Urban Pathways

Factsheet

Financing measures for energy efficiency

Wuppertal Institut

UN HABITAT FOR A BETTER URBAN FUTURE

UN environment

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This publication is part of the
Urban Pathways project

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Berlin, 2018

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Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag

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The Urban Pathways project helps delivering on the Paris Agreement and the NDCs in the context of the New Urban Agenda and the Sustainable Development Goals. It has established a facility in close cooperation with other organisations and networks active in this area to support national and local governments to develop action plans and concrete implementation measures to boost low-carbon urban development. This builds on UN-Habitat's role as "a focal point on sustainable urbanisation and human settlements including in the implementation and follow-up and review of the New Urban Agenda". The project develops national action plans and local implementation concepts in key emerging economies with a high mitigation potential. The local implementation concepts are being developed into bankable projects, focusing on the access to urban basic services to create a direct link between climate change mitigation and sustainable development goals.

Project concept

The project follows a structured approach to boost Low Carbon Plans for urban mobility, energy and waste management services that deliver on the Paris Agreement and the New Urban Agenda. The project works on concrete steps towards a maximum impact with regards to the contribution of urban basic services (mobility, energy and waste management) in cities to global climate change mitigation efforts and sustainable and inclusive urban development. This project makes an active contribution to achieve global climate change targets to a 1.5°C stabilisation pathway by unlocking the global emission reduction potential of urban energy, transport and resource sectors. The project will contribute to a direct emission reduction in the pilot and outreach countries, which will trigger a longer term emission reduction with the aim to replicate this regionally and globally to make a substantial contribution to the overall emission reduction potential.

Project aims

This project implements integrated urban services solutions as proposed in the New Urban Agenda providing access to jobs and public services in urban areas, contributing to equality and social coherence and deliver on the Paris Agreement and the Sustainable Development Goals. This is the first dedicated implementation action oriented project, led by UN-Habitat to deliver on inclusive, low-carbon urban services. Securing sustainability and multiplier effect, the project aims to leverage domestic and international funding for the implementation projects that will follow from this initiative.

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In brief

Energy efficiency holds an untapped potential for cities' budgets to be more cost effective. Modern and technologically advance developments have improved measures for energy efficiency, such improvements include lighting systems, heavy electrical equipment such as hydroelectric pumps, transport systems, and power plants. Realising this potential often requires large upfront costs that would then only benefit city administrations in the long run. Constrained by service delivery expectations and political support, city administrations most often have to find funding mechanisms to cover upfront cost necessary to implement technical efficiency in energy consumption. Grant and non-grant financing models can be used by city administrators to raise the financial capital investment so that they are able to, in the short term, implement the roll-out of long term energy efficiency measures that would save municipalities recurring costs. This factsheet presents an overview of financing models available to municipalities for undertaking energy efficient retrofitting projects.

Grant financing models include non-repayable funds, such as regular budget allowances, grants from government and non-governmental donors, and awards, etc. Grant financing models include:

Regular municipal budget allocations.

Energy efficiency funds from national or state governments. For example, the Government of Canada's Green Municipal Fund offers grants and soft loans to fund plans, feasibility studies, pilot and capital projects for municipal environmental initiatives in five sectors including energy efficiency (FCM, 2017).

Funds from non-governmental organizations, international/multilateral banking and development agencies etc. For example, the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility has financed a technical assistance (TA) grant of USD 1,000,000 for promoting energy efficiency initiatives in Thai Municipalities (ADB, 2008).

Non-grant financing models include repayable funds, such as debt and equity financing, loans, lease/sale-leaseback financing etc. (Rezessy & Bertoldi, 2010; Environmental Financial Advisory Board, 2014; Limaye & Derbyshire, 2014). Non-grant financing models include:

- ***Loans from commercial banks*** and financial institutions. For example, a loan of EUR 400 million has been disbursed by the European Investment Bank to Ukraine in 2016 for the Development of Municipal Infrastructure in Ukraine programme with a focus on increasing energy efficiency in district heating, buildings, and urban transport sectors etc., with an interest rate between 2.4 and 4% and a repayment period of 22 years (Slovak Aid, MoRDCHCS, & UNDP Ukraine, 2017).

