

Full Business Case

Document reference information

Project	Corporate Asset Decarbonisation Scheme (CADS)
Programme	Phase 2
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Project Manager	Jason Taylor
Version	V1.0
Date	20/02/2023

This document is built incrementally and should be updated and submitted for approval in two moments – for the Concept and Definition stage gate reviews. It should be read in conjunction with other stage review documents and should provide continuous business justification for the project, that is, reviewed at all stage gates.

Version

Ref No.	Document	Link	Version
1.0	Jake Stephen/Jason Taylor		20/02/2023

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1. Executive summary

The Corporate Assets Decarbonisation Scheme (CADS) 2 aims to build upon the success of CADS 1. CADS 2 will deliver LED Lighting upgrades and/or rooftop Solar PV in around 30 council buildings with the aim of contributing to SCC’s 2030 Net Zero Aspirations for its corporate assets.

In the wake of the Ukraine invasion and subsequent reduction in Russian gas export to Europe, energy prices across Europe have seen significant volatility, increasing to unprecedented rates. Cost of electricity purchased by SCC has increased by over 90% (with the average price of electricity increasing from 15 p/kWh to 29p/kWh). Industry analysts are suggesting that the era of cheap fuels is subsequently over in Europe, with prices unlikely to ever return to their pre-war rates. The cost of electricity is currently projected to be remain at on average 29p/kWh until 2030.

In light of this increase, CADS 2 has an emphasis on energy saving measures with a strong financial business case and short payback term. As agreed by the Decarbonisation Board, the fundamental business model for CADS 2 revolves around implementing energy saving measures that meet a minimum of a 10-year payback on investment. As the expected lifetime of the proposed energy saving measure is between 22.5-25 years, this leaves considerable margins and savings above the initial capital investment. The current payback term for CADS 2 is currently 7.3 years (including management and ancillary fees).

The Energy Team requests approval to spend on £944,085 of the £2m budget on project code CT0091100 for CADS in the general fund capital programme for FY2023/2024. This will deliver savings of £129,654 and 95 tonnes of CO₂e per year. Over a 25-year period, which is based on the useful life of the assets, energy saving measures are projected to produce a net revenue benefit of £1,263,671 saving for SCC (after allowing for borrowing costs based on 25-year borrowing rates).

The purpose of this project is...	The purpose of this project is to reduce SCC’s annual ongoing expenditure on energy and work towards enabling SCC’s 2030 Net Zero commitments by implementing energy conservation measures across SCC’s corporate stock.
Who are the primary beneficiaries for this project?	SCC’s Revenue fund are the primary beneficiaries due to reduced annual expenditure on energy, with wider benefits to Southampton as a whole through emissions reduction and Southampton First.
How does this project benefit SCC?	Direct reduction in energy consumption and energy bills at a time where energy security is a concern and costs are volatile.
It is estimated that the benefits realised from this project are...	It is estimated that CADS 2 will save £129,654 and 95 tonnes of CO ₂ e per year.
It is estimated this project will cost...	£944,085
It is estimated that this project will take...	Completed by Close of FY 2024/2025

2. Strategic fit

What is the basis for the business case?

- Invest to save
- Supporting Council's strategic objectives

Which of SCC' strategic objectives would this project contribute to?

- Strong Foundations for Life
- A Proud and Resilient City
- A Prosperous City
- A Successful, Sustainable Organisation

Explain how this project will contribute to the strategic objectives.

The CADS 2 business case is primarily constructed under the 'invest to save' model, by investing in energy saving measures SCC can directly reduce its annual expenditure on energy. CADS 2 also contributes to the strategic objectives under 'A Proud and Resilient City', 'A Prosperous City' and 'A successful, Sustainable Organisation' by contributing to the Green City Plan and Zero Carbon City. CADS will reduce SCC's associated CO₂e emissions and improve the council as an organisation by helping to reduce the council's energy costs, directly reduce its impact on the environment and support the delivery of the Net Zero agenda within the city.

	Yes	No
Will this impact on service users and/or protected groups (equalities)?		X
Will this mean we collect, store or use our data differently?		X

3. Background

The CADS programme aims to support the ambitions of SCC's Green City Plan and help to achieve a Net Zero carbon footprint for our corporate buildings and operations by 2030, along with reducing the cost risks associated with the rising price of energy. CADS aims to achieve this by implementing energy efficiency and renewable energy projects, known as Energy Conservation Measures (ECMs) within the council's corporate (i.e. non-housing or domestic) assets. Any remaining emissions that ECMs cannot eliminate will be required to be offset by 2030 to achieve our Net Zero targets under the Green City Charter. Reducing SCC's ongoing annual spend on utilities (Gas and Electric) and mitigating the requirement for additional annual ongoing spend for Carbon Offset to maintain SCCs Net Zero status.

3.1. Defining Net Zero

The current widely accepted definition of Net Zero under the Oxford dictionary is "the harmful gases produced by a particular company, region or country have no impact on the climate because they have been balanced by actions that protect the environment". The reference to 'harmful gases' within the context of climate change is referenced to Green House Gas (GHG). GHGs are emitted from both natural, but specifically, anthropomorphic (man-made) activity. Currently Southampton City Council aims to be Net Zero the following corporate assets under the Green City Charter and Net Zero Carbon Strategy by 2030.

- 1) Corporate Portfolio, our buildings/assets, including but not limited to:
 - a. Council Officers
 - b. Schools
 - c. Libraries
 - d. Depots and Facilities
 - e. Leisure Centres
 - f. Parks and Public Amenities
 - g. Carparks
 - h. Streetlighting
- 2) Fleet
 - a. Approximately 444 Fleet Vehicles

CADS 2 aims to address emissions from council offices, libraries, depots and facilities and public amenities. Fleet is not included within the CADS programme and is being dealt under a separate programme with the Sustainable Transport and Fleet Teams.

3.2. SCCs Current Emissions

Currently, SCC utilised two main forms of energy within its corporate assets, heat and electrical energy. These two forms of energy are supplied or delivered through four primary mechanisms. The resultant emissions from each source of energy can be grouped into Scopes, the wider CADS programme will eventually address both Scope 1 and 2 emissions by 2030. CADS 2 however, aims to deliver savings through reductions in Scope 2 emissions.

3.2.1. Scope 1

- 1) Decentralised (Onsite) Gas
 - a) Systems operating in the same manner as a gas boiler in homes, where gas is piped directly to an asset and burnt on site.
- 2) District Heating
 - a) One large, centralised boiler or other system generates heat at a central location, this heat is then distributed between buildings on a large network, typically hot water distributed between building by insulated pipework.
- 3) District Cooling
 - a) Heat from a District Heating Network can also be utilised to generate cooling, or the network can be used as a source to dump heat through a heat pump.

3.2.2. Scope 2

- 4) Electrical Energy
 - a) Electricity supplied to corporate assets through the national grid.

Table 1, outlines the current energy usage for SCC’s corporate assets for FY2021/2022 (including schools and Active Nation sites), current emissions are calculated from SCC energy consumption data input into the Green House Gas (GHG) Toolkit¹ available [here](#).

Table 1. Energy Consumption of SCC's Corporate Assets during FY 2021/2022.

Energy Source	Consumption per annum (GWh/annum)	Consumption per annum (%)	CO ₂ e Emissions (Tonnes/annum)	CO ₂ e Emissions (%)
Electricity	22.3	38%	4,700	47%
Natural Gas	21.9	37%	4,000	40%
District Heating (SDES)	11.8	20%	900	9%
District Cooling (SDES)	2.6	4%	400	4%
Total	58.5	100%	10,000	100%

For the purposes of this full business case, the FY2021/2022 will be used to represent the ‘base’ case. The base case represents the reference year or ‘starting point’ for understanding SCCs emissions pathway to 2030.

3.3. CADS 1

CADS 1 commenced in 2021-22 delivers both grant and borrowed capital works amounting to £5.3m. Works have been conducted in some of SCC’s largest assets, including the Civic Centre, One Guildhall Square and City Depot. Further works are currently programmed for FY23/24 including upgrading Southampton’s Streetlighting to LEDs. As part of CADS 1, SCC was successful in bidding for grant funding from the Department of Business, Energy and Industrial Strategy (BEIS) under the Salix Public Sector Decarbonisation Scheme (PSDS) to the value of £1.6M. Works completed as part of PSDS grant funding currently provides in excess of £450k and 600 tonnes of CO₂e savings per annum.

