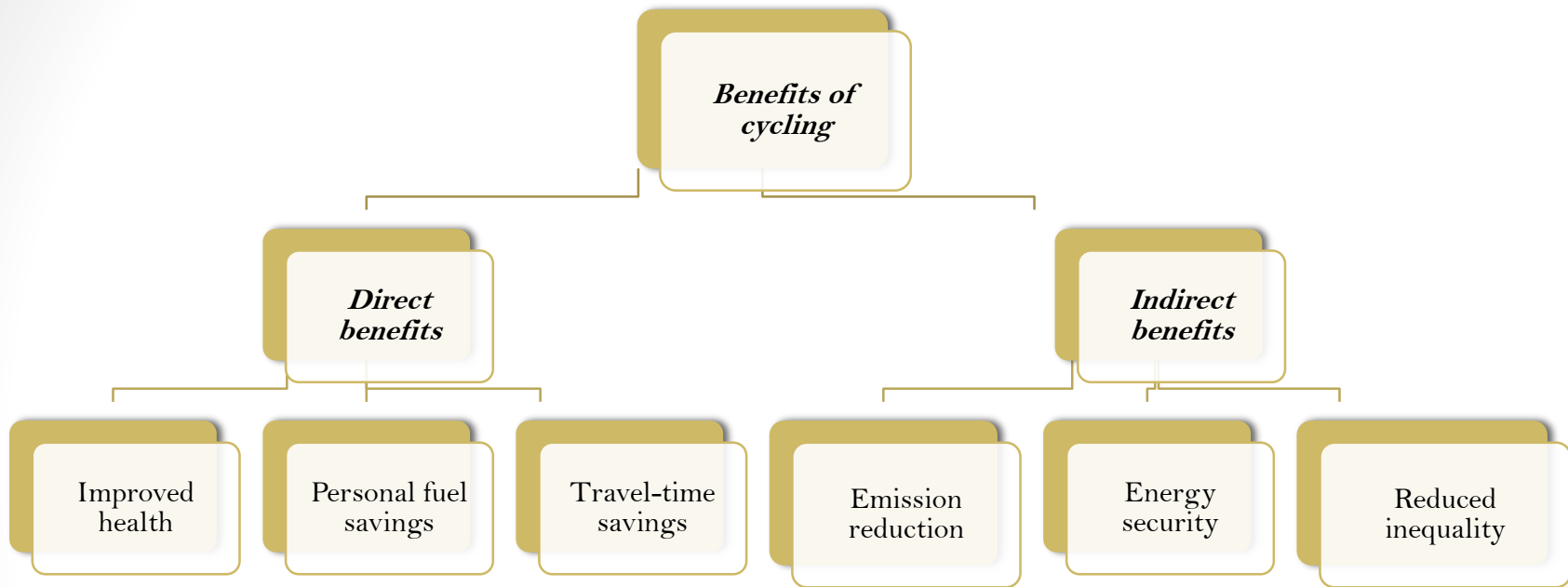


Figure : Share of Work Trips by Mode in Urban and Rural India (2016)



# Estimation of Benefits



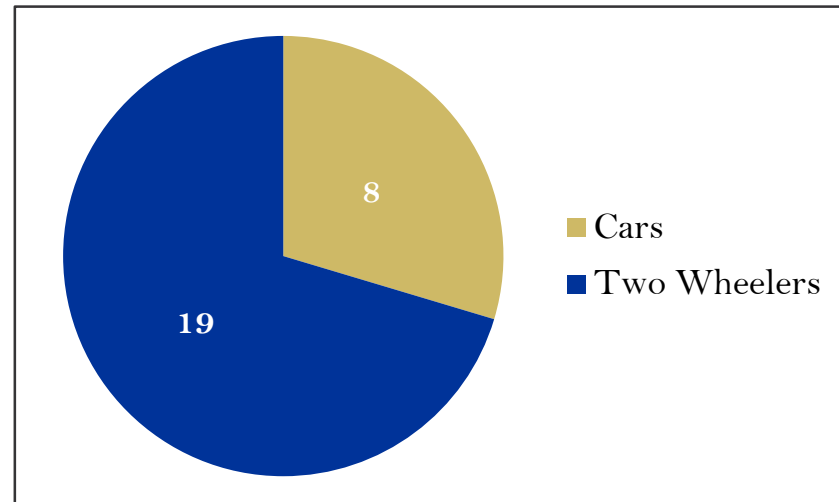
Substitution of short distance work trips presently being undertaken by two wheelers and four wheelers