- ***Municipal bonds***, either in the form of general obligation bonds backed by the city's taxing authority or as revenue bonds backed by the energy efficiency projects or other source of revenue. An example for the latter is provided in the case study section of this factsheet.

- ***Public-private partnership*** (PPP) loan funds. For example, Bhubaneswar Municipal Corporation, in the state of Odisha in India has entered into PPP to install and maintain energy efficient street lighting in the city (World Bank Group, 2013).

Examples Measures

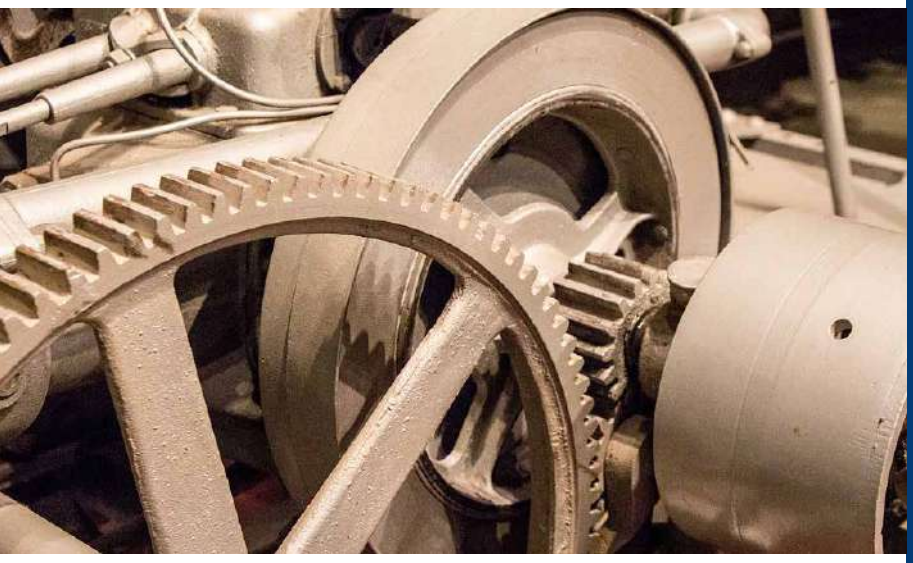
- ***Equity financing.*** Issuing shares of stock to investors raises the required capital (usually, but not limited to, private investors).

- ***Lease/sale-leaseback financing***. The required capital is raised by leasing the energy efficient equipment (vendor credit) or the 'sale and leaseback' of property with an option to buy back at a nominal price at the end of lease period. For example, the city of Providence in the state of Rhode Island in the USA, sold a number of buildings including city hall, schools etc. to the Providence Public Building Authority to raise funds for implementing energy efficient retrofitting measures. The Building Authority leases the buildings back to the city for a period of 15 years. During the lease period, the city pays the Building Authority from energy cost savings resulting from retrofit upgrades and buys the buildings back after the expiration of the lease term for nominal price.

- ***Dedicated revolving loan funds.*** A revolving loan fund is a self-sustaining funding mechanism that issues new loans from the principal and interest repayments obtained on old loans. An initial capital is required for establishing a revolving fund, which can be obtained from any of the above-mentioned means of financing. Revolving funds are an internal financing mechanism for cities to avail loans at favourable terms and sustain long-term financing for energy efficiency projects.

- ***Credit risk guarantee fund.*** Repayment for financing energy efficiency projects is usually done through the resulting energy cost savings. A credit risk guarantee fund provides partial or full risk coverage for mitigating risks associated with default in repayment due to various reasons, such as errors in baseline calculation, volatility in energy prices, under performance of energy efficiency measures or for no specific reason. Such a fund eases securing non-grant financing for financially weak municipalities. Government or non-governmental agencies establish a credit risk guarantee fund. For example, the Government of India has received USD 43 million from multiple donors towards setting up a Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE) (The World Bank, 2015).

