

Building

Resilient & Sustainable

Cities

in

TURKEY



Stephen Karam, Sustainable Development Sector Leader, World Bank
EMBARQ Türkiye Livable Cities Symposium
Istanbul, November 20, 2013

Why “Sustainable Cities”?

Context

- dramatic demographic growth & pressures on cities
- high energy demand, high energy import reliance
- increasing congestion and challenges to livability
- informal housing, disaster risk and housing affordability issues

Relevance

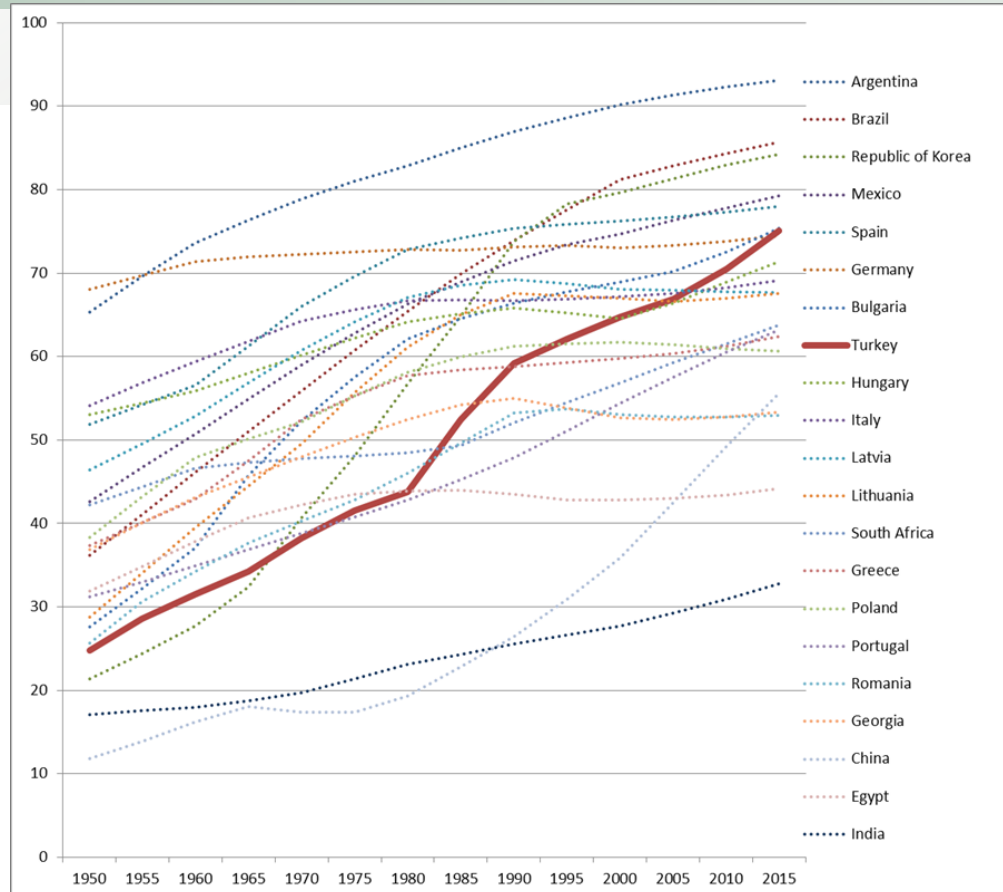
- economic growth and competitiveness
- new metropolitan municipalities will need to plan at higher scale
- cost savings & resource mobilization
- energy efficiency gains



Why “Sustainable Cities”?

Because demographic growth poses critical challenges

- Turkey’s rapid urbanization has transformed the country demographically and economically. Urban population has grown from 25% (1950s) to 77% (today).
- Urban growth country-wide is now tapering off from 4% to just over 2% annually, but sustained high level of growth in second tier metropolitan cities.

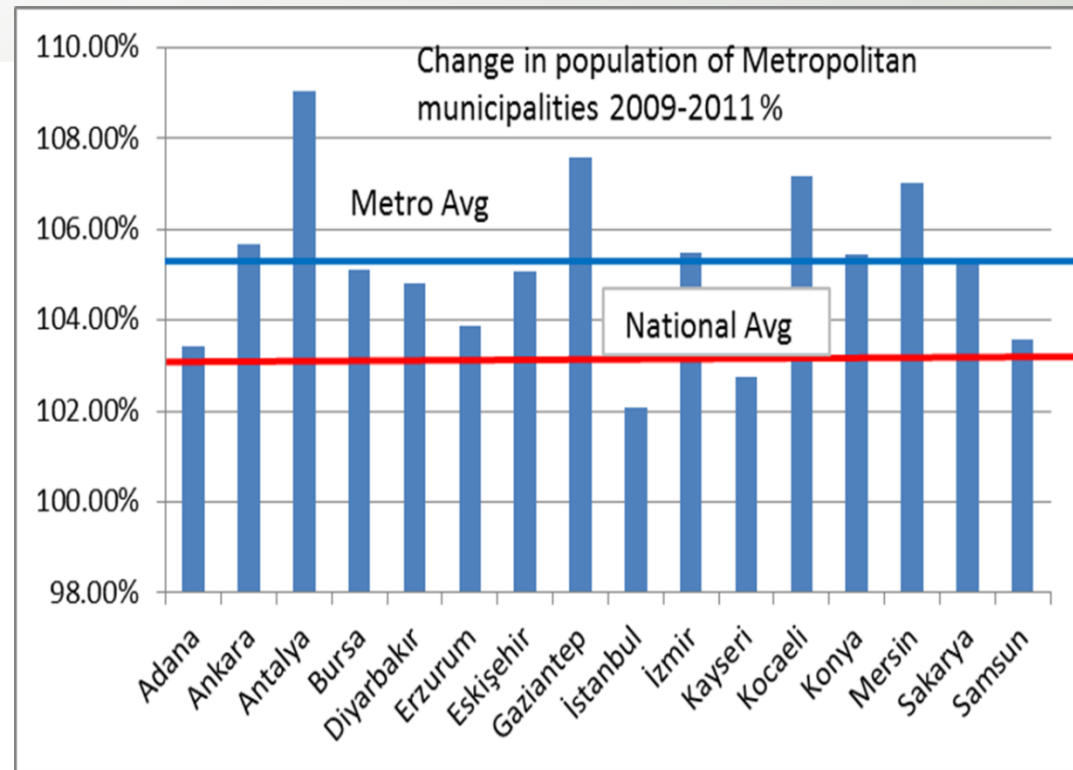


Why “Sustainable Cities”?

