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South African Local Government association

Driving Energy Efficiency and Renewable Energy in Municipalities:

Energy Performance Contracting:

Experiences from the City of Cape Town

SALGA CASE STUDIES SERIES

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GLOSSARY

BAC Bid Adjudication Committee (City of Cape Town)

BEC Bid Evaluation Committee (City of Cape Town)

DANIDA Danish International Development Agency

ECCU Energy and Climate Change Unit (City of Cape Town)

EEDSM Energy Efficiency Demand Side Management Programme (National Department of Energy)

ESCO Energy Service Company

kWh Kilowatt hour

MFMA Municipal Finance Management Act, No 56 of 2003

M&V Monitoring and Verification

SALGA South African Local Government Association

SCM Supply Chain Management Unit (City of Cape Town)

1. INTRODUCTION

Energy performance contracting refers to the practice of requiring an energy management service provider to guarantee that the full costs of a suite of energy efficiency interventions that it implements will be paid back through the energy savings that result from the interventions. By definition, the future savings must be greater than or equal to the costs.

The typical implementation of an energy performance contract involves the service provider raising the funds to undertake the implementation of energy saving interventions on behalf of their client. Once the implementation of interventions is complete, the service provider is then paid by the client out of the monthly savings achieved by the interventions. Payments continue until a specified contract period is complete.

In this form of energy performance contracting the client is not required to pay for the cost of the interventions at the outset. In addition, the client only pays from the savings achieved, so in cases where the savings are less than expected the client is not required to top up the payments and the service provider suffers the financial consequence of non-performance.

This document provides an overview of the energy performance contracting approach that is being used by the City of Cape Town for the implementation of energy efficiency interventions in its municipal buildings. Owing to the unique operating environment of South African municipalities, the City of Cape Town has developed its own approach to the implementation of performance contracting.

Primarily because of internal accounting procedures for the payment of electricity, it is not possible for the City of Cape Town to ring-fence savings and pay those to a service provider. Instead, the City of Cape Town pays the service provider for the interventions up front, but requires the service provider to provide a financial guarantee that the projected savings will be achieved. If the agreed savings are not achieved, the service provider's performance guarantee is used to re-imburse the difference to the municipality.

The first section of this document provides an overview of the current method of energy performance contracting used by the City of Cape Town and the second section examines some of the key issues that need be considered by municipalities when implementing energy performance contracting based on the City of Cape Town experience.

2. HOW THE CITY OF CAPE TOWN UNDERTAKES ENERGY PERFORMANCE CONTRACTING

The City of Cape Town first initiated energy performance contracting in 2009 with the issuing of an energy performance contract tender for four municipal buildings to be retrofitted for full energy efficiency. This first performance contract was funded through the Danish International Development Agency's (DANIDA) Urban Environmental Management Programme (UEMP).

In 2011, the City of Cape Town issued a second energy performance contract tender for an additional fourteen of their municipal buildings, which was funded by the National Department of Energy's Energy Efficiency Demand Side Management Programme (EEDSM). This performance contract was limited to lights, occupancy sensors and smart meters.

In 2013, a third tender was issued by the City of Cape Town for another twelve municipal building complexes, also funded through the EEDSM. These twelve buildings will receive full energy efficiency retrofits once the tender award process is complete.

Over the four years that the City of Cape Town has been engaging with energy performance contracting, it has refined its approach considerably. This Case Study explores the most recent (2013) model being used by the City of Cape Town in this regard.

To ensure that the municipality complies with the financial controls as laid out in the Municipal Finance Management Act (No. 56 of 2003) (MFMA), the process of procuring a service provider for an energy performance contract is conducted in two stages. These are described in the following sections.

STAGE ONE: Contracting a service provider and completing detailed audits

Stage one of the tender process involves securing a service provider to undertake detailed audits of each of the buildings for which energy efficiency measures are to be implemented in terms of the contract. The service provider is paid to undertake these detailed audits. The purpose of the first stage is to identify, through the audits, a suite of energy efficiency interventions that can be implemented in the various buildings along with the pay-back periods for these interventions.