Financial investment in energy efficiency creates and accelerates job growth in service and manufacturing sectors, especially in small and medium enterprises. Energy efficiency results in energy cost savings, and reduced GHG emissions. Energy efficiency improvements often result in enhanced comfort levels and improved operation and maintenance.



Results

Technical & Financial Considerations

Before selecting a financing model for energy efficiency projects, cities should asses their technical and financial, as well as, their implementation capacities. Cities may consider the following guidelines to select an appropriate financing model (Limaye & Derbyshire, 2014):

- ***Establish a budget line item*** for the project implementation when sufficient funds are available from regular municipal budget

- ***Seek out and apply for grants*** when a suitable funding opportunity arises

- ***Opt for commercial borrowing*** when banks offer dedicated credit lines for energy efficiency, which are backed by credit risk guarantee programmes

- ***Develop Energy Service Performance Contracts (ESPCs)*** or Energy Service Agreements (ESAs) with Energy Service Companies (ESCOs) and opt for commercial financing from banks, ESCOs, etc. (caution: poses a low to medium risk or may be unavailable for municipalities with poor credit rating)

- ***Negotiate leasing agreement*** or vendor credit agreement, or consider issuing municipal bonds when no other financial models are available (caution: poses a high risk and usually unavailable for municipalities with poor credit rating)

Technical considerations

- ***Baseline data are crucial*** for calculating energy cost savings resulting from energy efficiency improvements, and for selecting a suitable financing model. The facility owner or operator should assist the preparatory project team in establishing reliable baseline data, such as energy consumption and energy costs, occupancy, equipment, schedules, and operating parameters.

- ***Conduct a detailed investment*** grade energy audit to assess the technical and financial feasibility of the project when the scope of energy efficiency measures is large and complex, and commercial financing is needed.

Financial considerations

- ***Energy prices*** are usually subsidized for municipalities and residential customers, especially in developing countries. When energy prices do not reflect the actual costs of energy production , energy cost savings resulting from energy efficiency improvements are often low, negligible or even negative, and therefore renders the implementation of energy efficiency measures infeasible. Energy price distortion and future projections need to be considered and addressed before selecting a financing model.

- ***Financing models***, credit risk guarantee and the agreement strategies such as ESPCs, ESAs, MESAs must be within the ambit of financial laws and regulations that govern insurance, commercial banking, capital markets and investment management sectors. Modifications to the existing laws, or enacting new laws may be required to incorporate regulations that specifically encourage such financing measures in energy efficiency.

Technical

Financial

Policy Legislation

Policy/legislation

Access to finance is crucial for scaling up energy efficiency. International, national or sub-national missions for climate mitigation strategies should incorporate energy efficiency financing as a key policy instrument. Energy policy should facilitate investments in energy efficiency, for example by eliminating distortions of the energy price, or by providing tax incentives that encourage investments in energy efficiency. Technical guidelines and financial regulations should be in place for the empanelment of ESCOs and energy auditors to undertake or facilitate ESPCs and ESAs.

Institutions

Institutions

Cities can use financing measures to implement energy efficiency measures in their existing facilities and infrastructures. Cities could also leverage their regulatory or legislative authority to help in financing privately owned facilities. For example, under the United States Property Assessed Clean Energy (PACE) Programme, property owners can raise capital from the municipality by securing their property as collateral, for implementing energy efficiency measures and repay from the resulting energy cost savings as an addition to the property tax (energy.gov, n.d.).