Because growth is happening in 2nd tier cities with less capacity

Targeting Strategies: Which cities have been transformed the most and would need support through that transition?

Second tier Metropolitan Municipalities stand out – They grew at an average of over 5% compared to the national average of 3%



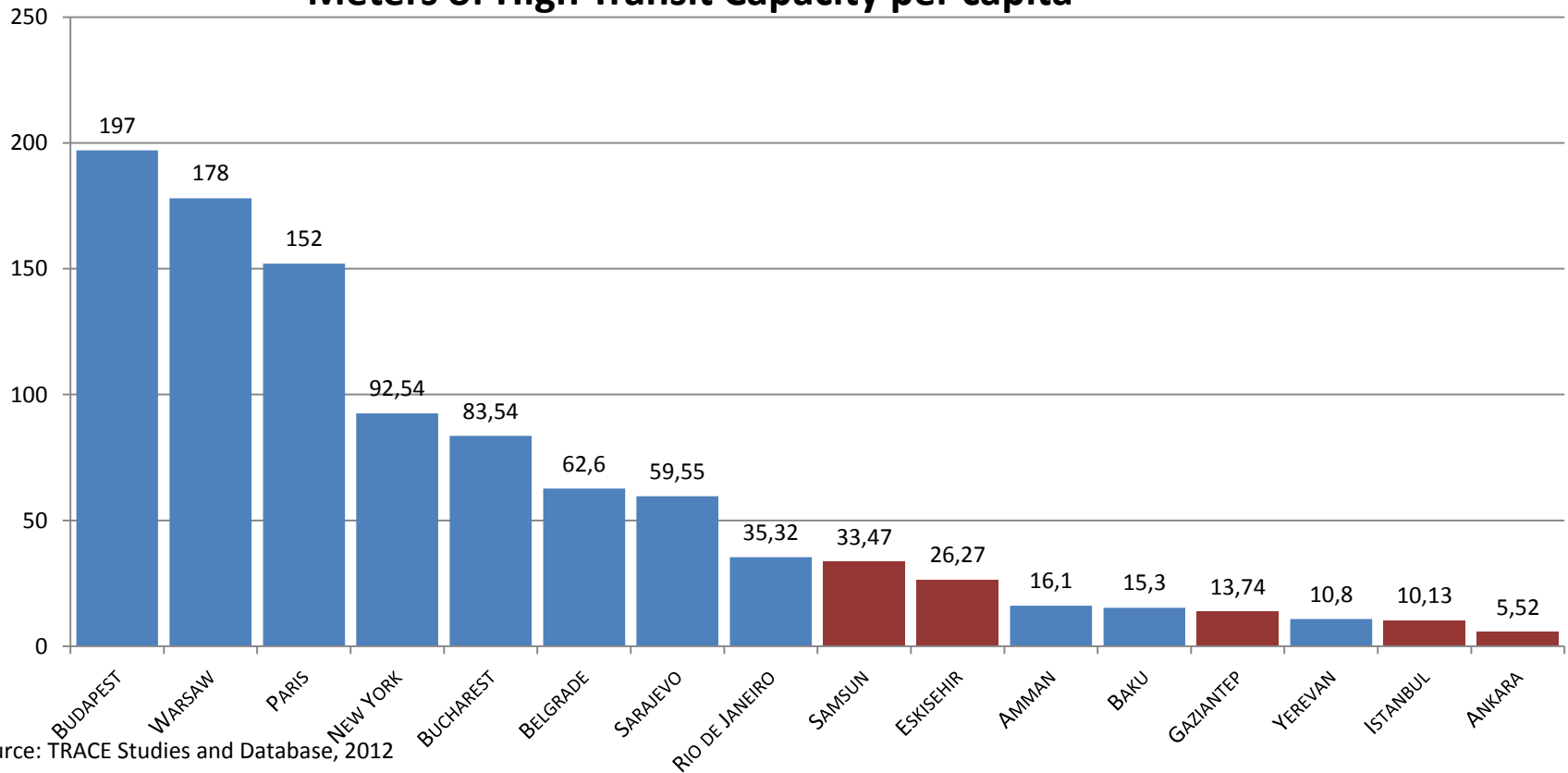
Source: TURKSTAT Data



Why “Sustainable Cities”?