¹<https://southamptongovuk.sharepoint.com/:x/s/GreenCityTeam/EX9qLO32bLRJoCsDBvUjaB8BAFBOPWQAV16cd6VnLVKD7A?e=sAd8eW>

4. CADS 2: Scope and Objectives

4.1. Scope of Delivery

The primary scope for CADS 2 is the delivery of Solar PV (Photovoltaics) and LED Lighting upgrades. These measures have been selected as part of this phase due to the strong and tested financial business case as a mechanism for alleviating pressure of ongoing utility price volatility.

4.2. Out of Scope

Although CADS 2 aims to decarbonise SCC corporate assets, the below currently fall outside of the scope of CADS 2.

4.2.1. Scope 3 Emissions & Fleet

CADS aims to deal with emissions and costs associated with energy utilised within corporate assets. Scope 3 emissions can loosely be defined as emissions from:

- a. Purchase and use goods and services and sold products
- b. Business travel
- c. Employee commuting
- d. Waste disposal
- e. Transportation and distribution
- f. Investment
- g. Leased assets

In addition to Scope 3 emissions being outside of the remit of CADS, Scope 1 emissions from SCCs vehicle fleet is also outside of scope, as the Energy Team does not deal directly with these areas.

4.2.2. Schools and Leisure Centres

Although SCC does purchase the energy utilised in both Leisure Centres (currently operated by Active Nation) and Schools, SCC is not responsible for payment of energy bills through the general fund revenue account mechanism; therefore, any expenditure in those assets would require investment recovery.

For Solar PV, this can be achieved through a Power Purchase Agreement (PPA), where power generated by panels and utilised on site is agreed to be purchased by the site occupier, typically at a rate lower than that purchased from a supplier (currently purchased through the LASER framework). At the unit rates projected to 2030, this provides an attractive opportunity to increase council annual revenue whilst reducing emissions. A PPA scheme could also be extended to other council rented assets, simultaneously increasing the EPC ratings of assets, and contributing Minimum Energy Efficiency Standards (MEES) compliance.

Currently there is no plan to take forward ECMs in Schools and Leisure Centres that cannot be directly logged or monitored to provide accurate energy reduction measurements. LED replacement schemes are therefore unlikely to be taken forward in these assets in the short term.

Due to the additional scope of work required in to get a PPA agreement in place, Schools and Leisure

Centres do not currently fall within the scope of CADS 2. A separate business case will be brought forward once sufficient assessment has been undertaken to underpin the formation of PPA agreements between SCC and asset occupiers.

Therefore, any figures, emissions and financial savings presented in this full business case utilising the term 'corporate assets' will therefore exclude Schools and Leisure Centres unless stated otherwise.

4.2.3. Plant Decarbonisation & Other Ancillary Works

The complexity of SCCs corporate assets, lack of sufficient technical information on existing SCC databases and internal SCC resource to sufficiently assess the condition of SCCs corporate plant room assets. This provides a significant hurdle in forming an effective decarbonisation strategy for SCC localised heat plant assets. SCC will be looking to procure a Project Partner for CADS 2 and form a strategic partnership for the wider CADS programme delivery to 2030. For CADS 2, SCC aims to source a Project Partner that has sufficient expertise and capacity to expand into future CADS phases. Due to this, heat plant (boilers) decarbonisation will remain outside of the current scope of CADS 2.

SCC will continue however, to seek grant funding when available (such as the Public Sector Decarbonisation Scheme, PSDS) for energy efficiency works throughout CADS 2 and the wider programme. All existing grant funding schemes currently have a heavy emphasis on plant decarbonisation and the installation of Heat Pumps or similar electrification technologies. Should SCC find itself in a situation whereby an application to grant funding schemes such as PSDS becomes feasible, SCC will pursue an application which will be subject to its own business case development and approvals process.

4.3. Measurable Objectives

4.3.1. Energy Savings

CADS 2 aims to primarily deliver Electrical energy savings across SCC corporate assets. All savings will be reported in kWh (kilowatt hours) and calculation methodologies for savings and assumptions defined within their respective technical documentation. Clear distinction and demarcation will be made between calculated estimates or approximate savings and confirmed savings (achieved through direct measurement). The reporting process is discussed further in Section 10.

4.3.2. Cost Savings

The average projected unit rate of 29p/kWh for electricity will be utilised for estimating cost savings across SCC's corporate assets within this business case, discussed further in Section 14. Final confirmation of savings will be reported as a function of actual site-specific unit rates and tariffs.

4.3.3. Carbon Savings

As CADS 2 will deliver electrical energy savings, with the quantity of annual CO₂ savings dependant on the carbon factor of the national grid for each financial year. Carbon Savings will be reported annually utilising the governments (BEIS) published carbon factors for the nation grid under 'Government conversion factors for company reporting of greenhouse gas emissions'².

² <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

4.1. Unmeasurable Objectives

Additional costs for maintenance have been included within the financial model where required. This primarily extends to the additional maintenance costs for Solar PV systems installed on SCC corporate assets. Maintenance costs for replacement or retrofit LED Lighting upgrades will be added to the existing Asset Management Repairs and Maintenance programme (R&M). There is already budget and maintenance contracts covering these technologies on SCC assets. Consultation with the Asset Management Team has clarified that existing contracts will be able to accommodate LED lighting technology. It is confirmed the new technology will reduce both planned and reactive maintenance due to warranty periods and newer technology replacing old. In addition, the lighting will be covered by a minimum refund or replacement 5-year warranty, further reducing potential associated costs.

New Solar PV installations through CADS 2 will be required to be incorporated into the existing maintenance regime and programme. It is likely however, that the current maintenance regime will be required to be revaluated under CADS 2 to accommodate all new and existing Solar PV installations.

5. Solution

This section outlines the available options for delivering CADS 2, highlight potential future offset costs to achieve SCC's Corporate 2030 Net Zero Commitments along with achieving Net Zero through purchasing offset alone.

5.1. Options Analysis

5.1.1. Do Nothing

Under the do-nothing scenario, SCC opts to not to attempt to honour its Net Zero by 2030 for its corporate assets. The sole benefit of this approach is the avoidance of commitment to capital expenditure from SCC. This option offers a short-term reduction in financial pressures by avoiding capital expenditure but does not begin to address the continued vulnerability of SCC to future price volatility and increase. Additionally, SCC will likely face public scrutiny for not attempting to meet its Net Zero commitments under the Green City Charter.

5.1.2. Do Minimum

Instead of a capital investment programme as a means of meeting its Net Zero commitments, SCC opts purchase carbon offsets as a means of obtaining Net Zero status. This option assumes no active decarbonisation programme is conducted by the Energy Team and represents a do minimum scenario whereby the only active decarbonisation is that of the decarbonisation of the National Grid. This option assumes that SCC retains its current assets and energy consumption across SCCs corporate portfolio remains at current levels.

SCC Corporate Assets emitted approximately 10,000 tCO₂e per annum (including schools and Active Nation Sites) during FY2021/22022. Due to ongoing efforts from British Energy grid decarbonisation the annual tCO₂e emitted by SCC will reduce to approximately 7,900 tCO₂e in 2030 (reducing by approximately 21%). This is projected to cost SCC approximately an additional £395,000 in Carbon offsets to obtain Net Zero certification per annum in 2030. This approach however provides no tangible benefit to SCC or Southampton as a city outside of the Net Zero certification.

The following table highlights the total energy consumption and associated emissions of corporate assets that would be required to purchase carbon offsets come 2030 to meet SCC's Net Zero aspirations.

Table 2. Current (2022/2023) and projected emissions for SCC's Corporate Assets (including schools and leisure centres) and potential carbon offset costs in 2030.