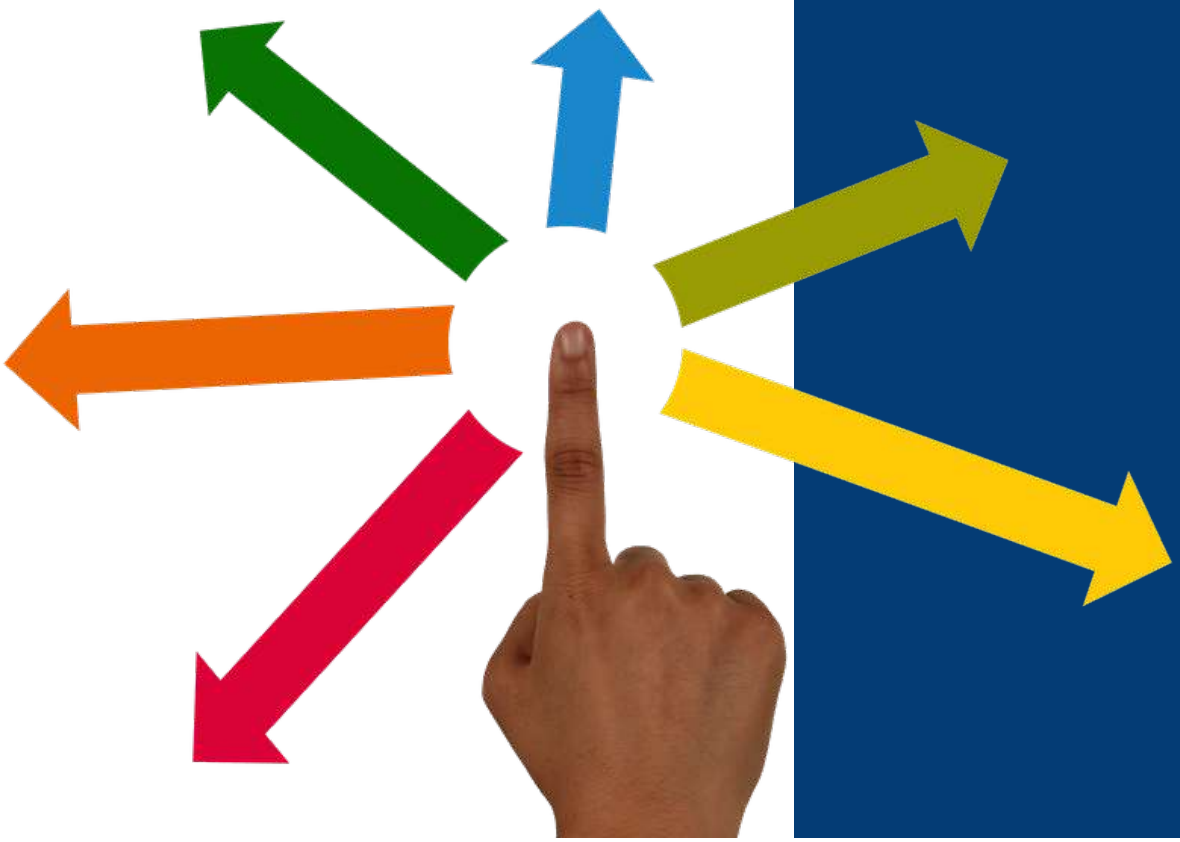
A competent state authority, such as a national energy agency, should train and empanel ESCOs to undertake ESPCs and ESAs, and accredit energy auditors to conduct investment grade energy audits. For example, the Bureau of Energy Efficiency (BEE) in India empanels ESCOs and accredits energy auditors (BEE, 2015b, 2015a). In addition, such agencies should provide model guidelines for ESPCs, ESA, MESA, PACE etc., which can be easily adapted by the municipalities to suit project specific requirements. Further, they should provide cities with a reliable and easily replicable methodology for baseline calculation, return on investment, and measurement and verification protocol. For example, USA's Environmental Protection Agency's guide for the implementation of "Energy Efficiency in Local Government Operations" (USEPA, 2011), the "Manual for the Development of Municipal Energy Efficiency Projects" in India etc. (IFC, BEE, & Alliance to Save Energy, 2008)

Transferability

Transferability

Financing mechanisms help cities for implementing energy efficiency measures in public lighting, waste management, water supply and sewerage, public transport, and energy supply etc. Credit worthy cities may opt for non-grant financing measures, while cities with limited resources may actively seek for grants or credit risk assurance. In addition, cities can leverage on their regulatory and legislative authority to encourage investments in energy efficiency retrofitting of private properties, which have high potential for returns such as the PACE programme.