Because urban transport options have not kept pace with growth

Meters of High Transit Capacity per capita



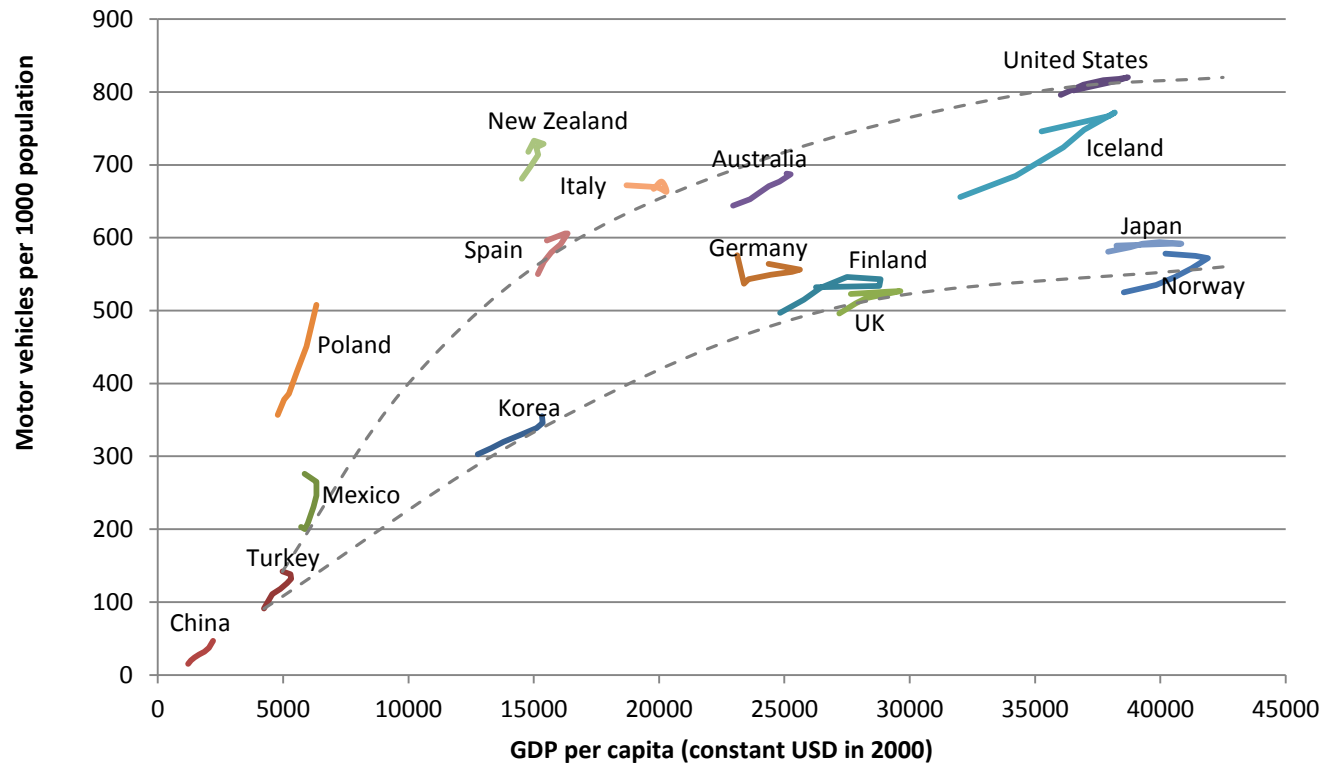
Source: TRACE Studies and Database, 2012



Why “Sustainable Cities”?

Because motorization rates are increasing and mobility declining

- **Motorization Rates in Turkey are increasing exponentially.**
- Over the last 30 years the ratio has increased from 15 to 190 cars per 1,000 people
- Turkey’s current path is along the lines of the US, New Zealand and Australia, which are heavily dependent on personal vehicle transport



Source: World Bank Data

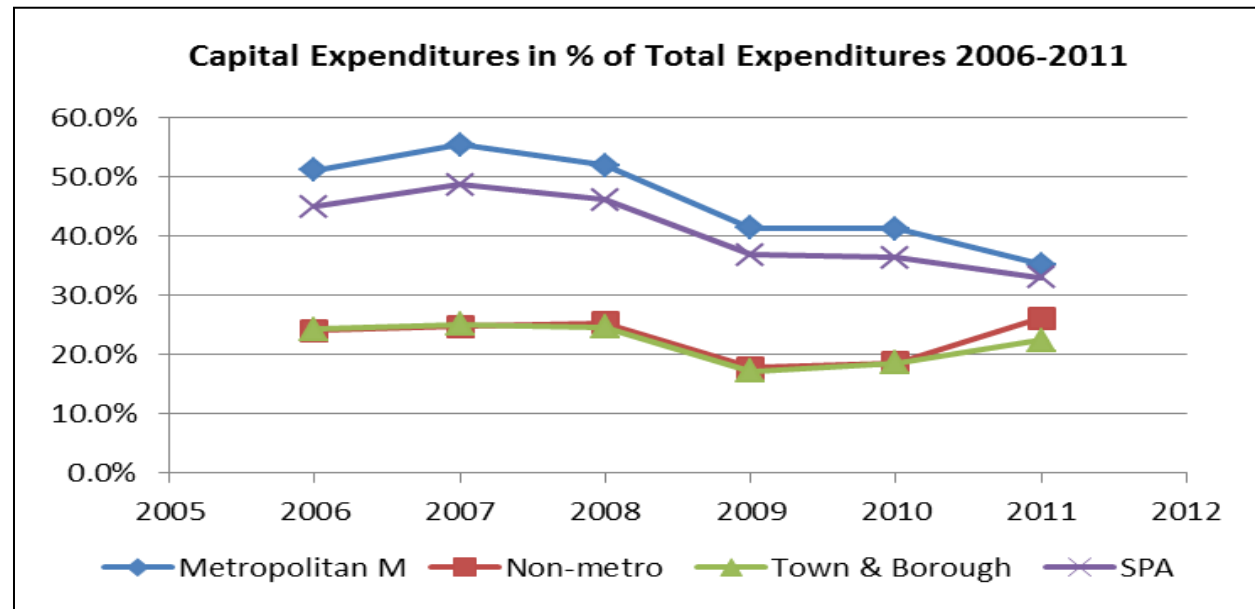


Why “Sustainable Cities”?

