



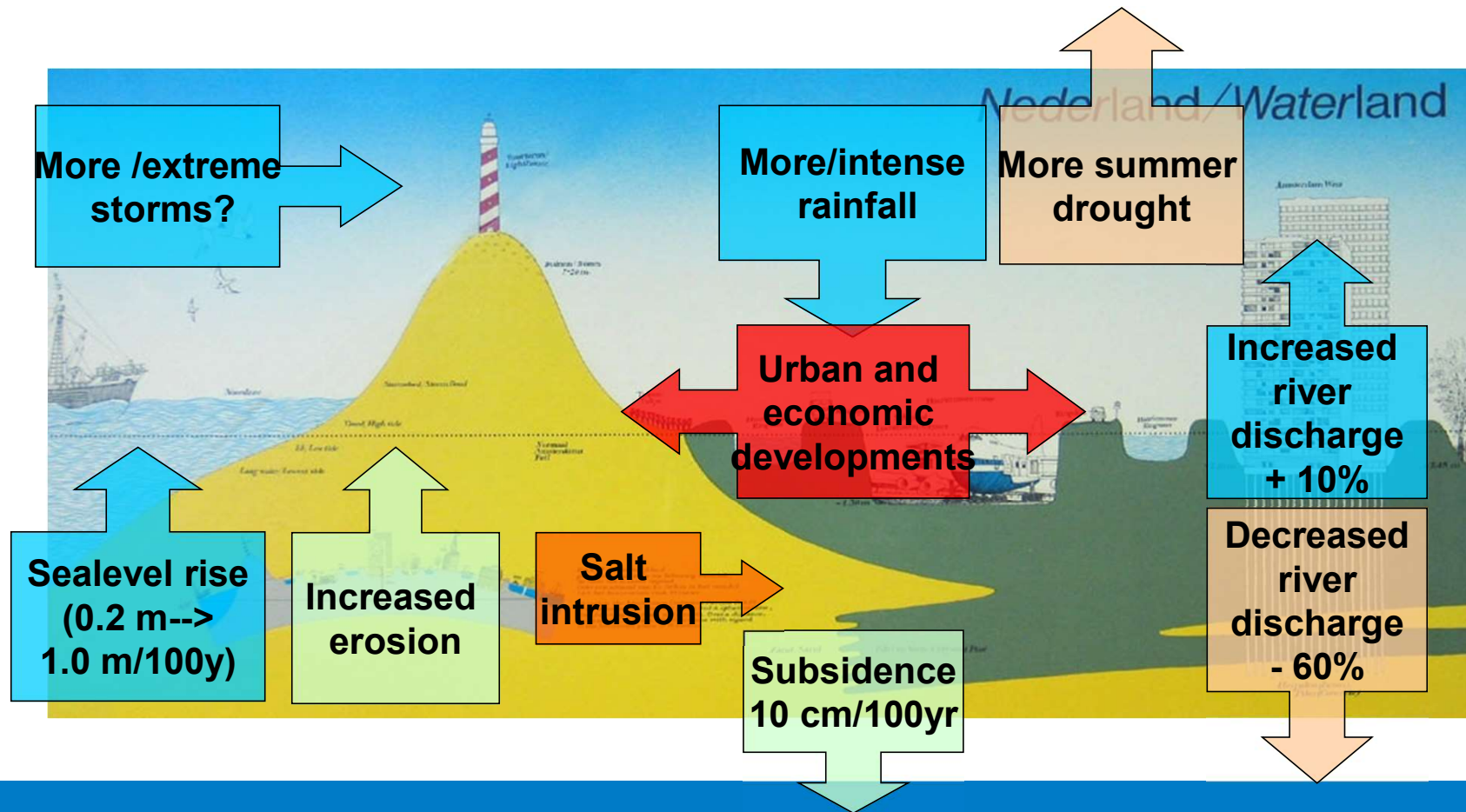
## Adaptive Delta Management strategies in relation to Sea Level Rise