Area	Total Energy Usage (kWh)	2022 Annual Emissions (tCO ₂ e)	2030 Projected Annual Emissions (tCO ₂ e)	2030 Projected Offset Cost (per annum)
Total Corporate Estate (Including Schools and Active Nation)	58,500,000	10,000	7,900	£395,000
Assets in CADS 2 Contribution to Total Emissions	5,200,000	4,400	4,200	£210,000

5.1.3. CADS 2

CADS 2 continues to build upon the foundations of works conducted under CADS 1 and grant funding received under PSDS (Public Sector Decarbonisation Scheme). Due to the increased economic pressure experienced by SCC, CADS 2 has a significant focus on delivering ECMs with strong financial business cases to help alleviate financial pressures from the ongoing energy price hikes. CADS 2 aims to deliver ECMs in approximately 30 of the council assets ranging in size and consumption. The costs discussed in this section are limited to technology and installation costs.

Table 3. Summary of CADS 2 technology costs and projected annual savings.

Technology Capital Cost	Annual Electrical Savings (kWh)	Annual Cost Savings	Payback (Years)	Annual Corporate Electrical Emissions Reduction (tCO ₂ e)
£727,515	447,081	£129,654	5.6 ³	95

5.1.3.1. Energy Conservation Measures (ECMs)

CADS 2 aims to deliver Solar PV and LED Lighting upgrades. Associated costs are shown in Table 4, which include both installation and labour costs. LED Lighting upgrades are primarily aimed at retrofitting and replacement of existing Fluorescent Tube lighting fittings, but additional savings may be realised through the introduction through low or no cost changes identified as part of the work programme at each site.

³ This is technological payback (Equipment & Installation)

Table 4. Technology costs for CADS 2 apportioned by energy conservation measure.

ECM	Approximate Capital Cost	Payback (Years)
Solar Photovoltaics (PV)	£446,477	4.9
LED Lighting Upgrades	£281,038	7.4

Costs for ECMs have been based on engagement with potential delivery partners on their respective frameworks, framework operators and internal experienced costs on previous works under CADS 1 and internal SCC energy team desktop assessments.

Assets initially identified suitable for Solar PV installations by Southampton based company Absolar through a remote sensing exercise have been utilised as an initial shortlist. Costs have been obtained through engagement with both delivery partners on, and the operators of, the Central Southern England Multi Contractor Framework. The operators of the framework have provided indicative costs for Solar PV installations quotes and tender returns on the framework. Prices on the framework range from between £500-£1,100 per kWp (kilowatt peak, meaning total generation capacity) of installed capacity depending on complexity of the installed system, with more bespoke systems requiring additional capital investment.

Additional quotes from Solar Voltaics and Infinity (contractors on the above framework) have provided indicative prices for SCC corporate assets ranging between £900-£1,500 per kWp. These quotes come with the caveats that depending on the project requirements, additional capital investment may be required for eternally fitted inverters, fireproof dooring and other unanticipated costs outside of scope of the initial tender document when submitted to the framework. To best account for this, delivery partners on the framework suggests that a flat rate of £1,100-£1,250 per kWp of installed capacity be utilised for benchmarking costs for SCC assets that will allow sufficient overhead for all but the most bespoke PV installations.

The Energy Team has chosen to utilise the benchmark costs of £1,250 per kWp for this Full Business Case assessment. Allowing sufficient overhead for all projects proposed under CADS 2 whilst also meeting proposed business case criterion. In reality, all Solar PV installations through the Central Southern England Multi Contractor Framework are tendered by mini-competitions. It is therefore anticipated that costs will be lower than projected; however, as the price of solar panels and components are also experiencing volatility its considered £1,250 per kWp will reduce risk. Additional overhead will be utilised to ensure that all projects proposed under CADS 2 are completed, all unforeseen costs absorbed by approved budget or expand the scope of CADS 2 to inclusion of additional corporate assets in CADS 2, upon approval from the Decarbonisation Board.

Lighting costs and savings are estimated through standardised benchmarked energy savings calculations. Where lighting loads are estimated to be equivalent to approximately 25% of total annual energy consumption. This assumption is based on non-domestic energy consumption figures published by The Department for Business, Energy and Industrial Strategy; Business Energy Statistical Summary 2018.

SCC assets surveyed indicated that existing lighting across SCCs corporate assets is predominantly fluorescent tubes. Upgrading to LEDs from the most typical fitting across SCCs corporate assets will net in

in excess of 50% savings on energy consumption. Fittings are assumed to be changed on a like for like basis wherever possible, with no resultant behavioural change required. Lighting will undergo a redesign as part of CADS 2, with scope to reduce the number of installed fittings whilst maintaining the compliant lux levels. Additional savings through changes in control strategy are currently not estimated at this stage, but any low or no cost implementations will be conducted providing they do not impact the business case and can be absorbed by the approved budget without impacting other works on the programme.

The associated lighting upgrade cost is calculated based on previous delivered works in CADS 1, under which multiple lighting replacement programmes were conducted on corporate assets such as the Civic Centre, City Depot, Lordshill Library and Nursling Depot. The upgrade cost is calculated as a function of the reduction in power consumption due to lighting upgrades, energy savings and cost associated with previous lighting upgrade programmes conducted by SCC.

It should also be noted that throughout 2023, replacement of existing fluorescent tube fittings across SCCs corporate assets will no longer be possible to legislative changes. Fluorescent tube fittings (such as T5 and T8) are the primary fitting across SCCs corporate assets, will no longer be available for purchase following 1st February 2024 under changes made to the Restriction of Hazardous Substances (RoHS). Resulting in all end of life fittings across SCC's corporate assets requiring replacement with LEDs under R&M in the near future.

5.1.3.1. Corporate Assets

A list of all assets which are under proposal as part of the Full Business Case is available in Appendix A. The final list of assets may be subject to change over the delivery stage as final costs are obtained and detailed savings calculations and assessments obtained, any changes, additions, or modifications to assets on the list of proposed assets under CADS 2 will be subject to approval by the Decarbonisation Board.

5.1.3.2. Payback & Qualification Criteria

All projects that are included in CADS 2 will be subject to a projected 10-year payback on investment qualification criterion agreed by the Decarbonisation Board during Outline Business Case (OBC) development. This qualification criterion ensures a healthy return on investment prior to the reasonable expected lifetime of the ECM.

SALIX Finance, a company wholly owned by the government and operates as a Non-Departmental Public Body (NDPB), under the sponsorship of the Department for Business, Energy and Industrial Strategy (BEIS). Publishes a database of persistence factors which are representative of the reasonable operational lifetime for ECMs. SALIX Finance (and subsequently BEIS) utilise these factors in calculating the lifetime financial, energy and carbon savings of measure for various purposes, including grant administration such as PSDS. The persistence factors of ECMs included in CADS 2 are listed below:

- a. LED Upgrade: Approximately 25 years⁴
- b. Photovoltaic Panels (PV): Approximately 22.5 years⁴

⁴ The operational lifetime does not account for early replacement due to component failure etc.

By utilising a 10-year payback on investment criterion it ensures a healthy margin on initial investment over the remaining 12.5-15 years on the expected lifespan of ECMs. In the unlikely situation where a CADS 2 project does not meet projected 10-year payback on investment, approval from the Decarbonisation Board will be required to proceed to ensure that the overall CADS programme maintains this payback criterion.

5.2. Options Summary

Table 5. CADS 2 options summary

Option	Pros	Cons	Timescales	Capital Cost	Annual Cost Saving
Do nothing	<ul style="list-style-type: none"> Avoids Capital Expenditure. 	<ul style="list-style-type: none"> Does not meet SCCs Net Zero commitments Susceptible to utility price volatility. No Revenue Benefits 	-	-	-
Do minimum	<ul style="list-style-type: none"> Meets SCCs Net Zero commitments. 	<ul style="list-style-type: none"> Still susceptible to utility price volatility. Estimated additional annual expenditure on offset in 2030 of approximately £395,000 per year. No Revenue Benefits 	-	-	-
CADS 2	<ul style="list-style-type: none"> Works towards meeting SCCs Net Zero Commitments. Strong Business Case. 	<ul style="list-style-type: none"> Requires capital investment. Does not deal with localised Fossil Fuel driven emissions. Small reduction in requirement to purchase carbon offset. 	FY 2023-2024	£727,514	£129,654

5.3. Procurement

SCC intends to procure professional services and delivery partners for CADS 2 under the following frameworks which have all been signed off by the Energy Team Procurement Business Partner and relevant access agreement approved.

