



# BD2050 Modelling GDP and population

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**Monjur Mourshed**

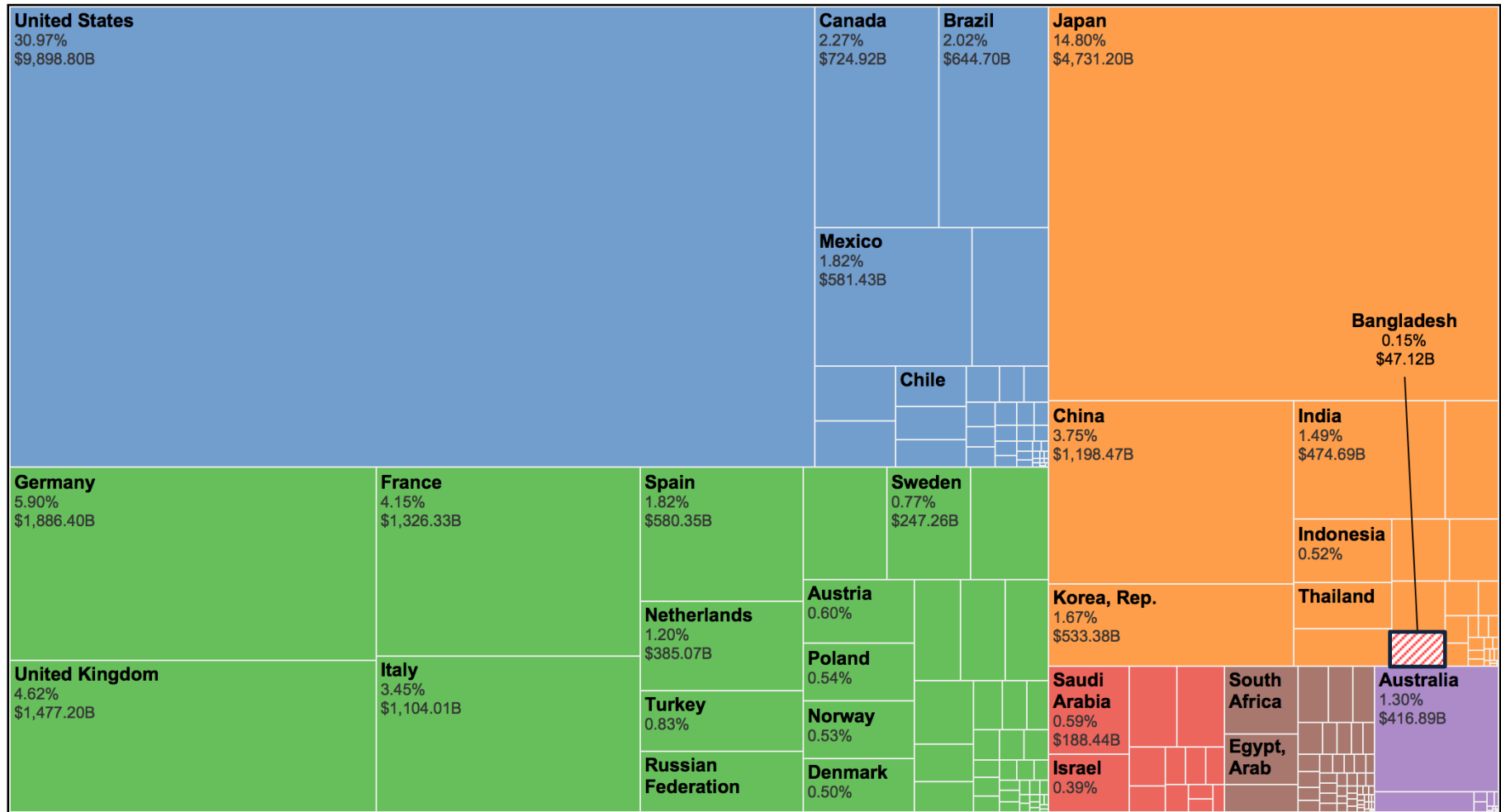
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A large stack of colorful shipping containers in various colors (red, blue, green, yellow) with the word 'GDP' overlaid in large white letters. The containers are stacked in a grid-like pattern, showing different brands and sizes. The word 'GDP' is prominently displayed in the center-left area of the image.

