ESMAP Knowledge Exchange Forum With Bilateral Agencies

AFD, Paris, November 27-28, 2012

Ivan Jaques

TRACE Case Studies



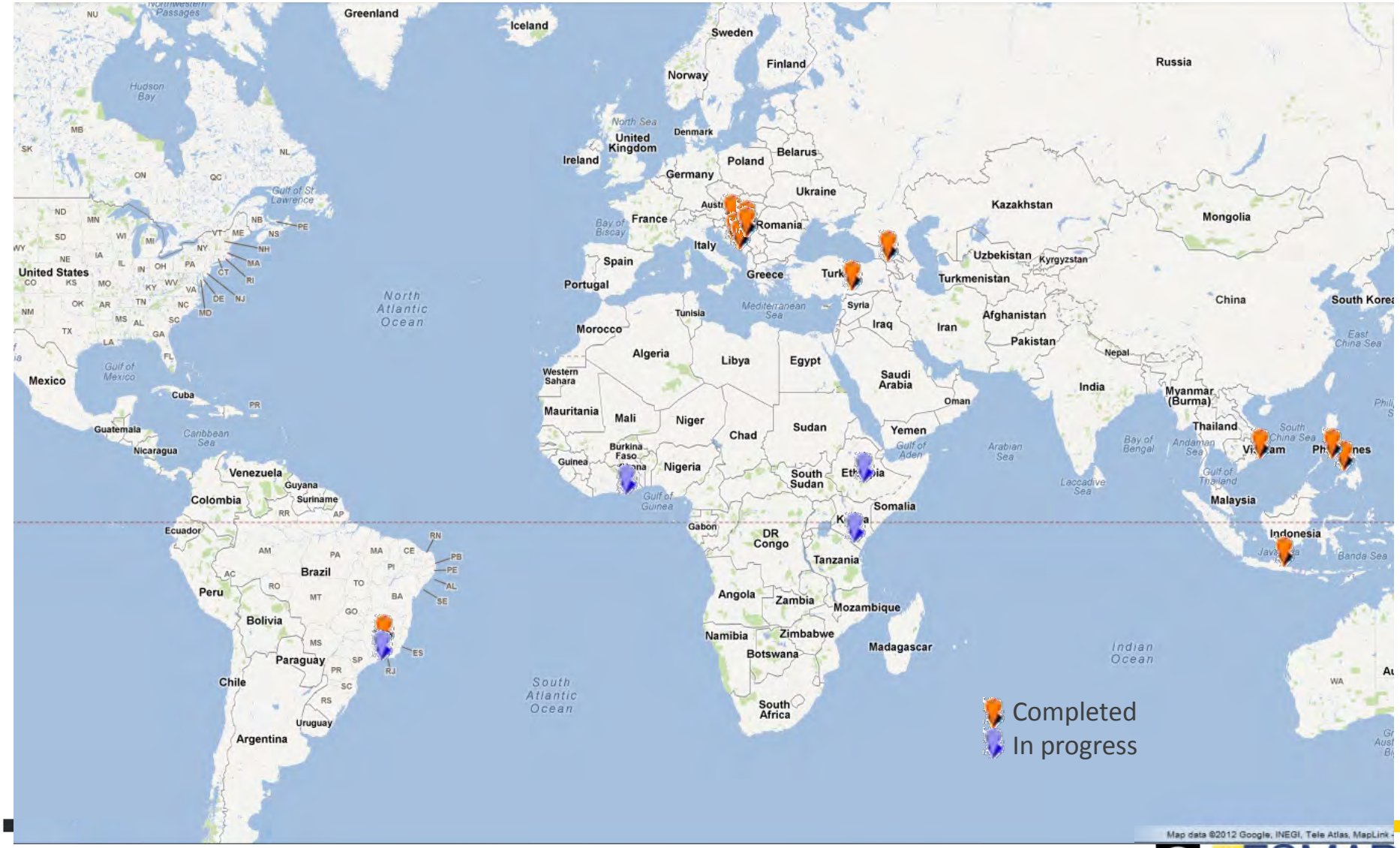


Agenda

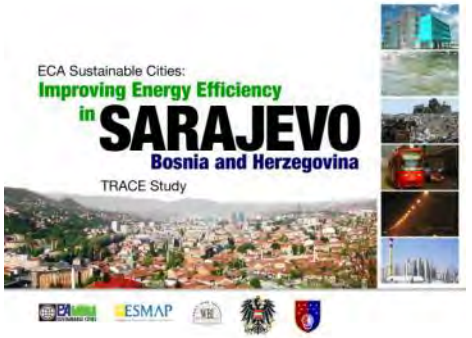
- Where has TRACE been deployed?
- How is TRACE helping identify key sectors and actions?
- What are the key issues?
- What have we learnt?
- TRACE as part of a comprehensive strategy:
  - Europe and Central Asia: Sustainable Cities Initiative
  - East Asia and Pacific: Sustainable Energy and Emissions Planning (SUEEP)
  - Latin America and the Caribbean: Rio Low Carbon Development Program
  - Africa: Urban Energy Efficiency Development in Sub-Saharan Africa

