

Renewable Energy Policy in Cities

Selected Case Studies



What Can Local Governments do to Support Renewable Energy?

In the last few decades, cities have grown at an unprecedented rate. As of 2011, more than 3.5 billion people live in urban areas, a number forecast to increase to 6.3 billion by 2050. With economic growth and rising levels of disposable income, energy use in cities is also projected to surge in the coming years. In fact, although cities are built on less than 5% of the earth's land surface, as the main hubs of economic activity, they consume a massive 80% of the earth's resources. They also contribute approximately 67% of world's primary energy demand, a number projected to reach 73% (12,374 million tonnes of oil equivalent) by 2030.

At the same time, the world is becoming more concerned with energy security and climate change; and cities are seen as the primary contributors to greenhouse gas (GHG) emissions. Indeed, over 70% of carbon dioxide (CO₂) emissions today relate to the needs of cities. In 1990, emissions were about 15 billion metric tonnes, rising to 25 billion metric tonnes in 2010. These urban-area CO₂ emissions are expected to reach 36.5 billion metric tonnes by 2030, assuming a business as usual growth path. Although this outlook may appear dim, there is potential for improvement. Cities have the scale, the appropriate networks, the dynamics and the strong sense of urgency needed to bring about meaningful changes in their surroundings.

As demand for energy services continues to expand, the energy infrastructure on which cities depend will have to be expanded, upgraded or substituted. This will allow for a multitude of other benefits, such as increased energy security, climate change mitigation, sustainable development, as well as other social benefits. More than ever before, local governments, which typically hold multiple roles as decision-makers, planning authorities, managers of municipal assets, operators of local energy providers and role models for the public, will have the responsibility to address and mitigate the challenges being faced. As drivers of change, local governments can encourage, enable, measure and regulate the local economy and inform the debate on suitable energy options to help cities adapt to new technologies and changing energy requirements. They also have the legislative power to make important decisions, such as the implementation of policies which enhance the deployment of renewable energy (RE) resources and reduce energy consumption from conventional sources. These efforts can be part of city development strategies, environmental strategies, climate change strategies or the result of individual isolated pilot projects, which can be replicated and scaled up.

Local government can actively support the establishment of related local RE industries in a multitude of ways. The different roles local governments can play are presented by IRENA across a selection of relevant themes, illustrated through eight city 'cases in focus' and complemented with a variety of shorter examples. The selected case studies were identified and collected through a global consultation to illustrate how local governments can support a transition to RE. The city cases in focus were selected from five continents from the following countries: Australia, Brazil, China, India, Germany, Sweden, and United States. They portray a broad mix of current actions taken by local governments to enhance the deployment of RE in their city. Each case focuses on a

particular programme, initiative, policy or measures that have been an important part of local governments. These selected cities are considered as regional pioneers, who have developed their RE action over a longer period of time. Below, we present a short overview of the themes and case studies selected:

GREEN ECONOMIC DEVELOPMENT STRATEGY WITH RENEWABLE ENERGY INDUSTRIES

Local governments can support the establishment of related local RE industries with the creation of cluster initiatives. Clusters can generate synergies between private actors, public stakeholders and research institutions, and eventually stimulate economic development. A successful example of this is found in Dezhou, China. In 1997, the municipality and local government of Dezhou elaborated a development plan for the Dezhou Economic Development Zone. As a result, Dezhou has built a strong economic base around RE, with over 120 solar energy enterprises generating an annual turnover of USD 3.46 billion. It has established a mature technology innovation system, as well as capacities in engineering, research and commercialisation.

POTENTIAL ANALYSIS OF RENEWABLE ENERGY FOR TARGETED POLICY INTERVENTION

A RE potential analysis can be used by any city that seeks to identify the locally available RE potential. It allows local governments to develop plans against a theoretical upper boundary of available RE supply, and enables the formulation of development strategies for the use of RE sources. A successful example of a local government which undertook RE potential analysis can be found in Chemnitz, Germany. In 2008, the city council developed the Integrated Climate Protection Programme. The analysis resulted in a comprehensive overview of the current state of climate change, future trends, and RE potentials. The analysis has been instrumental in informing on-going policy plans, identifying priority measures and key action areas needed to achieve the RE targets.

