



ENERGY EFFICIENT CITIES



Urbanization is a cornerstone of sustainable development.

Approximately 3.5 billion people currently live in urban centers and are expected to grow to 5 billion by 2030. Approximately 90% of this increase will occur in developing countries, where poor urban communities are growing rapidly. This urbanization has led to massive demand for energy to power economic activity, expand infrastructure, and deliver municipal services. Cities now consume about two-thirds of the world's energy, and are responsible for 70% of the global greenhouse gas emissions. Given the long-term nature of urban infrastructure, cities can lock themselves into unsustainable and costly energy consumption patterns. Investing in energy efficiency can help expand and improve urban services, while contributing to cities' efforts to be more competitive and address climate change. Energy efficiency policies and investments can curb energy demand growth and emissions growth in the near term while fueling economic growth without compromising goals of greater access to reliable and affordable energy services.

Notwithstanding, projections reveal that under existing policies, the vast majority of economically viable energy efficiency investments (e.g., in buildings, transport, etc.) may remain unrealized. No country has fully utilized the potential to im-

prove the energy efficiency of its economy and most still have room to go considerably further. Numerous barriers are responsible for the persistent energy efficiency gap.

ESMAP's energy efficiency activities seek to help client countries harness their energy efficiency potential as the "first fuel" (i.e., competitive, clean, and widely available) to support the high-level goals of ensuring energy security, reliability and affordability, as well as capture energy efficiency's multiple benefits-- addressing climate change, responding to peak demand pressures, lowering operating and maintenance costs, creating budgetary space for other expenditures, enhancing comfort, increasing property value, increasing competitiveness, among others.

This initiative builds on ESMAP's extensive work on urban energy efficiency, including support towards city energy diagnostics conducted with ESMAP's Tool for Rapid Assessment of City Energy ([TRACE](#)) in nearly 70 cities to help quickly identify potential energy efficiency improvements, target underperforming sectors, and prioritize interventions. Other efforts include knowledge products on various urban energy efficiency topics and issues, as well as technical assistance in a number of countries across the globe.

BARRIERS TO MUNICIPAL ENERGY EFFICIENCY

Financial

Higher upfront cost; difficult access to financing; lack of credit-worthiness; high transaction costs

Awareness & Incentive

Principal agent problems; lack of awareness of energy efficiency potential; low priority attached to energy issues; inadequate information; energy prices below the cost of supply

Implementation Capacity

Lack of familiarity with energy efficiency technologies; limited technical capacity; restrictive public procurement rules



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The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by The World Bank. It provides analytical and advisory services to low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, the European Commission, Finland, France, Germany, Iceland, Japan, Lithuania, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom, as well as The World Bank.

ESMAP has supported teams from across the World Bank Group working hand-in-hand with local and national governments to provide:

- Diagnostics and assessments of city energy use and energy efficiency potential
- Advice on policy, regulatory, and institutional reforms
- Training and capacity building to enhance understanding of urban energy efficiency and its delivery

- Knowledge exchanges to share and disseminate experiences and good practices
- Development of energy efficiency investment programs and support for project preparation

To further broaden the reach of ESMAP's Energy Efficient Cities activities, a public [e-learning course](#) has been produced, featuring different municipal sectors where energy plays an important role (e.g., public lighting, water supply). An [Energy Efficiency Project Resource Center](#) has also been developed, in coop-

eration with Energypedia, to provide practitioners from around the world with documents not widely available or easily accessible (e.g., sample terms of reference, contracts, surveys, and questionnaires; examples of economic and financial analysis; training material; methodologies and protocols; case studies). Additional knowledge products range from Mayoral Guidance Notes on urban energy efficiency, to lessons learned from city energy diagnostics, to insights from public lighting LED delivery models.

RESULTS

From 2014-16, ESMAP has supported scaling up of urban energy efficiency through 60 technical assistance activities in more than 50 cities in more than 25 countries. These technical assistance programs cover a broad spectrum of urban sectors, including: public lighting, water and wastewater, buildings, power and heat, waste management, industry, and transportation. Together, these programs will contribute to transformational impacts in cities' energy use and to their sustainable development. ESMAP has:

- Built the foundation for urban energy efficiency planning and investments through city-level diagnostics using TRACE in 70 cities
- Informed the development of several investments, including a \$100 million IBRD loan for municipal energy efficiency in Mexico; \$14 million IDA financing for urban energy efficiency in the Kyrgyz Republic, and a \$300 million public-private partnership for street lighting in

- Belo Horizonte, Brazil
- Supported IFC's EDGE Green Building Market Transformation Program's global knowledge approach and implementation of green building certification system in South Africa. EDGE is expected to achieve significant GHG reductions, annual water and energy savings, and to catalyze \$150 billion green investments.

GOING FORWARD

Building on its first three years of experience, ESMAP is pursuing its Energy Efficient Cities activities through two complementary focal areas to better respond to current and emerging needs and priorities:

- **Energy Efficient Services** aims to integrate energy efficiency in the design, planning, management and implementation of projects that improve city services
- **Efficient and Sustainable Buildings** aims to integrate energy efficiency with renewable energy and other sustainability aspects in buildings, including construction, retrofitting, energy use, and location