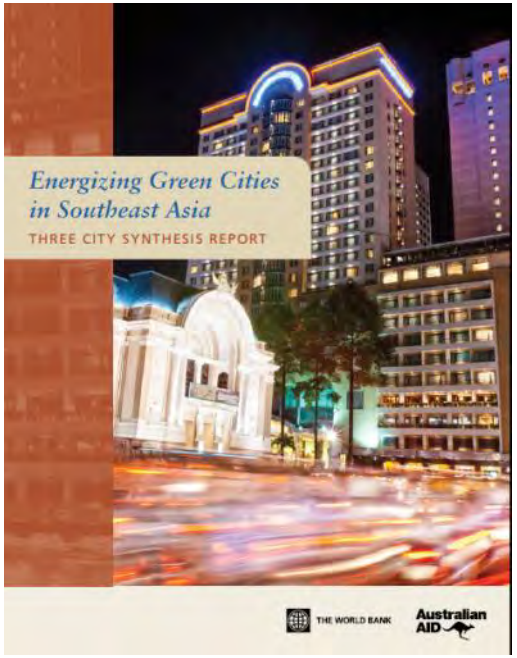
TRACE DEPLOYMENT

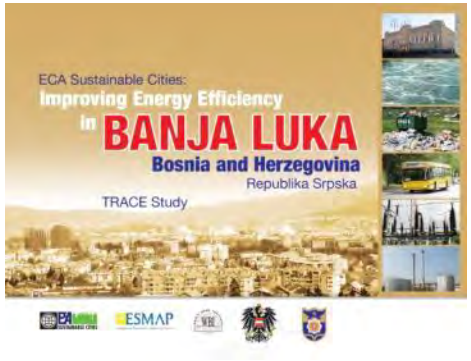
TRACE deployment

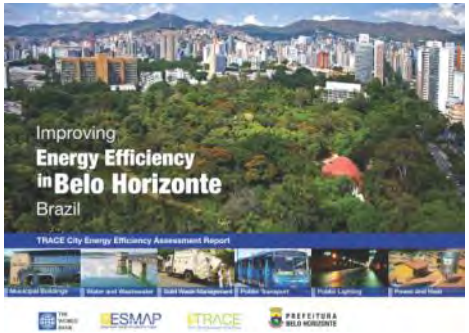


TRACE









ESMAP
Energy Sector Management Assistance Program

HOW IS TRACE HELPING IDENTIFY KEY SECTORS AND ACTIONS? EXAMPLES IN ECA

Energy Efficient Cities

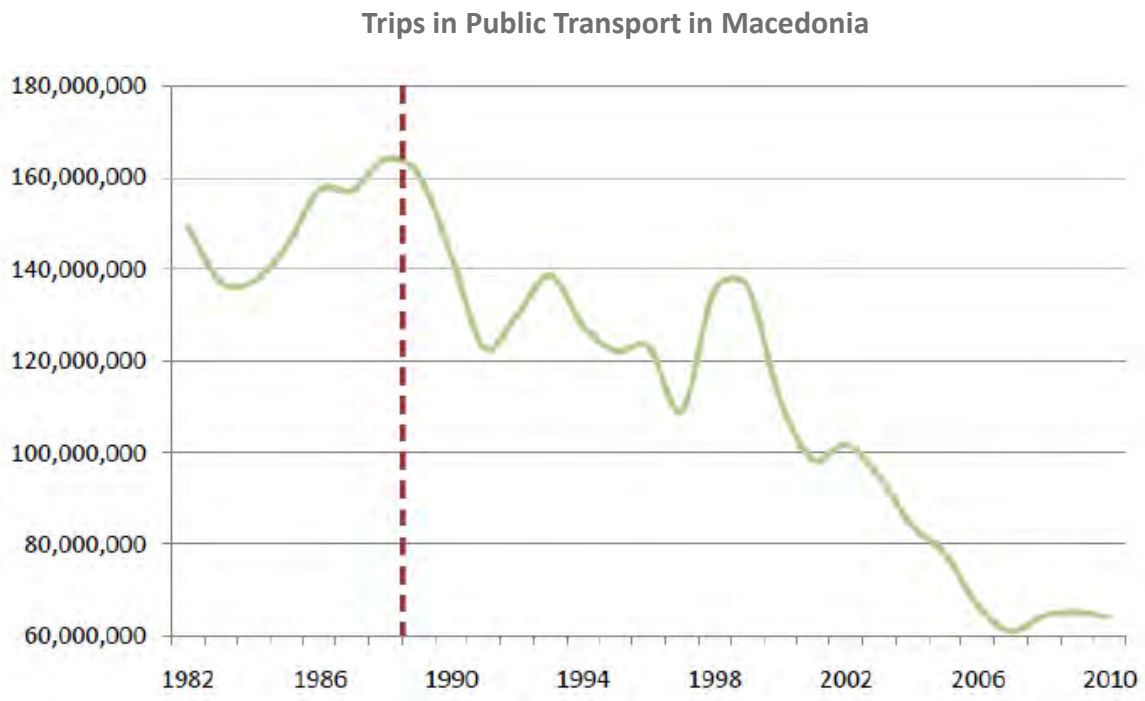
Urban Transport

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Urban Transport

Many cities in ECA are faced with widespread deterioration of existent public transport infrastructure and dramatic increase in number of private vehicles