Table 6. Proposed frameworks for CADS 2.

Framework	Service
Existing SCC Frameworks (Property Team Framework & DPS Log)	Professional Services
Hampshire's Mechanical and Electrical Minor Works Framework	LED Lighting Upgrades
Central Southern England Multi Contractor Framework	Solar PV

Procurement of a Project Partner is the first procurement requirement for CADS 2. The Project partners key role in CADS is supporting the Energy Team (Client) with Professional Services which extend to, but are not limited to:

- Project Management Services – Including acting as lead coordinator, managing contractors and site access.
- Early Warning/Risk Reduction – Including producing monthly highlight reports.
- Task Order Programme Review & Management.
- Payment Certification – Issuing Valuations and Retained Values to be approved by the Energy Team (Client).
- Completion Certification.
- KPI Monitoring.
- Technical Assessment – Including but not limited to Design, Structural and Electrical Engineering in accordance with SCC’s specification.
- Scope Design/Review.
- CDM – Including Health and Safety, Project related activities and compliance.

The Project Partner will not be responsible for the following:

- Internal Reporting & Communication – Reporting to the Decarbonisation Board will be the responsibility of the Energy Team (Client).
- Finance Reporting and Finance Monitoring – Responsibility of the Energy Team (Client) & Finance Business Partnering

A Project Partners specification and scope will be included as part of the CADS 2 Project Approach Documentation (PAD). Current costing estimates for Project Partner resource are based on project benchmarking costs provided by the SCC project management team and previously experienced or quoted project costs provided to the energy team under previous or similar projects.

Table 7. Project Partner fees for CADS 2.

Procurement	Cost (£)
Project Partner Fees	£149,140

Following appointing a Project Partner, the below workstream is proposed for CADS 2.

- I. **Scope Reassessment** – Current proposed programme and quoted costs will be passed to the Project Partner to undertake further detailed feasibility. This will be refined on an individual project basis and subject to design team input and scrutiny. Any structural or technical assessments required will be conducted at this stage.
- II. **Scope Confirmation** – Project Partner will outline final site suitability and provide further cost assurances and savings estimates, including but not limited to, cost, energy and CO₂ emissions.
- III. **Scope Approval** - Client to liaise with internal low-level decision-making board (Decarbonisation Board) to give the go ahead for full design specification and final costs associated with works (Energy Conservation Measures, ECMs).

- IV. **Delivery Procurement** – Project Partner assists SCC in the procurement of delivery partners through the pre-approved frameworks based on design. The Project Partner will form part of the evaluation panel as client-side expertise.
- V. **Project Management** – Project Partner will stay on as Project Management throughout the project supported by the Energy Team.
- VI. **Contract with Delivery Partners** – Projects delivered within timeline under agreed budget and savings.
- VII. **Snagging and Project Handover** - Project Partner stays through the snagging until end of project. Until each is handed back to SCC and respective site stakeholders.

6. Expected Outputs and Outcomes

Table 8. Expected outputs and outcomes for CADS 2.

Expected Outputs (<i>actions or items that contribute to achieving an outcome</i>)	Expected Outcomes (<i>What SCC wants or needs to achieve from the project?</i>)
Installation of energy saving measures across SCC corporate assets.	Less than 10-year payback (estimated 7.3 years)
	Savings of £129,654 and 95 tonnes of CO ₂ e (per annum)
	Reduction in ongoing R&M expenditure

7. Expected Benefits

7.1. Financial Benefits

7.1.1. Identified in Concept Stage (OBC)

The initially proposed OBC has undergone a significant change in scope due to the requirement for additional agreements between SCC and Schools and Active Nation sites. Capital costs under the OBC were approximately £3,290,000 with a payback term of approximately 11.3 years.

Table 9. Expected benefits identified in the CADS 2 Outline Business Case.

Benefit	Category	Baseline	Baseline Source / Method	Timescale for Realisation	Savings (per annum)
Reduction in expenditure on Energy across SCC Corporate Assets	Cost Avoidance	£2,957,551 (2021)	Energy Data & IPMVP Compliant M&V Annual Review	Up to 1 year post project implementation	£290,000 per annum

7.1.2. Updated in Definition Stage

Financial benefits from CADS for SCC have increased significantly compared to capital expenditure from the initial OBC, this is due to increased energy prices for the foreseeable future. Current projections from industry analysts indicate that price volatility will continue until 2030, with energy prices being significantly inflated due security over supply. Through to 2030, unit rates are projected to be on average approximately 29p/kWh. This unit rate will be utilised as the indicative electricity unit rate for this full business case. There are currently no known industry analysts that are publicly projecting energy prices past 2030, likely due to ever increasing uncertainty. Projections to 2030 encompass most of the payback term for ECM's, giving the Energy Team confidence that all ECM's will reach the required 10-year payback on investment criterion. Sensitivity analysis of the impact of unit rates on payback terms in presented in Section 9. Savings will be made on CADS 2 directly following installation, but to simplify the business case and provide additional assurances to finance business partnering, cost savings from CADS 2 will be fully realised 1 year following project completion.

Table 10. CADS 2 refined financial benefits under the Full Business Case.

Benefit	Owner	Baseline	Target Date	Target per FY (£)				
				'24-'25	'25-'26	'26-'27'	'27-'28	5 Year Total
Financial	Energy Team	£2,957,551 (2021)	Q2 2024/25	129,654	129,654	129,654	129,654	518,616

7.2. Non-Financial Benefits

7.2.1. Identified in Concept Stage

As discussed in the OBC, the primary non-financial benefit from CADS is the reduction in CO₂e emissions associated with the reduction in electrical energy consumption in SCC corporate assets.

Table 11. CADS 2 non-financial benefits identified in the Outline Business Case.

Benefit	Category	Baseline	Baseline Source / Method	Timescale for Realisation	Target
Carbon Dioxide equivalent (CO ₂ e)	Environmental	11,000 (2021)	Energy Consumption Data and The Department for Business, Energy and Industrial Strategy ⁵ .	Up to 1 year post project implementation	382 Tonnes CO ₂ e

7.2.2. Updated in Definition Stage

The amount of projected CO₂e saved from CADS 2 has seen a reduction due to the following factors.

1. Reduction in scale and capital expenditure due to the removal of Schools and Active Nation sites.
2. Updated the business case to reflect the carbon factors for 2022 published by BEIS.

It is important to note that all investment in electrical energy savings (UK wide) face the same reduction in CO₂e savings as the national grid decarbonises. This Full Business Case has opted to not attempt to account for the rate of decarbonisation between the current national grid and rates projected by 2030. The carbon savings achieved by CADS 2 will be assessed annually in accordance with the governments published

⁵ Greenhouse Gas Reporting: Conversion factors - <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022> (Annual Release)

greenhouse gas reporting conversion factors for reporting.

Table 12. CADS 2 refined non-financial benefits under the Full Business Case

Benefit	Owner	Baseline	Target Date	Target per FY (Tonnes CO ₂ e)				
				'24-'25	'25-'26	'26-'27	'27-'28	5 Year Total
Carbon Dioxide Emissions (CO ₂ e)	Energy Team	10,000 (2022)	Q2 2024/25	95	95	95	95	475

8. Costs

8.1. Capital Costs

Costs are currently indicative and will be reviewed and subsequently updated following appointment of a Project Partner. In addition to capital costs for Project Partner, the Energy Team’s Senior Energy officer role will also be funded through CADS 2 management fee (via a minimum 1 year fixed term contact to cover the project term), equating to an additional £53,944 per annum capital expenditure.

Table 13. Capital costs for CADS 2.

Detail	2023	2024	Total
Project Capital Costs			
Project Development and Detailed Design (Project Partner)	£119,312	£29,828	£149,140
Onsite Works (Delivery Partners)	£582,012	£145,503	£727,515
Senior Energy Officer	£53,944	£13,486	£67,430
Total capital costs	£755,268	£188,817	£944,085

8.2. Operational Costs

The specification for the delivery of an ongoing Solar PV operational costs will be redeveloped over CADS 2 to enable maintenance to be undertaken on an ongoing basis, either by continued maintenance by Housing Operations or an external partner, which will be funded by savings. Modifications to the ongoing maintenance approach will be agreed by the Decarbonisation Board once the annual costs are understood post project.

