codema
Dublin's Energy Agency

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

SOUTH DUBLIN COUNTY COUNCIL ENERGY REVIEW 2017

01. INTRODUCTION

Codema has developed this Energy Review on behalf of South Dublin County Council (SDCC), which is one of the largest local authorities in Ireland. The aim of this Energy Review is to highlight the total amount of energy SDCC consumed in 2017, along with the total cost and carbon emissions associated with this energy use.

This Energy Review also aims to clearly demonstrate where energy is used in the council, what drives its consumption, and where the greatest energy-saving potential is; this will help SDCC to identify where it currently is in relation to public sector energy targets, and what areas it needs to prioritise in order to meet these targets between now and 2020.

As part of this process, Codema has analysed SDCC's total energy use and broken this down into four Significant Energy Users (SEUs), which are explained in detail within this Energy Review. Codema gives an overview of the current energy use associated with each SEU, and provides detailed recommendations on the action SDCC must take to reduce energy consumption in each SEU area and meet 2020 targets.

PUBLIC LIGHTING

LEISURE CENTRES

OFFICES

TRANSPORT

Current Status & Obligations

In 2017, SDCC consumed a total of 53 gigawatt hours (GWh) of primary energy[1]; this is the equivalent of 11,500 tonnes of CO_2 and Codema estimates the associated cost of this energy use to be approximately €3.3 million.

This information comes from Codema's database, which incorporates the data from the Monitoring and Reporting (M&R) system developed by the Sustainable Energy Authority of Ireland (SEAI) and the Department of Communications, Climate Action and Environment (DCCAE). It is important to note that these figures may vary, as changes to data within the M&R system for previous years are accounted for, such as the addition of missing accounts or the removal of accounts that are no longer linked to SDCC. These changes are made throughout the system, from the baseline year to date, and don't affect the baseline or reduction target.

Codema has been entering this yearly data into the M&R system on behalf of SDCC since 2011, in order to comply with the reporting requirements of the European Energy Efficiency Directive 2012/27/EU. The directive has been transposed into Irish Law as Statutory Instrument S.I. 426 of 2014, which sets out several obligations on public bodies with respect to their "exemplary role" for energy efficiency by achieving savings of 33% by 2020. This is an average reduction target of 3% per year.

To date, as reported by the M&R system, SDCC has improved its energy performance by 25.4%, compared to the baseline. The overall energy performance in 2017 improved by 6.4%, when compared to the previous year. While steady progress has been made, much of the improvement is because of an adjustment in the baseline from 2009 to an average of between 2006 to 2008, due to the availability of new data for the transport fuel use. This amounts to a cumulative absolute saving of 6 GWh of primary energy or 1,560 tonnes of CO_2 saved from the baseline.

This means that SDCC must improve its energy performance by 7.6% in its buildings and operations between now and 2020, in order to meet the 33% public sector target. Through this Energy Review, Codema highlights the areas within the council that are consuming the most energy (i.e. the SEUs), and sets out possible solutions for each of these areas in order to achieve these additional savings.

1. Primary energy (TPER) is an energy form that has not been subjected to any conversion or transformation process. It is energy received as input to a system. Primary energy can be non-renewable or renewable.

SDCC Energy Overview 2017

CONSUMED 53 GWH OF PRIMARY ENERGY

11,500 TONNES OF CO_2 EMITTED

€3.3 MILLION ASSOCIATED ENERGY COST

Public Sector Obligations

ACHIEVE SAVINGS OF 33% BY 2020

REDUCTION TARGET OF 3% PER YEAR

SDCC Progress 2009-2017

IMPROVED ENERGY PERFORMANCE BY 25.4%

1,560 TONNES OF CO_2 SAVED

7.6% IMPROVEMENT REQUIRED TO MEET THE 33% PUBLIC SECTOR TARGET

01. INTRODUCTION
(CONTINUED)

Methodology

In order to calculate potential energy savings in SDCC, it is necessary to analyse changes in other factors that are directly related to the council's energy use. With this in mind, Codema uses Energy Performance Indicators (EnPIs) to measure SDCC's energy performance more accurately. This method determines how efficiently SDCC is using energy, as it is normalised to account for changes in the activity level related to the energy use, or the "activity metric", of the local authority. This is a measure of the key activity that has the greatest influence on energy consumption. An EnPI is calculated by dividing the organisation's Total Primary Energy Requirement (TPER) by an activity metric.

When there are multiple variables that drive energy consumption, a composite performance indicator is used. Determining a single performance indicator for complex situations where multiple variables drive consumption can be difficult, because different aspects of the facility consume different amounts of energy and are driven by different variables. In such cases, a composite performance indicator based on more than one variable is used. The scale of each variable's contribution is defined by a weighting scale.
In the case of SDCC, the overall performance indicator is based on population served. Therefore, SDCC's EnPI is the TPER divided by the population served for that year. Thus, the performance of SDCC is determined not only by its annual energy use, but also by a rise or fall in population in the South Dublin area in the same year. Savings are based on cumulative absolute primary energy and carbon savings from the baseline year to 2017.

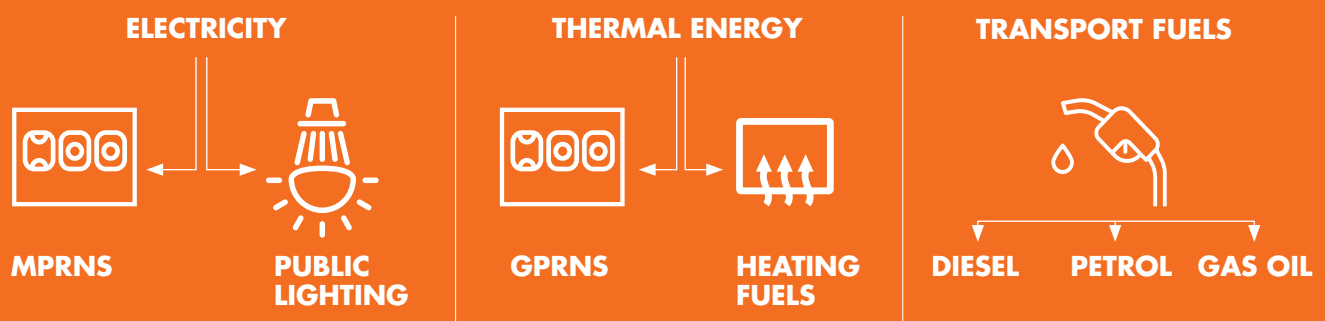
In 2010, the Dublin Local Authorities outsourced waste collection within the region. Also, in 2013, water services within the local authorities were transferred to Irish Water. The M&R system and Codema's database have provisions to account for these changes, and therefore accurately track the actual energy performance of the local authority from the baseline to 2017, which takes proper account of services that have been outsourced.