Source: Statistical Yearbook of the Republic of Macedonia, 2011

…Tbilisi (Georgia) completely lost its tram network

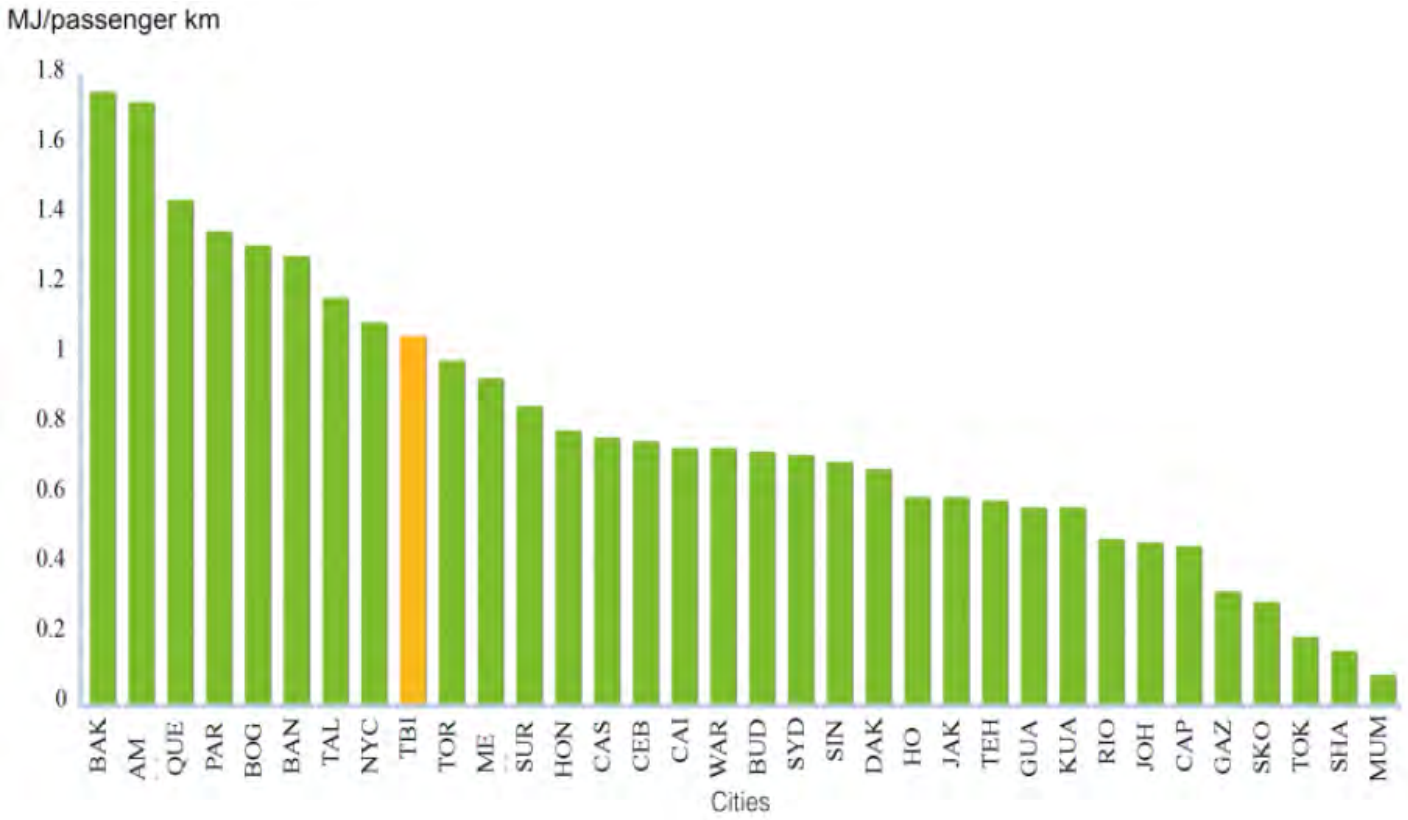
Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Urban Transport

Often, existent public transport infrastructure is old and energy inefficient

Public Transport Energy Consumption in Tbilisi



Source: ECA Sustainable Cities. 2011. Improving Energy Efficiency in Tbilisi: TRACE Study

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Urban Transport

City streets and sidewalks are increasingly chocked up with private cars

Congestion in Tbilisi

On-sidewalk Parking in Skopje

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Urban Transport

… however, local authorities in ECA are actively investing in improving public transportation systems

New Buses in Skopje

New Trams in Belgrade

New Buses in Tbilisi

New Trams in Gaziantep

Potential yearly energy savings for Skopje Public Transport System: $4 million

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Urban Transport

… and in non-motorized transport infrastructure

New Bike Paths in Skopje

New Pedestrian Infrastructure in Tbilisi

Potential yearly energy savings for Tbilisi Private Vehicles: $42 million

Source: ECA Sustainable Cities Initiative

Recommendations

	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
Public Transport Development	●●●	●●●	●●●	●●●	●●●	●
Development of Non-motorized Transport Infrastructure		●●●	●●	●		●
Parking Restraint Measures		●●●	●●	●	●	
Traffic Restraint Measures		●●	●●●	●		
Traffic Flow Optimization	●●	●	●	●●		
Municipal and City Bus Fleet Efficiency	●					

Source: ECA Sustainable Cities Initiative

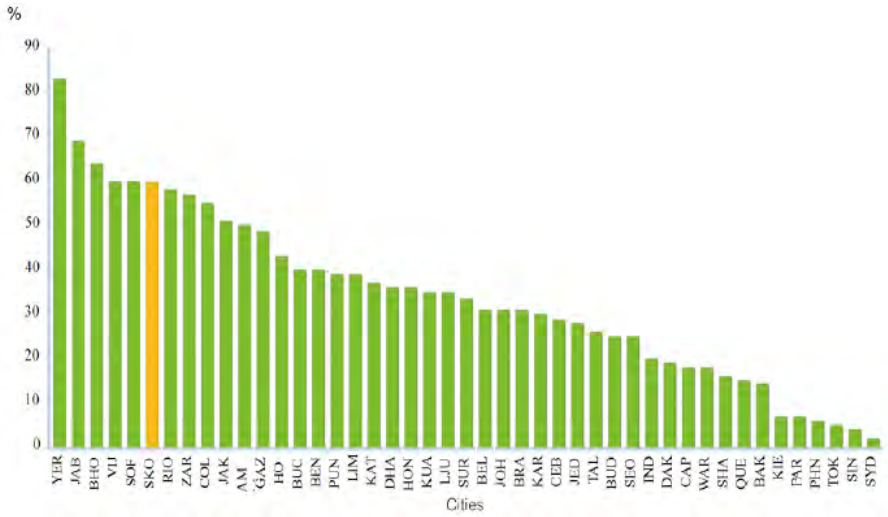
Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