Indicative industry standards for ongoing maintenance costs of £10 per kWp installed per annum, excluding reactive maintenance, have been included to the financial model and will be recovered from savings. Due to solar PV installations coming with a 5-year warranty as standard, maintenance costs have only been factored in from year 5 onwards. Indicative costs are only reflective of the increase in cost due to the additional capacity installed under CADS 2.

Table 14. Operational costs for CADS 2.

Detail	Per Annum (After year 5)	Total (Over the 22.5-year lifetime)
Project revenue costs		
PV Maintenance (Borrowing Model)	£4,000	£74,000
Total revenue costs	£4,000	£74,000

8.3. Overall financial profile of Spend

Table 15. Financial profile of spend for CADS 2.

	Q1-Q2	Q3-Q4	Total (£)
Financial Year 1	£377,634	£377,634	£755,268
Financial Year 2	£188,817	£0	£188,817
Total	£566,451	£377,634	£944,085

9. Investment Appraisal – Financial Business Case

CADS programme business model is based on spending capital to reduce revenue costs associated with energy. With business case justification made through the requirement to meet the approved payback term qualification criterion.

The total costs of delivery are considered along with the revenue savings associated with the technology measures delivered. The full business case financials can be seen in this section. Presented below is an assessment on the total capital costs, plus ongoing borrowing costs over a 25-year borrowing period, provided by the Energy Team's finance business partnering.

Due to the potential of ongoing price volatility etc. Sensitivity Analysis has been conducted under scenarios where energy prices would increase the payback terms of CADS 2. It is also equally as likely that prices could see significant further rises which could improve the payback terms substantially. This scenario however has not been accounted for, to ensure that cost savings are not over estimated.

9.1. Sensitivity Analysis

To try and best account for the current price volatility and potential scenarios and impacts going forward. Sensitivity analysis has been conducted to demonstrate the potential scenarios outlined below and assess the impact on payback terms (including technology costs and management fees) for CADS 2.

1. Volatility Continues (Risk Score 4): Uncertainty over supply of natural gas and a lack of commitment to finding alternative sources of energy has resulted in continued volatility to 2026-2027. This scenario follows the Cornwall Insights projections with average electricity prices to 2030 equating to 29p/kWh.
2. Conservative Case (Risk Score 3): Energy supply security for the UK improves significantly prior to October 2023. Upon which SCC's unit rates on the LASER framework see a significant reduction to an average unit rate of 25.5p/kWh to 2030 (the current lowest projected minimum price forecast to 2030).
3. Business as Usual Case (Risk Score 1): Although highly improbable, this scenario has been provided for assurance purposes. Energy supply security issues are resolved in their entirety by October 2023 and prices return to levels reflective of the 'High Scenario' projected and published by BEIS⁶ in 2020. Unit rates are on average 16.4p/kWh to 2030.

⁶ The Treasury Green Book supplementary appraisal guidance on valuing energy use and greenhouse gas (GHG) - <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

Table 16. CADS 2 payback sensitivity to electricity costs.

Scenario	Electricity unit rate	Target (Total Forecast)	Technological Payback (Years)	Total Payback (Years)
Volatility Continues (Risk Score 4, Likely)	29 p/kWh	£129,654 per annum	5.6	7.3
Conservative Case (Risk Score 3, Possible)	25.5 p/kWh	£114,006 per annum	6.4	8.3
Business as Usual (Risk Score 1, Very unlikely)	16.4 p/kWh	£73,321 per annum	10.0	12.9

CADS 2 remains viable under both the likely and possible scenarios, with total project payback remaining under the 10-year payback term qualification criterion providing that electricity unit rates do not fall below 0.21 p/kWh (Risk Score 2, Unlikely). Whilst technological payback terms remain viable under all foreseeable scenarios.

Under the very unlikely scenario that energy prices return to their pre-2021 rates prior to the deployment of ECMs on SCC corporate assets, CADS 2 will undergo a re-scoping exercise. All individual corporate assets will be revaluated, selecting sites that ensure that the minimum 10-year payback qualification criterion is achieved by all ECM's.

9.2. Financial Assessment

The borrowing model for CADS 2 has been calculated by the Energy Teams finance business partner with summaries available below. The full borrowing model is available [here](#)⁷.

Table 17. CADS 2 cost breakdown, payback term and carbon savings summary.

Measure	Capital Costs	Estimated Annual Cost Saving	Payback (Years)	Tonnes CO ₂ e saved per annum	R&M Costs (after year 5, per annum)
LED	£281,038	£38,034	7.4	28	-
Solar	£446,477	£91,620	4.9	67	£4,000
Project Fees	£216,570				
Total Plus Mgt fee	£944,085	£129,654	7.3	95	

⁷ <https://southampton.gov.uk/sharepoint.com/:x/s/EnergyTeam/EXqyciux5sRPrEd-RSUPJhsBTYQZGmRufqqFsb2xqE-tAg?e=0BgyyD>

Table 18. CADS 2 capital cost and borrowing model summary.

CADS 2	2023/24	2024/25	Source of funding
Capital expenditure	£944,085	-	-
Funded by:			
Borrowing	£944,085	-	Council Resources

Table 19. CADS 2 net financial benefits to SCC.

	2024/25 £	2025/26 £	2026/27 £	2027/28 £	5 year total £	25 year total £
Savings CADS 2	-129,654	-129,654	-129,654	-129,654	-518,616	-3,012,300
Financing costs	66,985	66,985	66,985	66,985	267,941	1,674,629
Repairs & Maint.	0	0	0	0	0	66,045
Net saving	-62,669	-62,669	-62,669	-62,669	-250,675	-1,263,671

10. Benefit Realisation

All Benefits Realisation for CADS 2 reporting will remain within the Energy Team. The reporting process will be fully transparent and easily auditable using internationally recognised standards. As part of the benefit realisation, the Energy Team will be implementing an annual CADS Measurement and Verification (M&V) summary report. This report will be easily accessible and understandable regardless of level of background knowledge and aims to inform Senior Management and Service Leads on the primary outputs and results of the programme to date. This report aims to act as an executive summary for the overall outcomes of CADS funded projects to date. Its proposed it will also be posted on the Southampton City Council web site.

10.1. Benefit Measurement

As the primary mechanism for CADS is to enable savings across council assets, benefits are directly monitored and assessed as part of the annual M&V reporting structure. As part of the M&V process, the measurement or 'boundary conditions' are clearly defined. The table below outlines the minimum requirements for benefit measurement for CADS 2 and outlines boundary conditions. Baseline energy consumption is set as energy consumption for the FY 2021/2022.

Table 20. Minimum boundary conditions for measurement of benefits for CADS 2.

Report	IPMVP Boundary Condition	Brief Description
LED Lighting	Boundary C: Whole Facility AND/OR Boundary D: Calibrated Simulation	Monitoring reductions in energy consumption from lighting can be difficult due to the impact of occupancy and usage patterns between sites. A combination of estimates based on electrical load reduction and whole facility energy consumption at low occupancy times (early morning or early evening) will be used to ascertain savings with accuracy depending on current site level metering granularity.
Solar PV	Boundary B: Retrofit-Isolation: All Parameter Measurement	All PV will have generation (as part of the inverter) and export meters installed as standard which will directly confirm kWh generated through Solar PV and the proportion used on site/exported.

10.2. Benefits Tracking, Performance Review and Reporting

Each annual summary will be underpinned by a series of technical summaries based on the International Performance Measurement and Verification Protocol (IPMVP⁸). IPMVP is recognised globally and used by Energy Service Companies (ESCO's), utilities, governments and financial institutions as it defines standard terms and practise for quantifying the results of energy efficiency investments. Reports aim to conduct a pre and post ECM (Energy Conservation Measures) impact assessment, outlining the assumptions, baselines, measurement and calculation conditions (referred to as boundary conditions), expected savings, assessment and reporting period and any adjustments or normalisation in benefit realisation. Supplementary technical summaries will be clearly documented allowing reproducibility for auditing and redundancy purposes.