Formula for Calculating EnPIs for SEUs

$$\text{ACTIVITY}_0 = \sum_{i=1}^{x} \left(\frac{\text{Subactivity}_i}{\text{Subactivity}_{i,\text{baseline}}} \times \text{Weighting}_i \times 1{,}000 \right)$$

02. SDCC ENERGY CONSUMPTION 2017

The energy database shows that SDCC consumed 53 GWh of primary energy and produced 11,500 tonnes of CO_2 in 2017. Codema estimates the costs associated with this energy use to be approximately €3.3 million for the year. This is broken down into three principal energy categories; electricity, gas/heating and transport fuels. Electricity consumption comprises of metered electrical accounts (MPRNs) from SDCC's public buildings and unmetered public lights. Thermal energy consumption consists of metered gas accounts (GPRNs) and heating fuels data from buildings, and transport accounts for all the transport fuels within SDCC, i.e. diesel, petrol and gas oil.



02. SDCC ENERGY CONSUMPTION 2017
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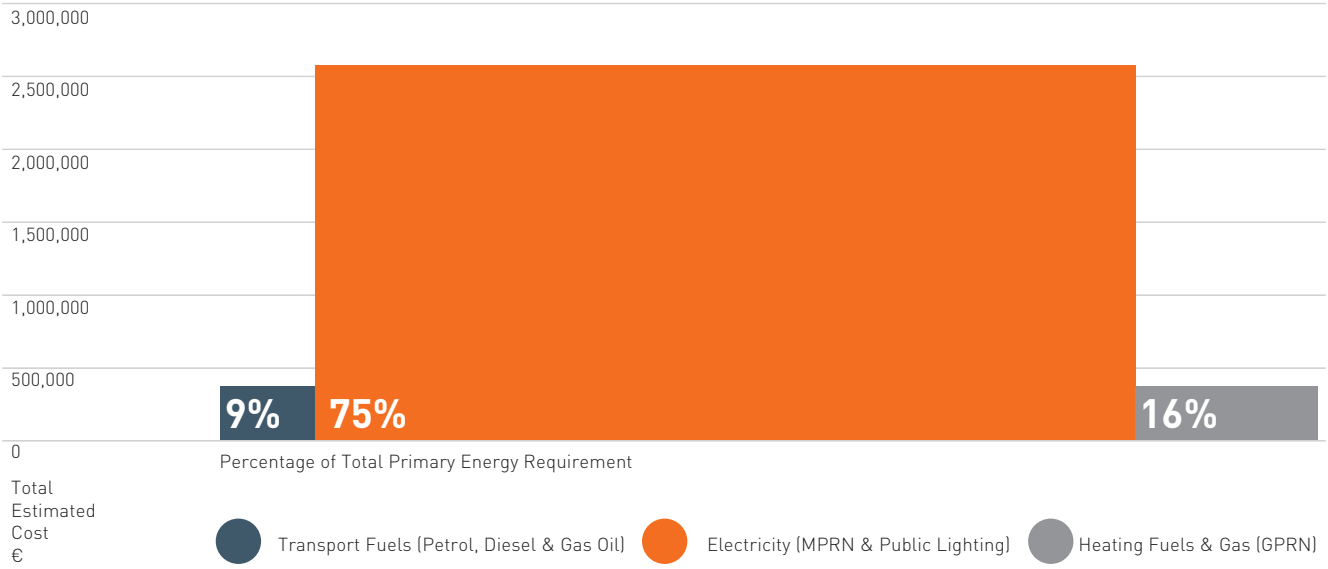


Figure 1: SDCC Energy Categories - 2017

Figure 1 shows the breakdown of the consumption categories. The height represents the total estimated cost of that energy type, and each coloured area highlights what percentage of the overall energy use this energy type accounts for.

Electricity accounts for the largest share of energy consumed, at approximately 75%. The reasons for this are the large number of public lights in the South Dublin area, and the high conversion factor of electricity from Total Final Consumption (TFC) to Total Primary Energy Requirement (TPER). The reason for the high conversion factor is to account for the high losses on the transmission system in Ireland and the carbon intensive method in which Ireland generates electricity.

With regards to the energy cost, the analysis is much more complex, as fuel tariffs vary and the various energy accounts have different suppliers. Also, the local authority's targets are measured in energy efficiency, not cost savings. In order to estimate the total cost of energy attributable to the different energy categories, Codema has used average national prices for electricity, heating gas and the different fuel types sourced from SEAI's commercial fuel cost comparison charts.

The energy database shows that SDCC improved its energy performance by 25.4% between the baseline and 2017, and a cumulative absolute saving of 6 GWh of primary energy or 1,560 tonnes of CO_2. This highlights a gap-to-target of 7.6%, meaning that SDCC must improve its energy performance by 7.6% between now and 2020, in order to meet its 33% target. This is estimated to be a cumulative absolute saving of 5.5 GWh[2] in primary energy.

Figure 2 illustrates SDCC's absolute energy consumption, and Figure 3 illustrates SDCC's normalised annual energy performance compared to the 33% glidepath. This takes into account the rise and fall of the activity metrics, and tracks them compared to SDCC's TPER of all fuel sources.

As highlighted in last year's Energy Review, there was a significant decrease in energy consumption in 2011. This was mostly due a decrease in the Transport fuels during this year, and from consulting with fleet management, Codema believes this to be due to the reduction in the fleet's workload as a result of the recession. Another factor is the introduction of newer, more fuel-efficient vehicles to replace older vehicles, which naturally improves energy performance as a result.

Figures 2 and 3 also show a decrease in energy consumption in 2015, as there was less Liquid Petroleum Gas (LPG) used by the council during that year. There was another reduction in 2017, due to a decrease in consumption of 44,000 litres of road diesel and 2,200 litres of petrol, compared to the previous year. However, without the use of a robust energy performance indicator to track the consumption across the Transport Department, it is hard to find a definitive reason for these decreases.

There was also a decrease in energy consumption in the Leisure Centres in 2017, due to less gas being used in both Tallaght and Clondalkin Leisure Centres. This is likely due to improved energy management practices in both facilities, and warrants investigation.

2. Codema calculated this figure using SEAI's gap-to-target tool, which takes into account the potential changes in the conversion factors and percentage increases of the activity metrics up until 2020.