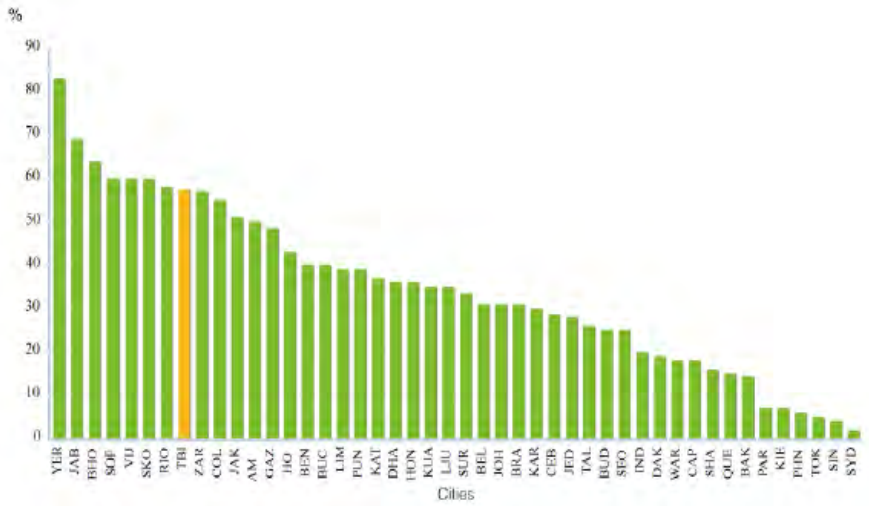
Water and Wastewater

Networks are often improperly maintained and inefficient

Percentage of Non-Revenue Water in Skopje



Percentage of Non-Revenue Water in Tbilisi

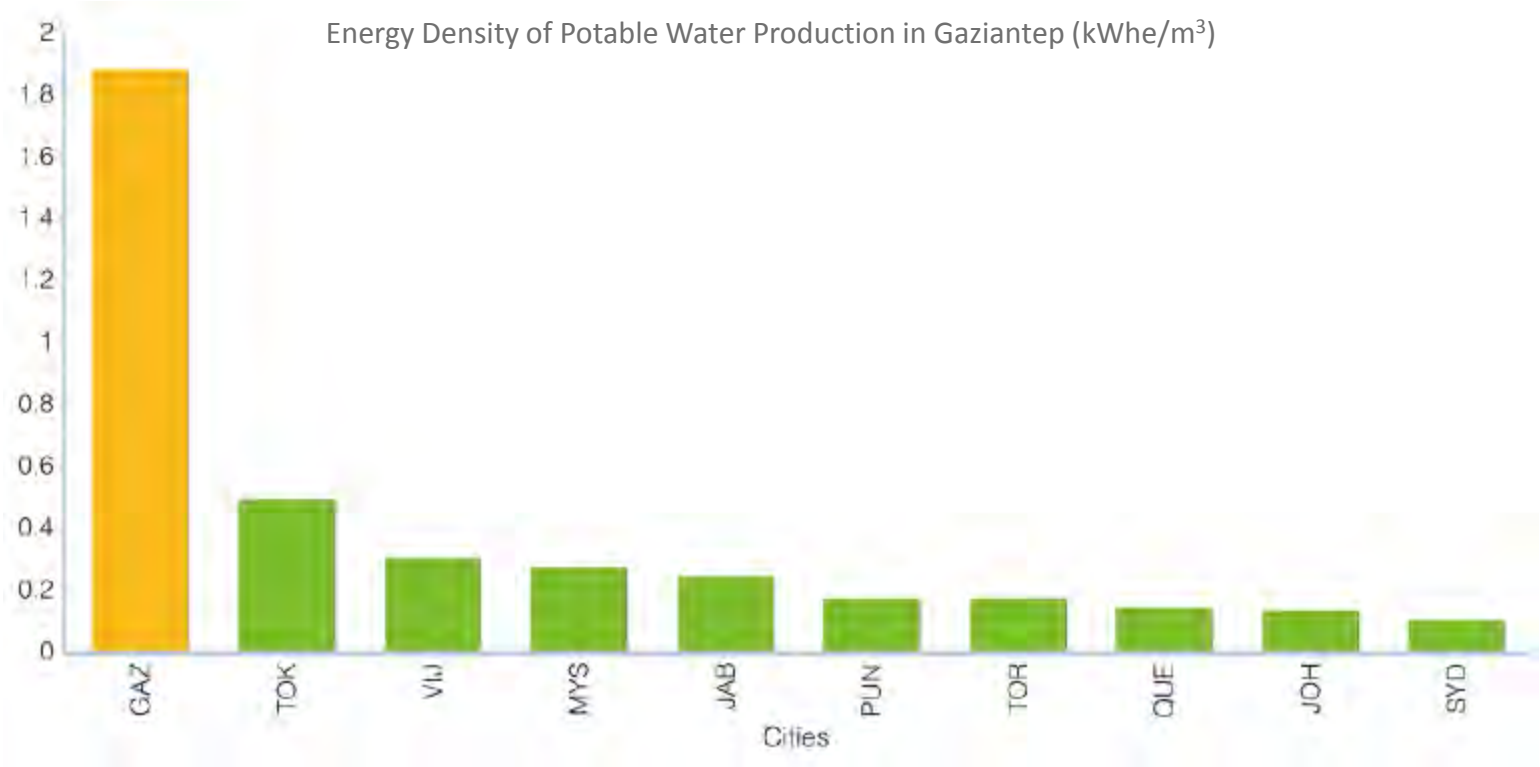


Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Water and Wastewater

Original design, often makes them energy inefficient



Water system in Gaziantep was designed for 300,000 people and now serves 1,300,000 people

Potential yearly energy savings from Gaziantep Water System: $14 million

Life-cycle costing should be part of original designs and upgrade investments.