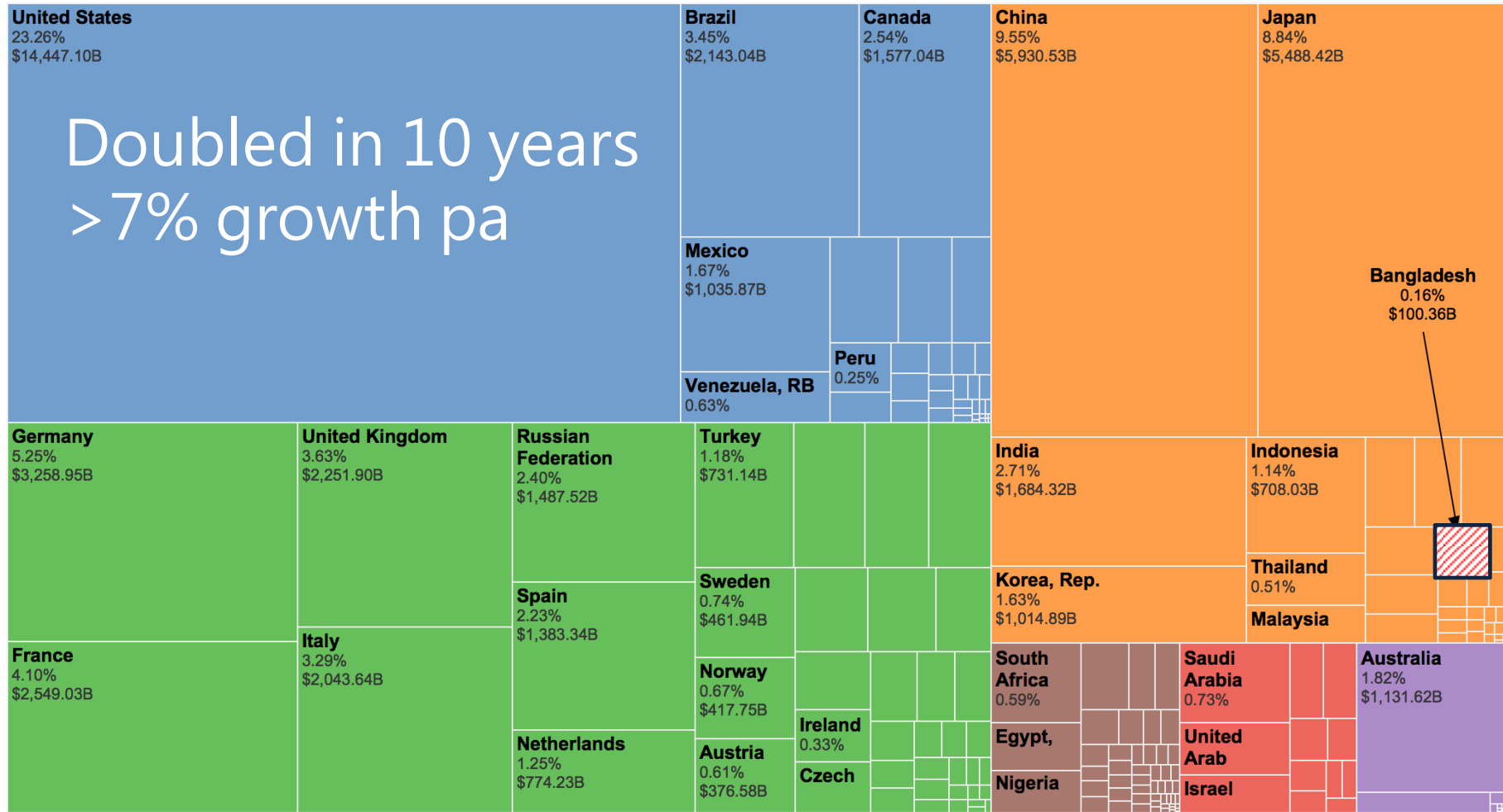
# Country share of GDP in 2000



■ The Americas ■ Europe ■ Africa ■ Oceania ■ Middle East ■ Asia

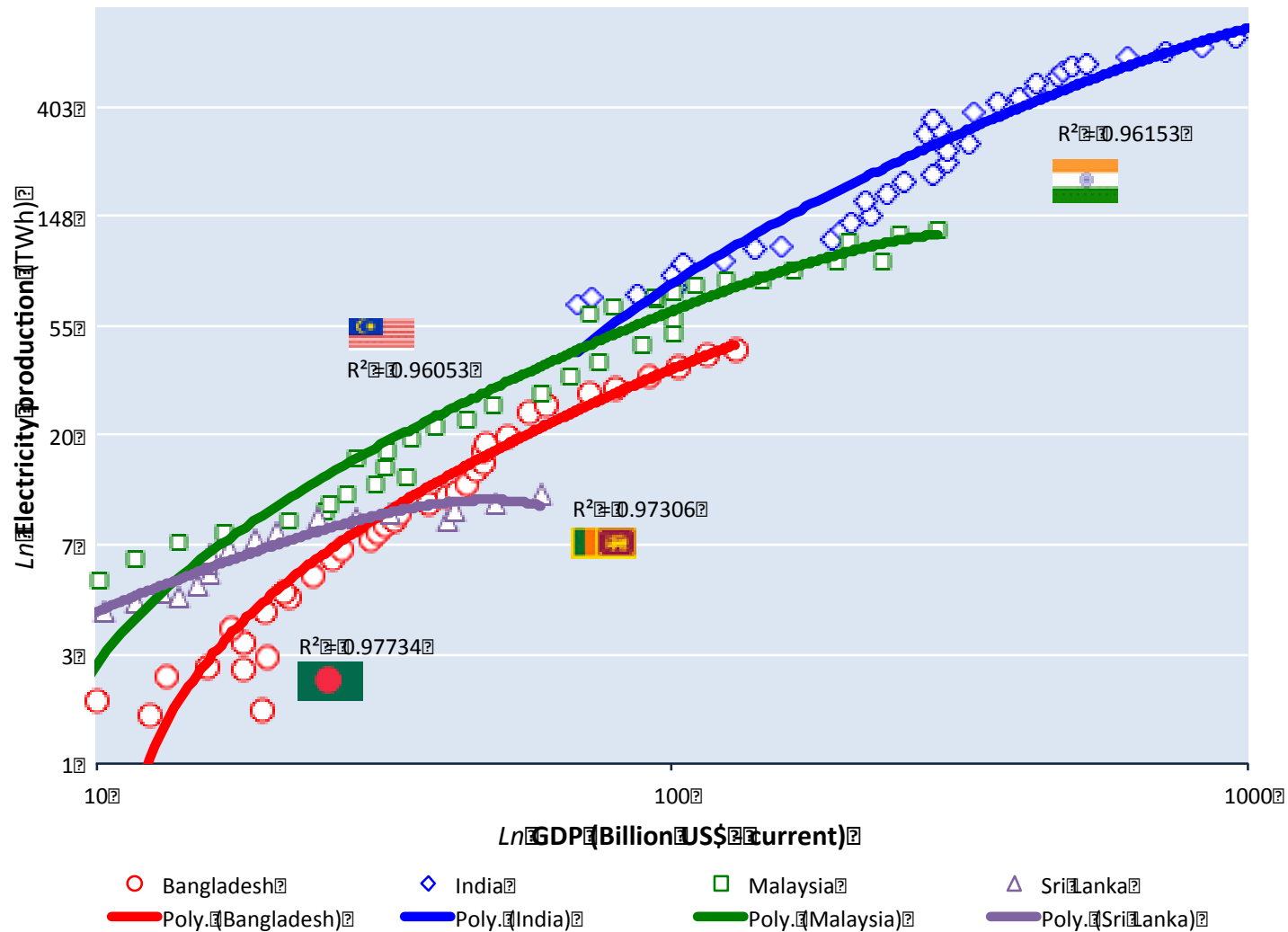


