LeisureEnergy
Sustainable savings

South Ribble Borough Council

South Ribble Borough Council Energy Proposal

Bamber Bridge Leisure Centre
Leyland Leisure Centre
Penwortham Leisure Centre
South Ribble Tennis Centre
Civic Centre
Moss Side Depot

Optimising energy use for leisure centres

ema winner 2019
Energy Management Consultancy Partnership

2020 British Pool & Hot Tub Awards
SPATA AWARD WINNER
Gold - Sustainability Award

energy institute
Company Member

HPF
HEAT PUMP FEDERATION

CHAS
Accredited Contractor
CHAS.co.uk

UK active
MEMBER

CONTENTS:

Leisure Energy Team

1. LEISURE ENERGY: About Us

1.1 Leisure Energy is an award-winning energy consultancy and principal contractor, who specialise in identifying and delivering energy conservation measures to the leisure sector. Leisure Energy have been appointed to carry out energy surveys at 4 leisure facilities and 2 council buildings across South Ribble Borough Council to identify sustainable savings, reduce carbon emissions and help them in future-proofing the leisure centres against rising energy costs.

1.2 We have developed solutions for the following 6 properties:

Bamber Bridge Leisure Centre
Leyland Leisure Centre
Penwortham Leisure Centre
South Ribble Tennis Centre
Civic Centre
Moss Side Depot

2. South Ribble Borough Council:

2.1 We note that South Ribble Borough Council declared a Climate Emergency in July 2019 making a pledge to make the Council carbon neutral by 2030 and formulating a Climate Emergency Task Group.

2.2 We note from the Council's Climate Emergency Strategy July 2020 that their aim is "To achieve carbon neutrality for the borough of South Ribble by 2030, taking account of any carbon offsetting identified".

Additionally, within the report published on the Manchester University website derived from the United Nations Paris Agreement on Climate Change for South Ribble, it has been ascertained that "**To stay within the recommended carbon budget South Ribble will, from 2020 onwards, need to achieve average mitigation rates of CO2 from energy of around -13.9% per year".**

2.2 The suggested works by Leisure Energy to be undertaken at the leisure facilities and Council buildings will help towards the pledge that the Council has made with regard to climate change and aims stated within the Climate Emergency Strategy.

2.3 Our energy saving measures will help to address the vision of the Council and some of the objectives mentioned in the South Ribble Borough Council's Leisure and Sport Facility Strategy 2020-2030 for both wellbeing and sustainable objectives:

a. 'To reduce our carbon footprint in line with the Council's ambition to be carbon neutral':

The leisure facilities are significant carbon emitters. The measures identified by Leisure Energy in this proposal will reduce carbon emissions by an estimated **139** tonnes CO_2 per year[1].

b. 'A healthy and happy community, flourishing together in a safer and fairer borough, that is led by a council recognised for being innovative, financially sustainable and accountable':

Local leisure facilities are a key part of the health and wellbeing of any local community. The proposed energy conservation measures will help to ensure that the centres remain commercially viable as well as helping to future-proof against rising energy costs.

[1] Assumes BEIS 2020 figures for grid electricity CO2e 0.23314 kg/kWh, natural gas CO_{2e} 0.18387 kg/kWh

c. 'To deliver industry leading service quality, operational efficiency and effectiveness':

An energy efficient leisure centre that uses the latest technology to treat both the air and water will improve the quality of the sports and swim environment, ensuring that the Council's customers will have access to the best pool experience.

The energy conservation and facility improvement measures are supported by state-of-the art gym equipment, excellent sports facilities, Swim England-accredited swimming programmes or fun activities for children. South Ribble's centres aim to offer something for the entire community to enjoy.

3. Energy Management: Current Position

3.1 The baseline data, received from South Ribble Borough Council, and current position for the sites are summarised below:

Baseline Data			
Site	**Bamber Bridge Leisure Centre**	**Leyland Leisure Centre**	**Penwortham Leisure Centre**
Baseline Period - Electricity	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019
Baseline Period - Gas	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019
Baseline Period - Water	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019
Grid electricity weighted average unit cost including CCL (p/kWh)	14.8	14.8	14.8
Gas p/kWh	3.6	3.6	3.6
Water £/m^3	1.3	1.3	1.3
Electricity grid CO_2 (kg/kWh)	0.212	0.212	0.212
Gas grid CO_2 (kg/kWh)	0.183	0.183	0.183
Baseline grid electricity kWh	364,636	414,487	321,092
Baseline electricity £	£53,849	£61,211	£47,418
Baseline gas kWh	1,536,550	1,485,626	1,393,874
Baseline gas £	£55,116	£53,289	£49,998
Baseline CO_2 (T)	359	323	360
Total baseline utilities £	£108,965	£97,417	£114,500
Total baseline utilities £/m^2/yr	£47	£55	£36

Baseline Data			
Site	**South Ribble Leisure Centre**	**Civic Centre**	**Moss Side Depot**
Baseline Period - Electricity	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019
Baseline Period - Gas	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019
Baseline Period - Water	January 2019 to December 2019	January 2019 to December 2019	January 2019 to December 2019

Baseline Data			
Site	**South Ribble Leisure Centre**	**Civic Centre**	**Moss Side Depot**
Grid electricity weighted average unit cost (p/kWh)	14.8	14.6	14.9
Gas p/kWh	3.6	3.6	3.6
Water £/m3	1.3	1.3	1.3
Electricity grid CO_2 (kg/kWh)	0.212	0.212	0.212
Gas grid CO_2 (kg/kWh)	0.183	0.183	0.183
Baseline total grid electricity kWh	271,311	338,897	195,830
Baseline electricity £	£40,067	£50,664	£28,564
Baseline gas kWh	257,623	416,102	223,264
Baseline gas £	£9,241	£14,926	£8,008
Baseline CO_2 (T)	105	148	82
Total baseline utilities £	£49,308	£65,589	£36,572
Total baseline utilities £/m^2/yr	£9	£13	N/A

3.1.1 Baseline Utility Data – data was received from the council in the form of a series of spreadsheets in a zipped file "Bill data" and Display Energy Certificates. It was presumed to be accurate.