Source: ECA Sustainable Cities Initiative

Recommendations

	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
Active Leak Detection and Pressure Management	●●●			●●●	●●●	●
Improve Efficiency of Pumps and Motors	●●●			●●●	●●●	●
Water Efficient Fixtures and Fittings	●●					
Improve Performance of System		●●	●●	●●●	●●●	
Educational Measures						●●
Water Meter Program		●●	●●			●

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Solid Waste Management

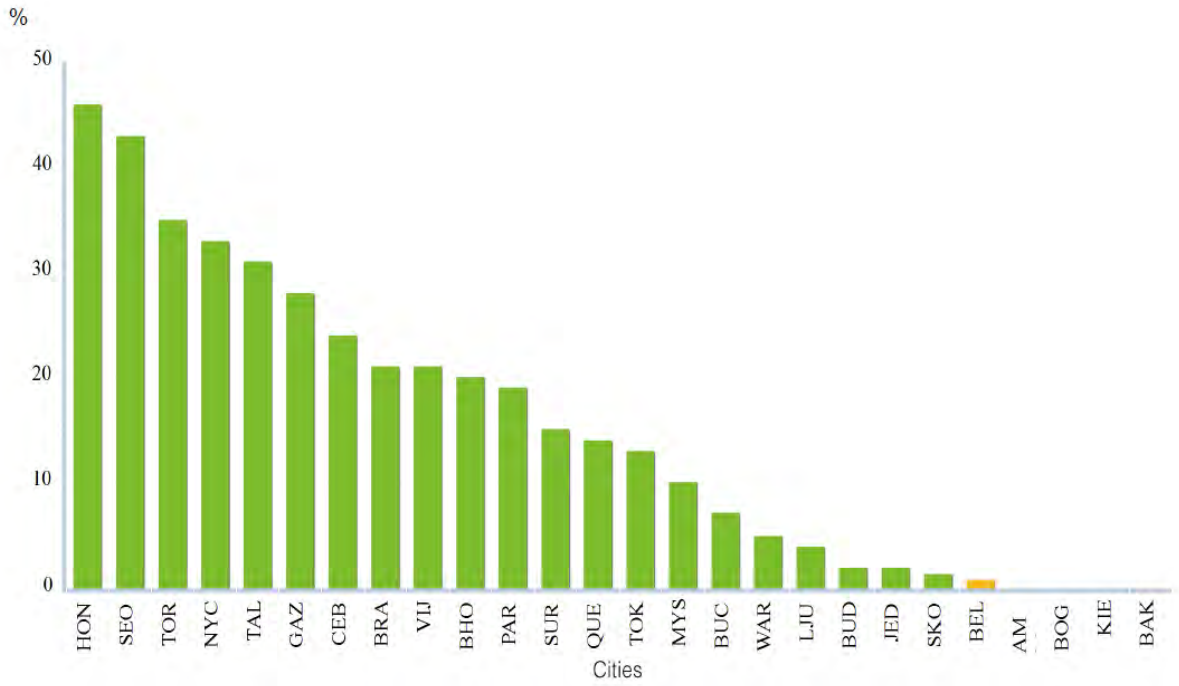
Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Solid Waste Management

Increased consumption and waste generation have put pressures on solid waste management systems (collection, transport, disposal)
… lack of funding leads to system deterioration

Percentage of Waste Recycled in Belgrade



Belgrade lost its recycling system in the transition years… and working on re-building it again

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Solid Waste Management

Many cities invest in energy efficiency improvements of SWM systems

-- mobile transfer station and new garbage trucks in Skopje
-- methane gas capture and electricity generation in Gaziantep
-- new garbage trucks and efficient transport routes in Tbilisi
-- new trucks and underground collection spots in Belgrade

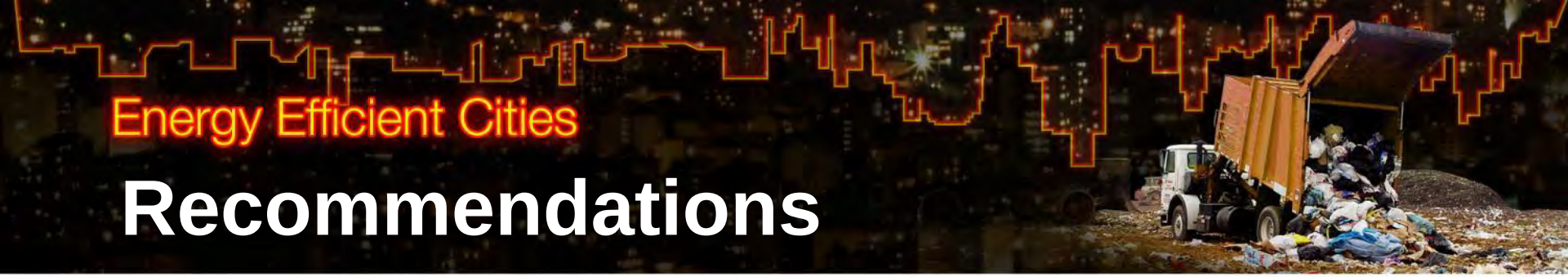
… in addition, all cities invest in development of recycling networks

