Ecological Impact Research and Ecotoxicology

Department of Ecotoxicology · Institute for Ecological Research and Technology

young cities
Developing Urban Energy Efficiency
Tehrān-Karaj

tu berlin

Indicators and Environmental Quality Norms (EQNs) for Quality of Life in Urban Areas

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Abstract

The study contributes to reliable resource management, evaluation of the interaction of ecosystems and urbanisation as well as quantification of risk. Indicating the sustainable development of ecosystems and for human health protection in urban areas. A comprehensive strategy is necessary to protect the ecology and characterize reference conditions in urban heavily modified areas and New Towns (Young Cities).

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Objectives

– development of a pertinent and scientific strategy for the assessment and evaluation of the qualitative and/or quantitative effects due to the proposed measures
– set up of measurable indicators for each team that will be completed with data
– permanent adaptation and update to the current status
– provision of a constant flow of information, permanent discussion as well as feedback

Data Collection – Evaluation Matrix

– tool needed to allow for lucidity and to enable everyone to check the ongoing status of the New Town Project (YC)
– development of complex matrices: **Objective – Strategy – Measure – Output – Indicator – Target Value – Measuring Method**

Stepwise Handling of the Data for Visualisation and Dissemination

Step 1: Original Data Set

SD	Dimension	WP	Objectives	Strategies	Measures	Impact	Impact Indicators	Objective Indicators	Target Values	Measuring Methods
Strategic Dimension 1	Urban Planning and Urban Design	1. Mixed-Use Schemes	Reduction of fossil energy use and carbon emissions	Reduction of distance travelled Reduction of energy consumption	Horizontal and vertical mix of uses combined with compact urban form Optimized use of energy through multiple and synergetic use Waste heat utilization Optimized utilization of the capacity of technical systems	Short way structure decreasing motorized traffic Compact multi-use buildings optimizing waste heat utilization and energy-efficiency	Inhabitants/ha, working places/ha (compared to other quarters of HNT) CO_2-emissions per capita and year (compared to other quarters of HNT)	CO_2 in g/capita (compared to other quarters of HNT)	Reduction of CO_2 emissions by 4-7% per capita (BBR, Germany)	Simulation and comparing results with realized projects