Energy efficient street lighting is one of the low hanging fruits of energy efficiency. For investments in energy efficient street lighting, various investment models have been developed and replicated across emerging economies as well as OECD economies (World Bank Group, 2018). In the USA, different financing models for energy efficient building retrofits have been developed and are replicated in many municipalities (USEPA, 2011). Financing model from one sector can be easily replicable in another sector that share similarities in capital requirements and potential for energy efficiency.



Case Study: Ann Arbor in the State of Michigan, USA

Case Study: Ann Arbor in the State of Michigan, USA

Context

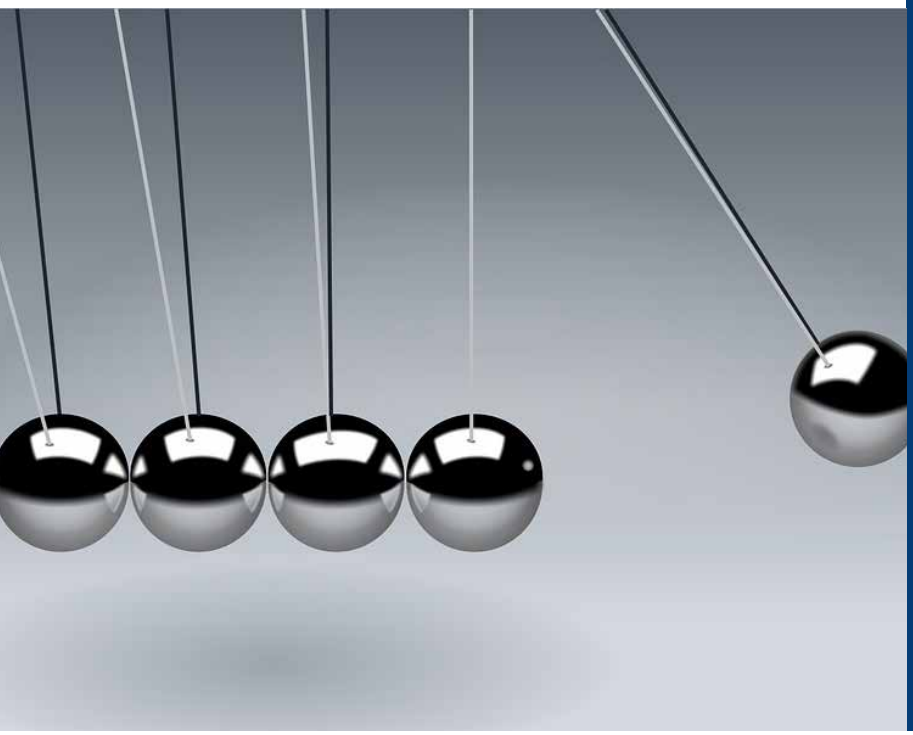
Ann Arbor is the sixth largest city in the US state of Michigan with a population of 113,934. The city has adopted a community focused Climate Action Plan (CAP) to reduce community-wide emissions up to 25% by 2025 and up to 90% by 2050 relative to baseline emissions levels of the year 2000. Since municipal operations such as waste management make up less than 2% of the total community-wide GHG emissions, also reducing the emissions from residential and non-residential buildings across the municipality was identified as crucial to the successful implementation of CAP (a2energy, n.d.). Towards this end, the Ann Arbor Energy Office, assisted by the city's Energy Commission, manages energy efficiency and renewable energy projects, and programmes and grants at the municipal level and throughout the community (Energy Office, n.d.-b). In action