New Garbage Trucks in Belgrade

New Garbage Trucks in Skopje

Potential yearly energy savings in Skopje SWM System: $500,000

Source: ECA Sustainable Cities Initiative



Recommendations

	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
Landfill Gas Capture		●●	●●	●●	●●	●
Fuel Efficient Waste Vehicle Operation	●	●●	●●		●●●	
Waste to Energy Program						●
Waste Infrastructure Planning					●	
EE Sorting and Transfer Facilities	●			●●●		●●
Intermediate Transfer Stations				●●		

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Municipal Buildings

Source: ECA Sustainable Cities Initiative

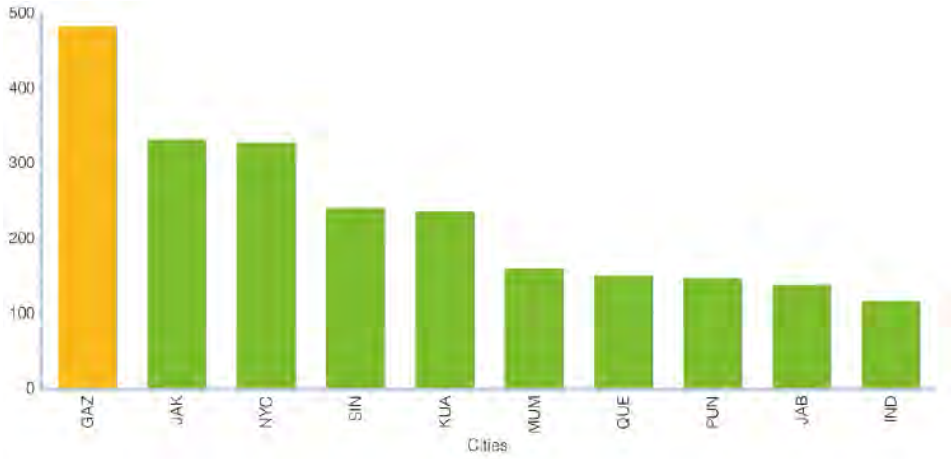
Energy Efficient Cities

Municipal Buildings

The building stock in ECA cities is ageing and often is quite energy inefficient

Heat Profile of Administrative Building in Belgrade

Municipal Buildings Electricity Consumption (kWh/m^2), in Gaziantep



Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Municipal Buildings

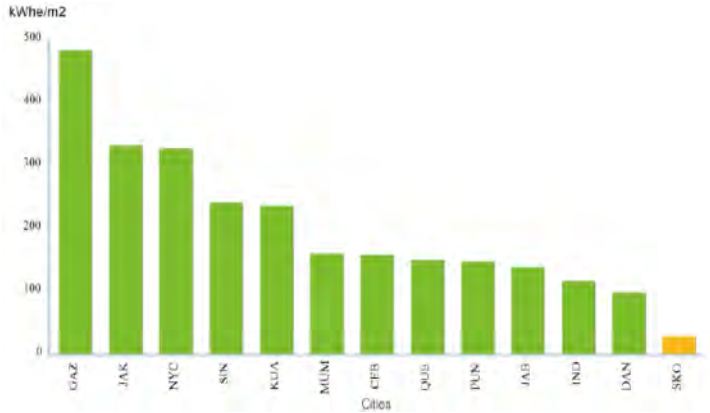
Energy efficiency investments in buildings are often quite simple and with a quick pay-back – e.g. efficient lighting systems

… some ECA cities are very pro-active in improving the energy efficiency in buildings

The City of Skopje and individual municipalities (e.g. Karposh), have invested aggressively in municipal buildings energy efficiency improvements (e.g. thermal insulation of external walls and roofs, new windows, efficient light bulbs, dimmers, automatic shut-off systems, pricing, etc.)

New Thermopane Windows in Skopje School

Municipal Buildings Electricity Consumption in Skopje



Potential yearly energy savings in Belgrade Municipal Buildings: $10 million

Source: ECA Sustainable Cities Initiative

Recommendations

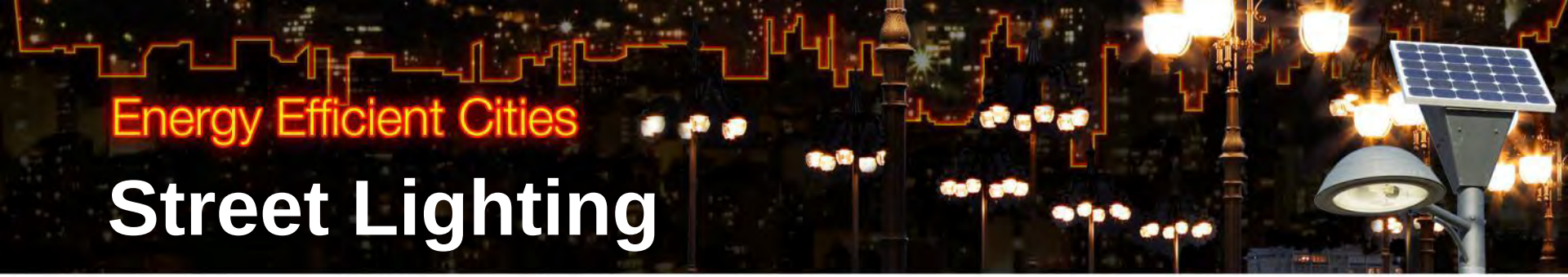
	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
Municipal Buildings Audit and Retrofit	●●●	●●	●●	●●●	●●●	●●●
Buildings Benchmarking Program				●●●	●●●	●●●
Green Building Guidelines for New Buildings		●●		●●	●	●
Municipal Buildings Mandatory EE Standards	●	●●●	●	●●●	●●●	●●
Buildings Mandatory EE Standards	●●	●●		●●	●●	●

