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Comparative evaluation of alternate policy scenarios for the 3 case cities

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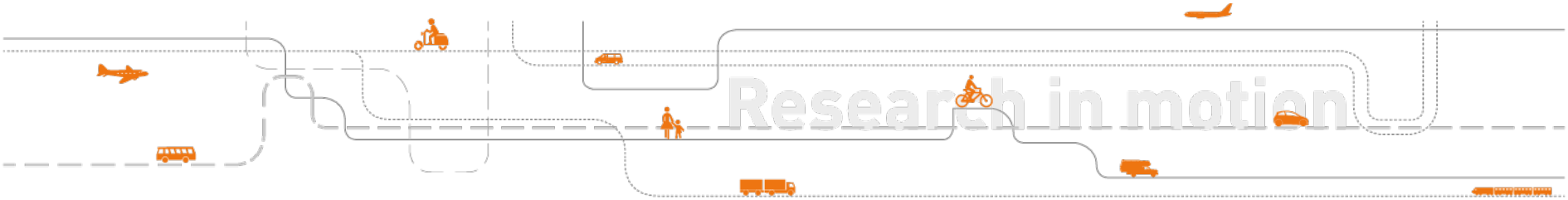


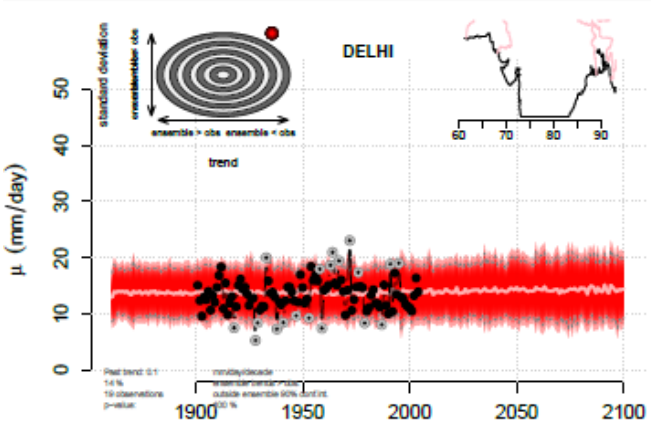
Outline

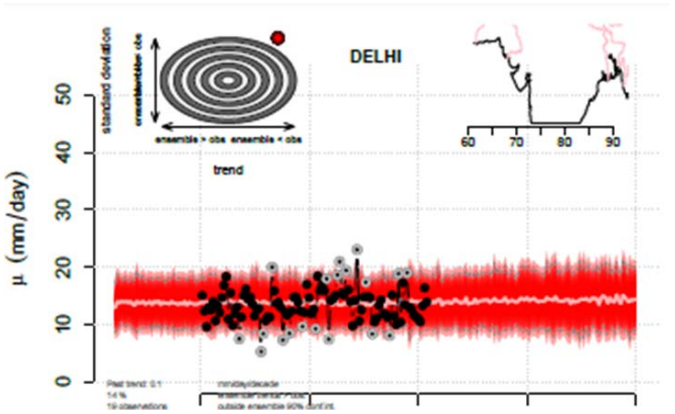
- Case city contexts
- Climate context and projections
- Framework for evaluation
- Policy packages for case cities
- Evaluation framework with focus on mitigation
- Comparisons of evaluation results with focus on:
  - *CO2 emissions*
  - *PM2.5 emissions*

Differences in case cities contexts

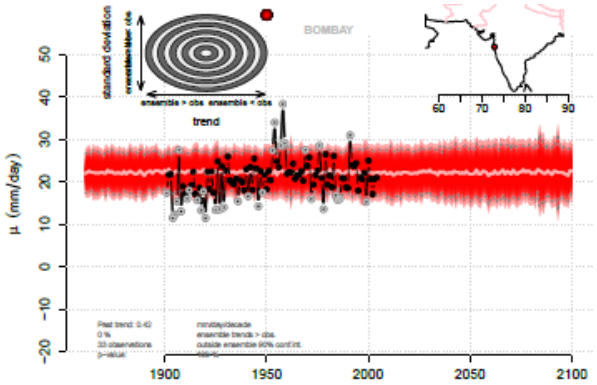
- Population and projections
- Economics and economic developments
- Transport infrastructure, land use and travel patterns
- Climate and projections of weather
- Extreme events and projections