Because finances and investment are as critical as infrastructure

Worrying trend: Four year decline in CAPEX relative to total expenditures

- ***Are metropolitan cities adequately financed?***
- and addressing their capital investment needs?
- Capital expenditures have been in decline relative to total expenditures over the last four years



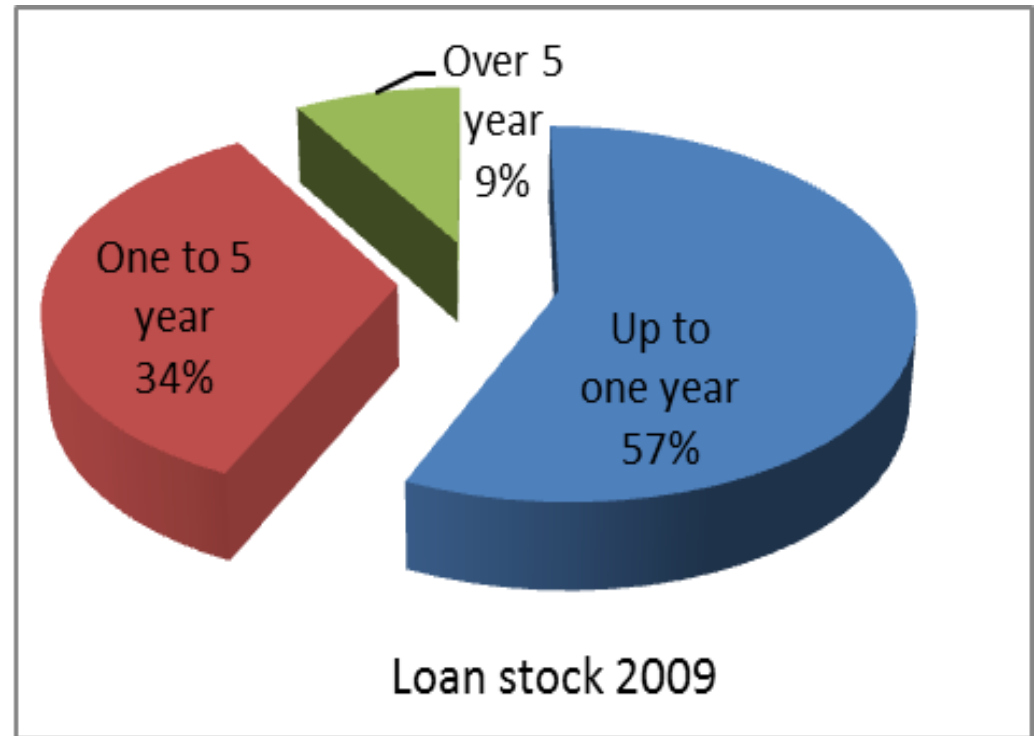
Source: Ministry of Finance Budget Data



Why “Sustainable Cities”?

Because short-term financing doesn't finance long-term needs

- Over 50% of the current debt stock in the municipal sector is committed to short term maturities
- Such financing is insufficient to cover long-term investment needs
- **Inter-generational equity**: Should today's city residents pay for future generation uses?



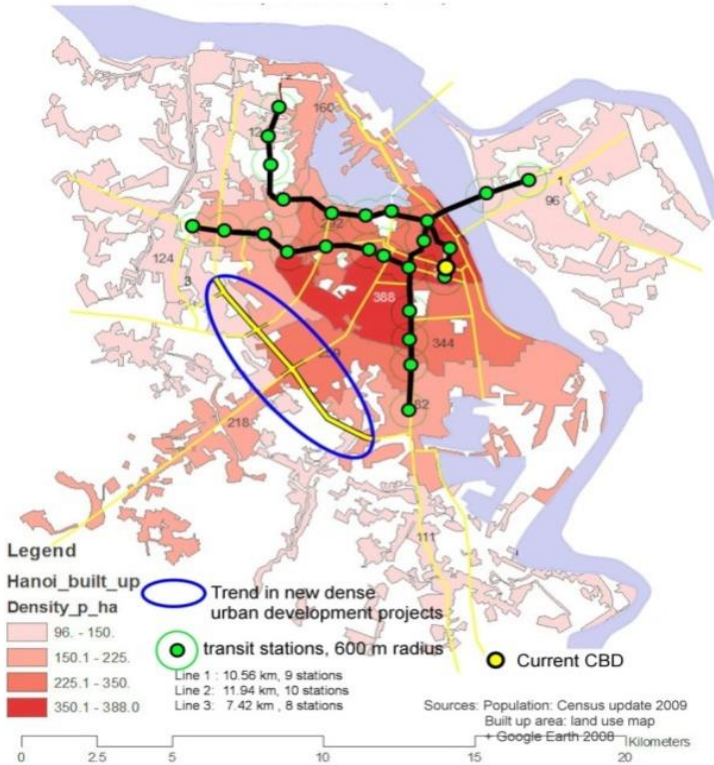
Source: Iller Bank Annual Report, 2011



Why “Sustainable Cities”?

Because as cities grow they need to plan to avoid costly problems

Hanoi - Projected Mass Transit Network and densities in 2009



Why “Sustainable Cities”?

Because Turkey’s Cities represent a great cultural patrimony

- **KONYA:** A spiritual city with claims to have the oldest city plan and largest city round-about
- **ISTANBUL:** A monumental city with one of the oldest underground transit lines
- **SANLIURFA:** The “Glorious” City with roots to the early Caliphate Period
- **ANCIENT CITIES:** Legacy of world civilizations. Home to the legend of Gilgamesh (Karkemish), Sumerian, Hittite, Roman, Byzantine, Seljuk, and Islamic civilizations



What Have We Learned ?

Those who think only of “stones and concrete” when it comes to city planning need to re-evaluate their ideas and create cities that have souls and direction.