⁸ Efficiency Valuation Organisation - <https://evo-world.org/en/>

Incremental updates to savings (monetary, energy and carbon) will be issued to the Decarbonisation Board monthly, with savings confirmed for the preceding financial year once full data is available. Technical summaries will be stored within the CADS Sharepoint which is centrally available to the Energy Team and Decarbonisation Board. Each technical summary will also include an executive summary denoting the key figures from each phase of works. Reporting and realisation will be addressed in the following structure.

Table 21. Reports and briefings to be issued under CADS 2.

Report	Content	Update/Published Frequency	Intended Recipients
CADS Summary	An overall summary of the key ECMs installed, findings, savings, and financial benefits of the overarching CADS programme (all work to date). This report may highlight individual noteworthy sites but aims to provide an executive summary of CADS.	Annually	Cabinet
CADS Briefing Paper	A concise 1- or 2-page briefing note that highlights key information, changes and risks occurring between annual reporting.	Quarterly	PLT and CMB
CADS Highlight Reports	Highlight reports will be issued monthly to the decarbonisation board detailing the current state of CADS 2. The decarbonisation board will also be issued the CADS Briefing paper on a quarterly basis prior to the briefing paper being presented at PLT and CMB.	Monthly	Decarbonisation Board
Site Based Technical Report	A site IMPVP based technical report that fully defines all ECM's installed at a site, any nuances in assumptions, calculation methodology or other potential available EMC opportunities which are identified during the development of CADS. Savings estimates for each ECM will be documented within this report.	Working Documents	Energy Team

Finalised savings will be initially reported each July to the Decarbonisation and Green City Boards, which will then be presented to Cabinet as appropriate. Once full data is available, for the preceding financial year. The Energy Team also proposes that the findings under the annual CADS summary report be made publicly available on the Southampton City Council web site, but the location has yet to be agreed by the Decarbonisation and Green City Board communications contacts.

11. Reporting and Escalations

All reporting and escalations will adhere to the existing Energy Team Reporting Structure.

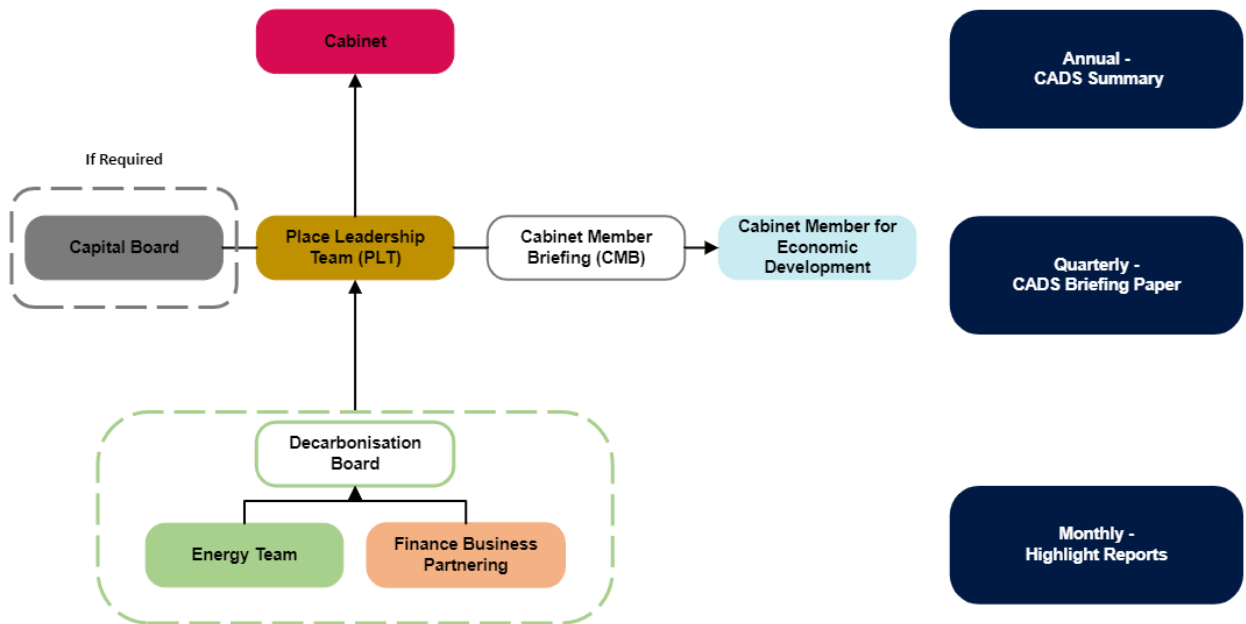


Figure 1. CADS 2 reporting structure.

12. Summary of Resources Needed

12.1. To Achieve Deployment and Transition Stages

Table 22. CADS summary of required resource.

Role	FTE/Other	Duration/effort
Jake Stephen (Senior Energy Officer)	1.0	For the duration of the Deployment and Transition stage review.
Jason Taylor (Energy Manager)	0.20	For the duration of the Deployment and Transition stage review.
Project Partner	Contracted	Project Duration
Procurement	10 Days	Q1-Q2 2023/3024
SCC Legal	2 Days	Q1-Q2 2023/3024

13. Risks

*Probability score 1-very unlikely, 2-unlikely, 3-possible, 4-likely, 5- very likely

**Impact score 1-minor, 2-moderate, 3-significant, 4-major, 5-critical

Table 23. CADS 2 identified risks.

Risk	Probability*	Impact**	Identifying controls
Resources to deliver the project – Inexperienced staff assigned or loss of critical staff	3	3	The proposed project team is or will be made up of members with a wide range of experience. The project officer (manager) / client will document the project correctly and comprehensively to enable the project to be taken forward, highlighting any resource issues to the Decarbonisation Board (as per governance structure). If the resources required as outlined in the previous section are not secured and delivered, then the project will not meet expectations. No allowances have been included to take account of any future COVID 19 impacts.
Insufficient time allocated or significant project team workload – project slippage	3	3	There will invariably be other calls on time for all project team members. To ensure sufficient resources being available, additional contingency will be added to each key milestone and the project team will be consulted on all key milestone timelines to ensure sufficient time allocation. Any challenges with delivery will be reported to the project board and if required additional resources will be made available. There is scope to budget for additional resources to be procured if required either internally, via the partnership with Hampshire County Council property services or external consultancy. Procurement Officers will be consulted to understand the timelines to secure contracts post project board approval. Design/specifications and scope will be passed to procurement once available. Legal have also been consulted on availability once approval has been sought.
Green City or Council Priorities	2	2	Climate change mitigation will continue to be a key council delivery requirement based on all political party aspirations. The project officers

change through project			will ensure the Green City aspiration of net zero carbon to 2030 for corporate buildings is met as far as possible by the CADS project and associated energy management work programme. Regular updates will also be provided on project development and evaluation reporting to all key stakeholders both officer and Councillors.
Project purpose definition, needs, objectives, costs, deliverables are poorly defined or understood	2	2	Ensure that all project team members / stakeholders are clearly consulted on at each stage of the proposed work programme to ensure all documentation reflects accurately the requirements of the project. Ensure that all delivery team members are fully aware of the project requirements and their role in the delivery of these.
Consultant or contractor delays	3	2	There needs to be sufficient contingency within the programme to allow for contractor delays. Note that future Covid19 delays haven't been included within the estimated project timeline. This has not been factored into the existing timeline until the situation becomes clearer i.e. once full design has been completed.
Technology Supply Issues	3	2	Issues associated with the supply of materials such as solar panels or other components will have to be considered in the final project plan. The supply of materials has improved over the past 12 months; however, contingency has been included in the current project forecasts to accommodate delays up to 12 weeks.
Estimating and/or scheduling errors	3	2	As there will be an obligation on SCC recovering the savings to pay for borrowing it is imperative that the savings are not overestimated. To reduce risks of not achieving the estimates the project costs carry significant contingency and the savings will, where required, be tempered. There is also likely to be continued energy price volatility over the payback term of each measure, which has been considered through sensitivity analysis. The current timeline is partially based on estimates due to contracts not currently being let. Once full programme schedule is agreed with the project team and contractors these will be updated. It should also

			be noted that the main Project design resource will have expert third party resource to verify and cross check all technical energy savings measures.
Energy price uncertainty	3	2	<p>SCC have procured new contracts for energy from October 2022 and will be required to do so again in October 2024. It should be noted that the current global economic uncertainty has significantly increased energy costs – both gas and power - and the UK is experiencing record high prices for energy. To best try and account for uncertainty, the best available estimates for prices going forward have been sought from industry experts and our suppliers which have been used to conduct sensitivity analysis. Highlighting the impact of potential energy price scenarios going forward and potential impact on payback times.</p>
Measures not being viable due to unforeseen circumstances	2	2	<p>Each energy reduction or generation measure will be identified and checked using both site assessment and desktop information. If it becomes apparent that an identified measure cannot be delivered, for whatever reason, this will mean they will need to be cancelled through the internal governance process prior to implementation. If required, measures will be modified, or alternative measures sought to ensure expenditure and associated savings are obtained. This may include delivery of measures at another site. Any changes to the project will be identified and approval sought via all internal procedures.</p>