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

Street Lighting

Source: ECA Sustainable Cities Initiative

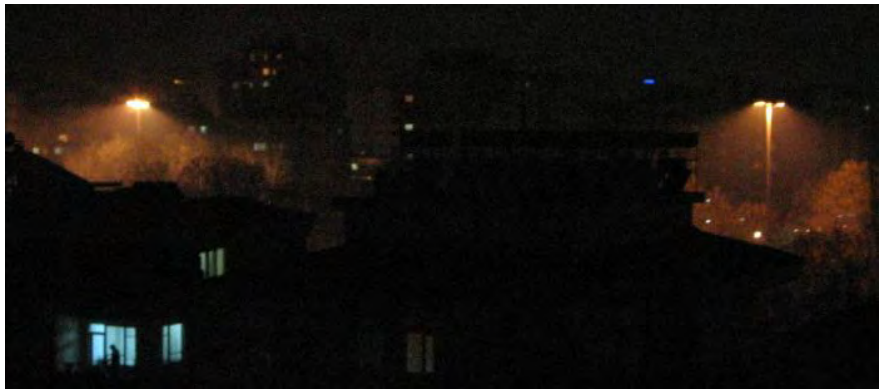


Energy Efficient Cities

Street Lighting

Street lighting systems need to be extended in many ECA cities, and system management can be improved

Insufficiently Lit Public Spaces in Gaziantep



Street Light Working in the Middle of the Day in Skopje

… however, most cities are heavily investing in better and more energy efficient lighting technologies

Potential yearly energy savings from Gaziantep Street Lighting System: $6 million

Source: ECA Sustainable Cities Initiative

Recommendations

	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
Street Lighting Audit and Retrofit	●●●	●●	●●	●●	●●●	●●
Lighting Timing	●●●	●●	●●	●●	●●●	●●
Integrated Public Lighting		●●●				
Procurement Guide for New Street Lights			●		●●●	

Source: ECA Sustainable Cities Initiative

Source: ECA Sustainable Cities Initiative

Energy Efficient Cities

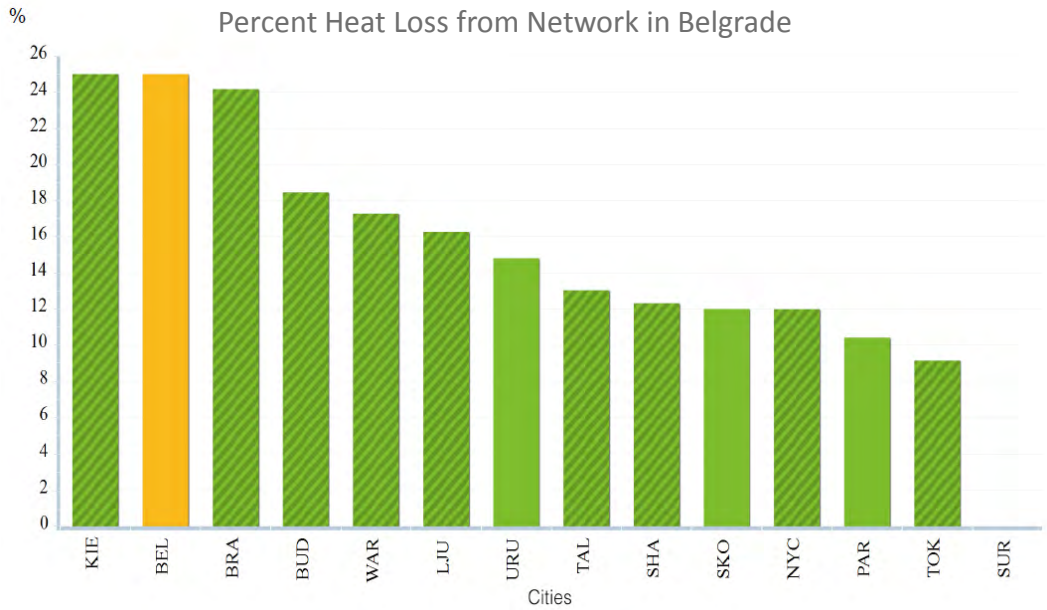
Power and Heat

District heating networks have deteriorated in the transition years

… in Tbilisi, the district heating system which served 870,000 people, was completely dismantled

… in Skopje, the district heating system was privatized to improve efficiency

… in Belgrade, district heating system is the biggest energy consumer, with over $223 million spent on fuel



Potential yearly energy savings from Belgrade District Heating System: $42 million

Source: ECA Sustainable Cities Initiative

Recommendations

	GAZIANTEP	SKOPJE	TBILISI	BELGRADE	SARAJEVO	BANJA LUKA
District Cogeneration Thermal Network				●●●	●●●	●●●
District Heating Network Maintenance		●●		●●●	●●●	●●●

Source: ECA Sustainable Cities Initiative

KEY ISSUES

Key issues

- Manage expectations
- TRACE is a step towards implementation
- Governance (commitment, implementing unit with power)
- Stakeholder engagement
- Benchmarking
- Data

LESSONS LEARNT

Lessons learnt

- TRACE addresses main municipal drivers: more efficiency, budgets, better service to citizens, environment, sustainability
- TRACE permits a comprehensive view: synergies, effects of actions in one system on others (e.g. urban planning and transport planning)
- Graphic benchmarking is a good tool to mobilize cities, they like to be compared to peers and learn from them
- Importance of actions in areas where cities don't have direct control, but can influence (e.g. private transportation – parking, traffic flow, congestion charging)

Lessons

- Importance of demonstration effect (lead by example). Public actions as triggers of private actions (e.g. demand side water efficiency motivates homeowners to do EE in electricity consuming equipment)
- Sustainable cities are key to successful sustainable development, and that cannot happen without a series of key elements in place: strong city leadership; a clear vision and strategy; enabling national policy environment; implementation, enforcement, and good governance.