Three scenarios of trip substitution:  
**50%, 75% & 100%**



# Personal Fuel Savings

- The composition and growth of India's vehicle fleet has transformed greatly in favour of private motorized vehicles
- Observed pace of motorization much higher in cities
- Predominantly powered by fossil fuels, the volatile and ever-rising prices of these fuels have steadily increased the operating costs



50% shift of short distance work trips could result in total fuel expenditure savings of INR 27 billion



# Health Benefits on Account of Increased Physical Activity

## Scenario 1

Number of Days Cycled	240	120	60
<b>Distance Categories</b>			
<8 km	4767	2384	1192
<3.5 km	2136	1068	534
<0.5 km	96	48	24

The table represents the present value of the total health savings accumulated over 10 years—that is, from 2016–26—if two trips are substituted across the distance categories and for the given number of days.

\*All figures are in INR billion

- Highly ambitious
- Moderately high
- Moderate
- Low
- Very low

## Scenario 2

Number of Days Cycled	240	120	60
<b>Distance Categories</b>			
<8 km	6408	3204	1602
<3.5 km	2871	1435	718
<0.5 km	129	65	32

The table represents the present value of the total health savings accumulated over 15 years—that is, from 2016–31—if two trips are substituted across the distance categories and for the given number of days.

\*All figures are in INR billion

- Highly ambitious
- Moderately high
- Moderate
- Low
- Very low

Figure : Present value of accumulated health benefits by 2026 and 2031

Source : TERI Analysis

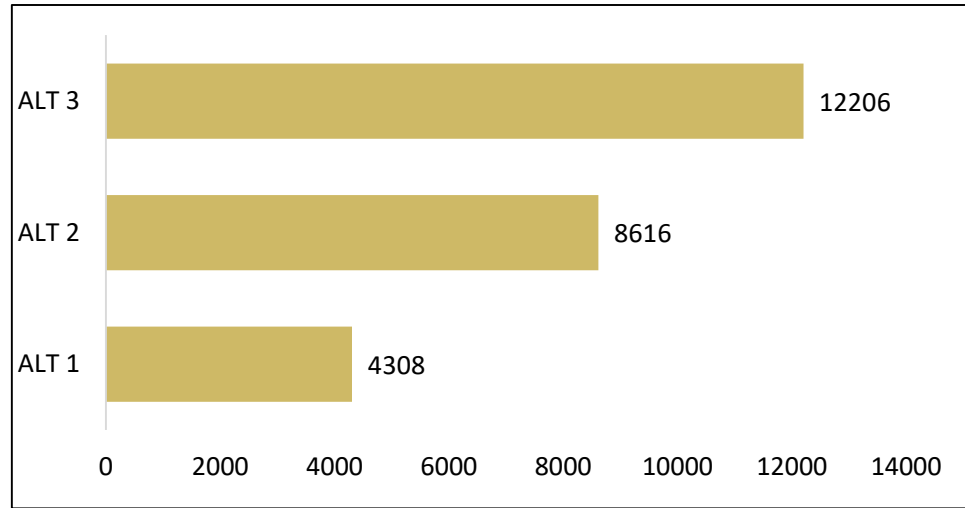
- Valuation of health benefits has been done using **WHO HEAT** tool.
- The tool assumes that the full benefits will be realised after a period of 5 years of continuous cycling
- Referring to the moderate scenario where individuals shift to cycling for an average distance of  $\leq 3.5$  km for 120 days in a year, the monetised benefits of increased physical activity translates into **0.9-1.3% of India's GDP for 2015-16**





# Health Benefits on Account of Reduced Air Pollution

Scenario*	Health Benefits from Reduction in Air Pollution (INR Billion)
ALT 1	120
ALT 2	241
ALT 3	341