PM Recep Tayyip Erdoğan, Today's Zaman, April 2, 2013

Key elements of successful sustainable cities

- enabling national policy environment
- strong city leadership, vision, and long term comprehensive strategy
- integrated city planning, involving a multi-sector approach
- innovative project ideas, backed by financing
- implementation, enforcement, and good governance



Shaping Sustainable Cities Together

Principles

- a city-wide scope for sustainable development
- a long term, strategic planning focus over 20 years in 5 year increments
- moving beyond “one-off” investments to city-wide strategic planning

Modalities

- SC diagnostics, capacity building for SC Action Plan
- Database: collection, benchmarking, performance monitoring
- integrated planning – Comprehensive Development Plan
- lifecycle costing of investments in priority areas



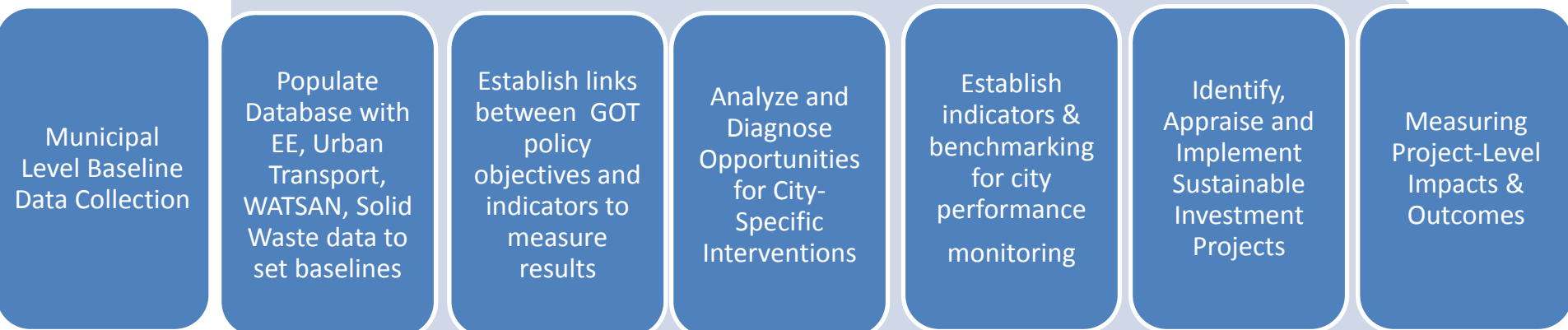
Turkey Enabling Legislation/Policies

- **10th National Development Plan (2014-2018):** Issued in June 2013 calls for livable cities and sustainable environment
- **Climate Change Action Plan (2011-2023):** Turkey aims to integrate climate change-related objectives into its development policies, emphasizing clean energy, energy efficiency, and providing citizens with a high quality of life and welfare with low carbon density
- **Amended Metropolitan Municipality Law No. 6360 (December 2012):** Adds 14 new MMs with significant planning challenges and opportunities, as well as new administrative arrangements and financing
- **Energy Efficiency Law (2007):** Affects building codes and municipal building permitting and certification
- **Privatization of Electricity Distribution (2013).** Cost of public lighting will fall to municipalities – but also provide important incentives for energy efficiency