To initiate Stage One, the City of Cape Town issues a tender calling for "*Provision of a service provider for detailed audits and energy efficiency interventions at council building complexes*". The tender requests bidders to quote on the following key items:

1. The cost of detailed energy audits of all identified buildings.
2. The mark-up percentage the bidder would impose on the cost of materials, labour and disposal for the implementation of the selected energy efficiency interventions. Since bidders would need to complete a detailed audit of each of the buildings in order to identify and accurately cost all the possible energy efficiency interventions, the bidders are not asked in Stage One to provide a full cost estimate for energy efficiency interventions.
3. Extra-over normal fees and disbursements, including items like the procurement of an occupational health and safety professional, printing and copying, travel expenses, behaviour change and capacity building programme, and accessing Eskom's Integrated Demand Side Management Funding.

Once all responses have been received from interested bidders, a detailed review of all the responsive bids is completed by a Bid Evaluation Committee (BEC) convened specifically for the tender. The recommendation of the BEC is then referred to the central Bid Adjudication Committee (BAC) of the City of Cape Town. Once the BAC has made a final decision, the preferred bidder / service provider is then appointed.

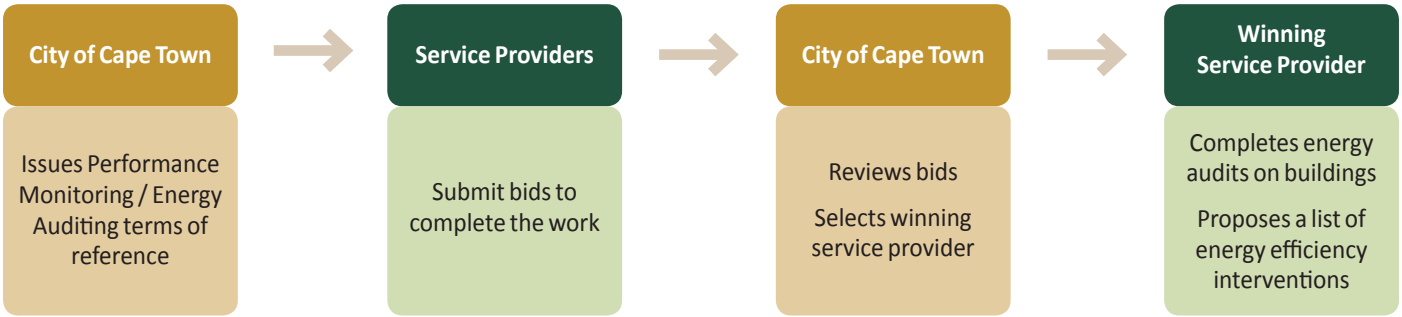
On receiving a formal appointment, the winning service provider proceeds to undertake detailed energy audits on each of the buildings identified in the tender to establish a baseline for energy use and to identify energy efficiency interventions that can be implemented. Using the results of the audit as a basis, the service provider then proposes a suite of energy efficiency interventions for each of the buildings.

The following details must be provided for each of the proposed interventions:

1. The cost of the intervention. This includes the cost of materials, labour, disposal of materials and service provider mark-up.
2. The amount of energy in kWhs that will be saved through implementing the intervention.
3. The pay-back period of the intervention.

An evaluation of the cost effectiveness of the intervention, taking into account both the costs of implementing the intervention, and the ongoing maintenance costs of the intervention, is then undertaken.

Figure 1: Steps involved in Stage One of a City of Cape Town Performance Contracting Tender



STAGE TWO: Implementation of interventions and performance guarantee

Stage Two of the process involves the implementation of the energy efficiency interventions and the ongoing evaluation of the success of the interventions.

Stage Two is initiated with the selection of a preferred suite of interventions by the City of Cape Town. Using the results of the detailed building audits, relevant municipal staff select a sub-set of interventions that are deemed most cost effective for each building. The service provider then implements the selected interventions in the various buildings concerned and is paid for the implementation of these interventions.

Once the interventions are in place and the service provider has been paid for the completed interventions, the performance guarantee period starts. The service provider is required to manage and maintain the installations and to guarantee performance for the entire pay-back period of the interventions. For example, if it is anticipated that it will take 5 years for the City of Cape Town to recoup the costs of the interventions through energy savings, the performance guarantee period will be 5 years. For ease of management the guarantee is managed in twelve month cycles.