13.1. Key Dependencies/Related Projects

Key constraints and dependencies from ongoing property team and wider council work to include:

- Roof replacement framework contract – CADS 2 will align with proposed roofing works with potential solar PV opportunities. Sites mapped and inclusion with CADS 2 delivery. Enablement works to be covered in specification.
- Repairs and Maintenance programme – align with and understand historical, ongoing and future planned works to minimise potential revenue expenditure or waste. Ensure ongoing maintenance liability is minimised where feasible.
- Green City Plan – align with key charters goals including the principal decarbonisation scheme and align with the aspiration to be Net Zero carbon by 2030.

14. Assumptions, Constraints and dependencies

14.1. Grid Decarbonisation

In discussing how Net Zero may be achieved, it is important to understand grid decarbonisation. The rate of grid decarbonisation is projected by The Department for Business, Energy and Industrial Strategy (BEIS) and plays a pivotal role in almost all organisations decarbonisation strategies in the UK. BEIS provides updates of projections annually and is published as part of the Treasury Green Book supplementary guidance (referred to as the Green Book) on valuing energy use and GHG emissions⁹. As part of the Green Book BEIS publishes emissions factors for national grid electricity to 2050 as part of this report for policy planning, representing the UK's national grids transitions towards Net Zero. The table below shows the current and projected emissions intensities for the fuels utilised by SCC. Current BEIS projections estimate that by 2030, CO₂e emissions from the national grid are projected to drop by 75%.

Table 24. Current and projected carbon factors for SCCs utilised energy sources. N.B. Discussions are currently ongoing for the decarbonisation of the Southampton SDES, but carbon factors are currently unknown.

Energy Source	2021 Carbon Factor (kgCO ₂ e/kWh)	2030 Emissions (kgCO ₂ e/kWh)
Electricity	0.212	0.052
Natural Gas	0.183	-
District Heating (SDES)	0.139	-
District Cooling (SDES)	0.153	-

Due to grid decarbonisation, the annual CO₂e savings on electricity offers diminishes towards 2030, saving fewer tonnes of CO₂e per year.

The UK gas grid currently has no policy in place for its decarbonisation, biomethane is currently injected into the grid and as a fraction of the gas grid mix is likely to increase over the coming years, but no policy has been put in place. Similarly, there are also proposal for hydrogen 'micro-grids' to be deployed across the UK in select location to help to meet Net Zero targets. This technology is within its infancy, but proposals offer a promising solution for decarbonisation of localised assets such as heat networks. There is however very limited scope for the wider deployment of hydrogen as a replacement for the natural gas grid but may form a fraction of grid gas (proposals are currently up to 20%). A similar role to that biomethane currently occupies. In light of the lack of formal projections from BEIS for carbon intensity of the UK gas grid going forward, a 'business as usual' scenario has been assumed to reflect the worst-case scenario, whereby no active decarbonisation takes place of the UK gas grid. Should policy be enacted following the full business case, these figures will be updated to reflect BEIS' projections.

The current widely accepted approach for decarbonisation of heat energy traditionally supplied through natural gas, is through electrification or decarbonised heat networks. The increase in proportion of electricity supplied by renewables on the national grid allows shifting of energy loads from localised fossil fuel consumption in favour of supply through electrical energy. This has traditionally been achieved

⁹ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

within the context of thermal comfort by replacing wet boiler systems with electric storage or panel heaters, but there is an increasing push towards heat pumps.

14.2. Electricity Prices to 2030

The primary goal of CADs is to simultaneously reduce energy consumed by SCC, the associated emissions and the cost of energy in maintaining operation of SCC. Since October 2022, the energy market in the UK and Europe has seen unprecedented volatility due to the war in Ukraine. The subsequent disruption to gas supplies to the UK through the Interconnector (to Belgium) and Balgzand Bacton Line (BBL, to the Netherlands) from Europe has as of December 2022, increased wholesale gas and electricity prices from by 300% and 200% respectively from their February 2022 baseline. The volatility in wholesale forward price peaked in August 2022 for gas and electricity at £592 p/therm and £511 £/MWh (a 400% and 350% increase respectively)¹⁰. Projections from Cornwall Insights indicate that prices will not return to their pre-February 2022 levels, electricity prices remain on average £125/MWh until the end of the decade, with the lowest current projected price of £90/MWh (up from their historic £50/MWh pre-2022).

SCC currently purchases its energy flexibly under a PIA through the LASER framework which has shielded SCC from a large proportion of the price volatility seen during 2022, with an average unit rate across SCC’s corporate assets of 29p/kWh (falling below the threshold to qualify for the governments Energy Bills Relief Scheme). SCC currently procures its energy for year in October, upon which price and unit rates are set. The current unit rates for gas and electricity are set until October 2023. Therefore, prices from October 2023 onwards are currently unknown.

Utilising projected wholesale energy costs published by Cornwall Insights which estimate UK wholesale costs and projected of non-commodity costs from the LASER framework operators to 2030, have allowed unit rate projections from 2023-2030.

Table 25. Projected energy unit rates for SCC electricity based on current industry estimates to 2030.

Scheme	2023	2024	2025	2026	2027	2028	2029	2030	Average
Unit Rate (p/kWh)	38	32	28	26.5	25.5	26.5	26.5	27.5	29

¹⁰ <https://www.ofgem.gov.uk/energy-data-and-research/data-portal/wholesale-market-indicators>

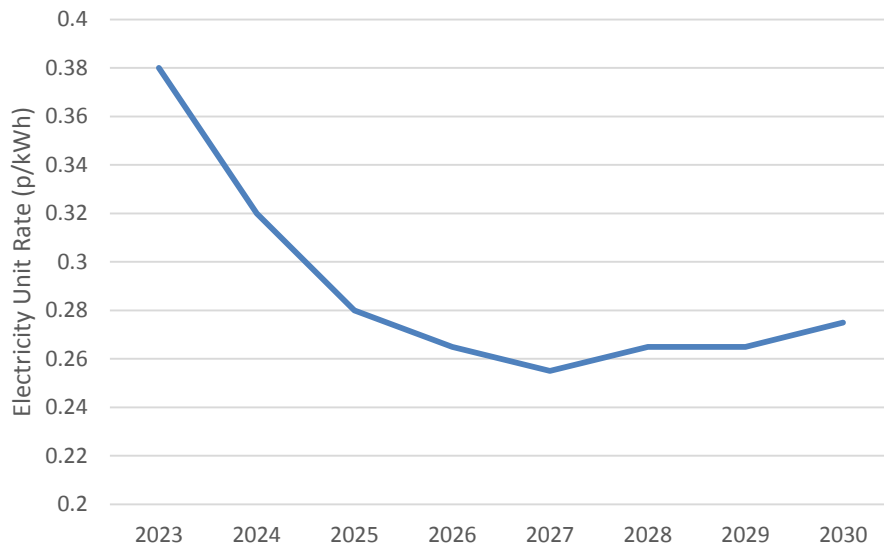


Figure 2. Projected energy unit rates for SCC electricity based on current industry estimates to 2030.