# Country share of GDP in 2010

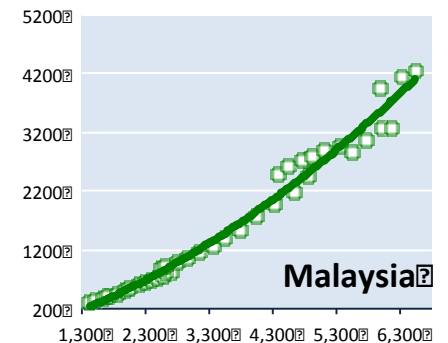
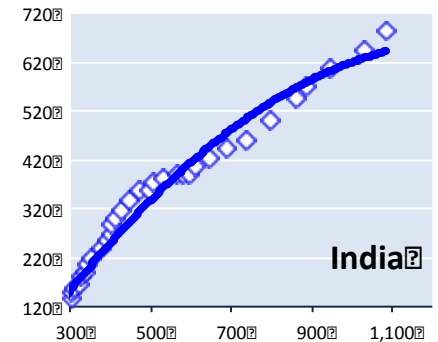
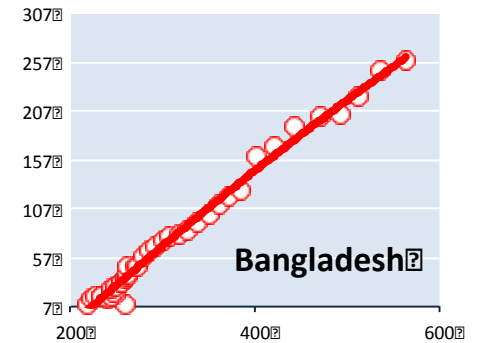
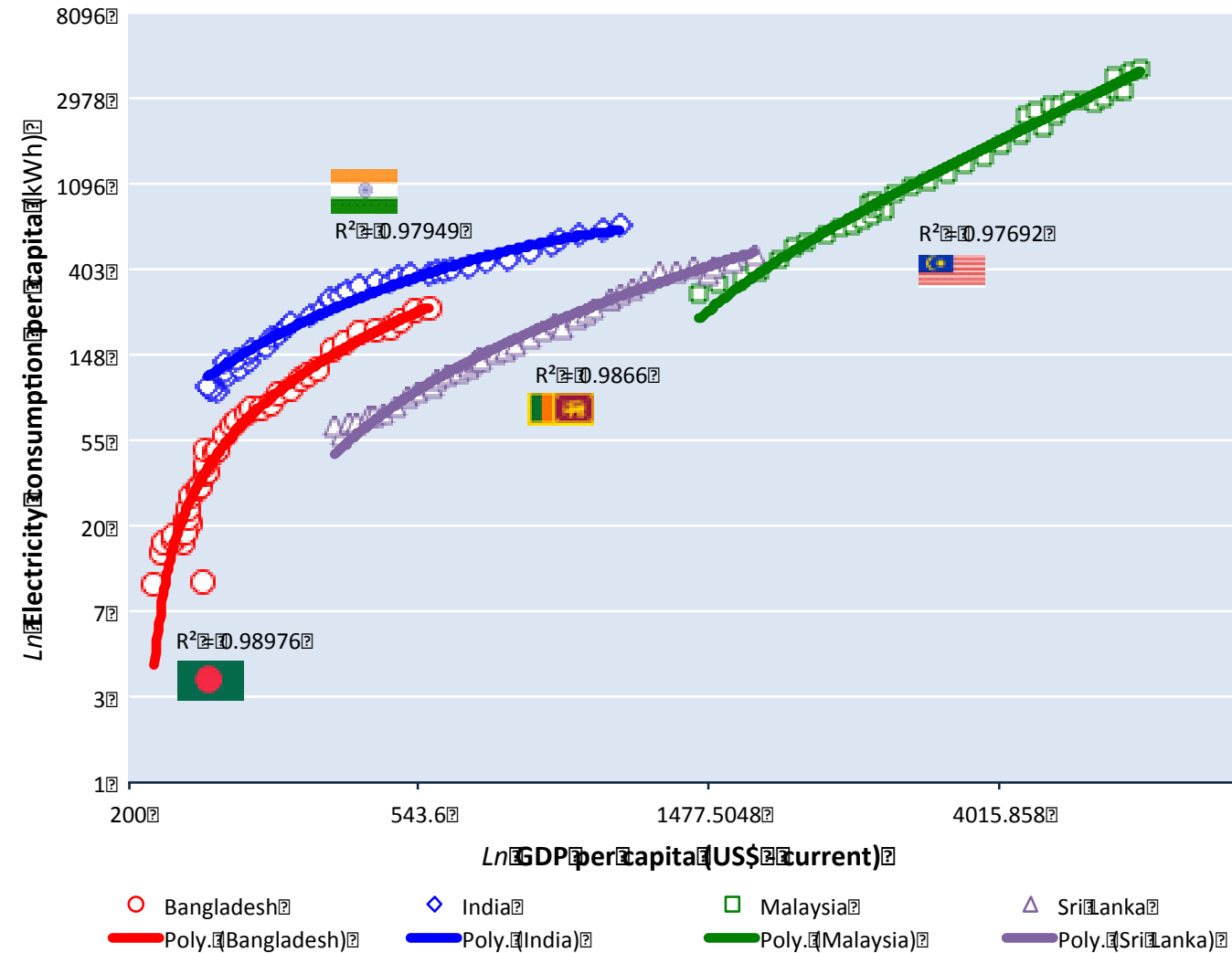