TRACE AS PART OF A COMPREHENSIVE STRATEGY

ECA Sustainable Cities Initiative

Awareness–Raising & Orientation	Diagnostic Assessments (Tools)	Policy Reforms & Investment Strategies	Financing
• General Orientation Workshops • Learning Materials and Case Studies • Knowledge Exchange & Learning Tours • Profiling global best practice • Peer learning • Innovative applications	• Baseline surveys and benchmarking • Urban Planning Audit • Carbon footprint calculation • Energy Efficiency Diagnostic (TRACE) • Shadow Credit Rating • Life–cycle costing • Traffic System Management Studies	• Updating master plans • Updating urban planning regulations • Setting emissions targets • City energy efficiency targets • Sustainable City (SC) Investment Strategies	• Specific Investment Financing • Results–Based Financing (RBF) • Private Sector Finance: ESCOs • Carbon Financing • Output–based Aid • Donor Co–financing

Source: ECA Sustainable Cities Initiative

ECA Sustainable Cities Initiative

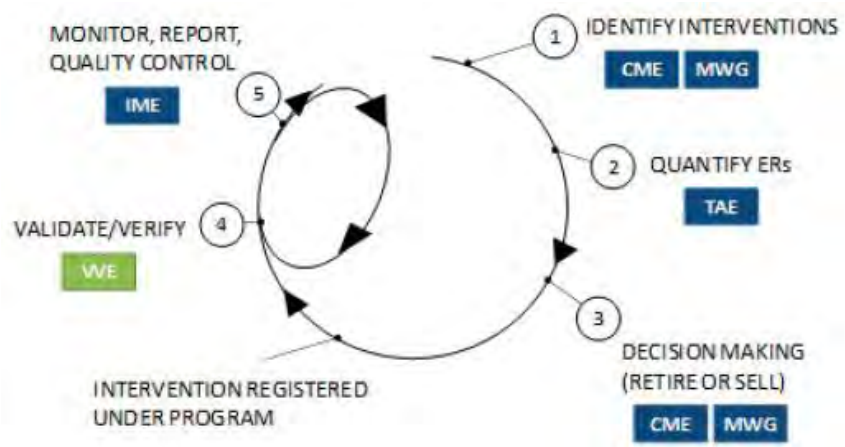
- Under the ECA SCI Framework, TRACE is a key diagnostic for informing further technical assistance, knowledge exchange, and lending work. For example:
  - **Gaziantep**: helped inform Country Program Strategy (CPS) discussion with Turkey and helped define Pillar III: Sustainable Cities. Gaziantep was also selected to be part of the ECA SCI knowledge exchange event on Historic Cities and Urban Regeneration.
  - **Skopje:** feeds into a broader Green Growth Agenda for Macedonia and could help inform investments within a Bank-financed Municipal infrastructure Investment Project in Macedonia.
  - **Tbilisi** will contribute to the development of the Georgia Municipal Development Fund, where a third generation of the fund will consider using a sustainable cities investment framework.
  - **Belgrade, Sarajevo, and Banja Luka:** will be highlighted in a knowledge exchange event on energy efficiency in ECA cities, and will inform a sustainable cities investment program in Bosnia and Herzegovina in the outer years of the current CPS.

EAP: Sustainable Energy and Emissions Planning (SUEEP)

Source: Energizing Green Cities in Southeast Asia, Three Cities Synthesis Report, The World Bank, 2012

Rio Low Carbon City Development

- ISO-certified framework and set of comprehensive requirements to help the city to plan, implement, monitor and account for low carbon investments and climate change mitigation actions across all sectors in the city over time
- Launched in Rio+20 in June 2012
- Integrated with Rio's climate change mitigation goals, strategic plan, and investments for the World Cup (2014) and Olympics (2006)
- Municipality-driven interventions, including policies and project developments that reduce greenhouse gas (GHG) emissions.
- TRACE used to identify energy-efficiency opportunities--backed by strong quantitative city data--that will be incorporated as interventions under the Program



Source: Directions in Urban Development, World Bank, Nov. 2012

Urban Energy Efficiency Development in Africa

- Sustainable urban energy planning study in three pilot cities (Addis Ababa, Accra and Nairobi) that assesses the city's energy profile and performance and prepares programmatic investment plans and policies to promote sustainable urban energy across major sectors.

MORE INFORMATION ON EECI | ESMAP Website
http://esmap.org/esmap/EECI

TO GET TRACE AND SUPPORT | ESMAP Website
http://esmap.org/esmap/TRACE

TRACE TRAINING | E-learning course available at:
http://vle.worldbank.org/moodle/course/view.php?id=605

ESMAP
Energy Sector Management Assistance Program

esmap@worldbank.org

Thank You.

The World Bank | 1818 H Street, NW | Washington DC, USA
www.esmap.com | esmap@worldbank.org