14.3. Offset Requirement – Current Market State

Under almost all Net Zero projections to 2030, there will be a requirement for offset, the primary objective for SCC being to minimise required offset. Carbon Offsetting will undoubtedly form a fundamental requirement for achieving Net Zero as the national grid does not reach a state of ‘Zero Carbon’ by 2030, nor does it decarbonise in its entirety by 2050. Therefore, any electricity SCC utilises from the national grid will therefore have some associated CO₂e emissions, although a comparatively small amount compared to emissions currently from electrical energy used by SCCs corporate assets.

There are currently two forms of carbon offset schemes, compulsory and voluntary. The UK Emissions Trading Scheme (UK ETS) is the compulsory scheme regulated by the Environment Agency in England. This scheme operates a ‘cap and trade’ system for sectors covered by the scheme (such as power and aviation), where an initial allowance is administered to participants with the option to purchase further allowances at auction or traded with other participants. This scheme is compulsory for the largest emitters but can be opted in to by smaller emitters under 25,000 tonnes CO₂e per year. This form of carbon offset does not directly apply to SCCs emissions.

The Voluntary carbon offset market has grown fourfold since 2010 and currently equates to approximately 0.8% of total global greenhouse gas emissions¹¹. The voluntary carbon market may form a potentially pivotal role in supporting wider environmental goals and sustainable development goals. However, critics are quick to point out that the voluntary carbon market is currently unregulated, lacks quality assurance and may be counterproductive to implementing tangible direct emissions reductions.

In response to doubts over credibility of voluntary carbon offset schemes due to absence of regulation,

¹¹ Voluntary Carbon Markets and Offsetting: Climate Change Committee - <https://www.theccc.org.uk/publication/voluntary-carbon-markets-and-offsetting/>

lack of quality assurance, official standards and protocols resulted in scrutiny as a valid tool for contributions towards Net Zero targets. Several schemes within the carbon offset market space have attempted to remedy this by introducing standards and protocols to ensure that the quality and credibility of offsets. There has been rapid growth in schemes which are enforcing standards such as ISO 14064 and certification such as Woodland Carbon Code (WCC), Gold Standard Voluntary Emission Reductions (VER) and the United Nations Certified Emission Reductions (CER) programmes. The table below outlines approximate cost of carbon offset in 2021-2022 in the UK³.

Table 26. Current offset costs (2022) per tonne of CO₂e.

Scheme	Lower End (£/tCO ₂ e)	Upper End (£/tCO ₂ e)	Mean (£/tCO ₂ e)
UK WCC (Verified Credit)	13.8	19.5	15.4
UK WCC (Pending Issuance Credit)¹²	8.1	16.3	12.2
International Carbon Credit	1.0	12.1	2.4

14.4. Offset Requirement – 2030 Market State

Current estimates suggest that demand for carbon offset will increase 15 fold¹³ by 2030. As demand increases and the market matures, most estimates suggest that prices will see an increase. Meta-Analysis on future offset costs conducted by Treeprint¹⁴ outlined in Table 28, summarises forecasts for voluntary carbon offset prices by 2030. There is a high degree of variance in current estimates which is primarily dictated by the offset approach with technology-based approaches attracting a considerable premium, such as Carbon Capture and Storage (CCS). To reflect a diverse portfolio of carbon offset approaches, the average cost of £50/tCO₂e for carbon offset will be used. This figure has been used throughout the business case for demonstration purposes and should be considered. The additional savings associated with cost avoidance through emissions reduction, and therefore the requirement to purchase carbon offset will not be factored into payback calculations.

¹² A pending issuance credit is a promise to deliver a verified credit in the future

¹³ A blueprint for scaling voluntary carbon markets to meet the climate challenge: McKinsey Sustainability - <https://www.mckinsey.com/capabilities/sustainability/our-insights/a-blueprint-for-scaling-voluntary-carbon-markets-to-meet-the-climate-challenge>

¹⁴ Tree Print: Carbon Markets, The beginning of the Big Carbon Age - <https://www.credit-suisse.com/media/assets/sustainability/treeprint-carbon-markets.pdf>

Table 27. Current research estimates for the cost of CO₂e offset by 2030.

Projector	Scenario	Average (£/tCO ₂ e)
Taskforce on Scaling Voluntary Carbon Markets (TSVCM) Projections¹⁵	Prioritization of Low-Cost Supply	12.15
	Preference for Local Supply	56.7
Trove Research¹⁶	-	30
BloombergNEF Projections¹⁷	Maintaining Status Quo (primarily low-quality credits)	8.9
	Removal Scenario (Carbon removal project credits only)	162
	Hybrid Scenario (gradual phase-into removal only)	39
Mean	-	49.8

¹⁵ Taskforce on Scaling Voluntary Carbon Markets: Final Report
https://www.iif.com/Portals/1/Files/TSVCM_Report.pdf

¹⁶ Trove Research - Future Demand, Supply and Prices for Voluntary Carbon Credits - <https://trove-research.com/wp-content/uploads/2021/06/Trove-Research-Carbon-Credit-Demand-Supply-and-Prices-1-June-2021.pdf>

¹⁷ BloombergNEF: Carbon Offset Prices Could Increase Fifty-Fold by 2050 - <https://about.bnef.com/blog/carbon-offset-prices-could-increase-fifty-fold-by-2050/>

15. Timescales

Table 28. CADS 2 proposed timescales.

No	Key milestone	Baseline date
0	Approval of Outline Business Case (OBC)	3rd October 2022
0	Draft Full Business Case (FBC) detail Decarbonisation Board	12th January 2023
1	Approval to take FBC forward Decarbonisation Board	9th February 2023
2	Place Leadership Team	24th February 2023
3	Cabinet Member Briefing – ECO Cllr Bogle	TBC
4	Forward Plan - Cabinet - Publication	6th March
5	Change Board Papers send	24th March
6	Change Board	2nd April
7	Capital Steering Group	12th April
8	Cabinet approval to spend (general fund (GF) only)	18th April 2023
9	Project Start Date	April/May 2023
	Project Completion	March 2024 (TBC based on programme)

16. Project Success Criteria

Table 29. CADS 2 project success criteria.

No	Success measure	Measured by	Measured when	Responsible for measuring
1	Financial	Energy Bill Reduction	August Annually	Energy Team
2	Carbon	IPMVP M&V	August Annually	Energy Team
3	Energy	IPMVP M&V	August Annually	Energy Team

17. Recommendation

Given the above business case, the Energy Team requests approval to spend on circa. £944,085 of the £2m approved CADS budget (CT0091) in FY 2023/2024. Capital investment will be spent on energy saving measures across SCC corporate assets, consisting of LED Lighting upgrades and rooftop Solar PV. The reduction in energy consumption across corporate assets will save SCC £129,654 and 95 tonnes of CO₂e per year, with an estimated net saving of £1,263,671 across the lifetime of the energy conservation measure and borrowing term.

18. Approval

18.1. In Definition stage

Business Case Approved by		Date
PMO		
Programme/Project Sponsor	Adam Wilkinson	20/03/2023*
Finance business partner	Jon Evans	20/03/2023*
Add others as necessary		

*Approval given through cabinet approval to spend paper.

19. Appendix A

CADS 2 Assets
Archaeology Storage Centre
Collections Management - Belgrave Road
Crematorium
East Park Depot
Granville St Depot (Chapel Road)
Holcroft House
Itchen Toll Bridge Control
ITEC Centre
Central Local Housing Office
Mayfield Park Depot
Paget St Workshop and Courier Service
Portswood Library
Public Toilets - Allotments Toilet
Public Toilets - Bitterne Road
Public Toilets - Mayflower Park
Public Toilets - Portsmouth Rd
Public Toilets - St Mary Street (Kingsland Square)
Public Toilets - Terminus Terrace
Public Toilets - Westridge Road
Sembal House
Shirley Library
Start Point Northam
Start Point Sholing
Subway - East Street
Subway - Redbridge Roundabout
Sure Start - Central
Sure Start - Cutbush (Bitterne)
Sure Start - Hoppers Harefield
Sure Start - Little Berries Hollybrook
Sure Start - Thornhill
Sure Start - Weston
Woolston Library - Centenary Quay

*All assets will be subject to a rescoping exercise following obtaining a Project Partner.