Dilemmas that deltas are facing in  
the long term

Jos van Alphen  
*staf Deltacommissaris*

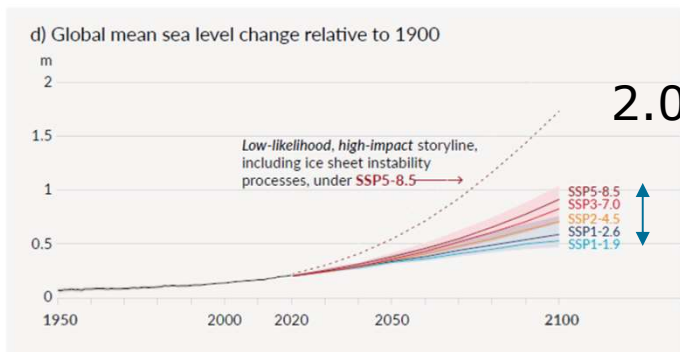


## Future risks of Dutch delta



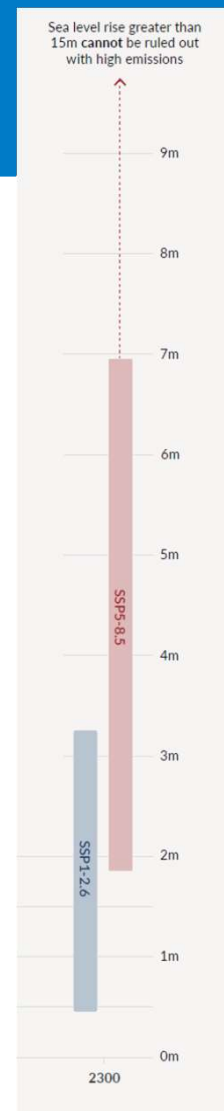


# Sea Level Rise



2.0 m?

+ 0.3 - 1.0 m



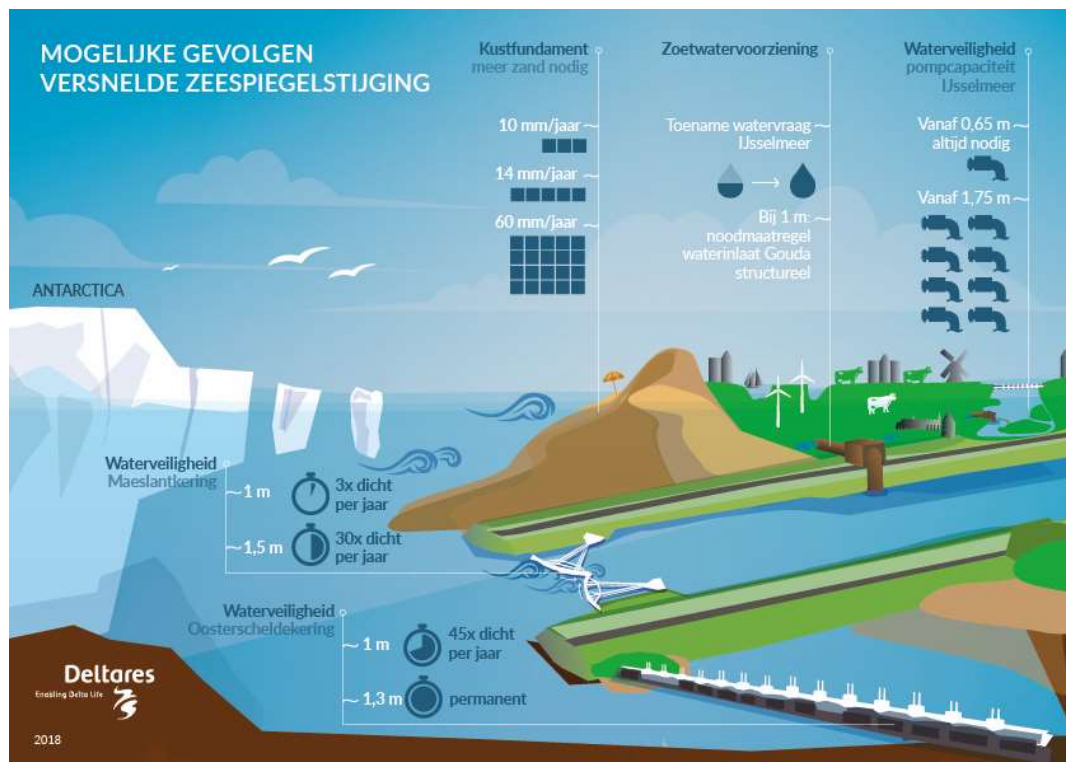
SSP5-8.5: +4.4°C in 2100, CO<sub>2</sub> verdubbeling in 2050/2100