WASTE-TO-ENERGY FOR MORE EFFECTIVE LANDFILL SITE MANAGEMENT

By 2025, global urban municipal solid waste (MSW) is projected to increase to 2.2 billion tonnes per year. Where solid waste management practices are in place, MSW often gets disposed at landfill sites. However, conventional landfill sites usually fail to exploit the potential of waste as an energy resource. A landfill site in Belo Horizonte, Brazil, operational for 32 years, is an interesting example of turning a closed landfill site into a waste-to-energy facility. Although it was once the largest single source of GHG emissions in the city, the emissions from the landfill site have been reduced substantially and since its closure in 2007, the site has been a waste-to-energy facility. The landfill capture and power generation facility have been fully operational since 2010.

STIMULATING RENEWABLE ENERGY THROUGH PUBLIC AND PRIVATE PROCUREMENT

Local governments are considered to have two ways of actively promoting sustainable procurement (SP) of energy. Firstly, they can adopt public SP practices in their own operations. Secondly, they can implement strategies that enable private actors to have a SP choice. For instance, The GreenChoice Program in Austin, United States, active since 2001, played an important role in the city's energy agenda by stimulating the initial demand for RE electricity, by facilitating municipal and community procurement of RE. Without any significant upfront investment by the local government, they were able to increase demand for RE above a critical demand threshold by providing new energy options to customers, as well as buying into this option themselves through public SP. This contributed to wind energy becoming a cost-competitive option in the region.

LIGHTING UP THE STREETS

Well-functioning public lighting improves a city's quality of life, but also contributes to a city's energy consumption and GHG emissions. The use of RE and energy efficiency measures in public street lighting presents an opportunity to reduce energy demand, to harvest financial savings from reduced electricity use and to reduce emissions. Many options exist for local governments to explore, such as: 1) energy conservation and efficiency reducing operation hours, the number of lights and power; 2) stand-alone PV powered lighting; 3) grid-interactive photovoltaic (PV) powered lighting; or 4) procurement of RE for lighting. The cases of Sydney, Australia, and Nagpur, India, are examples of local governments choosing suitable options for public lighting. In Sydney, existing light bulbs have been replaced with more energy efficient ones. LED lighting is expected to reduce electricity consumption in local street lights by 51% and CO₂ emissions by 2,185 tonnes a year. In Nagpur, PV-powered street lighting systems have been installed and significant energy and emissions savings are also being recorded.

LOCAL GOVERNMENT REGULATION: ORDINANCES AND LAWS TO PROMOTE RENEWABLE ENERGY

A regulation is a measure to influence actors by means of rules and directives, passed by legislation and having the force of a law. Conventionally, regulation has been a tool to restrict certain undesirable actions. More recently, it is being used to command a certain action without narrowly prescribing how the action shall be implemented or to promote more desirable actions. When used in this manner, regulation can stimulate innovation and encourage a transition to RE solutions. The Solar Ordinance of Sao Paulo, Brazil, requires new residential, commercial and industrial buildings to install solar water heating systems (SWH) to cover at least 40% of the energy used for heating water. The Solar Ordinance has stimulated market demand for this technology and caused a reduction in the production costs of SWH. By 2015, it will allow for around 35,000 tonnes carbon dioxide equivalent from the city's residential sector and 200 gigawatt hour of electricity consumption to be avoided. It is currently being replicated in cities across Brazil.

INTEGRATING AMBITIOUS RENEWABLE ENERGY TARGETS INTO CITY PLANNING

Targets can set the direction of current and future local action for increasing the share of RE. Local governments can develop and set targets through many routes, such as through integration into municipal operations, integration into comprehensive city strategies and plans, or through sector-specific targets. The city of Malmö, Sweden, is a case in point. The city set targets such that by 2020, Malmö is expected to be climate neutral and have all municipal operations run on 100% RE by 2030. Malmö has benefited from committed local politicians, private RE investment, strong co-operation with regional stakeholders and a thorough knowledge of the locally available RE sources. Although the implementation plan is still in its early stages, the target setting has been a success and has allowed the local government to integrate, synchronise and mainstream the targets across the City of Malmö's plans.