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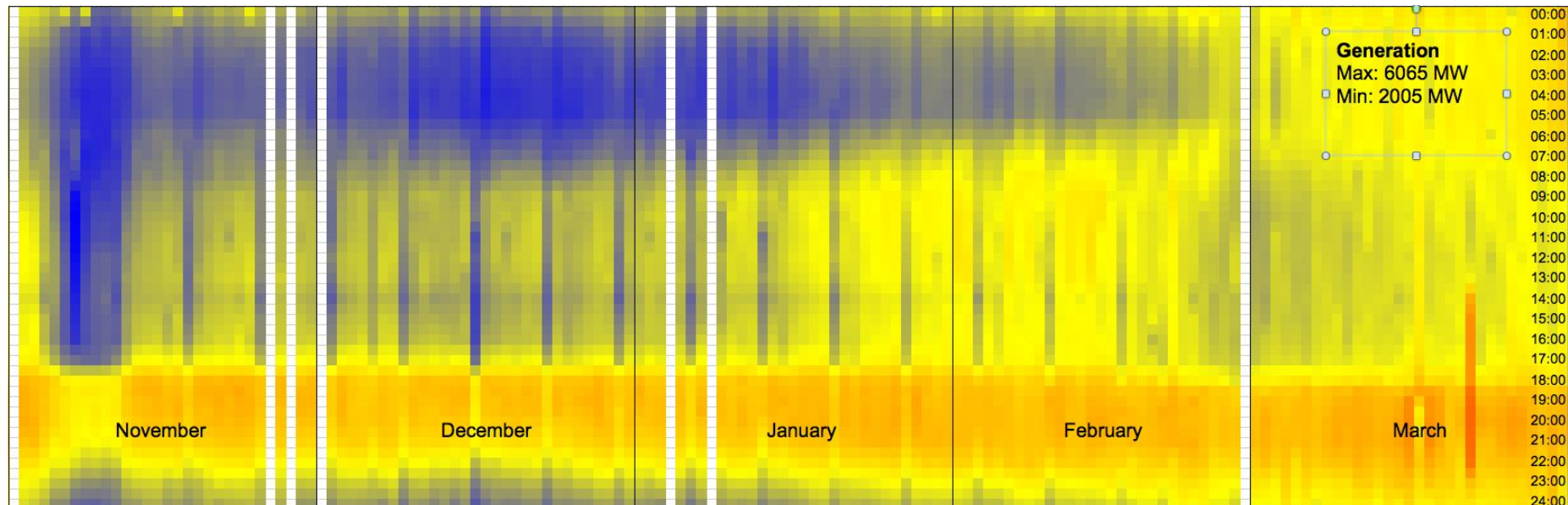
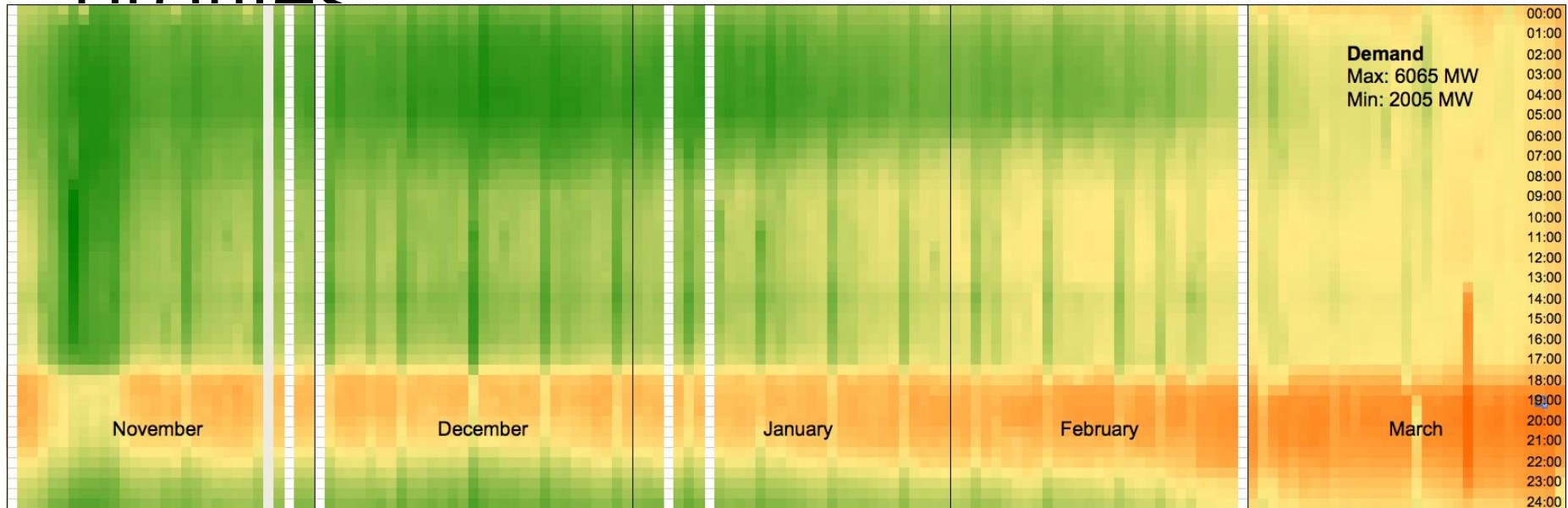
# GDP vs Electricity consumption



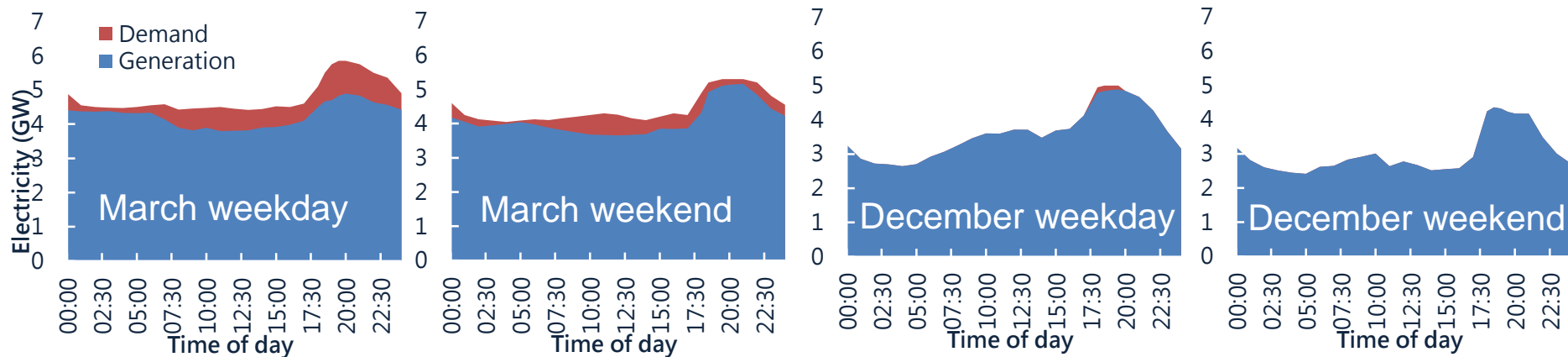
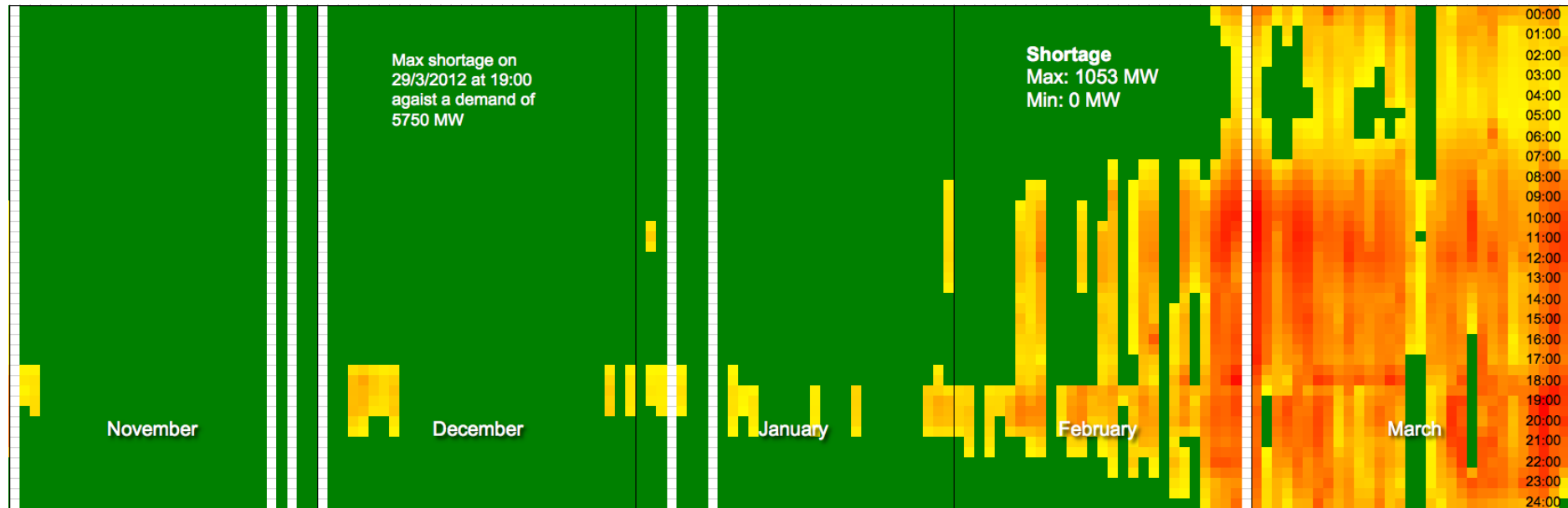
# GDP vs. Electricity consumption