3.2 Our modelling has been based on the following leisure centre opening hours set out below:

Bamber Bridge Leisure Centre			
	Start	**Finish**	**Hours**
Monday	08:00	12:00	4.00
	16:00	21:00	5.00
Tuesday	08:00	12:00	4.00
	16:00	21:00	5.00
Wednesday	08:00	12:00	4.00
	16:00	21:00	5.00
Thursday	08:00	21:00	13.00
Friday	08:00	21:00	13.00
Saturday	08:30	16:00	7.30
Sunday	09:00	15:00	6.00
		Total	66.30
		Daily Average	9
		Days/yr	362
		Hrs/yr	3258

South Ribble Tennis Centre			
	Start	**Finish**	**Hours**
Monday	07:00	13:00	6.00
	16:00	21:00	5.00
Tuesday	07:00	13:00	6.00
	16:00	21:00	5.00
Wednesday	07:00	13:00	6.00
	16:00	21:00	5.00
Thursday	07:00	13:00	6.00
	16:00	21:00	5.00
Friday	07:00	13:00	6.00
	16:00	21:00	5.00
Saturday	09:00	15:00	6.00
Sunday	09:00	13:00	4.00
		Total	65
		Daily Average	9
		Days/yr	362
		Hrs/yr	3258

Penwortham Leisure Centre			
	Start	**Finish**	**Hours**
Monday	08:00	12:00	4.00
	16:00	21:00	5.00
Tuesday	08:00	12:00	4.00
	16:00	21:00	5.00
Wednesday	08:00	21:00	13.00
Thursday	08:00	21:00	13.00
Friday	08:00	12:00	4.00
	16:00	21:00	5.00
Saturday	08:30	16:00	7.30
Sunday	09:00	15:00	6.00
		Total	66.30
		Daily Average	9
		Days/yr	362
		Hrs/yr	3258

Leyland Leisure Centre			
	Start	**Finish**	**Hours**
Monday	06:00	22:00	16.00
Tuesday	06:00	22:00	16.00
Wednesday	06:00	22:00	16.00
Thursday	06:00	22:00	16.00
Friday	06:00	22:00	16.00
Saturday	08:30	18:00	9.30
Sunday	08:30	21:00	12.30
		Total	102
		Daily Average	15
		Days/yr	362
		Hrs/yr	5430

3.3 With regard to the Civic Centre and Moss Side Depot we have based the figures on the following hours:

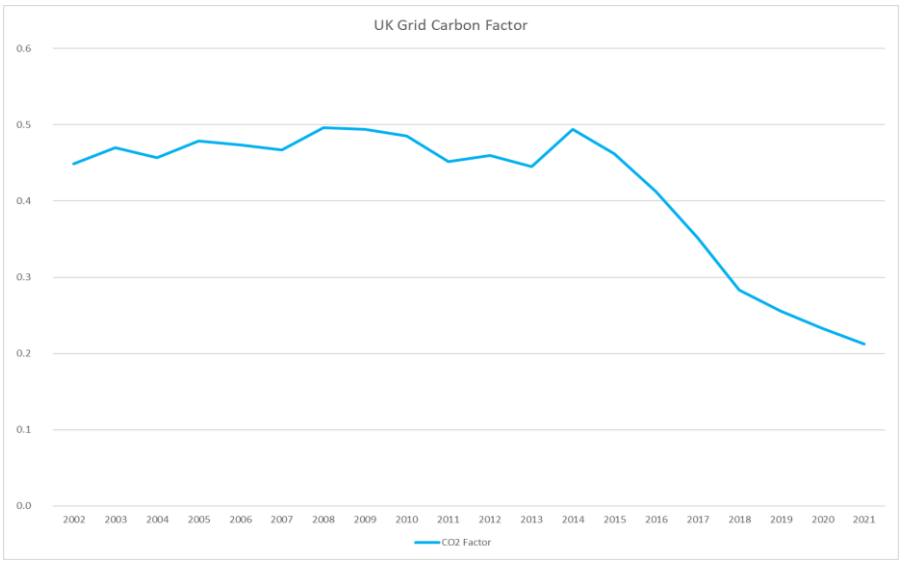
	Civic Centre		
	Start	Finish	Hours
Monday	07:00	19:00	12.00
Tuesday	07:00	19:00	12.00
Wednesday	07:00	19:00	12.00
Thursday	07:00	19:00	12.00
Friday	07:00	19:00	12.00
Saturday	00:00	00:00	0.00
Sunday	00:00	00:00	0.00
		Total	60
		Daily Average	12
		Days/yr	362
		Hrs/yr	4344