The first twelve month cycle is initiated within fourteen days of completing the installation of the interventions. At this point the service provider is required to lodge a performance guarantee with the City of Cape Town in the form of a bank guaranteed cheque. The performance guarantee must be for the amount of money that the service provider predicted the interventions would save the municipality over a twelve month period.

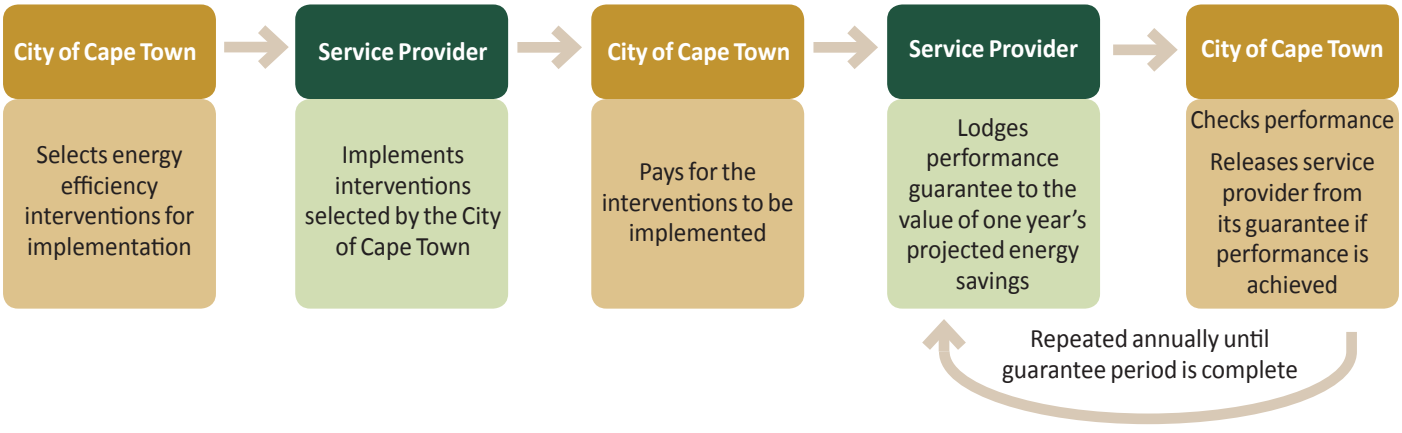
During the performance guarantee period the energy usage of the buildings is monitored and compared against historical energy usage prior to the implementation of the interventions. This information is used to determine the total energy savings that can be attributed to the interventions completed by the service provider.

There are three possible scenarios for the release of the guarantee:

1. The energy saving installations outperform expectations and twelve months of savings are achieved earlier than expected. In this scenario the municipality will release the service provider from its performance guarantee as soon as the savings are achieved (i.e. prior to the completion of twelve months). The service provider then provides the municipality with a new performance guarantee cheque for another twelve month period. Releasing the guarantee before the twelve month period is complete and immediately starting the next twelve month contract shortens the length of time the service provider is expected to guarantee performance. Since the earlier release of the guarantee is beneficial to the service provider, this provides an incentive for the service provider to exceed performance targets.
2. The service provider meets expectations and the total savings for the twelve month period are achieved in the expected time frame. In this scenario, the performance guarantee is released at the end of the twelve month period and the service provider will then issue the municipality with a new performance guarantee cheque for the next twelve months.
3. The service provider does not meet savings expectations within the twelve month period. In this scenario the service provider is required to pay the municipality the amount for any savings not achieved. Once this payment has been made the municipality releases the performance guarantee and the service provider issues a new performance guarantee for the next twelve month period.

Once the specified pay-back period for the combined interventions completed in a building has been reached, the cycle of issuing twelve month guarantees ends and the contract is complete.

Figure 2: Steps involved in Stage Two of a City of Cape Town Energy Performance Contract.



3. KEY ISSUES FOR ENERGY PERFORMANCE CONTRACTING BY MUNICIPALITIES

3.1 Supply Chain Management

Energy performance contracting departs from the standard approach to contracting service providers. Developing an appropriate contracting approach required staff of both the City of Cape Town's Energy and Climate Change Unit (ECCU) and Supply Chain Management (SCM) to spend time developing an appropriate contracting approach that conformed with the Municipal Finance Management Act (MFMA) and at the same time allowed for performance contracting. Through the experience of implementing two previous rounds of performance contracting tenders, the City of Cape Town has built the internal staff capacity in both the ECCU and SCM in this regard. As a result, an improved approach to the contracting process has been implemented in the third round.