# Sub-hourly demand and generation profiles



# Sub-hourly shortage (outage) profile



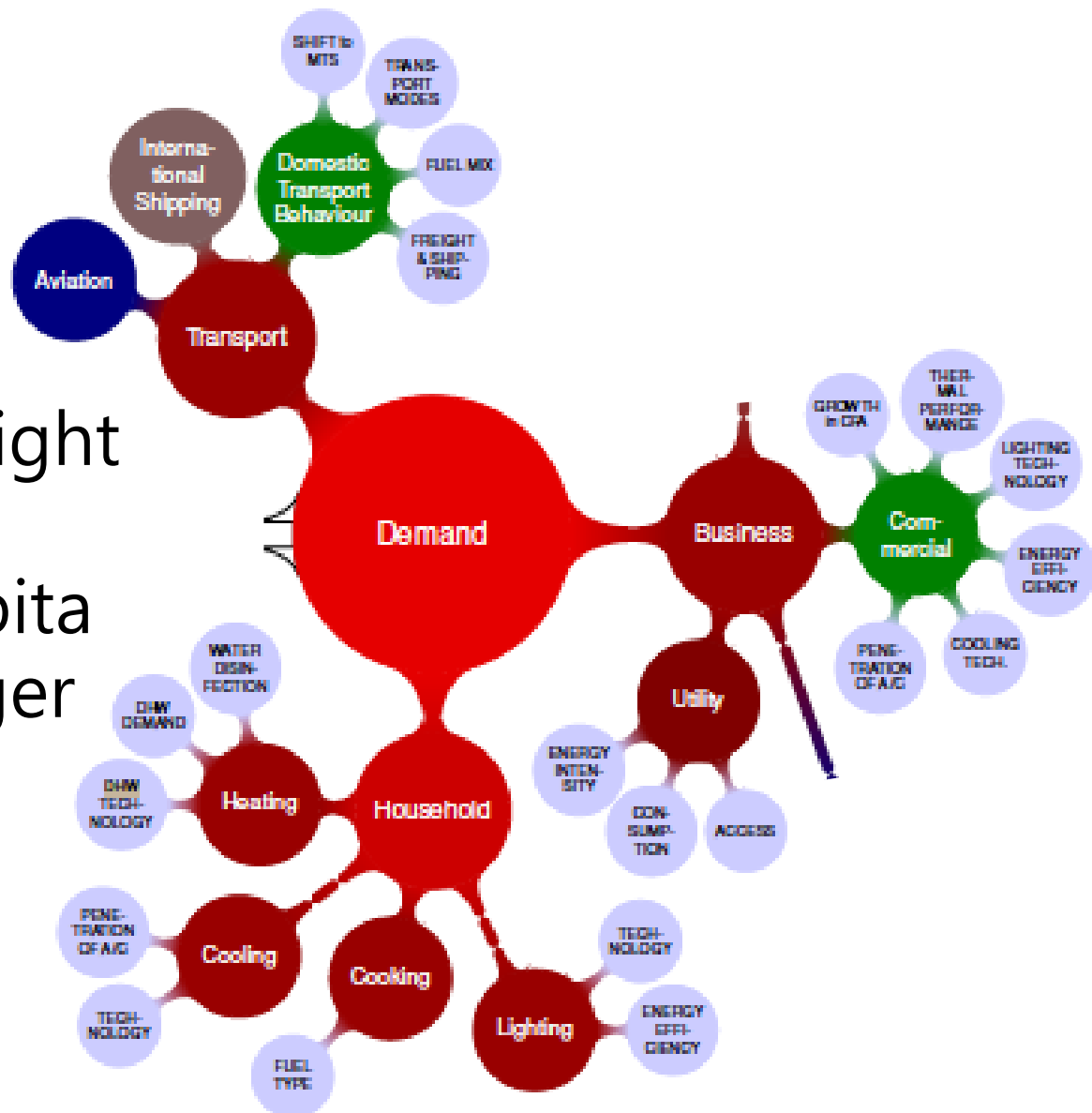


# Assertions

- Bangladesh displays “suppressed demand” scenario
- Four effects were considered:
  - **Income effect:** More income  $\approx$  increased demand
  - **Rebound effect:** Efficiency gain  $\approx$  increased operating time
  - **Minimum service level:** Meet BHN
  - **Basic human needs:** Physical and psychological needs
- Bottom up approach:
  - Demand is built up within disaggregated demand vectors (sectors) then aggregated to compute final demand
  - **Technology penetration** (BHN and MSL) follow