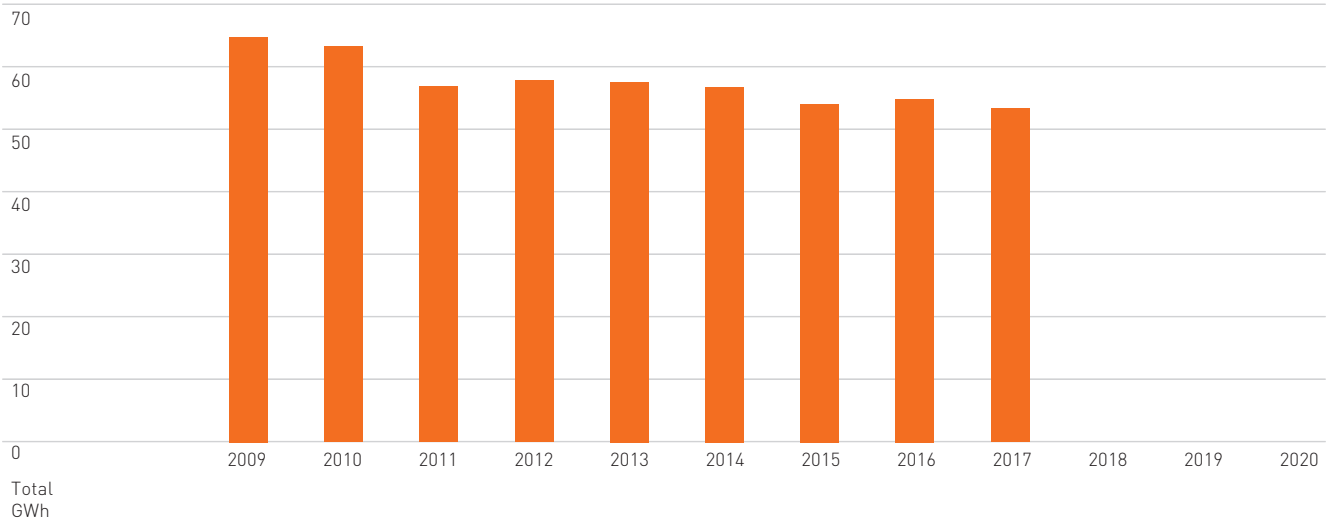


Figure 2: SDCC Absolute Annual Energy Consumption

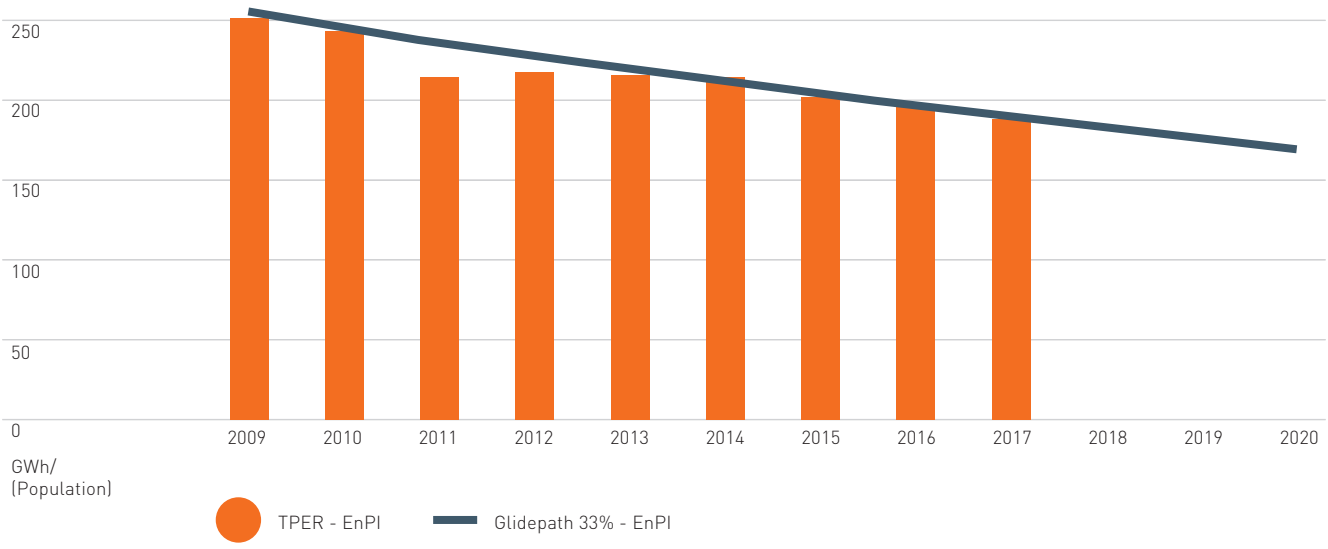


Figure 3: SDCC Annual Energy Performance Compared to 33% Glidepath

03. SIGNIFICANT ENERGY USERS

To help better understand SDCC's energy use, Codema has broken up the council's total energy consumption into Significant Energy Users (SEUs). These SEUs help identify the measures that will contribute most effectively to energy savings and will have the most positive impact on energy efficiency targets. This approach ensures the most efficient use of resources for maintaining and improving energy efficiency in critical areas within SDCC. Codema developed these SEUs by creating an energy database, which includes all the data reported in the M&R system back to the baseline, data compiled by Codema through energy audits, and direct contact with SDCC staff.

Codema compiled all of the council's electricity and gas accounts, and developed a full list of buildings by marrying electrical and gas accounts for each of these buildings. SDCC's Transport Department provided all of the fuels data, and all data on public lighting was compiled through contact with the Public Lighting Department and the Unmetered Registrar (UMR).

The database gives a breakdown of each of SDCC's SEUs into Total Primary Energy Requirement (TPER), CO_2, and cost year-on-year, and compares this back to the baseline. Codema also compares this data to an energy performance indicator to track the energy performance of each SEU.

Through analysis of this data, Codema has identified four key areas, or SEUs, which account for 81% of SDCC's total primary energy requirement and can be broken down as follows:

PUBLIC LIGHTING 48%

LEISURE CENTRES 13%

OFFICES 11%

TRANSPORT 9%

Figure 4 shows the breakdown of SDCC's SEUs. Public Lighting is the largest SEU, accounting for 48% of the total load. This is followed by Leisure Centres at 13%, while Offices, which comprise of County Hall in Tallaght and the Civic Offices in Clondalkin, account for 11%. The last SEU - Transport - accounts for 9% of the total load. The remainder of the consumption is made up of smaller accounts within SDCC, such as community centres, libraries, arts and civic centres, housing, depots, and heating fuels.

The management of energy in these four SEUs is critical for SDCC to achieve its 33% energy reduction target. Small energy reductions in these areas have a much greater effect on overall consumption than seemingly large reductions in the less significant areas.

Codema therefore recommends that SDCC uses a structural approach at senior management level in order to carefully plan and execute energy reduction projects. This targeted, holistic approach to these SEUs will help maximise their impact and will go beyond the typical energy-saving projects that are usually reactionary or part of routine maintenance.

Figure 5 shows how the SEUs performed in 2017, compared to 2016. All of the SEU areas recorded an improvement in energy performance in 2017, compared to the previous year. In Transport, this was due to a decrease in consumption of 44,000 litres of road diesel and 2,200 litres of petrol in 2017. Public Lighting decreased its energy consumption by 53 megawatt hours (MWh), due to the ongoing upgrading of public lights to LEDs. Offices improved its energy performance by 69 MWh, mainly due to the improved energy management practices in County Hall, and the Leisure Centres saw a reduction of 296 MWh, mainly due to less gas being used in both Tallaght and Clondalkin Leisure Centres.

