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Sustainable Urban Energy Planning

A handbook for cities and towns in developing countries

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About ICLEI, UN Habitat and UNEP



•I.C°L•E•I Local Governments for Sustainability

ICLEI – Local Governments for Sustainability

ICLEI - Local Governments for Sustainability is an international association of local governments and local government organisations that have made a commitment to sustainable development. Over 1000 cities, towns, counties and their associations worldwide comprise ICLEI's growing membership. ICLEI works with these and hundreds of other local governments through international performancebased, results-oriented campaigns and programs to support local government in the implementation of sustainable development at the local level. In the Climate and sustainable energy field, ICLEI runs one of the largest global climate change programmes for local governments, Cities for Climate Protection (CCP) Campaign, which aims to assist cities to adopt policies and implement quantifiable measures to reduce local greenhouse gas emissions, improve air quality, and enhance urban livability and sustainability. ICLEI is also active in the field of Adaptation through programmes focusing on the development of local capacity to identify and to reduce the vulnerabilities associated with climate change.

The **ICLEI Africa Secretariat** was the lead ICLEI partner for the development of this guidebook and is one of many ICLEI Regional Offices, works across the African Continent and collaborates closely with the global ICLEI network and other regional offices around the world, in sharing tools, materials and strategies and good practices specifically designed and implemented at the local level.

For more information, see: www.iclei.org

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UN-HABITAT

UN-HABITAT's mission is to promote socially and environmentally sustainable urban development with the goal of providing adequate shelter for all. In the field of the urban environment, Sustainable Urban Development Network (SUD-Net) is an innovative network of global partners promoting a multilateral and inter-disciplinary approach to sustainable urban development. UN-HABITAT supports local and national governments through SUD-Net and its component the Cities in Climate change initiative to address key urban environmental issues related to Climate Change. For more information, see: www.unhabitat.org/sudnet



UNEP

UNEP is the voice of the environment within the United Nations system. In the field of urban environment, UNEP supports national and local governments to address key environmental issues with a focus that have both a local and an international dimension. In cooperation with partners, UNEP assists national and local governments by providing awareness raising materials, organizing workshops and trainings, developing tools and involving cities in international meetings. UNEP Division for Technology, Industry and Economics (DTIE) encourages decision makers in government, local authorities and industry to develop and implement policies, strategies and practices that are cleaner and safer, make efficient use of natural resources, reduce pollution and risks for humans and the environment: energy, transport, building and construction as well as urban issues at local level are some of the key areas DTIE deals with in the context of sustainable development.

For more information, see: www.unep.org/scp

Why this handbook was written



The main purpose of this handbook is to assist people who are working in or with local government to develop *sustainable energy and climate action plans and implementation programmes*. There can be no single recipe for all cities – so it is up to each local government to develop its own innovative and appropriate plans based on local resources and needs. We, at ICLEI and UN-Habitat, hope this handbook will go a long way to helping you to do this and allow you to take full advantage of the opportunities inherent in such planning.

This handbook is for you if you are working in an urban context with or as part of a local government, and your primary areas of concern include:

- Delivery of services to citizens
- Economic development
- Strategic development planning
- Land use planning, zoning, building plans approval
- Housing and poverty issues
- Environmental management
- Management of local government resources and systems
- Fiscal responsibility and risk management
- Water resource and waste management
- Public health
- Transportation management

What you will find in this handbook

- The Introduction addresses the challenges of energy consumption, climate change and development in developing countries. It deals with the role of urban centres and local governments in defining a sustainable development path and a new energy future in their countries. It includes an explanation of the greenhouse effect and a mini-history on climate change.
- Chapter 1 is an explanation of why it is important for urban centres in developing countries to engage in sustainable energy planning.
- Chapter 2 provides in some detail a step-bystep process to developing and implementing a sustainable energy plan, illustrated by relevant case studies.
- Chapter 3 offers a range of case studies from developed and developing urban centres covering all the major areas of local government responsibility.
- Chapter 4 provides an extensive list and information on support organisations and resources.