	Moss Side Depot		
	Start	Finish	Hours
Monday	06:00	18:00	12.00
Tuesday	06:00	18:00	12.00
Wednesday	06:00	18:00	12.00
Thursday	06:00	18:00	12.00
Friday	06:00	18:00	12.00
Saturday	00:00	00:00	0.00
Sunday	00:00	00:00	0.00
		Total	60
		Daily Average	12
		Days/yr	362
		Hrs/yr	4344

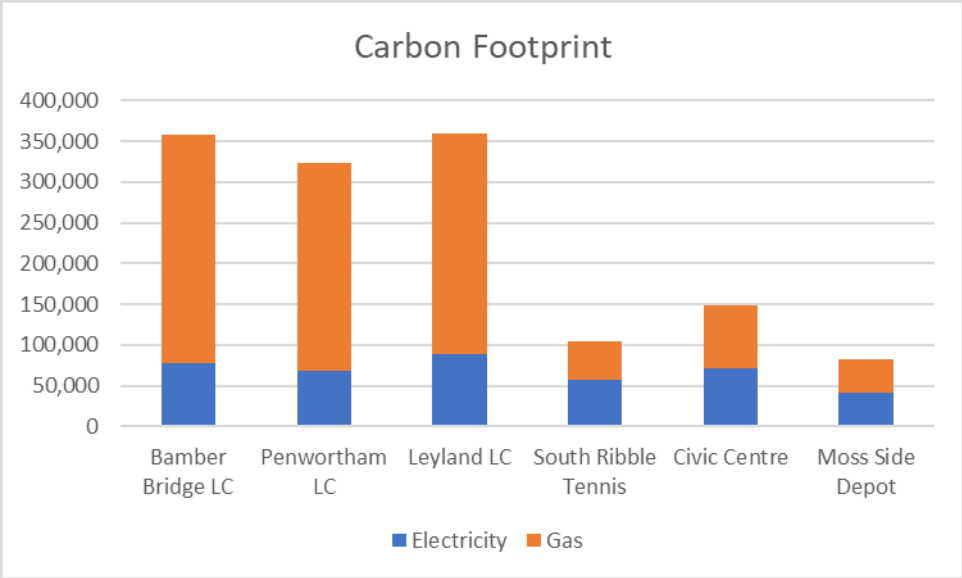
4. Decarbonisation and Net Zero

Decarbonisation is the removal of technologies that use carbon based fuels. For organisations such as South Ribble Council, this means removing gas heating and replacing with energy sources that have zero point of use emissions such as electricity. This report does not investigate the carbon emissions of vehicles.

Electricity in the UK currently is not 100% renewable, but the government is striving for this and at this time it is much easier to generate renewable electricity than creating renewable gas. In 2018 the government announced a ban on coal generation by 2025. This led to coal fired power stations not investing in their future and sites closing earlier than planned. The date has since been brought forward to 2024 and currently only 2 coal fired stations are available in the UK. This has seen coal use drop to less than 2% and renewables increase to 37% of UK generation. This has been reflected on the carbon emission factor of the electricity dropping from a high of 0.49608 $kgCO_2e/kWh$ in 2008 to 0.21233 $kgCO_2e/kWh$ in 2021. See graph below.



As mentioned in more detail below, the Carbon footprint of the 6 Buildings surveyed using the latest carbon factors and 2019 usage data is 1,377,891 $kgCO_2e$ (See table below). This is the equivalent of a hot air balloon lifting off every 7 hours of every day of the year full of CO_2 going straight into the atmosphere. In 2008 using the same energy usage, the carbon footprint would have been 1,918,790 $kgCO_2e$. i.e. the government has helped you reduce your carbon footprint by 28%.



1 ton of Carbon is equivalent to a hot air balloon in size and 1 kg of Carbon is equivalent to a football in size.

Site	Electricity			Gas		
	Usage (kWh)	Carbon Emission Factor ($kgCO_2e$/kWh)	Carbon Footprint ($kgCO_2e$)	Usage (kWh)	Carbon Emission Factor ($kgCO_2e$/kWh)	Carbon Footprint ($kgCO_2e$)
Bamber Bridge Leisure Centre	364,636	0.21233	77,423	1,536,550	0.18316	281,434
Penwortham Leisure Centre	321,092	0.21233	68,177	1,393,874	0.18316	255,302
Leyland Leisure Centre	414,487	0.21233	88,008	1,485,626	0.18316	272,107
South Ribble Tennis Centre	271,311	0.21233	57,607	257,623	0.18316	47,186
Civic Centre	338,897	0.21233	71,958	416,102	0.18316	76,213
Moss Side Depot	195,830	0.21233	41,581	223,264	0.18316	40,893
Sub Total	1,906,253		404,755	5,313,039		973,136
Carbon Footprint ($kgCO_2e$)						**1,377,891**

This report looks at how the carbon based fuel (natural piped methane gas) can be removed from sites by 2030 and still enable the buildings to operate. The primary decarbonising technology is Air Source Heat Pumps (ASHP). These units are very similar to air conditioning units running "in reverse" i.e. an AC Unit sucks heat out of a room and pushes it outside. ASHP suck the heat out of the atmosphere and use it to heat the building or swimming pool. Even below freezing air still contains energy until the temperature reaches absolute zero (circa -273°C). Ground Source Heat Pumps work in a very similar way but suck the heat out of the ground or a water course.