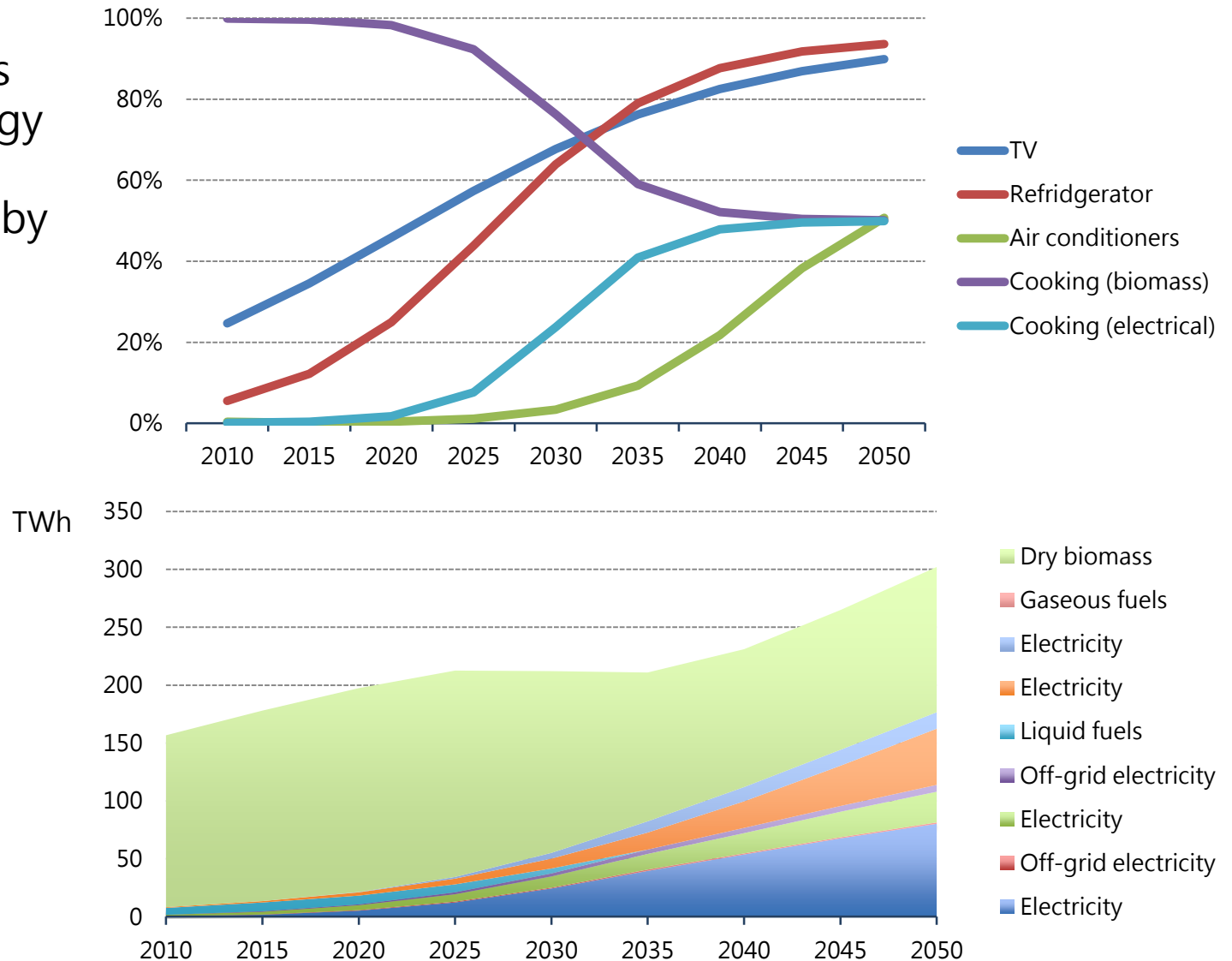
# GDP considerations in the model

- GDP affects freight transport
- Income per capita affects passenger transport



# Use of S curve distribution: Rural household

Upper limits  
of technology  
penetration  
moderated by  
GDP and  
Income per  
capita







Population



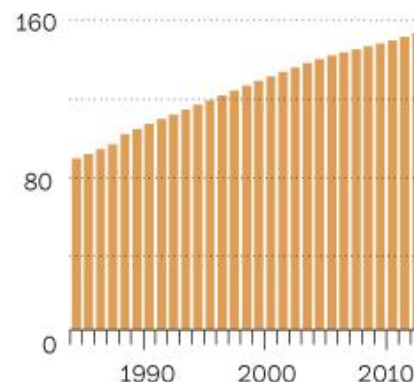
# THE LIFE AND ECONOMY OF BANGLADESH

Population density (people per square mile)

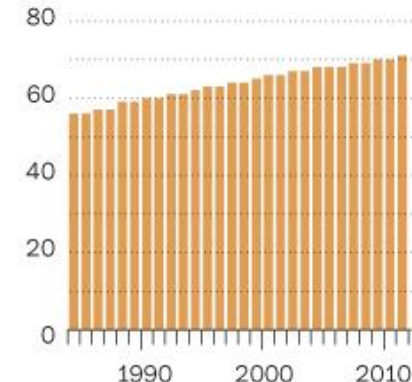
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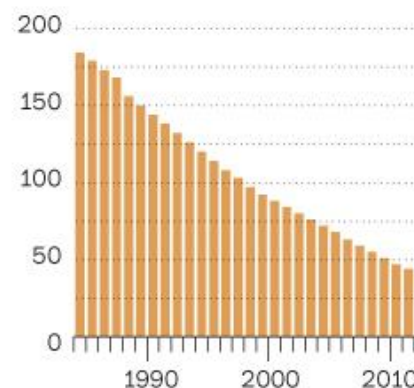
Population (millions)



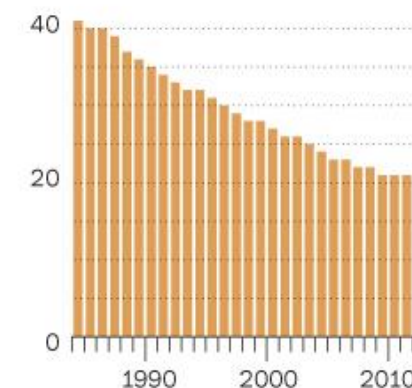
Life expectancy



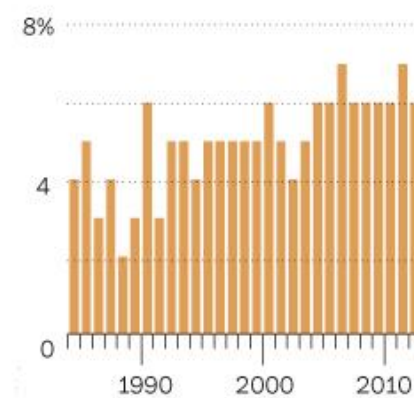
Mortality under-5s  
(per 1,000 live births)



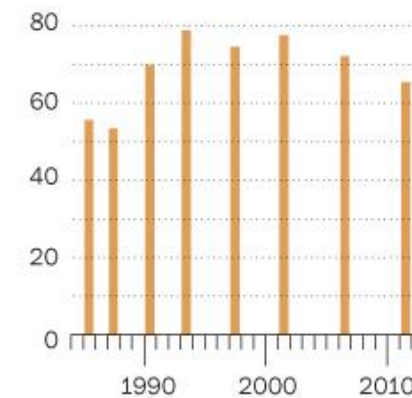
Birth rate  
(per 1,000 people)



