

The climate adaptation and sustainability implications of five strategies for a waterfront development

Presenting Author: Gregory M. Morrison¹

Other Authors: Per Knutsson², Katarina Buhr^{3,4}, Philip Thörn³, Ulf Moback⁵, Hanna Areslätt⁵

Corresponding Author: Gregory M. Morrison¹

¹Chalmers University of Technology, Gothenburg, Sweden, ²University of Gothenburg, Gothenburg, Sweden, ³IVL Swedish Environmental Research Institute, Stockholm, Sweden, ⁴Linköping University, Norrköping, Sweden and ⁵City of Gothenburg, Gothenburg, Sweden

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Introduction

Changing climate should mean that urban infrastructures will be adversely affected by extremes in weather. Adaptation strategies to date have relied on the IPCC protect-retreat-accommodate approach (Tol et al 2008) which has been applied to UK city studies and re-termed attack-retreat-defend (ICE 2009). We posit the need to connect climate adaptation with integrated assessments of sustainability. Based on this axiom we bring together emerging theories in sustainability science to analyse and assess the results of a transdisciplinary study of climate adaptation for a proposed development site in central Gothenburg. The outcome is five contiguous strategies for climate adaptation and sustainability.

Methods

The Frihamnen area is a proposed waterfront development of 104 ha in central Gothenburg. The area is low lying and highly vulnerable to the probable changes in sea-level rise which have been reported in local studies. Ten focus groups with even practitioner-researcher distribution were challenged to discuss ecological, politico-economic and socio-cultural aspects of the development. The focus groups were further

inspired by a contracted report illustrating residential developments under attack-retreat-defend strategies. The focus groups discussions were recorded translated and transcribed and the latent data was thematically analyzed according to Massey (2011). The hypothesis based and emergent data were structured into five distinct, but contiguous, strategies for climate adaptation and sustainability.

Results

Focus group data was first mapped as a continuum of sustainability fundamentals, ordered through the ecological, politico-economic and socio-cultural constructs. This value-neutral sustainability mapping provided the underlying understanding of five emergent patterns/discourses in the focus groups. These five patterns/discourses or contiguous strategies are:

Consonance with Nature (illustrated as a room in Figure 1) provides climate adaptation through extended natural areas, but with access for humans and built structures. This strategy provides a conciliation of densification with biodiversity through an emphasis on recreational/spiritual ecosystem services and urban ecology/restoration.



Figure 1. Consonance with Nature

Waterfront heritage is an attractive waterfront development which is a cultural maritime resource and challenges the threat of the ocean through advanced defensive barriers. This strategy builds on cultural patterns and the recreational/spiritual ecosystem services of water.

Liveable city (illustrated as a room in Figure 2) is an attractive and climate adapted living area with social and economic connection to the city centre. The housing provides a mix for young, middle and old generations with schools planned for inclusion and integration. Sustainability principles of fairness/intergenerational equity and human well-being, underlie this climate adaptation strategy.



Figure 2. Liveable City

Adaptation for sustainable building includes plus energy homes which contribute to mitigation, while innovative materials provide water resistant structures. Sustainability ideas concerning socio-technical system transition and resilience are featured in this strategy.

Branding adaptation and sustainability is a unique mix of the latest ideas in climate adaptation to shift attention and competitive advantage from successful sustainability projects in other Swedish regions, which have not yet implemented adaptation. The strategy is deliberately positive and prosperous, with an emphasis on a clear decision in socio-political structures and innovation and growth in a free market economy.

Discussion and Conclusions

Five contiguous strategies emerged from the transdisciplinary focus groups which relate to fundamentals of sustainability and provide a basis for climate adaptation planning in Frihamnen and elsewhere.

References

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Disclosures

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