Once the technologies outlined in this report are implemented, there will still be a residual carbon footprint from the electricity used. To reach net zero the council will also need to either generate all of this electricity itself or buy renewable electricity from a supplier. REGO certificates are a means to

obtaining Green Energy. There are a number of confusing terms when talking about energy contracts. Brown electricity is "traditional" grid electricity which in 2020 was made up by approximately 45.6% fossil fuel, 17.3% nuclear and 37.1% renewable. This means that brown electricity does have some renewable energy in the mix. Blue electricity is generated from Nuclear which, although not classed as renewable, they have very low-carbon emissions associated with the process. Currently only EDF Energy offers blue electricity. Green electricity comes in two variants the first is that energy suppliers will contribute towards environmental schemes on your behalf. This could be tree planting offset which is not renewable generation. The second is certificated green electricity which will match your usage with actual renewable energy generation or they purchase Renewable Energy Guarantee of Origin (REGO) certificates on the open market. These certificates are issued to renewable energy generators for each megawatt hour of renewable energy generated. They can sell any excess certificates created at times of surplus to non-renewable energy generators, who then use them to create a 'green tariff'.

5. Energy Conservation Measures

5.1 We have produced 'site summaries' for the 4 leisure facilities and 2 council buildings attached as an appendix. These summarise the energy conservation measures and provides an overview of the proposals.

5.2 Projects identified and recommended are designed with an 8-year plan that is designed to help achieve the 2030 decarbonisation target. The recommendations are set out in stages: stage 1 - initial energy savings potential and what needs to be done immediately; stage 2 - further capital improvements through renewable technologies and stage 3 - full decarbonisation initiatives through the installation of ASHPs.

5.3 The simple payback* has been calculated using forecasted utility tariffs provided by South Ribble Borough Councils (*Simple payback is defined as the total cost of the project, divided by the estimated first year savings). Payback periods would be significantly shorter if natural end of life replacement were taken into account.

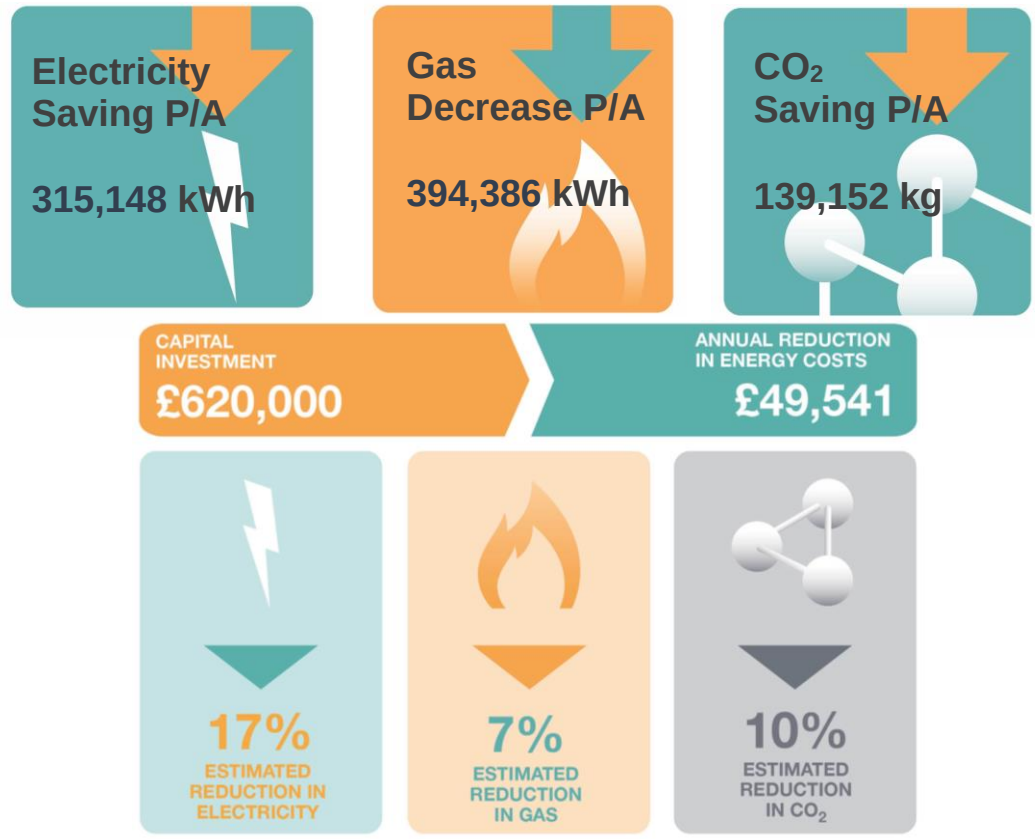
5.4 Additional costs for large projects such as CDM costs have not been included in this report.

5.5 All energy saving calculations in this proposal are based on engineering calculations with assumed rather than measured variables. The assumed variables are based on a combination of visual inspection (where possible), onsite plans and documentation (where available), experience and specific expertise, direct verbal reports from site staff and publicly available information e.g. operational hours available online. It is suggested that Ribble Valley Borough Council together with Leisure Energy review the engineering calculations and specific variables used prior to installation.