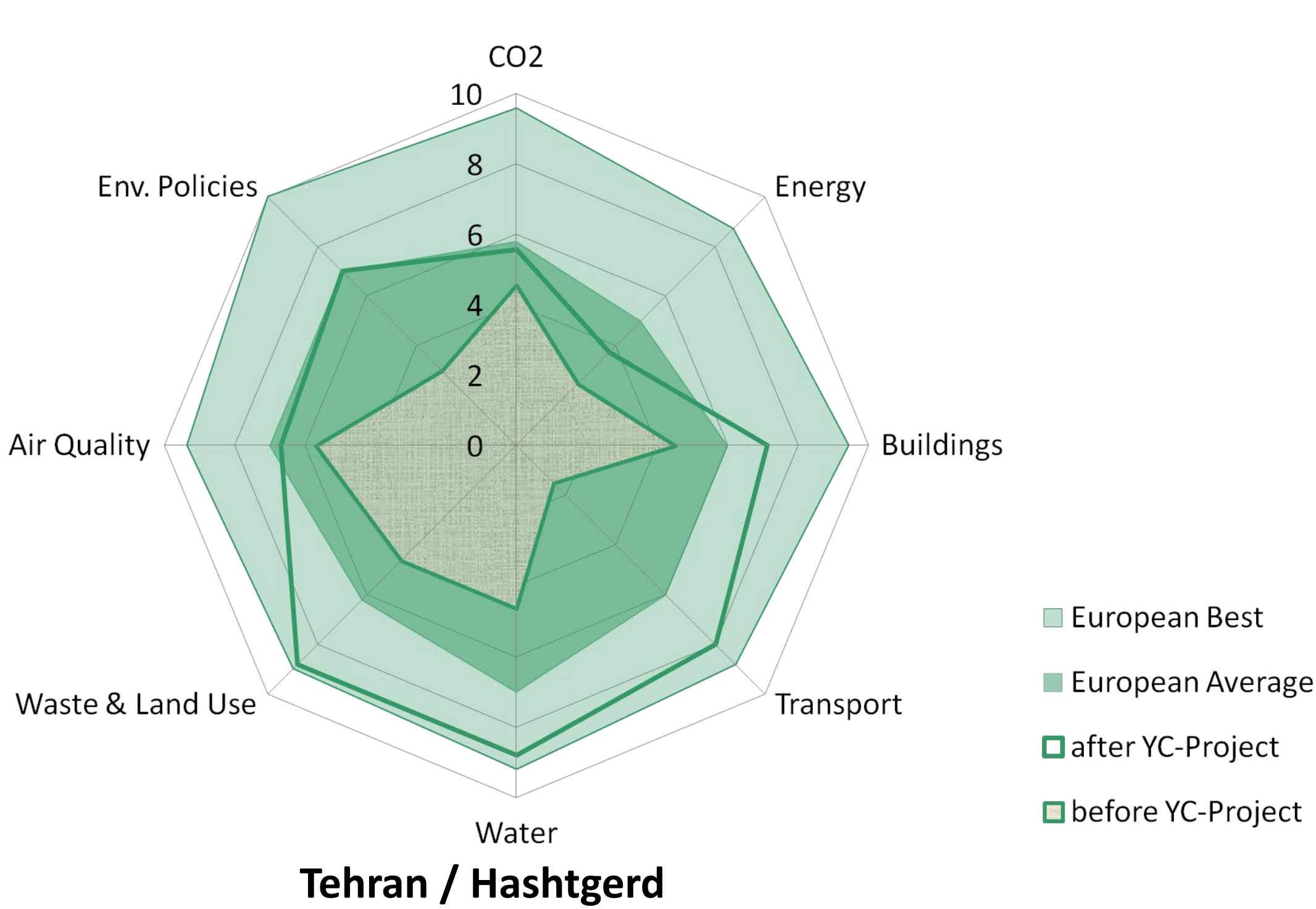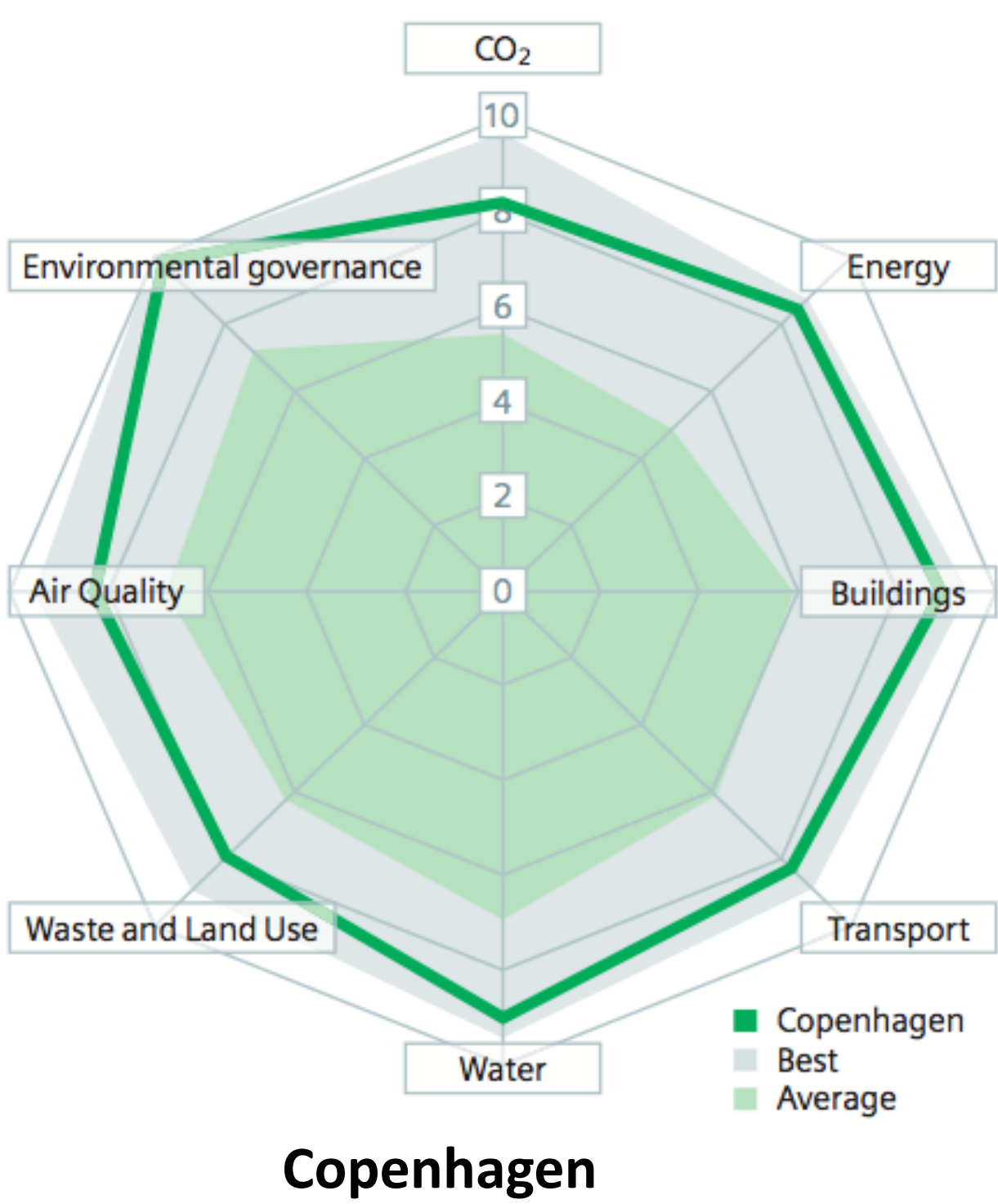### Step 2: Condensed Matrix of focused Data concerning Sustainability

Strategic Dimension Team	WP	Objective	Target Values qualitative / quantitative	Contribution to Sustainability	Field of Sustainability
Urban Planning and Urban Design	1. Mixed-Use Schemes	reduction of fossil energy use and carbon emissions	reduction of CO_2 emissions by 4-7% per capita (BBR, Germany)	saving fossil energy and reduce CO_2 emissions	economy ecology governance

Step 3: European Green City Index (GCI) as a Bechmark for Hashtgerd (YC)

Category	Indicator	Description by the GCI	YC Data	Data of Copenhagen
Energy	consumption	total final energy consumption, in gigajoules per head	67,4 [GJ/head]	80,63 [GJ/head]
Energy	intensity	total final energy consumption, in megajoules per unit of real GDP [€]	8,52 [MJ/€ GDP*]	1,34 [MJ/€ GDP*]
Energy	renewable energy consumption	percentage of total energy derived from renewable sources, as a share of the city's total energy consumption, in terajoules	0,0038 [%]	18,76 [%]

* GDP = gross domestic product

Step 4: Visualisation – Benchmark Copenhagen and Results of the YC-Project

Copenhagen

Tehran / Hashtgerd

European Best
European Average
after YC-Project
before YC-Project

Acknowledgement

Research for a Sustainable Future of our Ecosystems