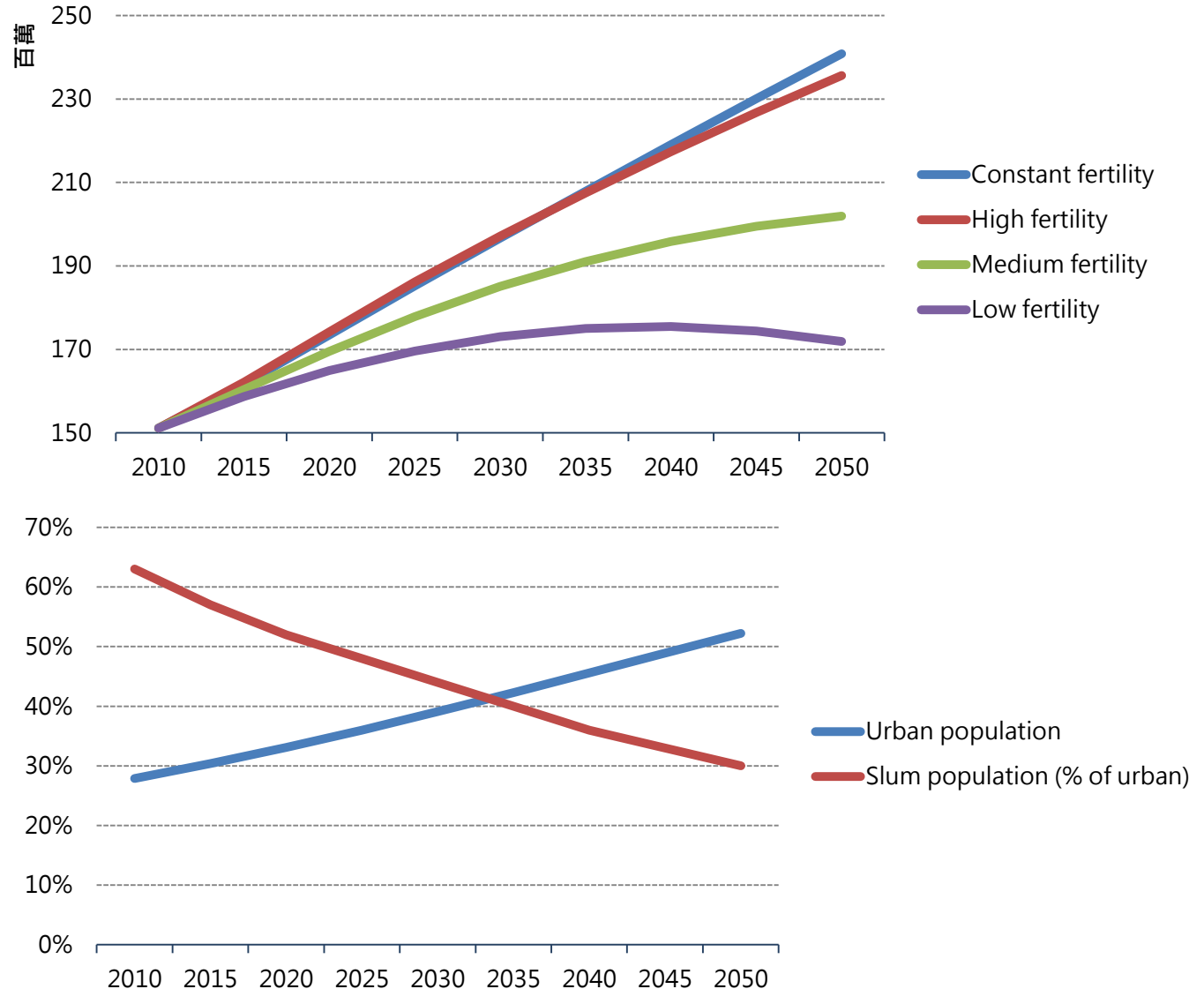
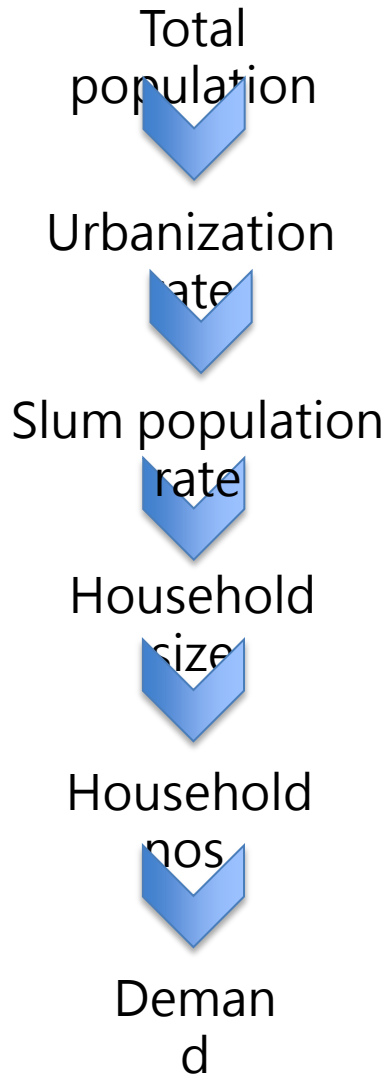
Annual GDP growth  
(as a percentage)



Millions living in poverty  
(on less than \$1.25 day)