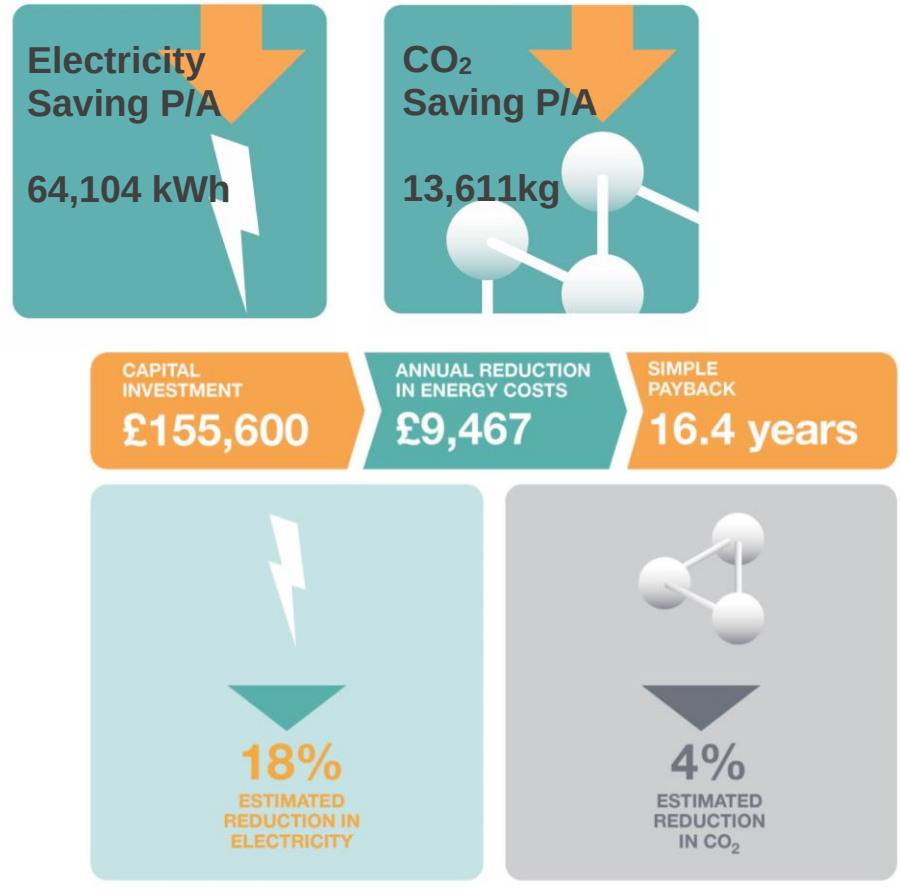
6.1 Stage 1: Energy Conservation Measures: Combined Sites

6.1 We have presented the data as a combined total for all the sites and then by each leisure centre and the Moss Side Depot.

6.1.1 Combined All Sites Projected Results:



7. Energy Conservation Measures: Bamber Bridge Leisure Centre



7.1 Bamber Bridge Leisure Centre has a DEC rating of 'C'.

7.2 Lighting

7.2.1 We propose to install new LED energy efficient lighting to the following areas, which will reduce connected loads and improve illumination levels:

- Staff room
- Corridors
- External
- Pool
- Changing rooms
- Reception
- Sports hall
- Sports hall store
- Squash courts

Whilst the whole centre was surveyed, new lighting has been excluded from areas where the existing lighting is reasonably efficient and providing sufficiently good lighting quality and where replacement would have a longer simple payback period.

7.2.2 Emergency lighting will be replaced on a like-for-like basis. This proposal is intended to preserve and not improve existing emergency lighting provisions.

7.2.3 We have not included the reduction in maintenance costs within the energy payback calculations.

7.3 Pool pump controls

7.3.1 The pool circulation pumps seem to be oversized. There are three 5.5kW pumps on the system and should operate duty/duty/standby but currently site can only run one pump at full speed. There is little control in place. We propose installing new pumps correctly sized with improved controls with adequate throttling or VSDs. This will allow for the pumps to reduce speed and flow overnight.