SSP1-2.6: +1.8°C in 2100, CO<sub>2</sub> afname vanaf 2020

Bron: IPCC WG1, 2021



## “What-if” inventory Deltares 2018



- Large potential impact on
  - flood defences,
  - storm surge barriers,
  - beach nourishments,
  - salt intrusion/salination,
  - pumping capacity
- Up till 2050 Deltaprogram strategies are sufficient
- Start research to:
  - Reduce uncertainty in SLR and potential effects of Dutch Delta
  - Explore strategies and measures to adapt (and keep future options open)



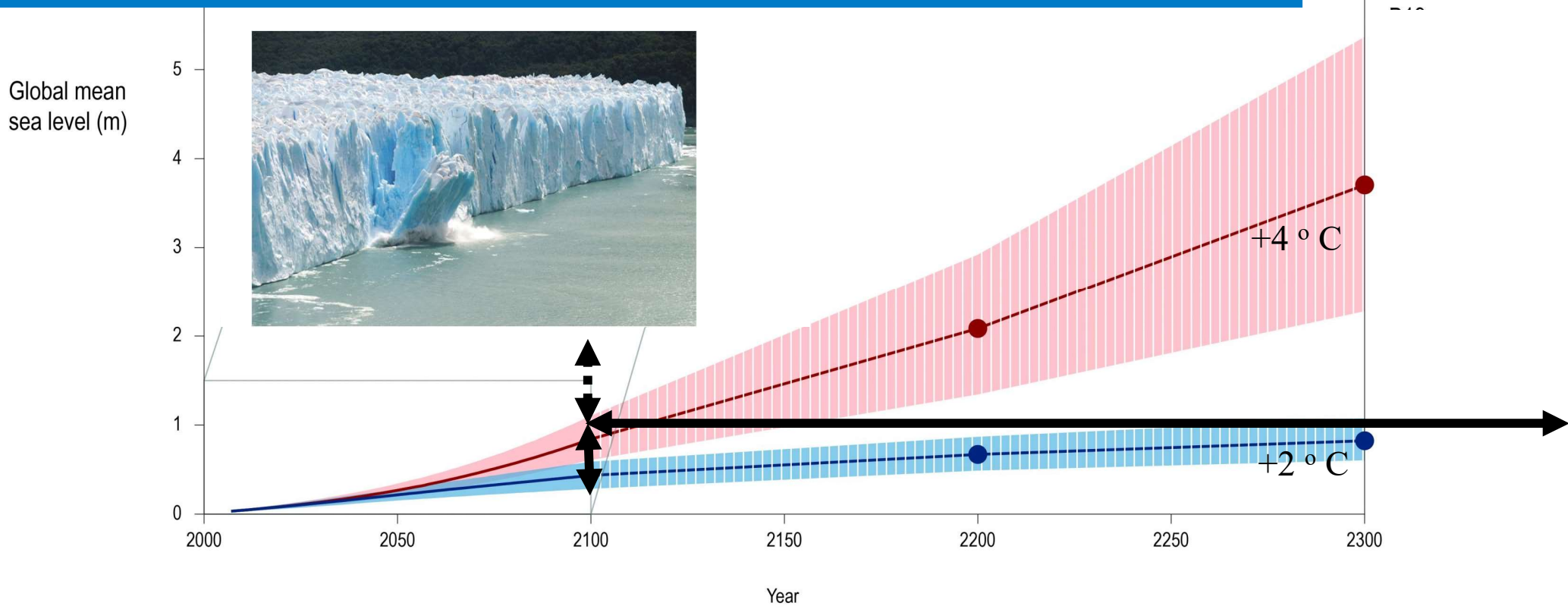
## Research program Sea Level Rise

- 2020-2025
- focus:
  - flood protection
  - fresh water supply
  - beyond 2100
- Deltaprogram partners:
  - Ministry of Infrastructure & Watermanagement
  - Delta Commissioner
  - knowledge institutes,
  - NGO's,
  - private sector