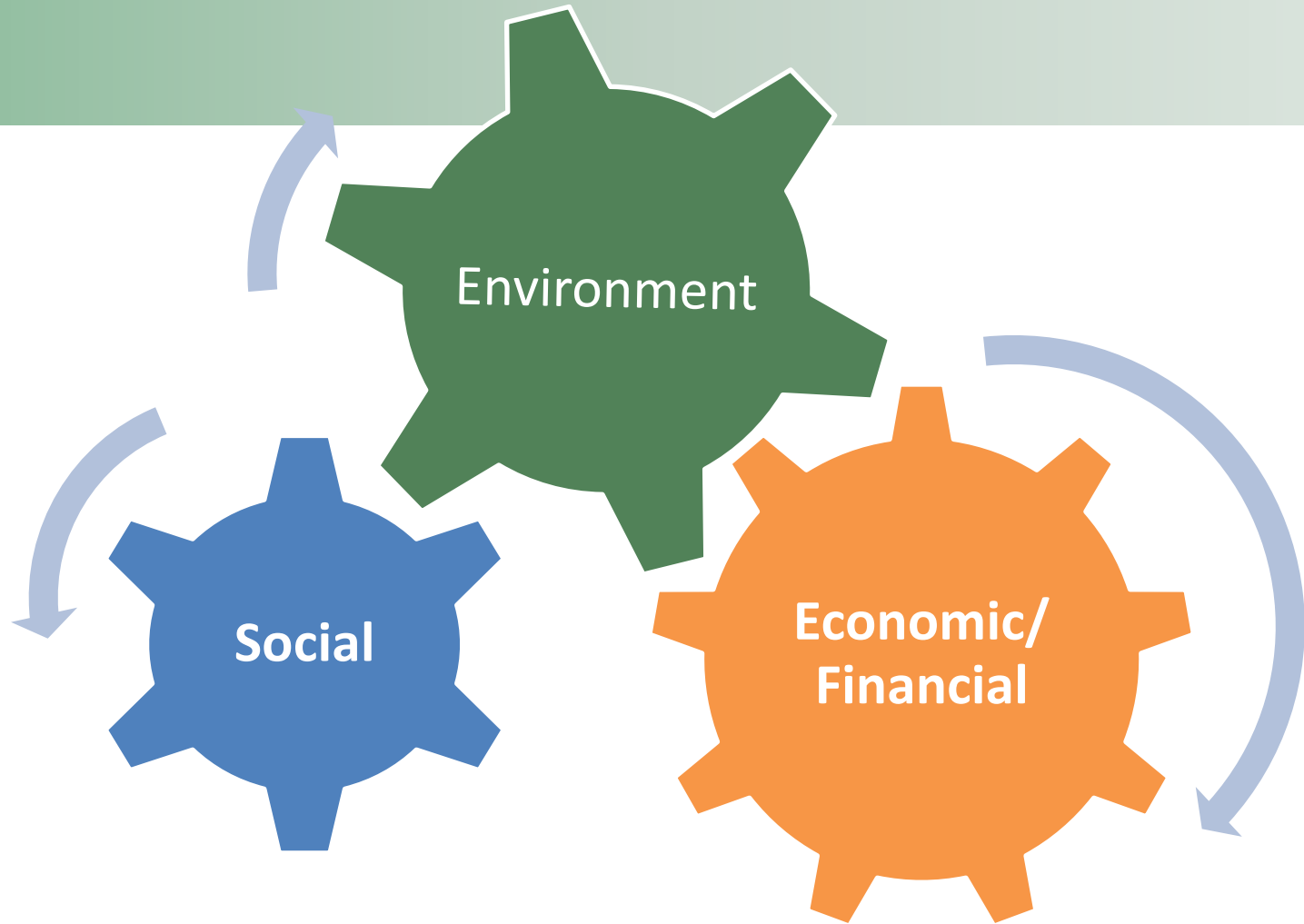


Linking SC Program with National Policy Objectives

“What does not get measured, does not get done.” Peter Drucker, International Management Expert



Three Key Elements of Sustainable Cities



Environmental Sustainability

Potential Areas for Intervention

- **Energy Efficiency & Renewables:** Turkey is heavily reliant on imported energy which accounts for 6% of GDP – *Cities account for, on average, 70-80% of a country's energy consumption*
- **Water Management & Conservation:** Measures to reduce NRW losses – Turkey is a water surplus country but at risk of becoming a water deficit country – *NRW is as high as 50% or more in some cities*
- **Resilience to Natural Disasters:** Turkey has high exposure to seismic risk and unplanned buildings and development that put populations in harm's way
- **Smart Urban Transport.** Mass-transit options that are cost effective
- **Solid Waste:** Turkey has high levels of emissions attributable to solid waste combustion. Recycling and disposal/conversion options



Buildings



ENVIRONMENTAL SUSTAINABILITY

Housing accounts for some 60-70% of a city's energy consumption. Municipalities play a critical role in issuing building licenses under Turkey's new Energy Efficiency Law. How can they be influenced to support national policy objectives?

ENVIRONMENTAL SUSTAINABILITY

Gaziantep has a very costly pump-based water supply system (TRACE). Conversion to a gravity-fed system could reduce its long-term recurrent costs



ENVIRONMENTAL SUSTAINABILITY

Electricity distribution will be fully privatized by end-2013. Municipalities will be responsible for payment of their public lighting bills beginning in 2015. Are they ready? Would investments in energy-efficient lighting better help them transition? They say: YES



Financial Sustainability

Potential Areas for Support

- Improving credit-worthiness (Shadow Credit Ratings)
- Improving multi-year capital investment planning (CDP & Toolkit)
- Strengthening intergenerational equity in finance (MF Handbook)
- Providing long-term financing (Iller Bank, IBRD and other IFI funds)
- Conducting life-cycle costing for investments (ECO2 Cities Handbook)
- Strengthening cost recovery (Municipal Finance Credit Enhancement TA)
- Generating cost savings from energy efficiency gains (TRACE)
- Achieving higher economic return on investments (WB advisory services)



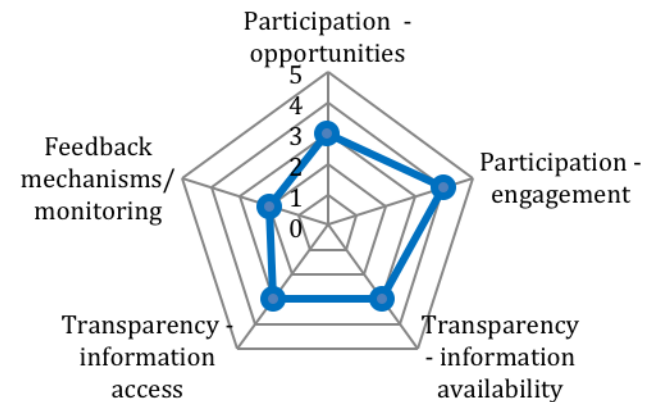
Social Sustainability

Potential Areas for Support

- Citizen participation in GPS mapping of service needs
- Support centers and facilities for 'homeless' children
- Citizen report cards and service feedback mechanisms
- Access to services of disadvantaged groups: physically disabled, women, affordable transport for low income households

** Social Sustainability Diagnostics will identify key challenges at the city level and prospective solutions

Social Sustainability Performance



SCP: Component One

Sustainable City Planning and Management Systems

- **Preparing Comprehensive Development Plans, including:**
 - Developing strategic vision
 - Spatial/land-use planning designations
 - Environmental planning factors
 - Assessment of housing stock, affordability and demand
 - Urban Transport Plan
 - Planning and provisioning for green space
 - Infrastructure inventory with projected long-term needs
 - Energy Efficiency Measures
 - Preparation of multi-year capital investment plan
- **Development of GIS System to monitor and maintain infrastructure network**



SCP: Component Two

Municipal Investments within a SC Action Plan

- Urban Transport: BRT/Municipal buses, TRAMs, Trolley buses, road/corridor development, pedestrian walkways, bikepaths, municipal parking garages, intersection and choke-point improvements, synchronized traffic light systems, traffic management systems
- Energy Efficiency/Renewables: Public lighting, municipal building retrofitting, water supply systems, urban transport
- Water Supply and Wastewater: Water purification, water supply and sanitation network rehabilitation and extension, wastewater treatment plant (extension, upgrade or new facility)
- Solid Waste: Closing of uncontrolled dump sites, new sanitary landfills, waste-to-energy options, recycling