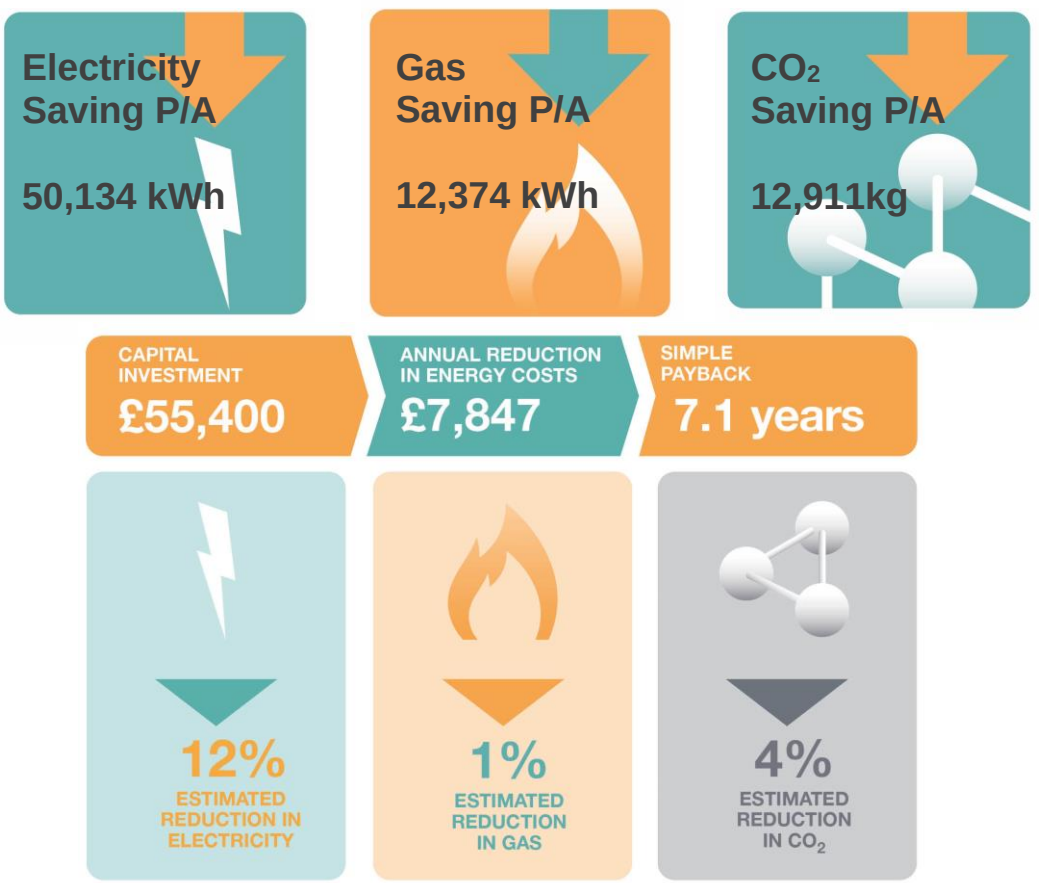
7.3 Hot water circulation pumps control

7.3.1 There are two 2.2kW pumps on the system with no speed control. We propose installing VSDs on the motors to allow variability of supply to match demand. This will allow for the pumps to reduce speed and flow to match demand and to reduce consumption overnight.

7.4 New pool AHU

7.4.2 It was noted during the survey that the pool AHU is old and in a state of disrepair and requires replacement. It is recommended that a new AHU be installed to better control the pool air, to reduce evaporation and better control energy consumption.

8. Energy Conservation Measures: Leyland Leisure Centre



8.1 Leyland Leisure Centre has a DEC rating of 'C'.

8.2 Lighting

8.2.1 We propose to install new LED energy efficient lighting to the following areas, which will reduce connected loads and improve illumination levels:

- Changing rooms
- Dry plant room
- Fitness centre
- Main gym
- Offices
- Pool
- Pool viewing area
- Sports hall
- Squash courts
- Studio
- Wet plant room

8.2.2 Whilst the whole centre was surveyed, new lighting has been excluded from areas where the existing lighting is reasonably efficient and providing sufficiently good lighting quality and where replacement would have a longer simple payback period.

8.2.3 Emergency lighting will be replaced on a like-for-like basis. This proposal is intended to preserve and not improve existing emergency lighting provisions.

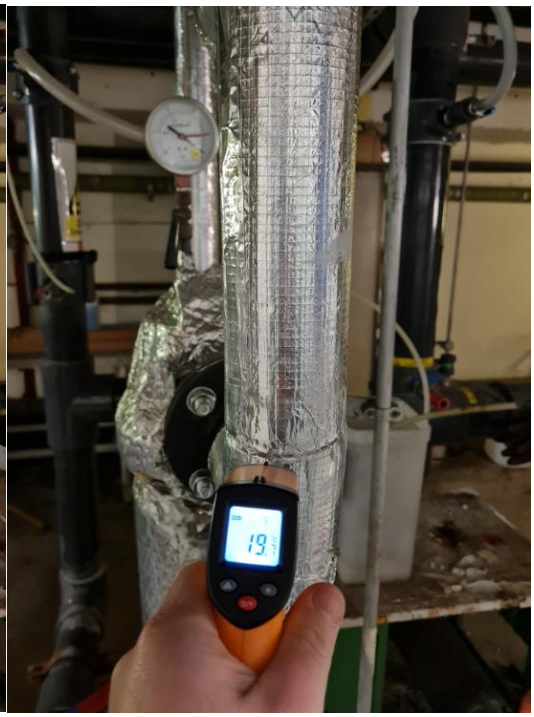
8.2.4 We have not included the reduction in maintenance costs within the energy payback calculations.