Acronyms



CACP	Clean Air and Climate Protection (ICLEI software)
ССР	Cities for Climate Protection, a programme of ICLEI- Local Governments for Sustainability
CDM	Clean Development Mechanism
CO ₂ e	Equivalent carbon dioxide
ESCO	Energy Services Company
GHG	Greenhouse gas
GWh	Gigawatt hour
ICLEI	Local Governments for Sustainability (previously International Council for Local Environmental Initiatives)
ITDG	Intermediate Technology Development Group (recently renamed to Practical Action)
kV	Kilovolts
kW	Kilowatt
kWh	Kilowatt hour
LED	Light Emitting Diode
MW	Megawatt
NGO	Non-governmental Organization
R&D	Research and Development
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN-HABITAT	United Nations Human Settlements Programme
USAID	United States Agency for International Development

Greenhouse gases are the gases present in the atmosphere which reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect. Greenhouse gases are essential to maintaining the temperature of the Earth; without them the planet would be so cold as to be uninhabitable.

kWh = kilowatt-hour GWh = gigawatt-hour (1,000,000 kWh = 1 GWh) 1 GWh = 3600 Gigajoules (GJ) 1 kg coal = 1.89 kWh 1 kwh = 0.963 kg CO₂ 1 kwh = 1.26 Litres of water used

A kilowatt-hour (kWh) is one unit of electricity; one 60 Watt light bulb burned for one hour will use 0.06 kWh (60 Watts) x (1 kilowatt/1000 Watts) x 1 hour) = 0.06 kWh "The overriding concern of developing

developing countries to engage on the

eradication and you cannot expect

overriding objectives."

countries is economic growth and poverty

question of climate change and harm those

United Nations Framework Convention on

Climate Change (UNFCCC) April 2008



"The climatic world is one world even if politically we are not." R.Bryson

What is the future for energy and development?

The global energy crisis coupled with the threats of climate change bring into sharp focus both opportunities and challenges for developing countries. Developing countries have to address the increasing energy demands of growing economies, as well as address energy poverty issues often highlighted by extreme disparities in income. They also need to deal with the real and potential impacts of climate change. In addition to these challenges is the global imperative to reduce carbon emissions in order to prevent climate change. While

developing nations have thus far been sheltered from obligations to reduce carbon emissions, we cannot anticipate that this situation will continue. Within this context developing nations need to follow a very different development path from that established by first world **Yvo de Boer**, Executive Secretary of the countries. This development path is a low energy, low carbon, and generally a resource efficient one.

Economies across the world need to change the assumptions of this paradigm in order to build a sustainable reality. As financial and environmental impacts soar, the real costs of resource inputs and of waste generation need to increasingly be taken into account. These factors are making efficiency, conservation, reuse, recycling and renewable energy sources primary considerations for a healthy economy. In an attempt to reduce resource inputs and environmental impacts, some developed nations have and to 'docourle' oconomic growth from onorgy

as the island states of Reunion and Mauritius. As such, under conditions of necessity, pursuing efficient and renewable energy paths is possible.

There is potential to greatly improve energy efficiencies and reduce carbon emissions in many upper-middle income developing countries which have a substantial industrial base. For example, South Africa produces a mere US\$1.06 in economic value for every 1 kWh of electricity consumed - Brazil manages twice and Mexico four times this level of energy efficiency.¹

What is happening in our cities?

Over the last 20 years, urban centres have experienced dramatic growth. Today half of the world's total population (around three billion people) live in urban settlements. Developing countries in particular are undergoing rapid change from rural to urban-based

> economies as they are transformed by their urbanising populations. There are marked differences in the level and pace of urbanisation within less developed regions of the world. Latin America and the Caribbean are highly urbanised, with 78% of their populations living in cities in 2007. Asia and Africa are less urbanised, both with

around 40% of their populations living in urban areas. While currently less urbanised, Africa and Asia are experiencing rapid rates of urbanisation. Consequently by 2050, about 62% of their inhabitants will live in urban areas. At that time, 89% of the population of Latin America and the Caribbean will be urban.² In addition, over the next 30 years population growth will be nearly entirely concentrated in urban areas in the developing world. Much of the current debate regarding sustainable cities focuses on the formidable problems for the world's largest urban agglomerations.

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