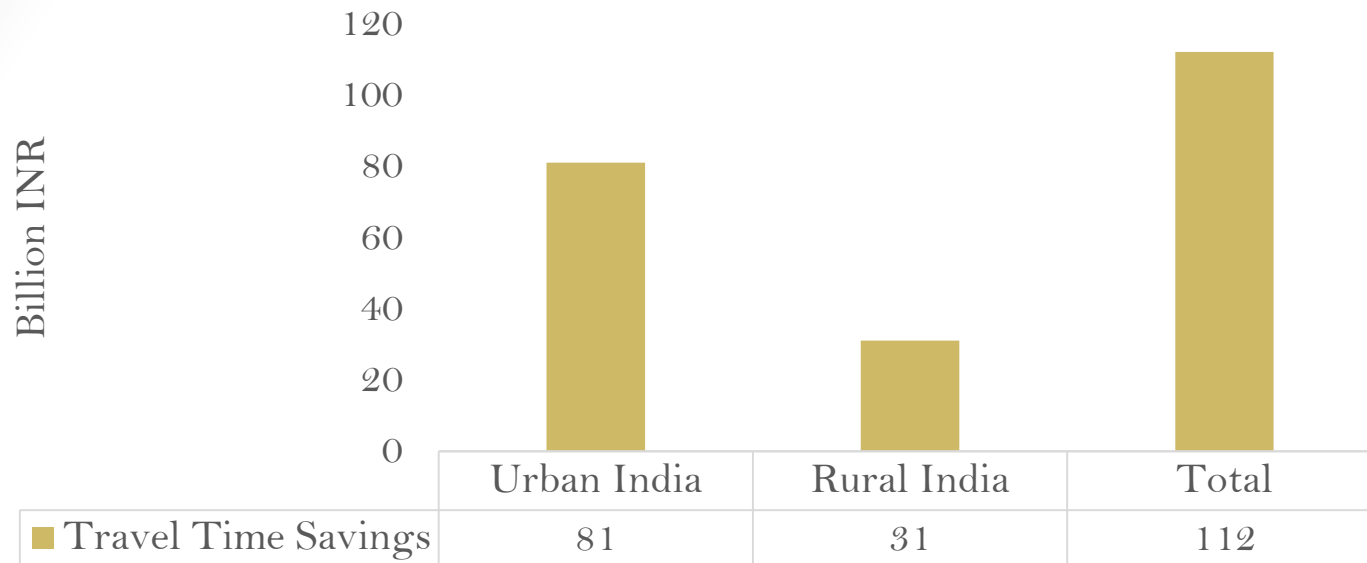
Reduction in mortality due to reduced air pollution

- In comparison to the BAU, a 50% increase in the bicycle PKM results in a reduction of premature deaths by 8618. This corresponds to an annual saving of INR 241 billion.

ALT 1-25% increase in bicycle PKM  
ALT 2- 50% increase in bicycle PKM  
ALT 3 -75% increase in bicycle PKM



# Value of Travel Time Savings



Source : TERI Analysis

- 31% and 26% of workforce undertakes an average work trip of 3.5 km and 8 km on foot
- It is estimated that the provision of bicycles to unskilled workers in India who walk to work for a distance greater than 3.5 km can result in an annual travel time savings worth INR 112 Billion.
- These savings are representative of the additional output that is produced in the economy as a result of increase in man hours, which amount to 23 Million added hours.