8.3 Main pool and small pool circulation pumps control

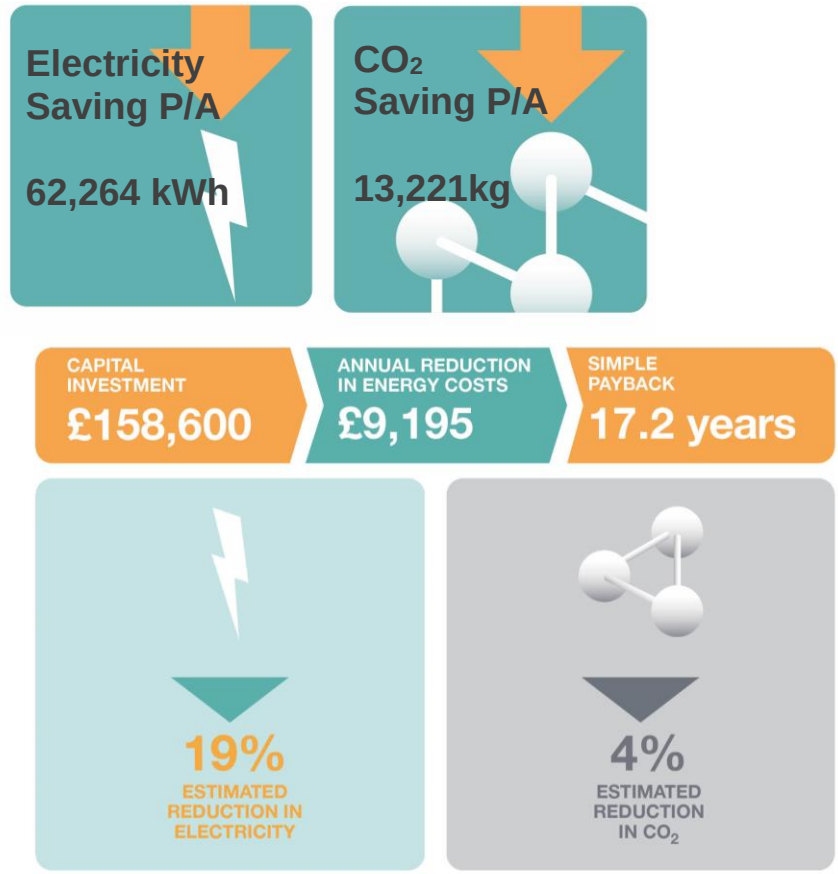
8.3.1 There are two 5.5kW pumps both for the main pool and the small pool circulation. There was no evidence of speed/flow control during the survey. We propose installing VSDs on the motors to allow variability of supply to match demand. This will allow for the pumps to reduce speed and flow to match demand and to reduce consumption overnight.

8.4 Boiler room insulation

8.4.1 The insulation of some piping, joints, elbows and valves could be improved. However, this would be recommended along with other work as the potential energy savings and carbon reductions would likely be small.



9. Energy Conservation Measures: Penwortham Leisure Centre



9.1 Penwortham Leisure Centre has a DEC rating of 'C'.

9.2 Lighting

9.2.1 We propose to install new LED energy efficient lighting to the following area, which will reduce connected loads and improve illumination levels:

- Car Park
- Corridors
- Dry plant room
- Gym
- Other rooms
- External
- Pool
- Sports pitches
- Squash courts
- Wet plant room

9.2.2 Whilst the whole centre was surveyed, new lighting has been excluded from areas where the existing lighting is reasonably efficient and providing sufficiently good lighting quality and where replacement would have a longer simple payback period.

9.2.3 Emergency lighting will be replaced on a like-for-like basis. This proposal is intended to preserve and not improve existing emergency lighting provisions.

9.2.4 A conservative maintenance and lamp replacement saving has been factored into the simple payback calculations.

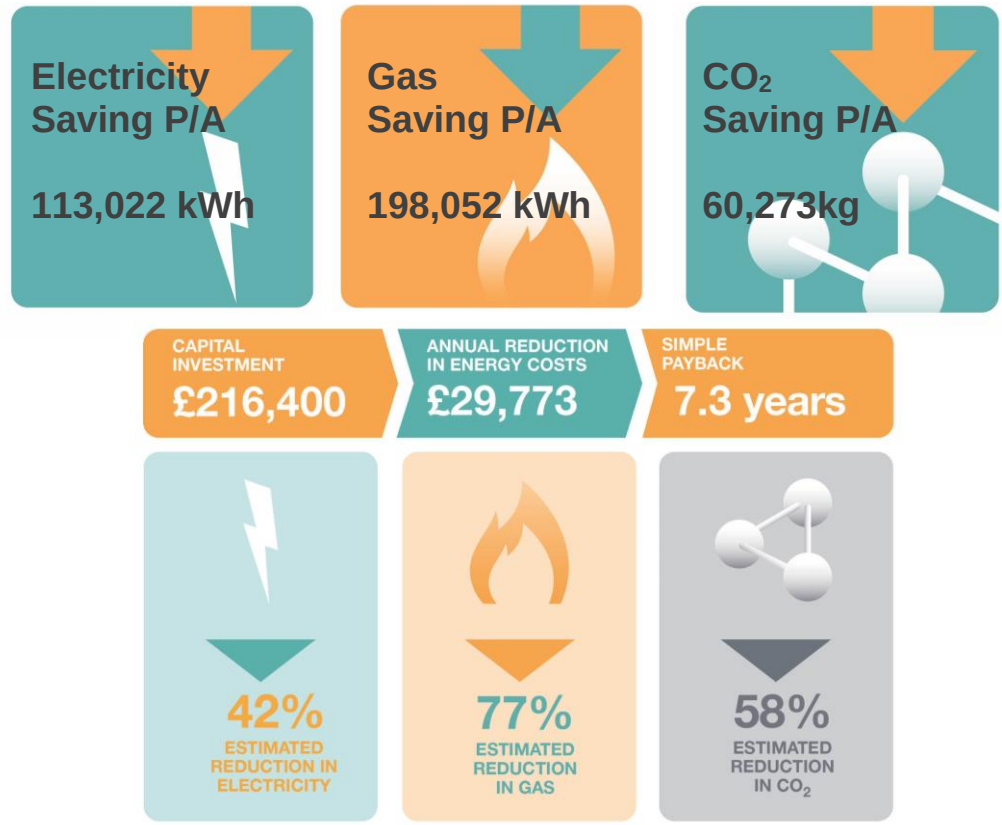
9.3 Pool pump controls

9.3.1 The pool circulation pumps seem to be oversized. There are three 5.5kW pumps on the system and should operate duty/duty/standby but currently site can only run one pump at full speed. There is little control in place. We propose installing new pumps correctly sized with improved controls with adequate throttling or VSDs. This will allow for the pumps to reduce speed and flow overnight.