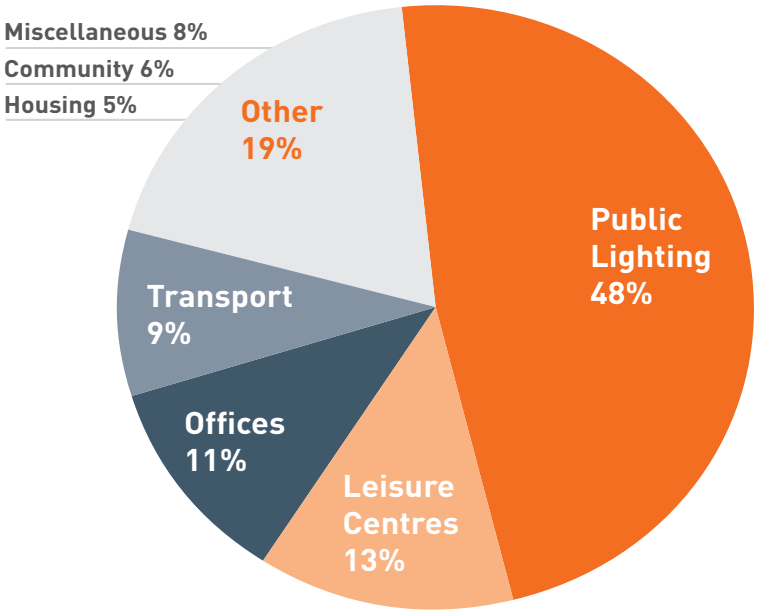


Figure 4: SEU Analysis

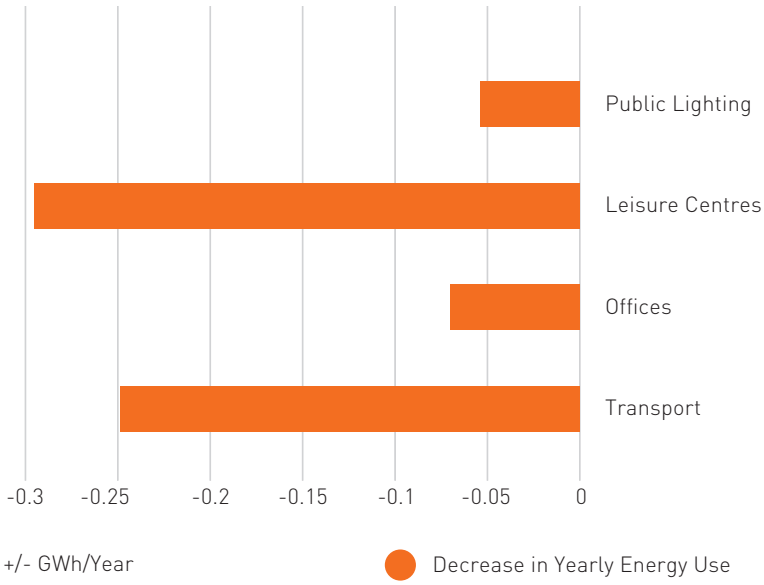


Figure 5: SEU Performance Change Between 2016 & 2017

03. SIGNIFICANT ENERGY USERS
(CONTINUED)

PUBLIC LIGHTING

Public Lighting is the largest SEU within SDCC. In 2017, Public Lighting accounted for 48% of SDCC's primary energy consumption, which amounted to 25.6 GWh of primary energy consumption, 5,530 tonnes of CO_2 and an estimated €1.4 million in energy costs. Public Lighting consists of over 28,000 lamps, which are broken up into three main different light sources, which are listed below in order of their efficiency:

- Light Emitting Diode (LED) – 7,528 lamps
- Low Pressure Sodium (SOX) – 15,805 lamps
- High Pressure Sodium (SON) – 4,566 lamps

SDCC Public Lighting 2017

CONSUMED 25.6 GWH OF PRIMARY ENERGY

5,530 TONNES OF CO_2 EMITTED

€1.4M ASSOCIATED ENERGY COST

IMPROVED ENERGY PERFORMANCE BY 12.5% SINCE BASELINE

Identification of relevant variables for Public Lighting

In relation to Public Lighting, the relevant variables for the development of EnPIs to track the energy performance are very constant. Public Lighting only consumes electricity and has a predictable load. Public Lighting is also charged on a predefined number of burn hours per year, and is largely unmetered. Burn hours are reflected seasonally, and don't change from year to year.

One variable that is not a constant, and drives energy consumption in Public Lighting, is the quantity of lights. As the region grows to support a rise in population, the quantity of lights increases. This is reflected in the data received from the Unmetered Registrar (UMR). Therefore, to accurately track

the energy performance, Public Lighting is compared to the number of unmetered public lights for that given year:

Public Lighting EnPI = kilowatt hours (kWh) TPER / Number of public lights

Energy Performance of Public Lighting

To date, SDCC's Public Lighting Department has already retrofitted 7,528 lights with LEDs. The energy database shows that Public Lighting has increased its energy performance by 12.5% since the baseline, based on its EnPI. This is an absolute reduction of 3.7 GWh of primary energy and 808 tonnes of CO_2.

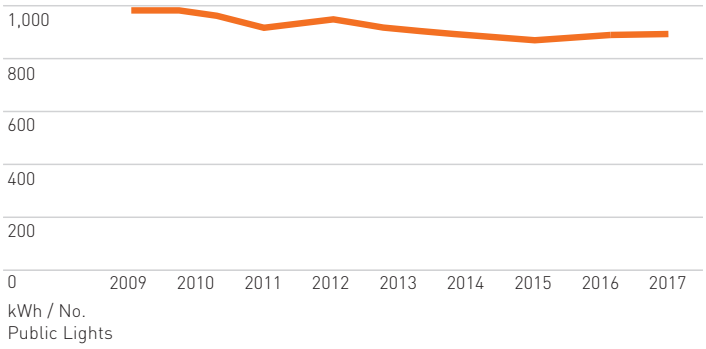
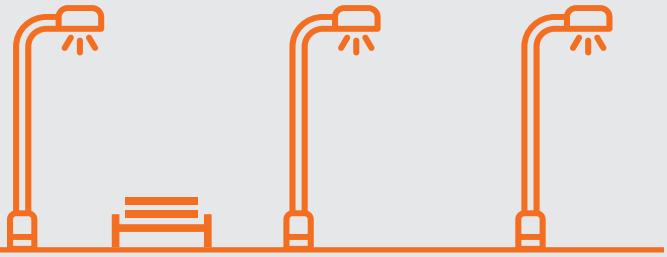


Figure 6: Public Lighting Annual Energy Performance

PUBLIC LIGHTING PLAN TO 2020



As Public Lighting is key to SDCC achieving its energy efficiency target, the council must commit to further energy reductions in this area between now and 2020. Energy reduction in electricity has more impact on the council's targets than any other energy type, due to the poor primary energy conversion factor.