SCP: Component Three

Project Management and Institutional Capacity Building

- Supporting Ilker Bank's internal departments to promote sustainable cities: urban transport, energy efficiency, water/sanitation, waste
- Enhancing Ilker Bank's municipal credit analysis and portfolio management systems
- Developing a Database for participating Sustainable Cities to establish baseline indicators, sustainable cities index and performance targets
- Developing SC Guide: Sustainability goals and methods, Diagnostic Tools, alternative analysis, economic/financial analysis
- Overall Project Management and Implementation Support to Ilker Bank



Diagnostic Tools: Energy Efficiency Focus

Why TRACE?

Developing countries will triple their built-up area

Almost $\frac{3}{4}$ of energy use and GHG will come from cities

Buildings alone account for 35-40% of global energy use

81% of urban energy demand increases will come from non-OECD cities

Transport accounts for 25-30% of energy demand

Turkey is an energy dependent country with growing demand



Diagnostic Tools: Energy Efficiency Focus

What is TRACE?

A practical tool for conducting rapid assessment of energy use in cities to identify and prioritize sectors, and suggest specific energy efficiency interventions with 3 principal components:

1. A city energy benchmarking tool
2. A process for prioritizing sectors that offer the greatest EE potential
3. A 'playbook' of tried and tested EE recommendations



Diagnostic Tools: Energy Efficiency Focus

What is TRACE? The TRACE Tool

Energy Efficient Cities Initiative
Tool for Rapid Assessment of City Energy

 Save

Energy Benchmarking

Compare the performance of your city to others



Benchmark Data



Benchmark Results

Sector Prioritization

Identify the sectors with highest priority



Relative Energy Intensity



Sector Energy Spending



City Authority Control



Sector Priority Results

Energy Efficiency Recommendations

Find ways to improve your city's energy efficiency



Recommendations



Initial Appraisal



Energy Savings Assessment



Review



ESMAP
Energy Sector Management Assistance Program

happoldconsulting



User Guide & Documents

Diagnostic Tools: Energy Efficiency Focus

What is TRACE? The TRACE Tool

- 59 Recommendations in total
- Mix of strategic programs and specific sector activities
- 191 case studies with hyper-links to other resources and tools
- Each recommendation 'rated' on three attributes: *Energy Savings Potential, First Cost, Speed of implementation*

Water and Wastewater Calculator Assumptions

These figures are referenced in all of the calculator and can be altered by the consultant as required.

Background Information

Cost of electricity (\$/kWh)	0.15
Cost of electricity at discounted tariff (\$/kWh)	0.1
Sector Energy Spend (\$)	17000000

Pump & Motor Upgrade Calculator

Recommendations Reference: 01 Improve Efficiency of Pumps and/or Motors

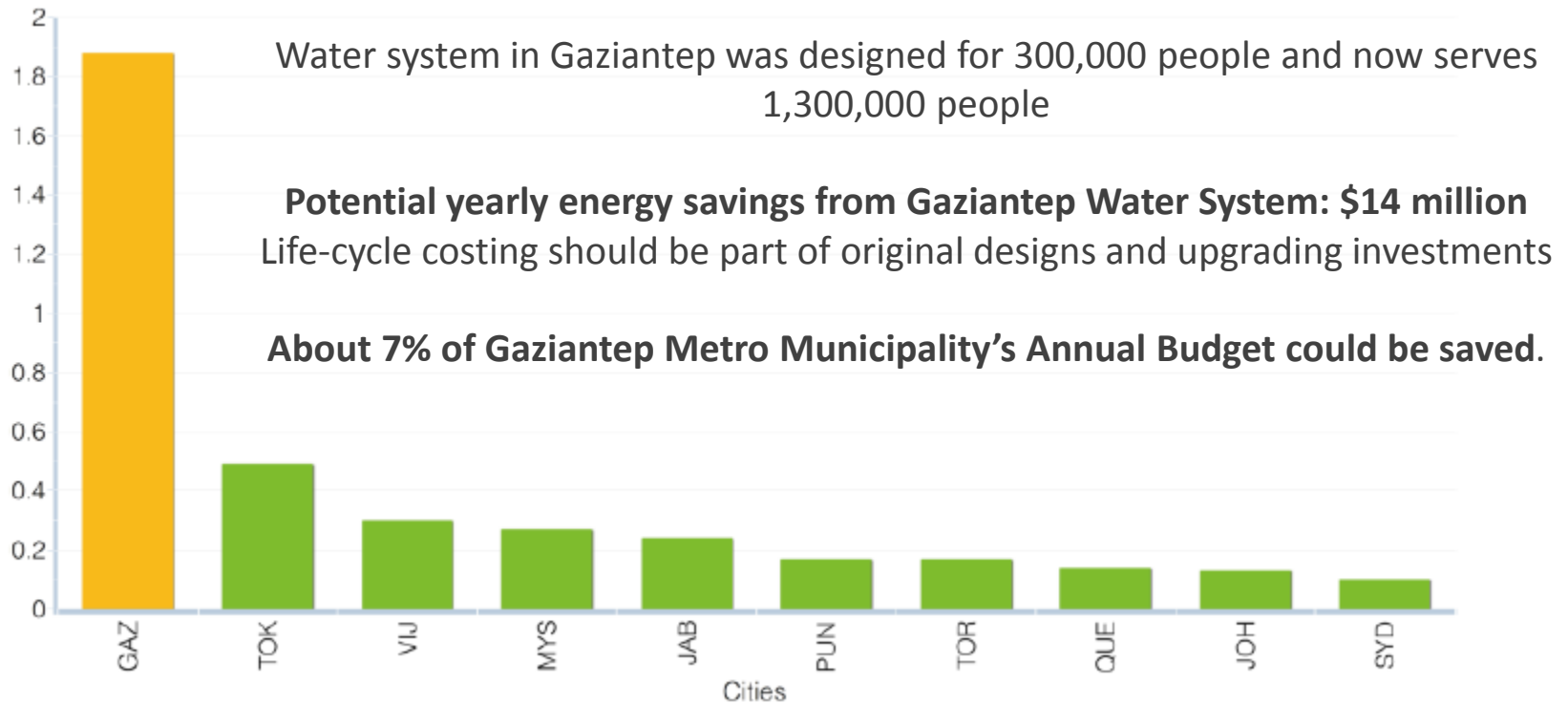
Attributes	Current Energy Consumption							Post-Upgrade Energy Consumption							
	Model	Flow Capacity (m3/h)	Pump Efficiency	Differentia Head (m)	Hours of Operation per day	Total Flow per day (m3/day)	Total kWh per day	Model	Flow Capacity (m3/h)	Pump Efficiency	Differentia Head (m)	Hours of Operation per day	Total Flow per day (m3/day)	Total kWh per day	
Pump1		360	60%	10	2	720	32.70		360	60%	10	2	720	32.70	
Pump2		120	60%	10	1	120	5.45		120	70%	10	1	120	4.67	
Pump3		40	60%	10	1	40	1.82		40	80%	10	1	40	1.36	
Pump4															
Total						880	40						880	39	
Total Energy Savings						450 kWh / annum									
Percentage Improvement						0 %									
Total Cost Savings						774 \$ / annum									