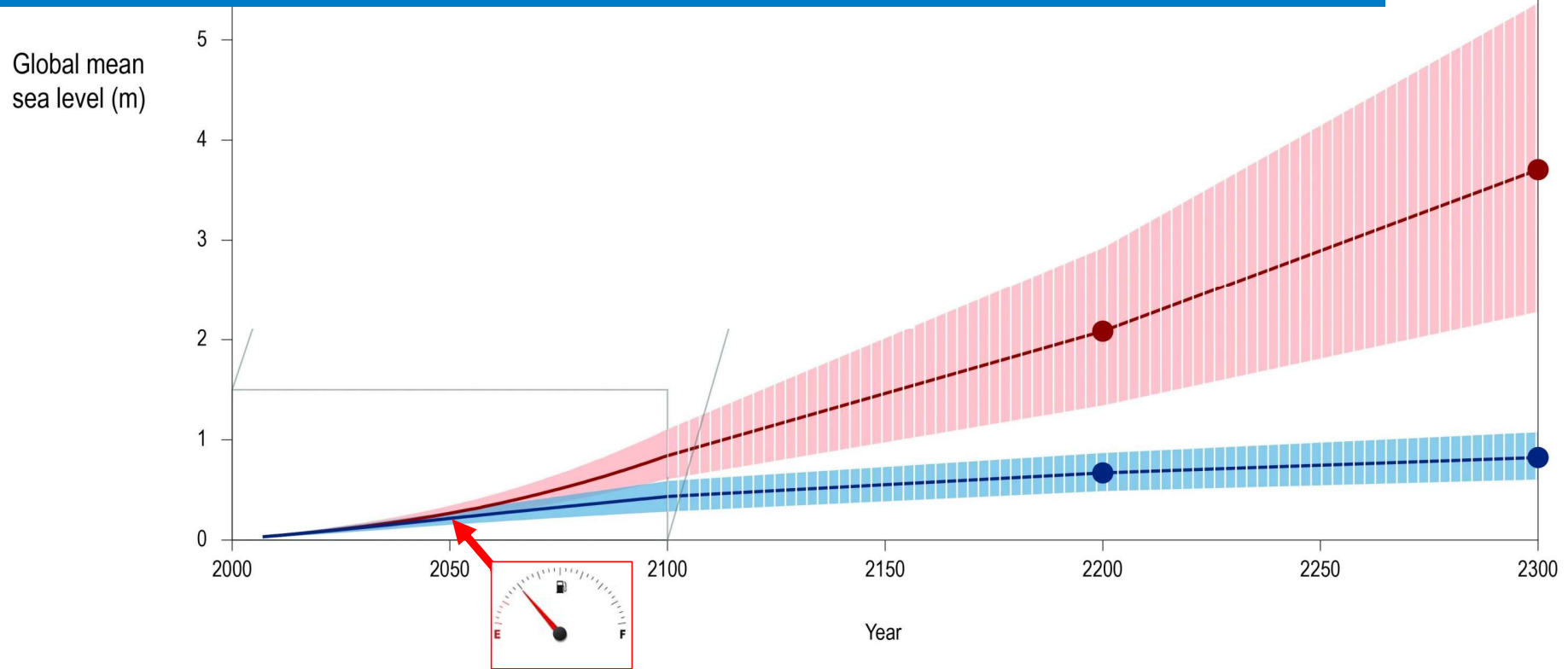
# Track 1: What can we expect?