Within SDCC's stock of public lighting, there is currently over 15,000 SOX lamps. The manufacture of these SOX lamps is in the process of being phased out, so these will have to be replaced, and LED lights, with their very high energy efficiency, are the obvious replacement. If SDCC commits to replacing 4,000 of these SOX lamps by 2020, it could produce savings of 2.3 GWh of TPER and 514 tonnes of CO_2. This would have a significant impact on the council's 2020 targets. In addition, an ongoing programme to replace the remaining street lighting with LEDs beyond 2020 is strongly recommended.

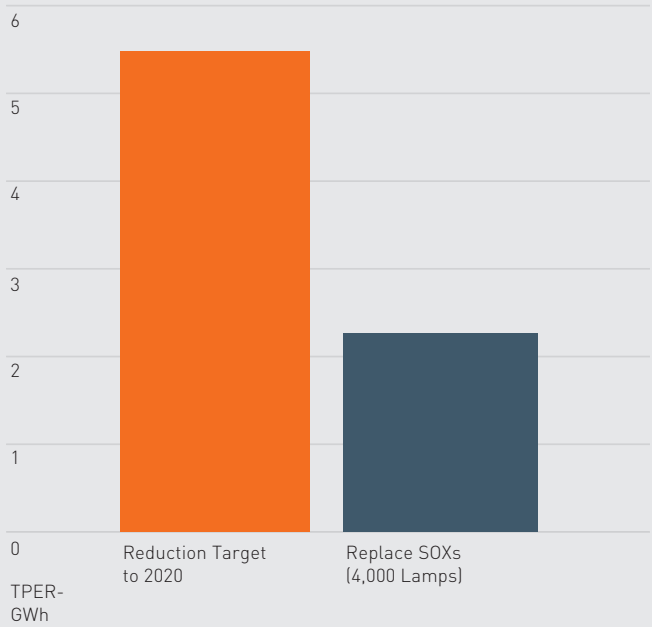


Figure 7: Public Lighting Plan to 2020

03. SIGNIFICANT ENERGY USERS
(CONTINUED)

LEISURE CENTRES

Leisure Centres are the second largest energy consumer within SDCC. SDCC currently operates two large leisure centres, namely Tallaght and Clondalkin Leisure Centres. In 2017, these leisure centres accounted for 13% of the local authority's primary energy requirement. This is a consumption of 7 GWh of primary energy, 1,425 tonnes of CO_2, and an estimated €341,700 in energy spend.

Identification of relevant variables for the Leisure Centres

In relation to the leisure centres, electricity and gas are the two main energy types. When there are multiple variables that drive energy consumption, a composite performance indicator is used, as mentioned in the methodology section.

In terms of the electrical consumption, it is difficult to find a single significant driving factor for the energy consumption, as there are many variables which determine this, such as footfall, opening hours, floor area, etc. Gas consumption is mainly dependent on the external temperature. Therefore, the composite performance indicator used to measure the Leisure Centres' energy performance is the energy consumed (kWh TPER) divided by a weighting scale of total floor area (m^2) and heating degree days (HDD), derived from the formula given in the methodology:

Leisure Centre EnPI = kWh TPER/ (m^2)(HDD)

SDCC Leisure Centres 2017

CONSUMED 7 GWH OF PRIMARY ENERGY

1,425 TONNES OF CO_2 EMITTED

€341,700 ASSOCIATED ENERGY COST

INCREASED ENERGY PERFORMANCE BY 20.8% SINCE 2009

Energy Performance of Leisure Centres

The Energy Database shows that the Leisure Centres have improved their energy performance by 20.8% since the baseline, compared to the EnPI. As highlighted in last year's Energy Review, there was a decrease in the Leisure Centres' energy consumption in 2011. In analysing the electrical and gas consumption from both facilities to help identify this reduction, there was similar reduction across both facilities. This reduction could be the result of the effect of the recession on the activity levels of the facilities.

There was also a decrease in energy consumption in the Leisure Centres in 2017. This was due to a decrease in the gas consumption in both Tallaght and Clondalkin Leisure Centres in 2017. This could be due to improved energy management practices within the facilities, and warrants further investigation.

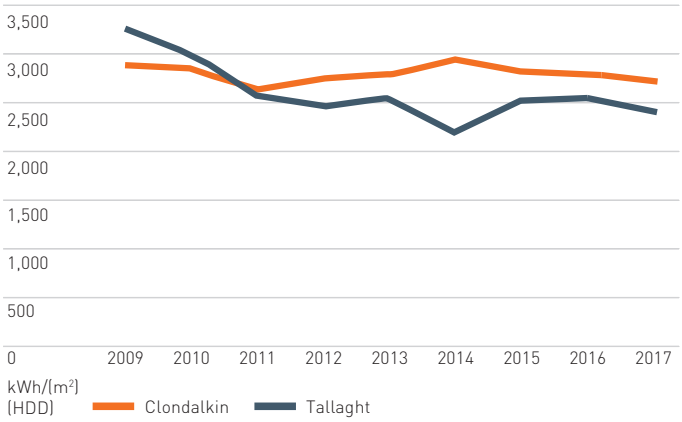


Figure 8: Leisure Centres' Annual Energy Performance

LEISURE CENTRES' PLAN TO 2020

In 2016, Codema helped Dublin City Council (DCC) to implement the first local authority Energy Performance Contract (EPC) for three of its leisure centres. Codema is assisting DCC with the ongoing Measurement and Verification (M&V) of this project; in the first year alone, DCC has saved over €122,000 in energy and maintenance costs and has achieved average energy savings of 38%. These savings were achieved through measures such as:

- New LED lighting
- A new combined heat and power (CHP) system to efficiently heat the swimming pool (Ballymun)
- Improved building control systems, which help to manage all of the equipment in the centres

The EPC model puts the responsibility onto the contractor to guarantee energy savings over the lifetime of the contract. Energy savings are verified by a Measurement and Verification (M&V) process developed by both the Energy Service Company (ESCo) and the client.

Codema is currently helping SDCC implement its own EPC project within Tallaght and Clondalkin Leisure Centres. The initial energy audits of these facilities have been completed to identify the energy savings, and show that a potential 1.6 GWh of primary energy and 373 tonnes of CO_2 could be saved by implementing an EPC in the Leisure Centres.