At first glance, one of the most difficult challenges to performance contracting is presented by Section 33 of the MFMA, which requires municipalities to follow a number of special steps in order to put in place a contract that "*will impose financial obligations on the municipality beyond the three years covered in the annual budget for that financial year*". However, since the performance guarantee period of the contract does not impose any financial obligations on the municipality and instead imposes financial obligations on the contractor, performance guarantee contracts are in fact not affected by Section 33 of the MFMA provided that all interventions have been implemented and paid for in the first three financial years of the contract. In this regard, ECCU staff highlight that an energy performance guarantee is in effect equivalent to a general guarantee on a capital purchase that a municipality may require of a service provider.

A second challenge to performance contracting from an SCM perspective is that at the outset of the contract the full cost of the interventions is unknown. The full cost can only be determined once a detailed audit has been completed of the identified buildings. From a contracting perspective the most efficient way of handling this difficulty would be to commission a service provider to complete a detailed audit of the buildings and then to issue a separate tender to commission a service provider to implement the interventions. In reality, however, this approach is not workable as it is highly likely that different service providers would then be commissioned to complete the audits and the interventions. The two service providers may have different views on both the costs of the interventions and the likely savings. To resolve this challenge, the City of Cape Town instead issues a single tender for both the audit stage and the intervention stage. Bidders are required to provide a full quote for the audit stage and also outline the mark-up percentage they would impose on the cost of materials, labour and disposal for the implementation of the selected energy efficiency interventions. Through this mechanism the City of Cape Town is still able to evaluate the relative cost effectiveness of bidders without the bidders being required to provide a detailed quote on the interventions themselves. In addition the City of Cape Town only commits to the actual interventions once details on the costs of the interventions and likely savings have been outlined in the audit stage.

3.2 Securing an appropriate service provider

For their energy performance contracting tenders the City of Cape Town specifies that eligible service providers must be Energy Service Companies (ESCOs) that are registered with Eskom. The ECCU of the City of Cape Town emphasises that this is an important requirement, as only ESCOs are familiar with energy performance contracting, and as a result, are in the best position to implement and guarantee savings.

The ECCU also looks for service providers that have a good track record in implementing energy performance contracting projects and indicates that reference checking is essential to determine if the bidding companies have performed to the expectations of other clients.

3.3 Internal technical capacity

The ECCU of the City of Cape Town highlights the need for internal technical capacity to oversee the implementing of energy performance contracting. A technical expert is required to properly evaluate the bids and also to assess the technical viability of the individual interventions that are proposed by the service provider.

The ECCU warns that it is extremely important to evaluate the appropriateness of any new technologies that may be adopted through the energy performance contract. The choice of inferior technology during the course of the performance contract could have substantial cost implications as the technology may not have the expected energy saving impact or could have a significant maintenance cost. In addition, once the new technologies have been used, they then become adopted into the City of Cape Town system and they will be re-stocked on a regular basis in the City of Cape Town stores. They will also be used by facilities management staff when replacements are required and also possibly introduced into other buildings. If at a later date it emerges that the technology has too

short a life span or is not as efficient as predicted, time and effort will be required to reverse the use of the technology within the standard facilities maintenance systems.

3.4 Building Management

The City of Cape Town Corporate Services Directorate has a Specialised Technical Services department which is responsible for facilities management in administrative buildings within the City of Cape Town. In addition, other Directorates have their own internal facilities management units. With regards to the administrative and operational buildings, the Technical Services department allocates a building manager to each building. Building managers are responsible for ensuring that their buildings operate smoothly so that building users can perform their allocated municipal responsibilities unhindered. Building managers are able to call on a pool of maintenance staff within the Technical Services department to fix and in some cases replace faulty equipment. Building managers are also supported by a team of services staff provided by Specialised Technical Services who provide services such as cleaning and security. Building management has a significant impact on energy use in four ways:

1. **Control of centralised equipment**: Building managers are in control of centralised systems that service the entire building. For instance, building managers are often in a position to set the temperature of centralised air-conditioning systems and so increase or decrease the total energy required by the system.
2. **Technology choice**: Building managers and their supporting maintenance staff are responsible for selecting replacements for old or faulty equipment. Energy efficiency of the replacement products will have a significant impact on energy use going forward.
3. M**aintenance**: Poorly maintained and faulty equipment can result in unnecessary energy use. By ensuring the proper maintenance, building managers play an important role in preventing wasteful energy use.
4. **Energy behaviour of service staff**: Services staff can play a role in assisting with energy management by, for instance, reporting faults and switching off equipment after hours. Building managers are in a position to include responsibilities of this nature into the daily duties of service staff.

Recognising the significant role that facilities management staff play in energy management within buildings, the ECCU ensures that the facilities management unit is fully informed on energy performance contracting interventions and is up to date with any developments in this regard. The ECCU has also arranged for twenty-two facilities management staff members to receive specialised energy management training to provide them with the necessary capacity to contribute to energy efficiency in city facilities. This training course has now been introduced as a standard training module for facilities management staff within the City of Cape Town and departments are able to use their allocated training budgets to send staff on this course. In addition to training of facilities management staff, the ECCU has provided education programmes for servicing staff whose behaviour can have a significant impact on energy usage within a building.

3.5 Maintenance of Interventions

Maintenance during the contract period can be a serious challenge to energy performance contracting, as if interventions are not properly maintained the service provider could claim that underperformance is a result of poor maintenance. As a result of this concern the City of Cape Town requires contractors to be responsible for the maintenance of their interventions for the duration of the pay-back period.

The contract does, however, include a small budget allocation for capacity building that the service provider is able to use on training City of Cape Town Technical Services staff to assist with the maintenance. The City of Cape Town requires the service provider to use the Technical Services department to implement the maintenance for the last two years of the performance contract to ensure that the Technical Services department will be able to continue the maintenance once the performance contract period has ended. Whilst most of the maintenance requirements are straightforward, in some cases maintenance is highly technical and will still require support from external service providers. Since effective maintenance by the Technical Services department during the performance contract period will result in cost savings for the service provider, the service provider is incentivised by the contract structure to properly train the Technical Services staff and to make use of them in the maintenance process. It should be noted, however, that the service provider is still ultimately responsible for ensuring that the interventions are maintained and able to achieve the predicted level of savings.

3.6 Behaviour Change

Municipal buildings house a wide variety of municipal departments and units that offer a range of services to residents of Cape Town. Some buildings may be occupied by only one entity whereas others can be occupied by several different entities. The municipal entities occupying a building are billed for their energy use by Cape Town Electricity. However, it should be noted that municipal entities don't receive and pay a conventional electricity bill, instead an internal transfer of funds takes place between the relevant entity and Cape Town Electricity. Where more than one entity occupies a building, the bill is split on a *pro rata* basis that is normally related to floor space occupancy.

Building tenants are the energy users of a building and their energy performance requirements as well as energy use behaviour have a significant impact on the total energy used in a building. Owing to the important role of building tenants in energy management, the ECCU has included a small budget allocation in its energy performance contracts for the service provider to promote behaviour change to building tenants. The impact of behaviour change is not included in the calculation of the pay-back period for the performance contract. As a result the service provider can significantly reduce the length of the performance guarantee period through successful behaviour change work. This incentive for the service provider to seriously invest in behaviour change has been promoted by the ECCU since it has recognised the important role tenants play in long term energy management.

The ECCU also complements the behaviour change efforts of the energy performance contracting service providers with their own behaviour change programmes. ECCU behaviour change interventions use a wide variety of techniques including:

1. **Executive workshops**: ECCU hosts workshops with the key management staff of facilities to inform them of the energy efficiency initiatives in their facilities and to gain their support for the implementation of energy efficiency education and awareness interventions with their staff.
2. **Formal training sessions**: ECCU has developed two energy efficiency training modules. One module has been developed specifically for professional staff and a second module has been developed for non-professional staff. The training modules cover generic items such as basic environment and climate change awareness, practical energy awareness and energy efficiency tips. The training also includes content specific to the site where staff are located such as a tour of the energy efficiency retro-refitting undertaken in their facilities and explanations of the electricity savings targets set for their facilities.
3. **Establishing Green Teams**: Where possible the ECCU also initiates the establishment of Green Teams for facilities. These teams are made up of staff that take on the promotion of energy efficiency and sustainability in their facilities on a voluntary basis.
4. **Pop up Exhibitions**: To provide a more informal opportunity for staff to learn about energy efficiency and sustainability, pop up exhibitions are held at facilities. These exhibitions have representatives on hand to explain energy efficiency and sustainability to interested staff. The exhibitions also offer take-home brochures and examples of energy efficiency products.
5. **Posters**: The ECCU has developed a variety of general posters that highlight energy efficiency issues and also have facility specific posters that provide an overview of energy usage over time at the facility so staff can track the effectiveness of energy savings efforts in their facility. In the future ECCU is planning to introduce monitors into the foyers of buildings that display live consumption data and savings tips.
6. **Emails**: The ECCU also makes use of email to send out regular energy efficiency and sustainability tips.

To evaluate the effectiveness of their own behaviour change and awareness interventions, ECCU monitors energy use at a facility before and after the implementation of specific interventions. The monitoring information is evaluated to verify the effectiveness of behaviour change interventions and is also used to assist in identifying the most effective methods of behaviour change for ongoing implementation.

3.7 Monitoring & Verification of Performance

Accurate monitoring and verification of energy savings is critical to the effective implementation of an energy performance contract. Without accurate information it is not possible to determine if the required savings have been achieved. This particular issue has been a challenge to the City of Cape Town energy performance contracts in the past, as historically not all municipal buildings have had separate metering systems. Since accurate energy monitoring is critical for long term energy management, the City of Cape Town has been running a programme to install smart metering systems in its buildings. As a result, the City of Cape Town now has smart metering systems for all the buildings included in the latest performance monitoring contract. These systems provide time of use energy information. The information from the smart metering system is available on-line so that building managers, performance contracting service providers and ECCU staff are in a position to monitor energy use themselves. The energy management training course that has been developed by the ECCU for building management staff includes a component on how to read the smart metering data to ensure that building managers are able to make full use of the smart metering data for their building.

The ECCU highlights that it is important to also have historical information on building performance in order to have a baseline of energy use against which future reduced energy use can be compared. Without this historical information it is not possible to evaluate the savings achieved by the service provider.

In addition to smart metering, the ECCU recommends the use of a quality Monitoring and Verification (M&V) specialist to review the energy savings on an annual basis. This provides a high level of surety that the savings have been achieved and is required by the EEDSM programme. In addition, the ECCU has found that having the savings externally verified assists when making proposals for further funding of energy efficiency initiatives to the City of Cape Town finance department.

3.8 Greening Procurement

The implementation of performance guarantee contracts has also served to highlight to ECCU that a large portion of the existing City of Cape Town lighting stock is energy inefficient. As a result, efforts to make buildings more energy efficient can be undermined at a later date when light bulbs are replaced. The ECCU has therefore initiated a broader project entitled "Greening the city's procurement". Through this initiative all existing stock items in the city system have been examined and research conducted to identify energy efficient alternatives. Through this programme, incandescent light bulbs have been made obsolete. The "Greening the city's procurement" project is serving to ensure savings achieved through performance contracting are maintained and that new infrastructure uses energy efficient lighting solutions.

3.9 The need for an internal energy management protocol

The energy performance contracting experience of the City of Cape Town has served to highlight the integrated nature of energy management within the city and the need to coordinate efforts and ensure that energy issues are considered in the construction of new buildings and the retrofitting of old buildings. Already some of the learnings from energy efficiency efforts have translated into SCM implementing its own energy performance contract for the retrofit of the Civic Centre. In addition, energy efficiency measures have been used in constructing the new Human Settlements Contact Centre in Manenberg, which is the first municipal building in the country to receive a Green Star SA rating from the Green Building Council of South Africa.

However, to ensure these learnings are fully institutionalised within the City of Cape Town's operations, the ECCU has identified the need to formalise the City of Cape Town approach to energy management. As a result the ECCU will shortly be initiating a project to establish an internal energy management protocol that will be used to guide activities linked to energy management going forward.