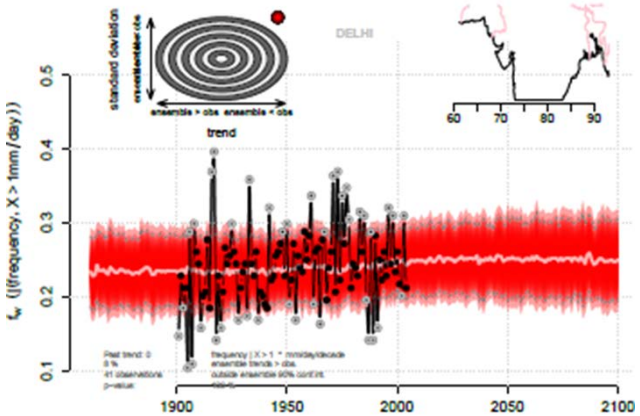
Extreme precipitation: Climate scenario RCP8.5



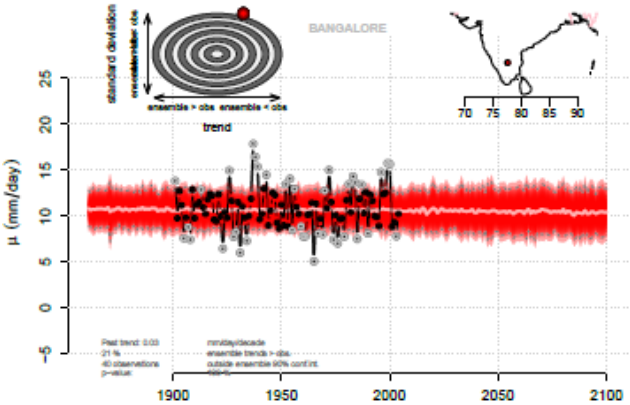


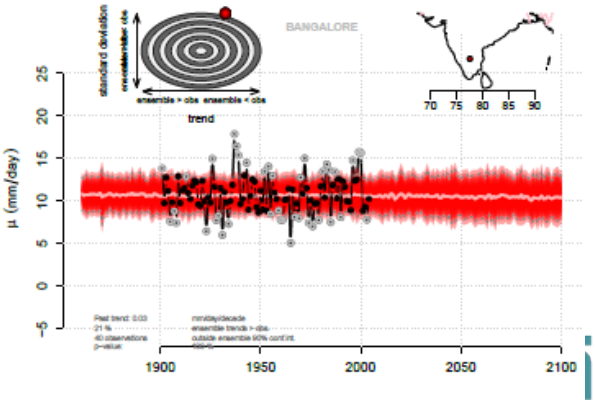
Delhi





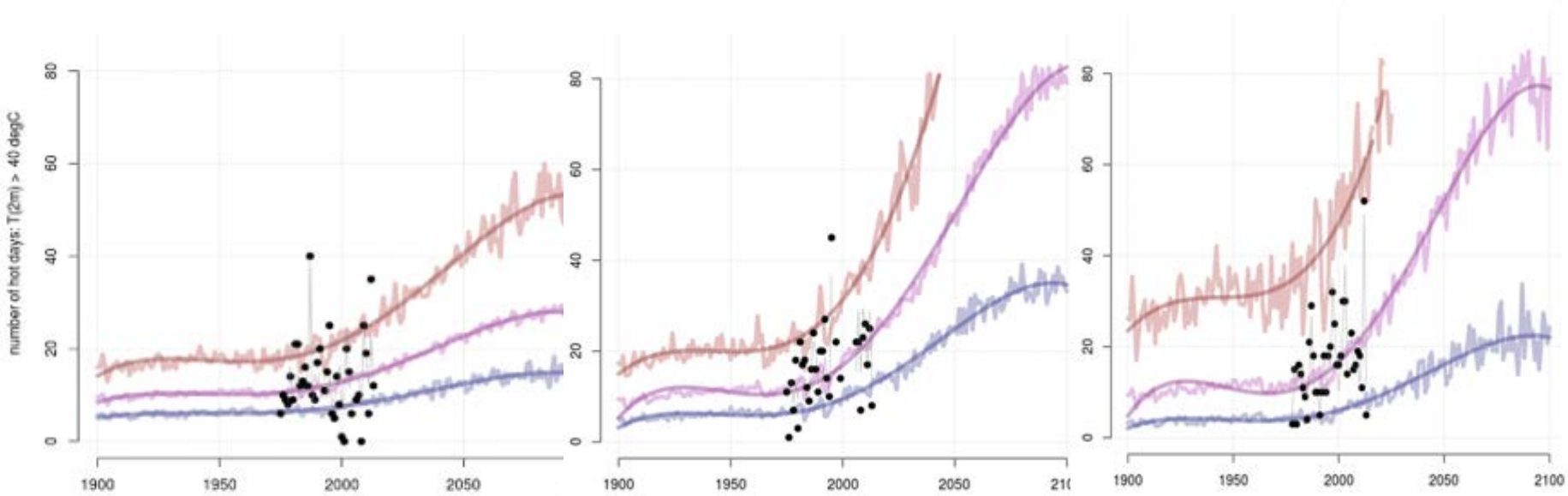
Mumbai





Bangalore

Analysis of «hot days»: Climate scenario RCP8.5



Bangalore

Mumbai

Delhi

Close match between the mean temperature and number of days above a certain threshold ("hot days"). The upper and lower curves represent typically hot and cold seasons (mostly inter-annual spread), whereas the middle curve is the ensemble mean.

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Framework for evaluation (1)

Benefits

- Mitigation CO2 emissions
- Reduction of local pollutants
- Health effects
  - $PM_{2.5}$
  - *Other local pollutants*
- Changes in travel pattern due to a policy package
  - *Decrease in traffic congestion*
  - *Time savings and losses*
  - *Increased health effect due to walking and cycling*
- Potential reductions in traffic injuries and fatalities
- Improvement in case cities livability
- Energy security: Reductions in fossil fuel consumption

Framework for evaluation (2)

Costs

- New infrastructure investments
  - *Cycling and walking*
  - *Public transport*
  - *Road infrastructure*
- Improvements in the existing transport infrastructure
- Other infrastructures: IT infrastructures, early warning systems, recharging infrastructure for El-vehicles,….
- Cost of financing of investments

Policy Packages adopted in the 3 case cities

The selected policy packages differ in the 3 case cities due to:

- *Case city context*
- *Master transport plans*
- *Consultation with Stakeholders in workshops*
- *Delphi study among city and national stakeholders*

The policy packages selected for each city are hence more realistic for the horizon years