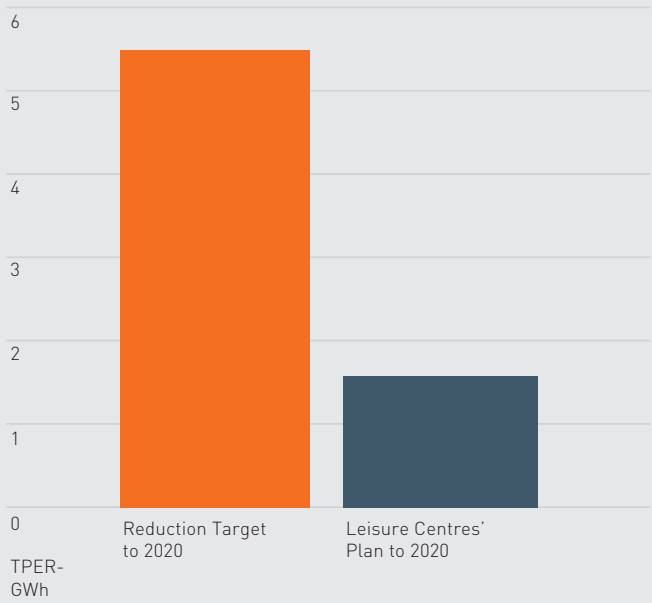


Figure 9: Leisure Centres' Plan to 2020

03. SIGNIFICANT ENERGY USERS
(CONTINUED)

OFFICES

SDCC has two large public office buildings, namely County Hall in Tallaght and its Civic Offices in Clondalkin. In 2017, these offices accounted for 11% of SDCC's primary energy consumption. This is a consumption of 5.9 GWh of primary energy, 1,268 tonnes of CO_2 and an estimated €373,000 in energy spend.

Identification of relevant variables for the Offices

In relation to the office facilities, there are two main energy types, electricity and gas. When there are multiple variables that drive energy consumption, a composite performance indicator is used, as mentioned in the methodology section.

It is difficult to find a single significant driving factor for the overall electrical consumption, as there are many variables that determine this, such as the number of employees, opening hours, floor area, etc. Gas consumption is mainly dependent on the external temperature. Therefore, the composite performance indicator used to measure the Offices' energy performance is the energy consumed (kWh TPER), divided by a weighting scale of total floor area (m^2), heating degree days (HDD) and full time employees (FTE). This is derived from the formula given in the methodology, as shown below:

Offices EnPI =
kWh TPER/ (m^2)(HDD)(FTE)

SDCC Offices 2017

CONSUMED 5.9 GWH OF PRIMARY ENERGY

1,268 TONNES OF CO_2 EMITTED

€373,000 ASSOCIATED ENERGY COST

IMPROVED ENERGY PERFORMANCE BY 10% SINCE 2009

Energy Performance of the Offices

The database shows that the Offices have improved their energy performance by 10% since the baseline. This is an absolute reduction of 1.4 GWh of primary energy and 360 tonnes of CO_2.

Within the Offices, there was a decrease in energy consumption in County Hall between 2014 and 2015, which then increased in 2016. In analysing the electrical and gas consumption, this variation in energy performance came from fluctuations in the gas consumption over these years. This can

be seen in Figure 10 and could be due to a number of factors such as heating control issues, or changes in the occupancy hours of the facility.

As stated previously, there were savings of 1.4 GWh of primary energy since the baseline. The majority of these savings are as a result of the work carried out by SDCC staff to reduce the electrical load within County Hall by reducing the quantity of lights within certain parts of the building. There have been occupancy sensors added to the lights, along with LED retrofits. The Building Management System (BMS) has also been upgraded, along with improved energy management practices by the facilities management, both of which have also contributed to this reduction since the baseline period. In addition, 188 solar photovoltaic (PV) panels have now been connected on the roof of County Hall, which will continue to reduce the electrical load of the building.

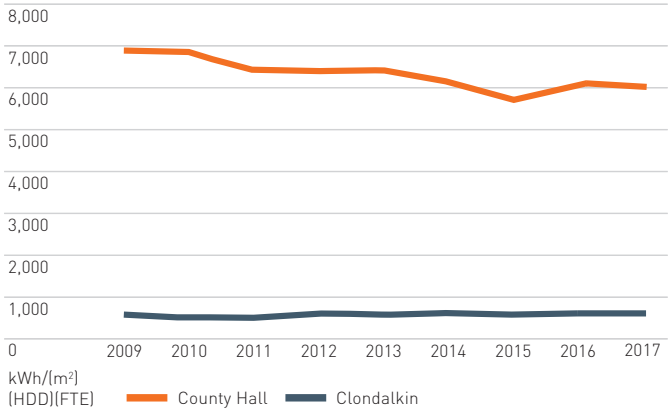


Figure 10: Offices' Energy Performance

OFFICES' PLAN TO 2020

Following a meeting with SDCC's facilities manager, Codema carried out a detailed energy audit of County Hall in Tallaght. This energy audit has identified lighting retrofits in particular as having significant potential for continuous energy savings in the facility. A small number of fluorescent tube ceiling panels in the facility have already been replaced with 40 watt LED panels, combined with occupancy sensors and light dimming switches. In addition to the 44% reduction in energy consumption per light fitting, fewer fittings are required to achieve the same lighting effect as the old fittings.

If the remaining 2,600 light fittings in the facility were to be replaced with high-efficiency LED fittings, this could achieve savings of 517 MWh in primary energy and 115 tonnes of CO_2. The reductions could be greater still if some unessential fittings are removed, and a full roll-out of occupancy sensors and light dimming controls is carried out throughout the building.

Codema is also currently working with SDCC to develop Ireland's first large-scale district heating network involving its County Hall and surrounding facilities. The South Dublin District Heating System is due to go out to tender in 2018 and is estimated to save the council 1 GWh in primary energy and 1,736 tonnes of CO_2. The proposed system seeks to utilise a low temperature waste heat source from a data centre through a large-scale heat pump, in order to supply space heating and hot water to a cluster of nearby local authority buildings. The system will also have the capacity to supply other nearby interested customers in the public and private

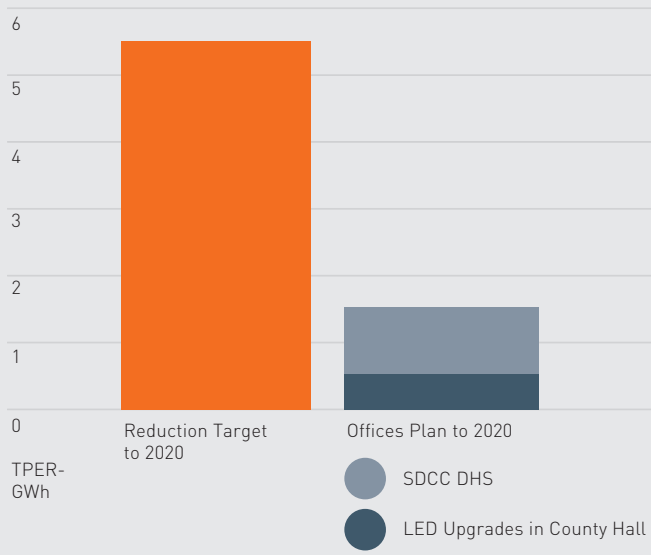


Figure 11: Offices' Plan to 2020

sector in the following phases. This innovative district heating scheme will provide low-carbon, low-cost heat to the Tallaght area, will be the first of its kind in Ireland and the UK, and the only not-for-profit energy utility in Ireland.

