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“RISK-BASED RESILIENCY PLANNING
BUILDING BUSINESS CASES FOR CLIMATE ADAPTATION
WWW.RAMBOLL.COM/SERVICES-AND-SECTORS/WATER”
Risk-based resiliency planning is an essential process in building business cases for informed decision-making within climate change adaptation and city planning. A risk-based resiliency planning approach provides the necessary input to estimate cost of inaction, to decide between different planning scenarios, plans or designs, and to identify feasible levels of service.

Making the case for climate adaptation
The risk-based resiliency planning approach can help:

- Build a business case for climate adaptation in relation to baselines
- Prioritize between adaptation options, plans or designs
- Define optimum level of service for climate adaptation

Our approach
It is a 4-step iterative process of moving from 1 Initial determination of risks, to 2 the development of a resiliency plan/project, and 3 documenting the adaptation effect. The outcomes are incorporated into 4 a Cost Benefit Analysis (CBA) where the costs and benefits are compared over time.

Costs and benefits
As part of a CBA, costs cover implementation, operation and management, and revaluations of adaptation measures over time. Benefits cover both the avoided risk over time, as well as the added value created through adaptation measures.

Risk is defined as the potential loss of life, injury, or damaged assets which could occur to a society. It may also include loss of revenue and production. Risk is determined as a function of hazard, exposure, vulnerability and capacity. Risk can be expressed as the Expected Annual Damages (EAD).

Added values refer to the environmental, social and economic impact climate adaptation might bring, e.g. improved air quality, physical health, the values of residing in a resilient neighbourhood, increased property values, etc.

Hydraulic calculations, GIS data, advanced climate hazard and risk modelling act as the foundation of the approach and are crucial in providing a solid basis for informed decision-making. Spatial overlay of datasets and analyses at multiple levels help to identify potential synergies and cumulative effects.

RISK-BASED RESILIENCY PLANNING

ABOUT RAMBOLL
Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. The company employs 15,000 globally and has especially strong representation in the Nordics, UK, North America, Continental Europe, Middle East and Asia Pacific. With more than 300 offices in 35 countries, Ramboll combines local experience with a global knowledgebase constantly striving to achieve inspiring and exciting solutions that make a genuine difference to our clients, the endusers, and society at large. Ramboll works across the markets: Buildings, Transport, Planning & Urban Design, Water, Environment & Health, Energy, Oil & Gas and Management Consulting.

WWW.RAMBOll.COM

RISK

CITIES BEFORE AND AFTER
When a city isn’t adapted to extreme climate events, it is exposed to high flooding risks including damages on infrastructure and buildings, loss of effects and production, and citizens may feel unsafe. Through investments into climate adaptation, a more resilient city can be built, where citizens not only experience less flooding damages, but also gain the added values from climate adaptation such as a more attractive, green city, and a safe city.

RESILIENCY PLANNING

RISK-BASED

CLIMATE CHANGES

81.5

RISK MAPPING

MIKE Urban, MIKE FME and CADSS Excel

DETERMINE

1 2 3 4

PLANNING & DESIGN

INTEGRATED

PROJECT SIZE

P

O

J

E

Net value

Costs

Benefits

INVESTMENT

GDP

Defense

Irrigation

Water supply & sanitation

Health

Adaptation & resilience

AVOIDED DAMAGES AND COSTS

AVOIDED DAMAGES AND COSTS

ADDED VALUE

Increased property values, etc.

CITY SERVICES

A clean and climate safe city

Aesthetic and healthy citizens

Unsafe and vulnerable citizens

CITY UTILITIES

The New York City Department of Environmental Protection (NYDEP) launched a ‘Cloudburst Resiliency Planning Study’. The study provides insight on ways for New York City to advance climate resiliency projects and traditional stormwater solutions to mitigate inland flooding and accommodate future increase in rainfall intensity through integration with ongoing urban planning development.

COPENHAGEN CLOUDBURST PLANS

Gentofte, Denmark

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COP26.

The climate adapted city

The exposed city

The masterplans of the Danish capital’s Cloudburst Management Plan in close collaboration with the city’s municipalities

A LIVING SHORELINE

Boulder Point, Washington DC, US

The masterplan for the planned level of resiliency towards storm surge and sea level rise only had limited effect on reducing future flooding. Hence, Ramboll conducted a cost-benefit analysis for the currently proposed protection level and for a recommended higher protection level, to illustrate the value of climate resilience both in terms of reduced risks, but also in terms of added value.

A CLEAN AND CLIMATE-SAFE CITY

Aesthetic and healthy citizens

Unsafe and vulnerable citizens

CITY SAFETY

Gentofte, Denmark

After a very destructive cloudburst in Copenhagen in July 2016, the City began to invest heavily in protecting against extreme cloudbursts in the future. The protection of the city was the catalyst for designing a blue and green city with higher recreational values, more urban quality and increased biodiversity. Ramboll designed the masterplan of the Danish capital’s Cloudburst Management Plan in close collaboration with the city’s municipalities.
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<td>Based on four different hydraulic masterplans, a risk assessment and a CBA this project set out to determine the return period for a rain event to which the socio-economic gain of climate adaptation was the most favourable. For each masterplan the net present value of adaptation costs were weighted against the benefits of adapting, and the socio-economic optimum was found where the net value peaked.</td>
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