We consider these differences to be a strength of the study

Delhi: Policy packages for mitigation

3+2 Policy packages:

- **Policy package 1:**
  Planning: Increase in Transit Network + Transport Oriented Development (TOD)

- **Policy package 2:**
  Travel Demand Management: Congestion + Fuel + Car Share

- **Policy package 3:**
  Technology adaptation: BAU with Electric Mobility

- **Combination of Policy packages:**
  - Planning Policy with Electric Mobility
  - TDM with Electric Mobility

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Mumbai: Policy packages for mitigation:

2 + 2 Policy packages:

- **Policy package 1:**
  - *BAU + Policy 3+ Policy 4*
  - *3. Transport Infrastructure Development*
  - *4. Travel Demand Management*
  - ***Policy package 1 w/electric mobility***

- **Policy package 2:**
  - *Policy 2 + Policy 3+ Policy 4*
  - *2. Draft Mumbai Metropolitan Regional Plan 2016-36 scenario*
  - *3. Transport Infrastructure Development*
  - *4. Travel Demand Management*
  - ***Policy package 2 w/electric mobility***

Bangalore: Policy packages for mitigation

3 +1 Policy packages:

- **Policy package 1:**
  - *Increasing network coverage of Public Transit +*
  - *Cycling and walking infrastructure +*
  - *Additional tax on purchasing vehicles*
- **Policy package 2 :**
  - *Additional tax on purchasing vehicles +*
  - *Strict Vehicles inspection/ Improvement in standards for vehicle emission +*
  - *Increase in fuel cost*
- **Policy package 3:**
  - *Increasing network coverage of Public Transit +*
  - *Defining car restricted zones +*
  - *Congestion Pricing +*
  - *Park and Ride +*
  - *Cycling and Walking infrastructure +*
  - *Encouraging car-pooling and High Occupancy Lanes +*
  - *High density mix building use along main transport corridors*
- **Policy package 4:**
  - *Policy packages 1-3 w/electric vehicles*