Diagnostic Tools: Energy Efficiency Focus

Gaziantep TRACE Results

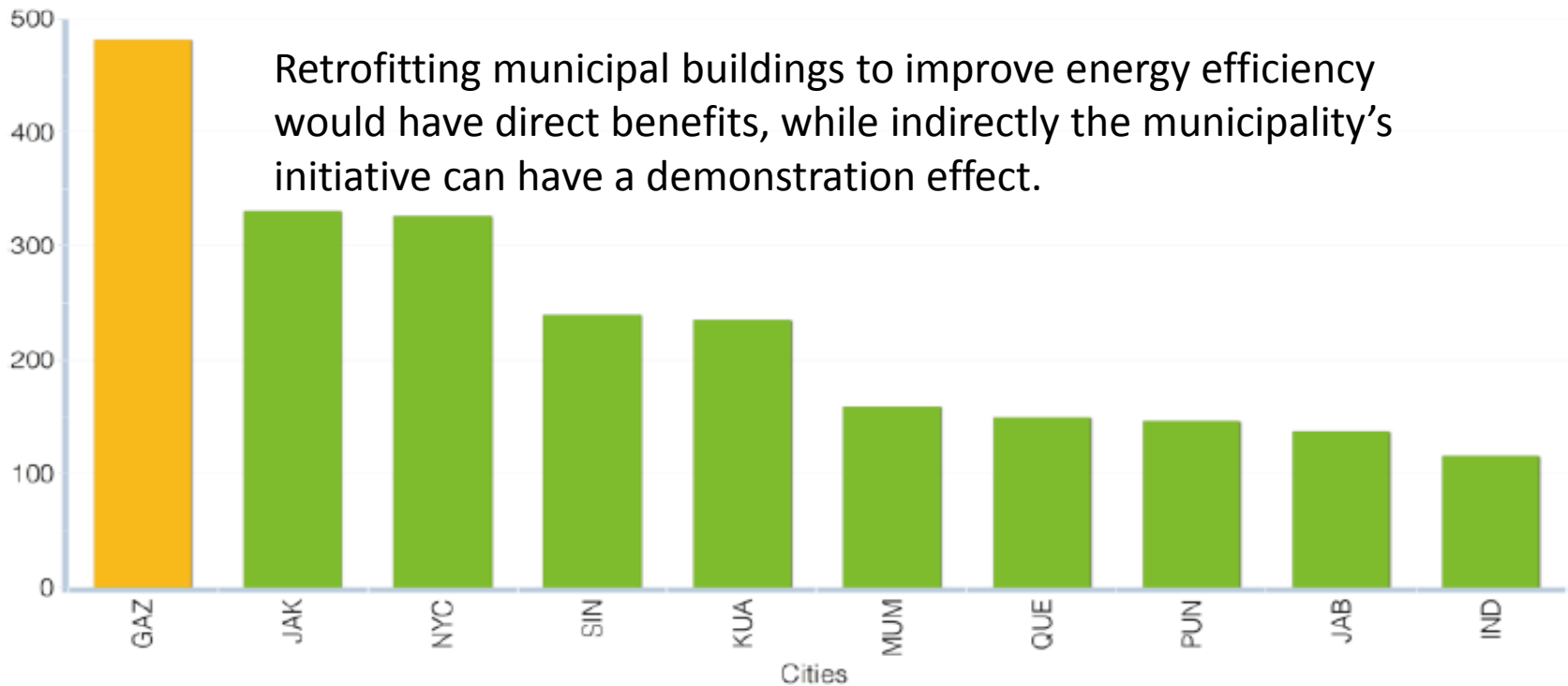
Energy Density of Potable Water Production in Gaziantep (kWh/m³)



Diagnostic Tools: Energy Efficiency Focus

Gaziantep TRACE Results

Municipal Buildings Electricity Consumption (kWh/m²) in Gaziantep



Teşekkür ederim

THANK YOU

Stephen Karam

Sustainable Development Sector Leader

World Bank – Turkey Country Program

skaram1@worldbank.org

