

# Adaptation to climate change, from cities to buildings

Delivering Construction Solutions

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# Climate change is here to stay ...

In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate. {1.3}

Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions. {1.4}

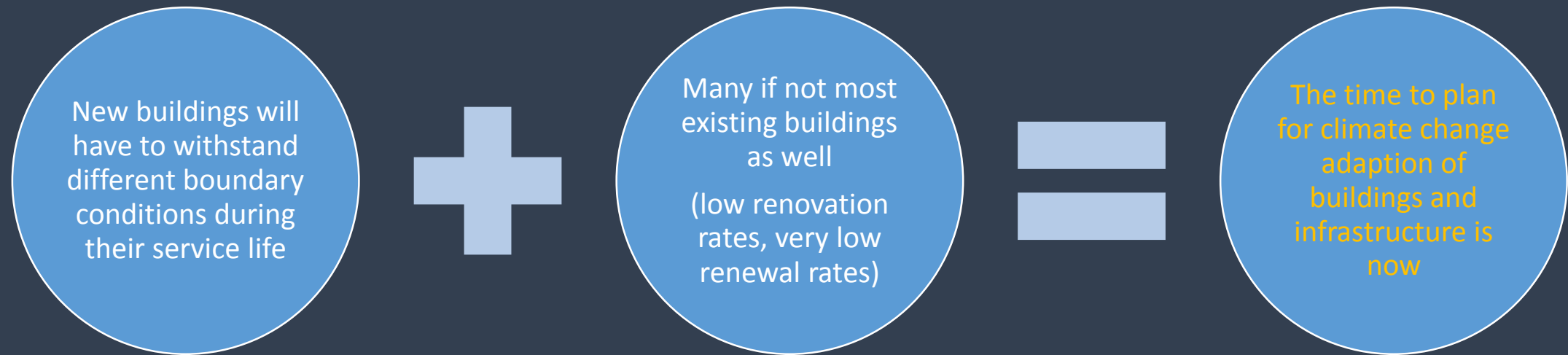
Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level to rise. {2,2}

*Source: IPCC, Climate Change 2014, Synthesis Report, Summary for Policymakers*



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Construction, Energy & Environment

# ... and so do our buildings and infrastructure



# Main impacts of climate change on buildings

- Structural loads
  - Strong winds
  - Heavy rainfalls / snowfalls
  - Floods (due to rainfalls or sea surges)
  - Temperature differences
- Indoor environment (thermal comfort, air quality)
  - Increasing average temperature
  - Heat waves
  - Humidity
- Durability of materials

# Which strategies?

- A question of adequate risk management (probability, damage importance)
- Risks and vulnerabilities varies with climate and geographical regions
- Climate data are not immediately usable in construction design
- Multiple levels of intervention, all useful but with different timeframes



# Some key messages (1)

- Climate change risks must be anticipated in urban and territories planning as well as in development and renovation schemes.
- Climate resilience assessment tools (and data) are needed.
- Significant investments are required and hence public and private funding mobilised.
- Long term and predictable frameworks encourage investment.

# Some key messages (2)

- Climate projections need to be translated in construction design parameters.
- Standards and building codes need (frequent) adaptation too.
- Various technical solutions are available.
- Early involvement of contractors leads to better technical choices.

# Conclusions

- Technical solutions are available
- Climate change adaptation is needed now
- The issue is not yet sufficiently integrated in the current practices, standards and codes
- Existing structures need assessment and retrofits but renovation and renewal rates are low



# Thank you