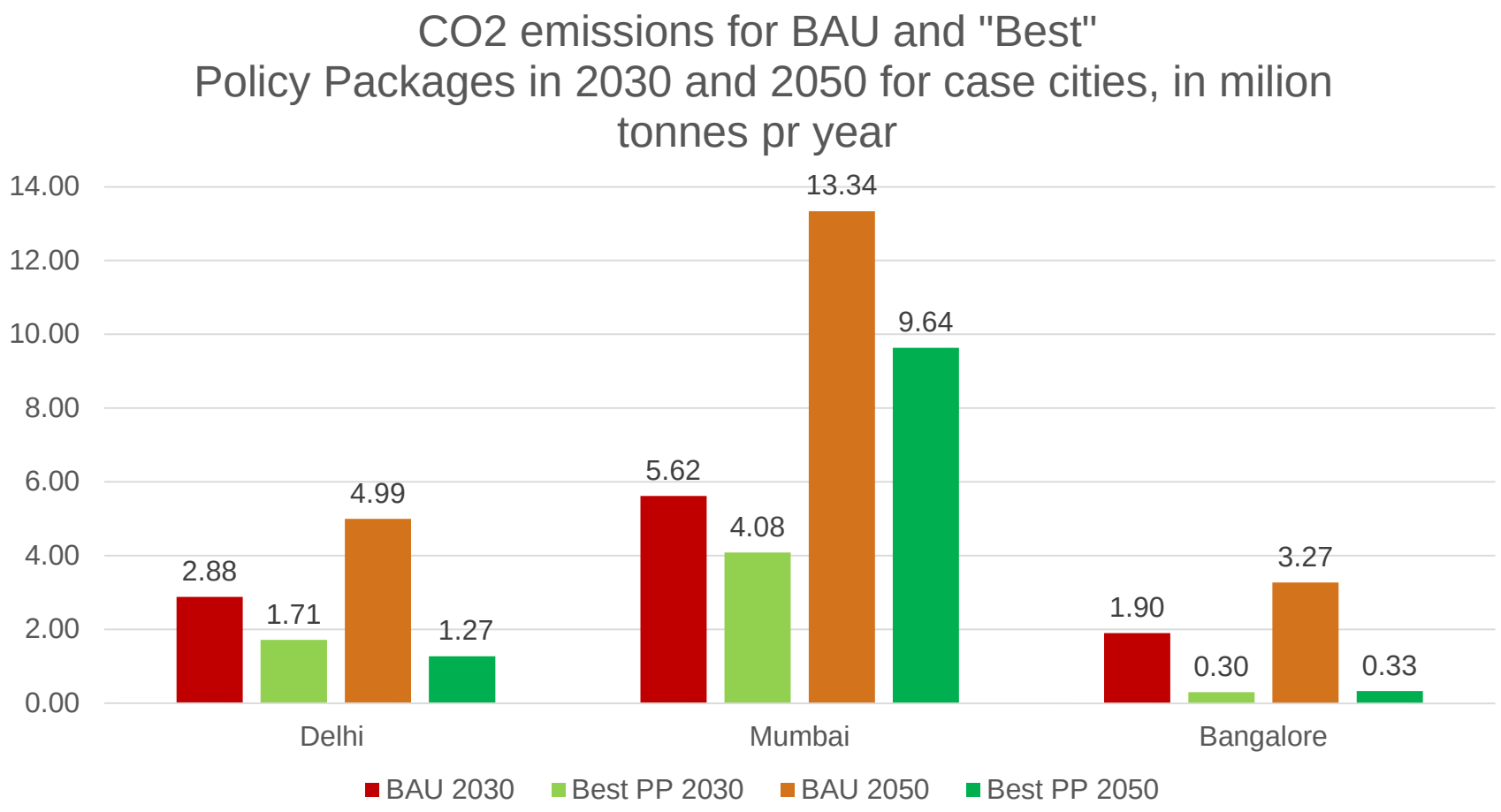
Focus on CO2 and PM2.5 emissions

In this presentation we focus on:

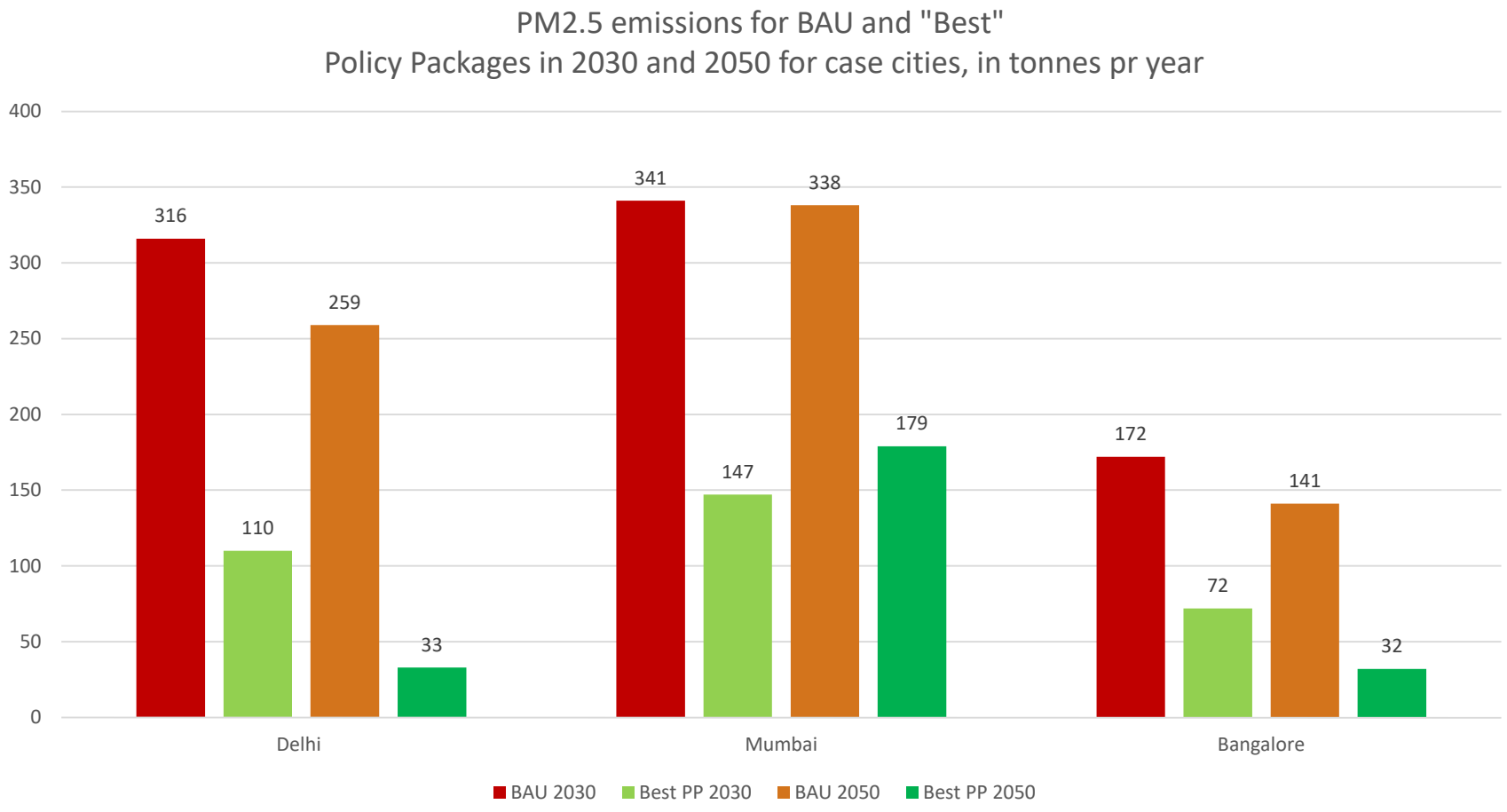
- *C02 emissions*
- *Health effects (mainly mortalities due to PM2.5)*

PM2.5 is the most important pollutant for health effects

CO2 emissions with BAU and “Best” Policy Bundles



PM2.5 emissions with BAU and “Best” Policy Bundles



Thank you for your attention!

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