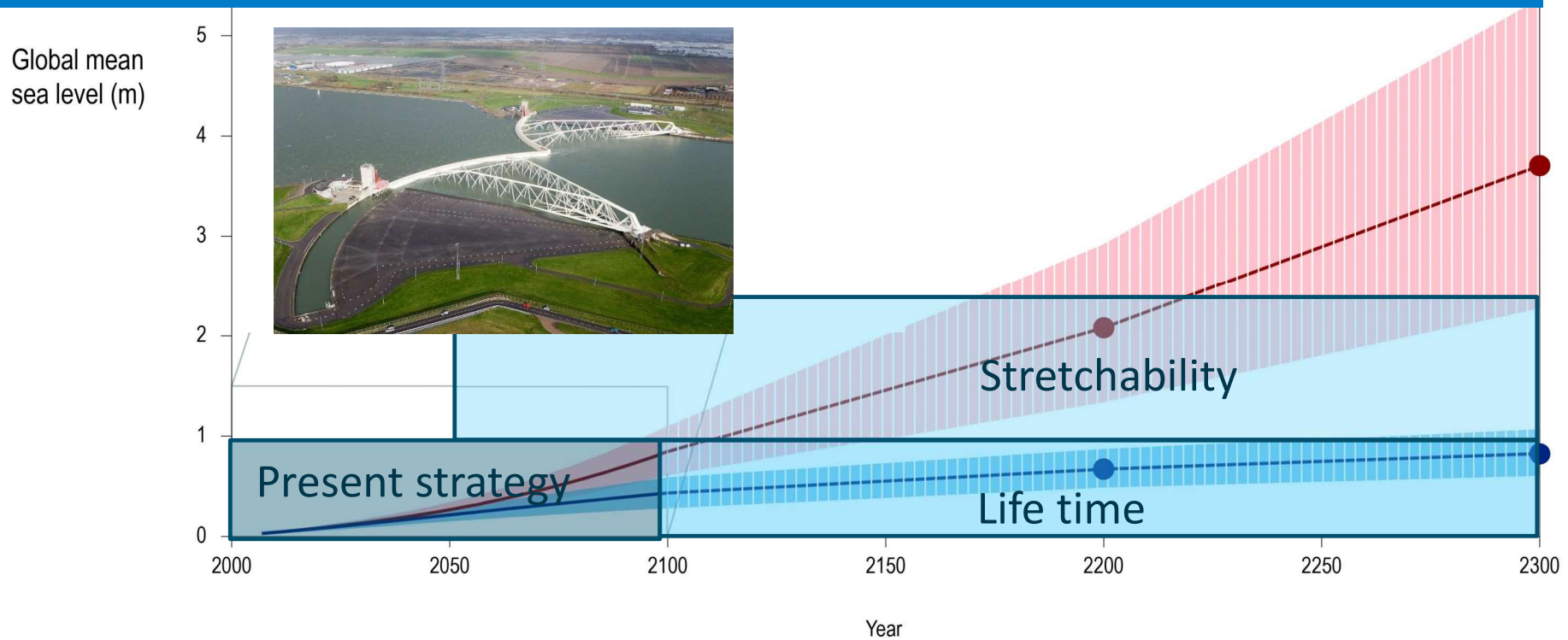
# Track III

## Early Warning method, when start to act?



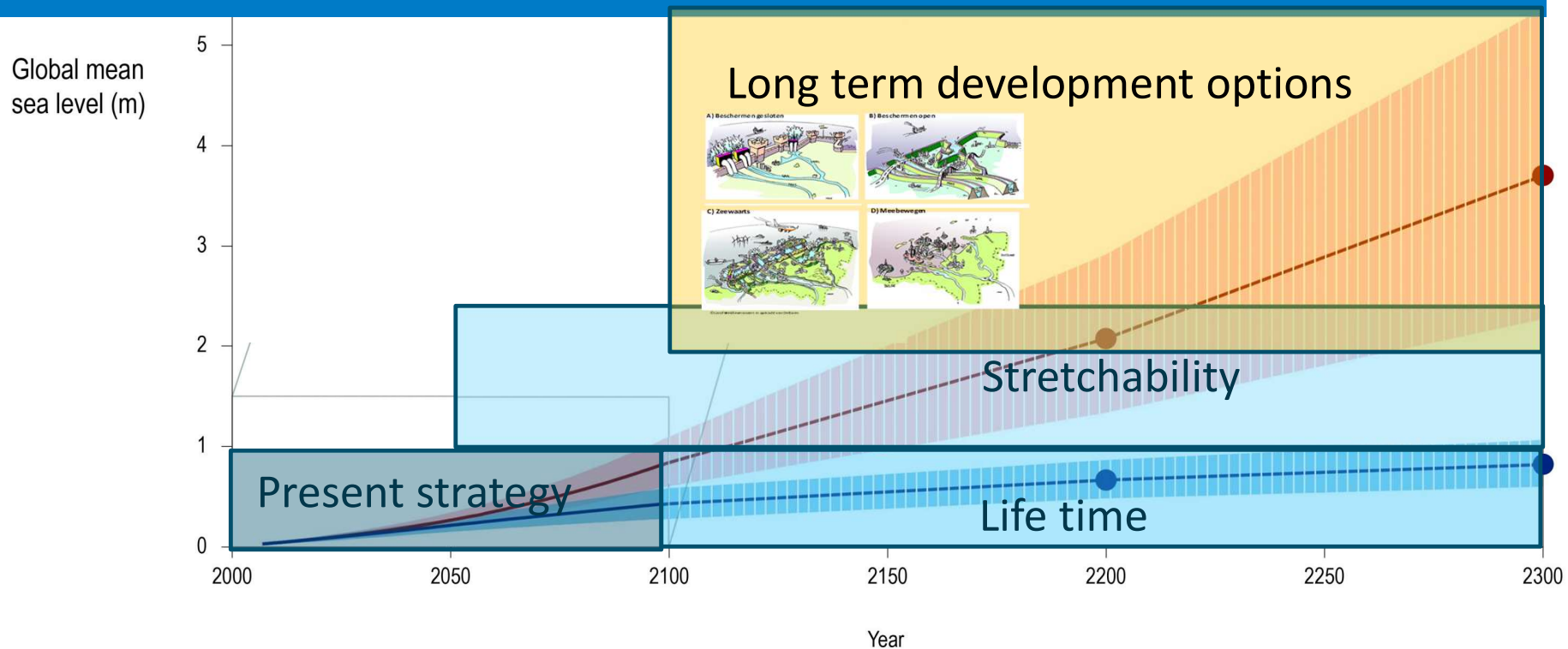


# Track II System explorations → Life time of present strategies



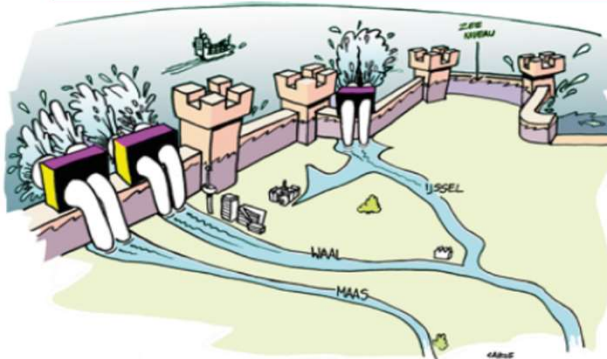


# Track IV Long term development options

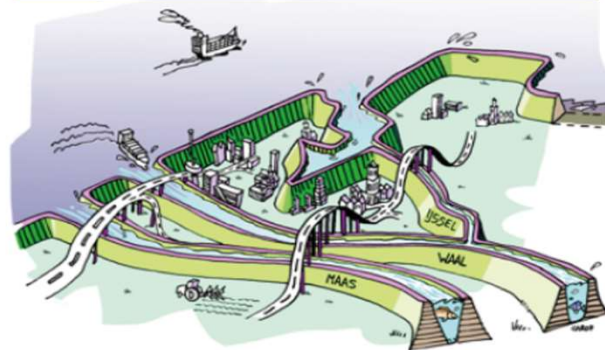




## Protect-closed



## Protect-open



## Advance



## Accommodate

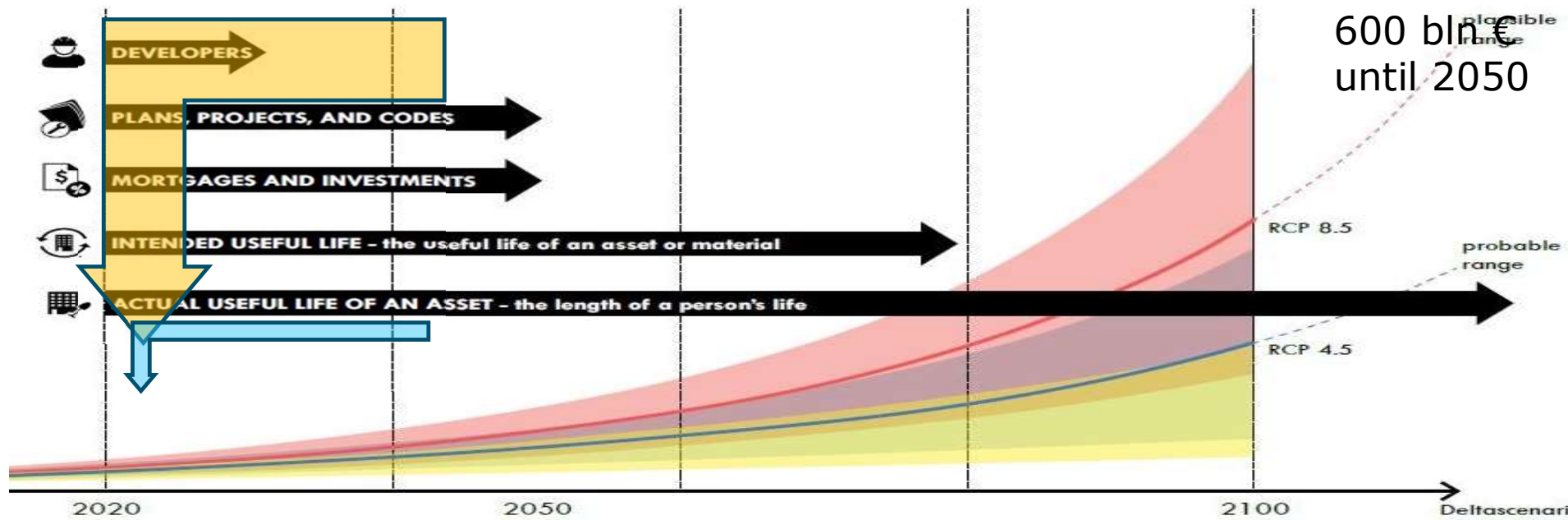