If all of the above projects are completed within the Offices by the end of 2018, they could collectively save DCC 1.5 GWh of TPER in total and 1,851 tonnes of CO_2.

03. SIGNIFICANT ENERGY USERS
(CONTINUED)

TRANSPORT

Transport is the third largest SEU within SDCC and comprises of fuels used by council vehicles (including light and heavy vehicles), and fuels used by the park services. In 2017, transport accounted for 9% of SDCC's primary energy consumption. This amounts to 4.6 GWh of primary energy, 1,095 tonnes of CO_2, or an estimated €375,000 in energy costs.

Within Transport, diesel accounts for almost 70% of the total primary energy consumption, while gas oil accounts for nearly 28%. Petrol accounts for only 2%, as it is only used to fuel small equipment. A breakdown of this is shown in Figure 12.

Identification of relevant variables for Transport

It was very easy to identify the many variables that drive energy consumption within Transport, such as miles travelled, efficiency of the fleet, number of vehicles, etc. However, some of these variables are not reported consistently, and so there is currently very little data available to develop a robust performance indicator for Transport. However, in 2017 the Transport Department provided information on the quantity of vehicles they are responsible for. With this new information, and with further updates to it each year, a more robust energy performance indicator can be developed.

With this in mind, Codema used the number of vehicles to develop a new performance indicator for Transport. This gives a more true depiction of the energy consumed by the Transport Department than the previous performance indicator of population served. Therefore, the EnPI for Transport is the kWh consumption of primary energy divided by the total number of vehicles. This formula is:

Fleet EnPI =
kWh TPER / Number of vehicles

SDCC Transport 2017

CONSUMED 4.6 GWH OF PRIMARY ENERGY

1,095 TONNES OF CO_2 EMITTED

€375,000 ASSOCIATED ENERGY COST

IMPROVED ENERGY PERFORMANCE BY 10% SINCE BASELINE

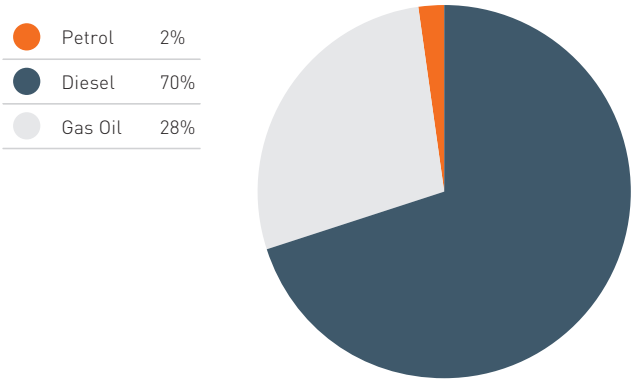


Figure 12: SDCC Fuels TPER - 2017

Energy Performance of Transport

The database shows that the energy performance of Transport has improved by 10% since the baseline. This improvement in performance is largely due to a decrease in the number of vehicles attributable to the fleet in 2016.

As highlighted in the last Energy Review, Figure 13 shows that between 2010 and 2013, there was a significant improvement in energy performance. This was due to the reduction in the litres of fuel consumed by the council's fleet. From consulting with fleet management, Codema believes this to be due to the reduction in the fleet's workload as a result of the recession. Another factor is the introduction of newer, more fuel-efficient vehicles to replace older vehicles, which naturally improves energy performance as a result.

The consumption of diesel and petrol began to rise from 2014, which may be due to an increase in the workload of the council's fleet. The consumption of petrol then peaked in 2015, as there was a large amount of this fuel type used that year. There was then a big saving in diesel in 2017, but without the use of a robust energy performance indicator to track this fuel use, it is hard to find a definitive reason for this, and this needs to be investigated further.

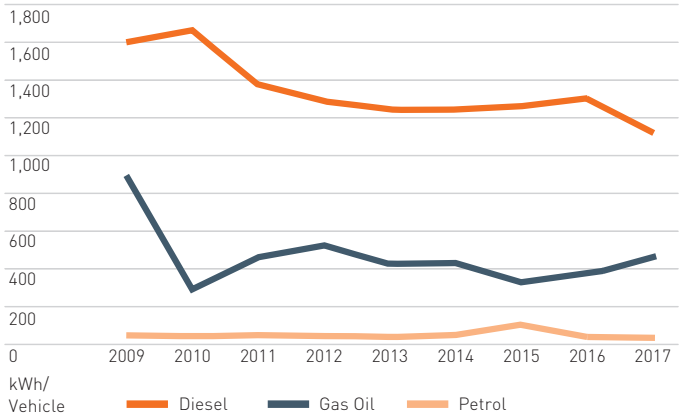


Figure 13: Transport Energy Performance

TRANSPORT PLAN TO 2020

An energy management system is due to be implemented to cut down on unauthorised consumption of SDCC's fuel, accurately monitor the overall consumption, and develop energy performance indicators to track energy performance. The council could potentially see savings of approximately 5% (or 228 MWh and 55 tonnes of CO_2) by implementing such an energy management system.

In 2018, SDCC's Transport Department is embarking on a provisional replacement programme of 38 large vehicles, which are coming to the end of their lifespan. This programme will be expanded in 2019 to a three-year programme, which will replace all of the council's fleet with a more up-to-date, energy-efficient alternatives.

This may include the electrification of some of the council's fleet, which could reduce fuel consumption by 254 MWh of TPER and 67 tonnes of CO_2, compared to the energy needed to charge the vehicles. Codema recommends that a detailed feasibility study be carried out in order to identify the true potential of such a project and to learn from other local authorities that have carried out similar replacements.

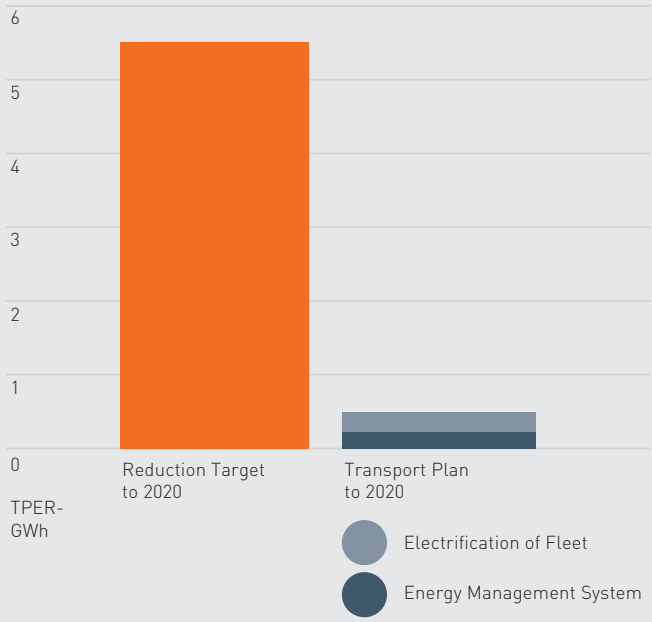


Figure 14: Transport Plan to 2020

04. CONCLUSION

SDCC has achieved energy savings of 25.4% between the baseline and 2017. While these savings are substantial, the council still needs to save a further 7.6% to achieve the 33% energy saving target by 2020. The next three years will be crucial, and will require the most innovative and challenging projects to date, in order to achieve SDCC's targets by the 2020 deadline.