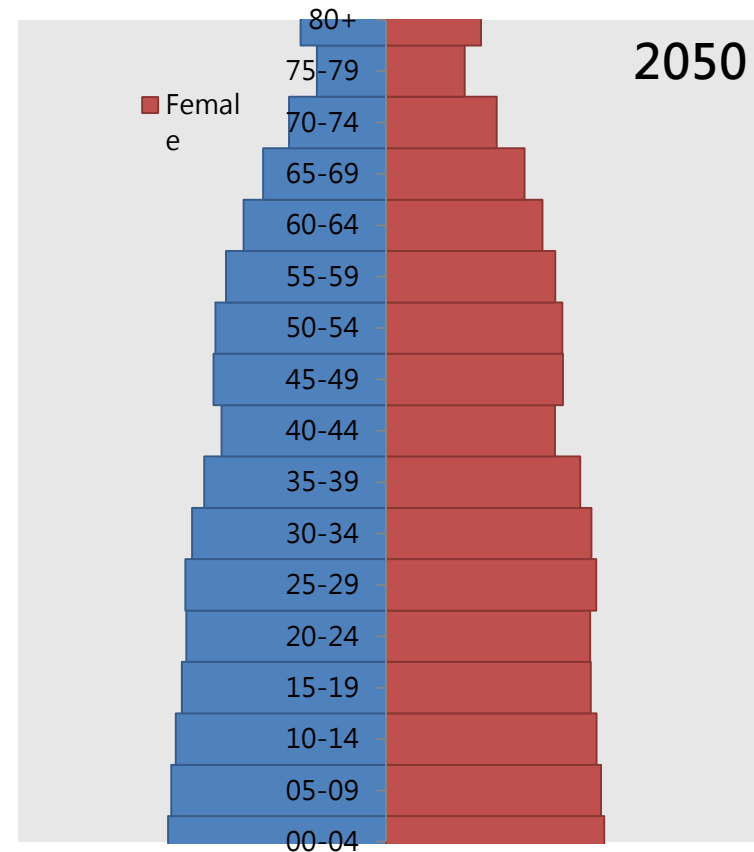
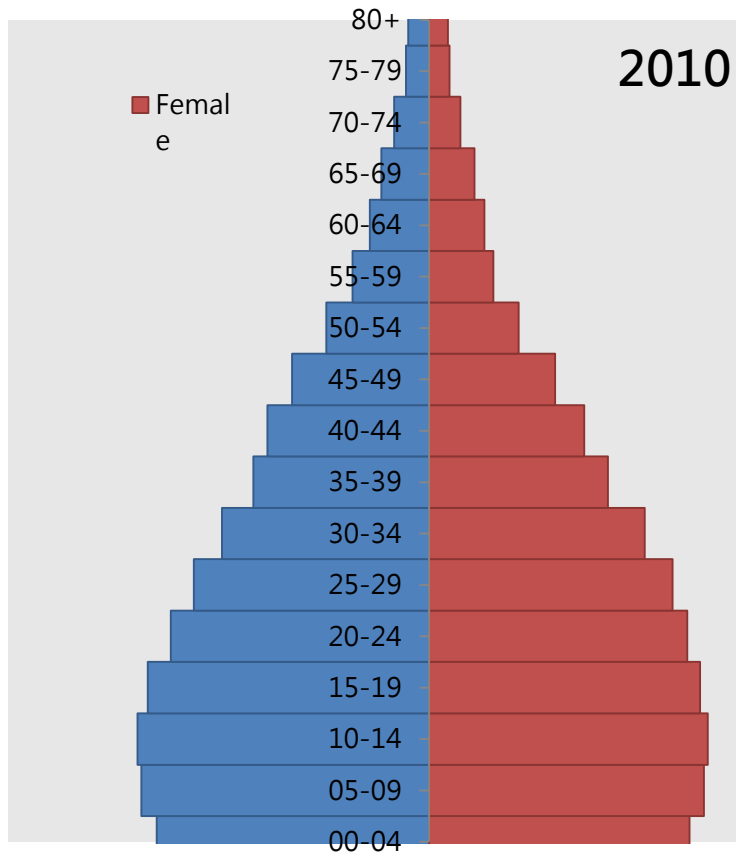


# Population projection





# Age distribution



- Ageing is not as big a concern as in developed countries
- The shape of the distribution may have tangible effect on demand; e.g. trans

# Future considerations

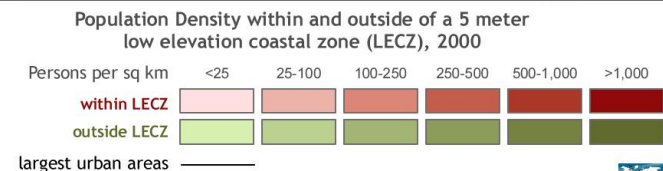
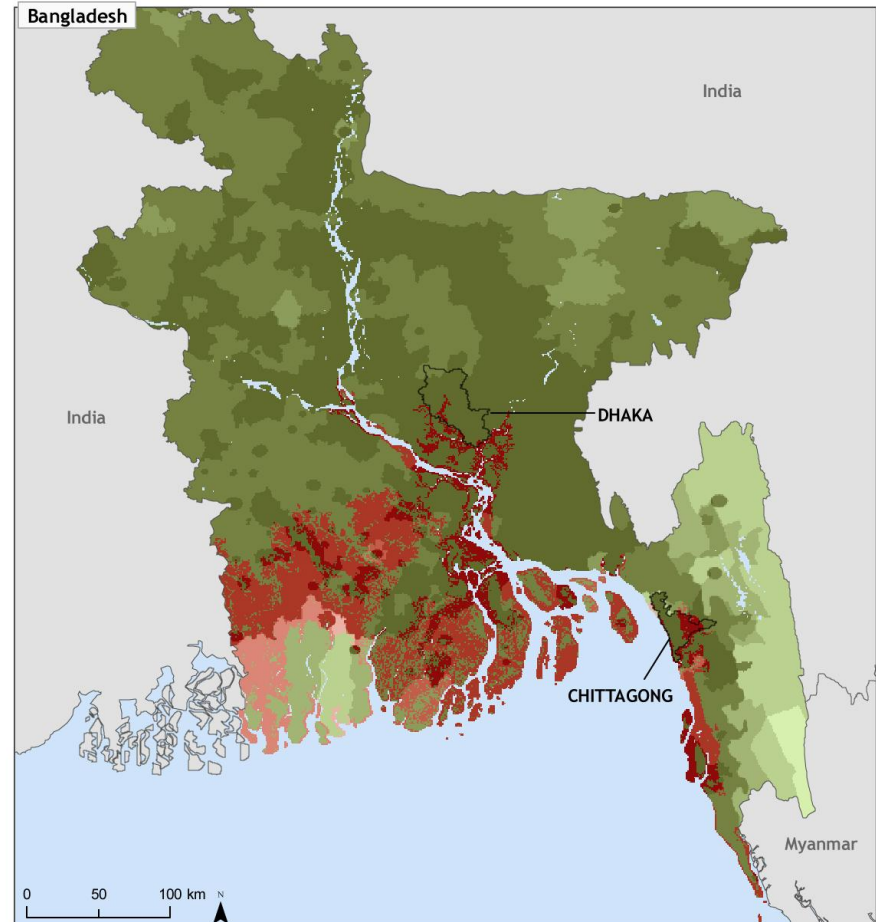
## Climate change effects on

- Economy
- Migration and displacement

## Demand and GDP

- Bi-directional causality
- Income effects

Population Density within and outside of a 5m Low Elevation Coastal Zone





Thank you