Cartoons developed by Carof for Deltares



# Track IV Other transitions, keeping options open

Global mean sea level (m)

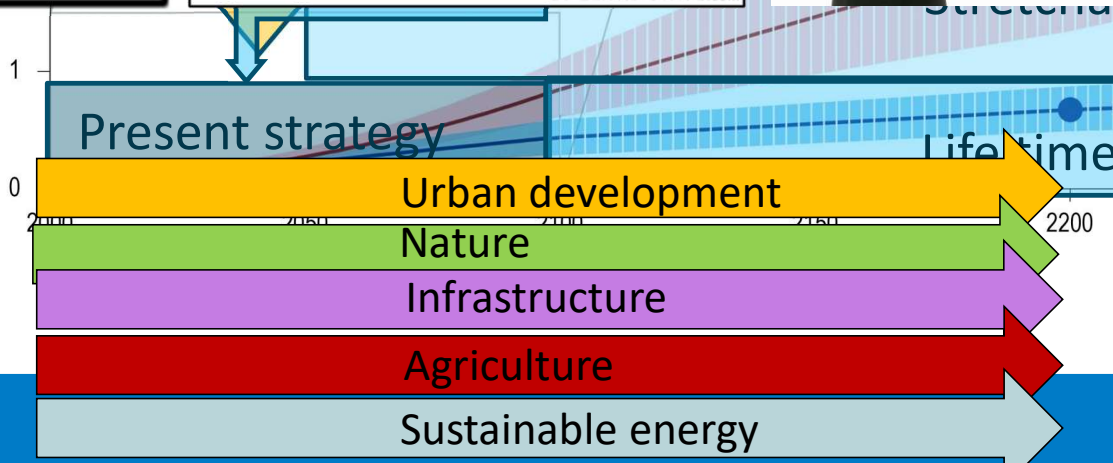


- Infrastructure
- Agriculture
- Sustainable energy





# Track V Implementation aspects



# Proposed actions next decades

- **Maintain space** to strenghten flood defences, store water and dredge sand;
- **Use synergy** with other societal transitions;
- New investments: execute **stress tests** regarding long term SLR, avoid high-regret developments
- **Experiment** with flexible measures (building with nature, floating buildings, salt tolerant agriculture)
- Develop **adaptive design**
- Prepare **societal transformation**

<https://english.deltaprogramma.nl/delta-programme/knowledge-development/sea-level-rise-knowledge-programme>