Energy efficiency projects within each of the four key SEUs identified will deliver the required energy savings by 2020. Small energy reductions in these areas will have a much greater effect on overall consumption than seemingly large reductions in the less significant areas. Codema therefore recommends that SDCC uses a structural approach at senior management level in order to carefully plan and execute energy reduction projects. This targeted, holistic approach to these SEUs will help maximise their impact and will go beyond the typical energy-saving projects that are usually reactionary or part of routine maintenance.

In terms of the smaller accounts, which are not highlighted in this report, it is recommended that SDCC develops a framework that will incorporate the maintenance and upgrade of systems within these facilities. This framework will also incorporate an energy efficiency aspect to the works. Codema will help SDCC develop this framework that will focus on the smaller energy consumers within the local authority. This is important as it highlights the "exemplary role" to the public, as set out in SI 426 of 2014.

Figure 15 illustrates SDCC's gap-to-target model for the next three years. If all the projects set out in this energy review are completed by 2020, SDCC can reach and even exceed the target reduction of 5.5 GWh, or 33%, by 2020.

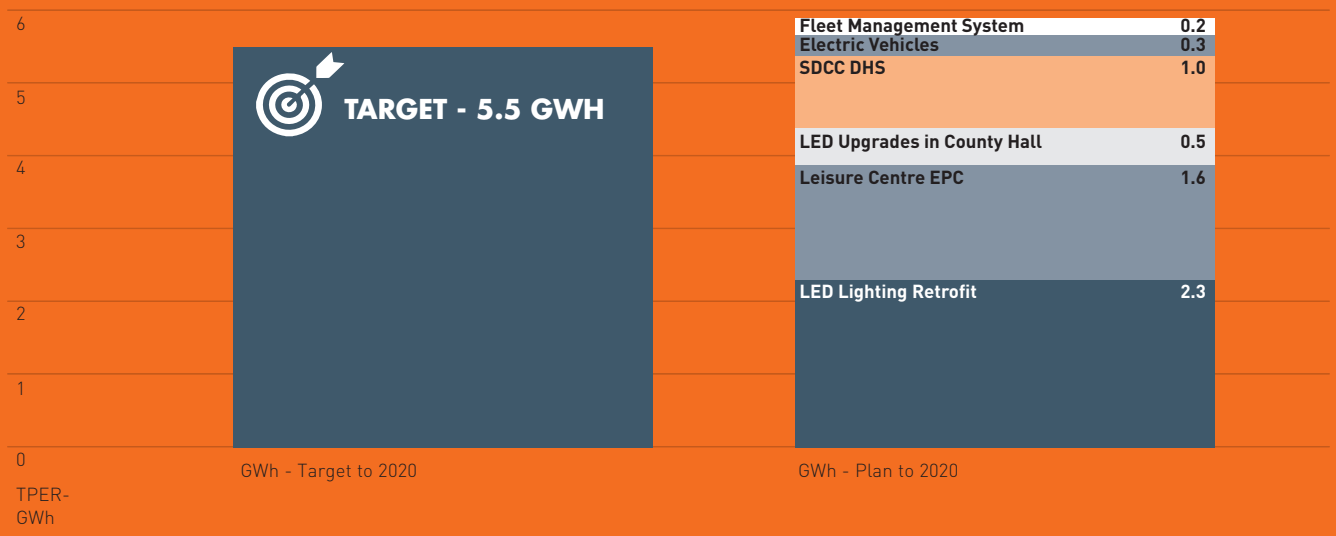


Figure 15: SDCC Plan to 2020

SEU AREA	ACTION	ESTIMATED SAVINGS
PUBLIC LIGHTING	REPLACE 4,000 SOXS WITH LEDS	2.3 GWH
LEISURE CENTRES	EPC IN TALLAGHT AND CLONDALKIN LEISURE CENTRES	1.6 GWH
OFFICES	CONNECTION OF SOUTH DUBLIN DISTRICT HEATING SYSTEM & LED UPGRADES IN COUNTY HALL	1.5 GWH
TRANSPORT	PROCUREMENT OF ELECTRIC VEHICLES & INTRODUCTION OF ENERGY MANAGEMENT SYSTEM	0.5 GWH

05. APPENDICES

SEU Summary

Table 1: SEU Summary

SEU	TPER - GWh	Tonnes CO_2	Cost	% +/- since baseline
Public Lighting	25.6	5530	€1,385,292	-12.5
Leisure Centres	7.0	1,425	€341,709	-20.8
Offices	5.9	1,268	€372,578	-10
Transport	4.6	1,095	€374,594	-10
Total	43.1	9,318	€2,474,173	

Project Plan to 2020 Summary

Table 2: Project Plan Summary

SEU	TPER - GWh	Tonnes CO_2
Public Lighting	2.3	514
Leisure Centres	1.6	373
Offices	1.5	1,851
Transport	0.5	122
Total	5.9	2,860

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Abbreviations

BMS	Building Management System
CO_2	Carbon Dioxide
CHP	Combined Heat and Power
DCC	Dublin City Council
DCCAE	Department of Communications, Climate Action and Environment
EnPIs	Energy Performance Indicators
EPC	Energy Performance Contract
ESCo	Energy Service Company
FTE	Full Time Employees
GPRNs	Metered Gas Accounts
GWh	Gigawatt hour
HDD	Heating Degree Days
kWh	Kilowatt hour
LED	Light Emitting Diode
LPG	Liquid Petroleum Gas
m^2	Metres Squared
M&R	Monitoring and Reporting
M&V	Measurement and Verification
MPRNs	Metered Electrical Accounts
MWh	Megawatt hour
PV	Photovoltaic
SDCC	South Dublin County Council
SEAI	Sustainable Energy Authority of Ireland
SEUs	Significant Energy Users
SON	High Pressure Sodium
SOX	Low Pressure Sodium
TFC	Total Final Consumption
TPER	Total Primary Energy Requirement
UMR	Unmetered Registrar

codema
Dublin's Energy Agency

The Loft, 2-4 Crown Alley,
Temple Bar, Dublin 2, Ireland D02 TK74
+353 (0)1 707 9818
www.codema.ie

Comhairle Contae
Átha Cliath Theas
South Dublin County Council