In action

The city of Ann Arbor have been using multiple financing models to sustainably fund various energy efficiency projects. Municipal bonds have been strategically used to set up a revolving energy efficiency fund for financing efficiency projects in the city. Further, grant funds have been obtained for financing energy efficiency projects in both the city and the community. Some of the financing models are described below:

- ***Municipal bonds:*** The city issued energy bonds of USD 1.4 million in 1988 for implementing efficiency measures at 30 city facilities. The bonds were fully repaid in 10 years (C40.org, 2011). Resulting energy cost savings from the projects, supported under the bond programme, encouraged the city to sustain its support for energy efficiency financing (ESMAP, 2018).

- ***Revolving fund:*** After full repayment of the energy bonds in 1998, the city continued to redirect for the next five years, an amount equal to half of the budget allocated to servicing the annual bond payments to set up an energy efficiency revolving fund of approximately USD 500,000. The revolving fund provides capital for implementing municipal energy efficiency projects. 80% of the resulting savings from the projects that are financed out of this revolving fund are deposited back into the revolving fund and thus, makes it self-sustaining. The city has used revolving funds to finance energy efficiency projects such as lighting improvements in traffic and pedestrian light, street lighting, parking lighting, retrofit boiler in a building etc. (Energy Office, n.d.-b; ESMAP, 2018).



- ***Grants and awards:*** The city has developed a revolving loan fund called 'a2energy Loan Fund for Rental Housing' to finance a pilot programme for implementing energy efficiency measures in rental housing in Washtenaw County of the City. The capital for the loan fund has been obtained as a combination of a grant from the U.S. Department of Housing and Urban Development (HUD) Sustainable Communities grant to Washtenaw County and an award from University of Michigan, Dow Distinguished Award for Sustainability (City of Ann Arbor, n.d.). The pilot programme has a limited budget of USD 40,000 and offers a loan to landlords of properties with 1-4 units in Washtenaw County. The loan is capped at USD 8,000, available at low interest rates, and is payable in 12-36 months (a2energy.org, n.d.; Stanton, 2015). The city has also used a grant of USD 630,000 from the Ann Arbor Downtown Development Authority to fund retrofit of over 1,000 downtown streetlights (Energy Office, n.d.-a).

- ***Property Assessed Clean Energy (PACE) programme:*** Michigan's PACE Act authorises cities to adopt PACE programmes. Under the PACE programme, owners of existing commercial (including residential properties of larger than 4 units) or industrial properties located within the city limits can apply for a soft loan that is repayable in 10 years. The projects should be in the range of USD 10,000 to 350,000, and cannot exceed 20% of the property's State Equalized Value. The loan can be used for conducting energy audit and for implementing energy efficiency measures that are outlined in the programme such as upgrades in building insulation, lighting, heating, ventilation and air-conditioning systems, energy star appliances, etc. (a2energy, n.d.). Michigan's PACE Act authorises the city of Ann Arbor to raise the capital investment for the PACE programme by issuing bonds or notes. The capital investment, however, has to be secured by the payments of assessments on benefited property, or grants from local reserves, or other forms of credit support or liquidity such as municipal bond insurances, letters of credit or guaranties etc. (a2energy.org, 2012).

Results

It is estimated that the projects financed using revolving energy funds in the period of 1998-2008 resulted in cost savings of approximately USD 860,000, energy savings of 10.7 GWh, and CO2 emissions reduction of about 8,000 tonnes, besides offering better comfort and modern city facilities (ESMAP, 2018). The street lighting programme has in total converted approximately 2,000 city-owned and 500 utility owned lights to LEDs, which resulted in cost savings of USD 200,000 in annual maintenance (about 70-85%) and energy (about 15-30%) costs with an estimated payback period of 6 years. Further, the projected led to annual electrical energy savings of 850,000 kWh and annual CO2 savings of 800 metric tons (Energy Office, n.d.-a).

Results

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