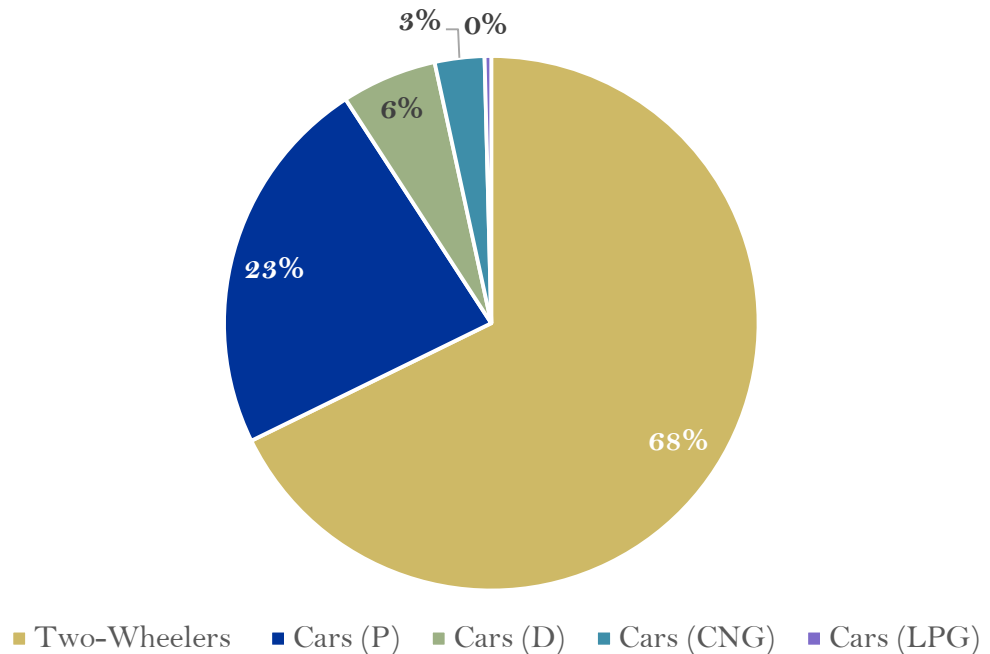
# Monetized Benefits

- **Cycling to work can lead to total benefits of INR 1.8 trillion. This amounts to 1.6% of India's GDP for the year 2015-16.**
- Health Benefits account for 87% of the total monetized benefits of cycling.
- Cycling also leads to benefits in terms of infrastructure savings, congestion reduction, road safety. However, these benefits have not been valued due to data unavailability.



# Energy Savings and Emissions Reduction

- In 2015-16, more than 50 million daily work trips up to an average distance of 8 km were undertaken by two-wheelers and cars
- As per the estimation, these trips accounted for 800 million litres of petrol consumption
- 75% of petrol being consumed by two-wheelers



Among private vehicles two-wheelers account for the highest share in total CO<sub>2</sub> emissions

**Energy Savings of 0.35 MTOE and 1 million tonnes of CO<sub>2</sub> emission reduction**



# Improving Bicycle Ownership among Low Income Households

1. Bicycle is an invaluable asset used for multifarious income generating activities
2. Cost-effective form of mobility
3. Positively impact the socio-economic condition of women

***Bicycle ownership still remains low in this segment, primary reasons being:***

- High price of Bicycles
- Lack of financing options

There is a need for making bicycles affordable by:

- ❑ **Reducing the GST on bicycles costing less than INR 5000 along with input tax credit**
- ❑ **Provision of micro-credit loans: Bicycles should be brought under priority-lending guidelines of RBI**



## Promoting Cycling among Choice Users

- ❑ **Increasing investment on cycling infrastructure**
  
- ❑ **Mandating investment on NMT for projects that seek to develop motorized and public transport infrastructure**
  
- ❑ **City-wide bicycle sharing schemes should be planned and supplemented with awareness campaigns**
  
- ❑ **Aforementioned measures should be supplemented by regulations on the use of private motorized vehicles:**
  - Congestion tax
  - Parking pricing
  - Pollution tax



## Initiatives by Government

- ❑ **Several state governments have initiated the bicycle distribution scheme in India**
  - Mukhyamantri Cycle Yojana introduced by Bihar govt has resulted in a 5% increase in the enrolment rate of girls in secondary school and a 25% reduction in the gender gap in enrolment
  - 3,423,004 cycles were distributed as a part of Sabooj Sathi scheme in West Bengal to the students of classes X and XII in order to increase access to higher secondary schools



# Initiatives by Government

## What more can be done?

### □ Development of Platform

To make cycling industry more globally competitive, initiatives should be taken to promote technology up gradation and indigenous production of advanced raw materials

### □ Mass Awareness Campaigns along with Cycle Sharing Schemes

The focus of the campaigns should be to highlight the economic, social, health, and environmental benefits of cycling and to change the perception of the bicycle as the poor person's mode of mobility and an unsafe mode of transport





**Thank You**