One of the key issues that will be addressed through the implementation of the internal energy management protocol is the fact that most departments do not currently monitor their own energy and water use. The current internal payment systems for energy and water services do not require departments to be accountable for the amount of energy and water that they use. The planned internal energy management protocol will encourage departments to monitor their own usage.

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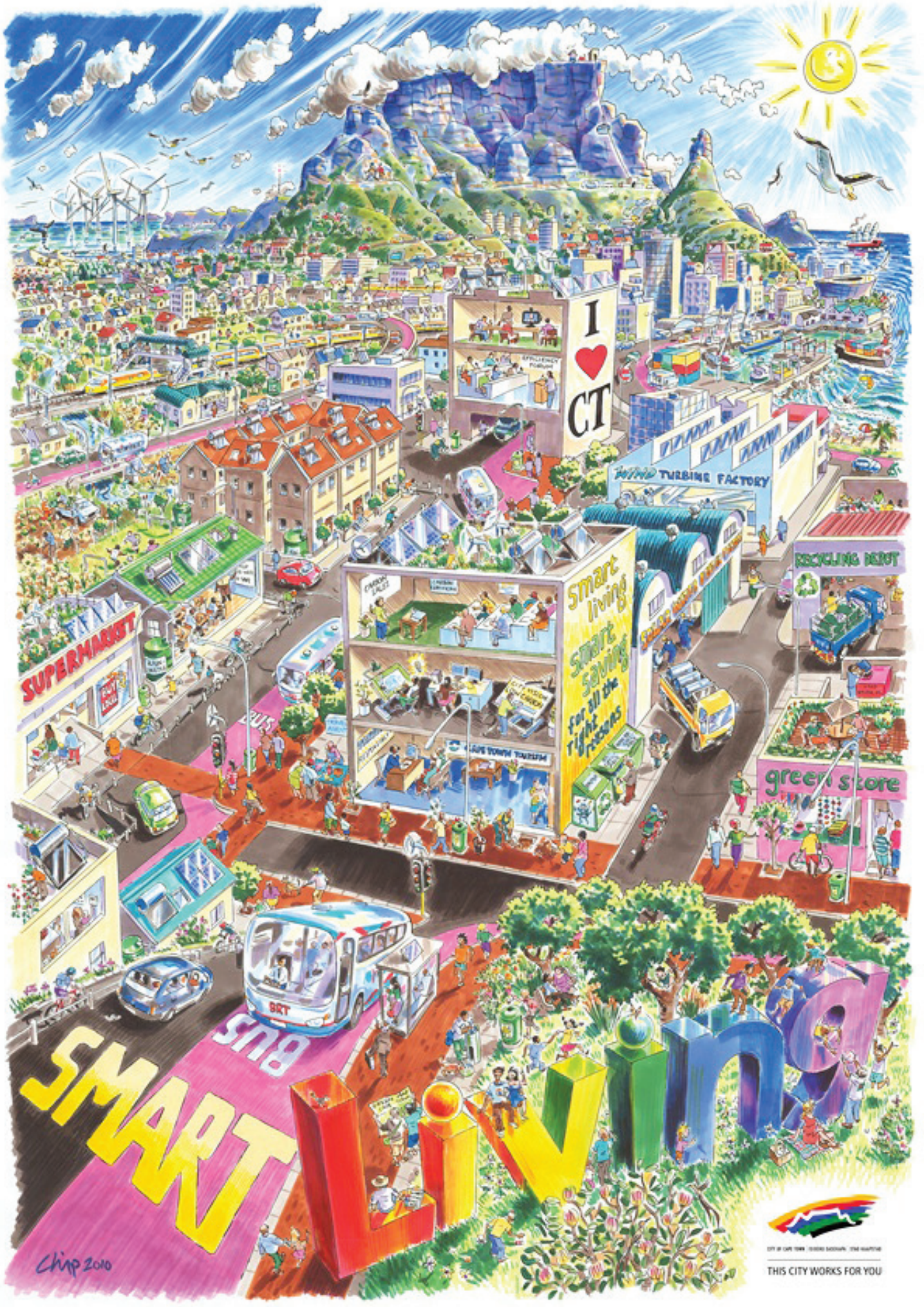
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