9.4 New pool AHU

9.4.2 It was noted during the survey that the pool AHU is old and in a state of disrepair and requires replacement. It is recommended that a new AHU be installed to better control the pool air, to reduce evaporation and better control energy consumption.

10. Energy Conservation Measures: South Ribble Tennis Centre



10.1 South Ribble Tennis Centre has a DEC rating of 'C'.

10.2 Lighting

10.2.1 We propose to install new LED energy efficient lighting to the following area, which will reduce connected loads and improve illumination levels:

- Tennis changing rooms
- External
- Kitchen
- Other rooms
- Outdoor pitch
- Spin room
- Tennis courts
- Tennis courts, corridors

10.2.2 Emergency lighting will be replaced on a like-for-like basis. This proposal is intended to preserve and not improve existing emergency lighting provisions.

10.2.3 Whilst the whole centre was surveyed, new lighting has been excluded from areas where the existing lighting is reasonably efficient and providing sufficiently good lighting quality and where replacement would have a longer simple payback period.

10.2.4 We have not included the reduction in maintenance costs within the energy payback calculations.

10.4 New AHUs

10.4.2 Space heating at the Tennis Centre is achieved via forced air gas heaters. Installing two new AHUs would improve air quality and distribution of air both sides of the building. This would also enable further decarbonisation as the AHUs could be supported by two ASHPs. It is recommended that the gas heaters be replace by two AHUs and two ASHPs.

11. Energy Conservation Measures: Civic Centre

11.1 The Civic Centre has a current DEC rating of 'C'. the council has been very active over the last few years in reducing the energy use of the Civic Centre.

11.2 Phase 1 – Carbon reduction and Energy efficiency

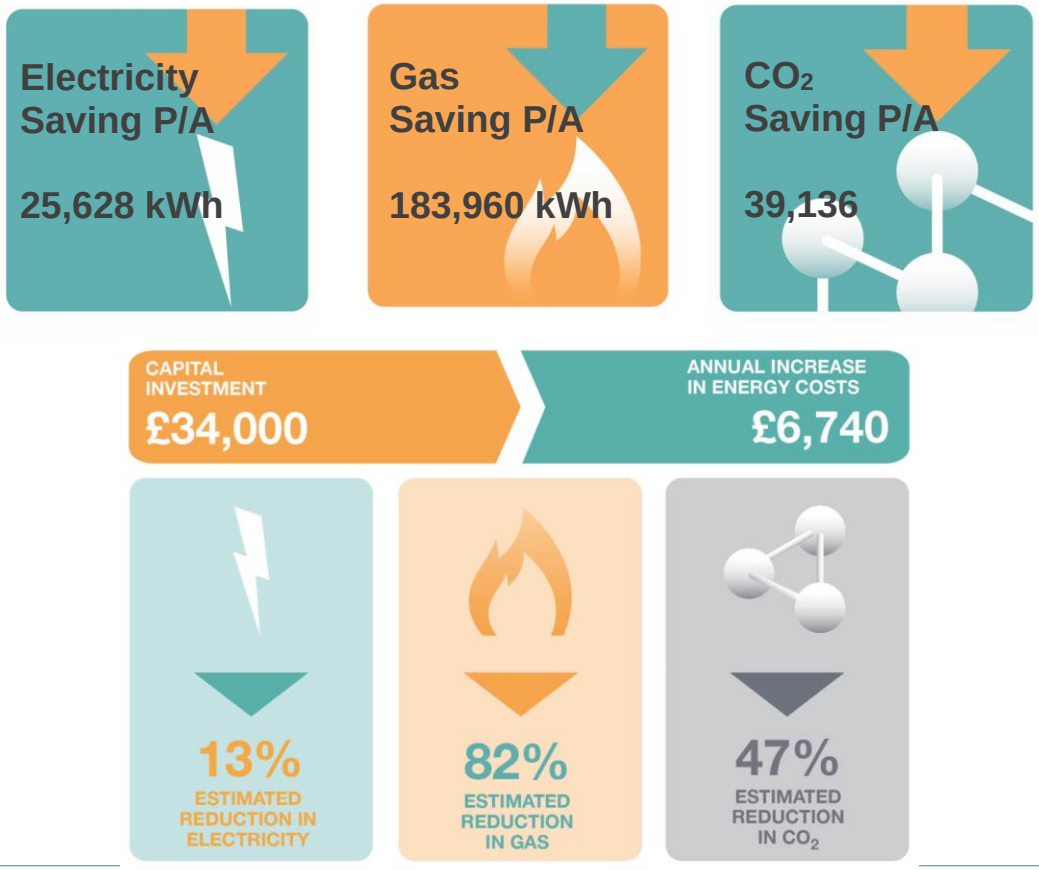
11.2.1 Last year the council installed Solar PV and Solar thermal arrays on the roof of the building. This has been termed phase 1.

11.3 Phase 2 – Carbon reduction and Energy efficiency

11.3.1 Further to a successful grant application to the Public Sector Decarbonisation scheme the council has plans in place over the next few months to install more Solar PV at the Civic Centre, Tennis Centre and Moss side depot along with plans to replace all of the existing lighting at the Civic Centre with high efficiency LEDs.

11.4 What opportunities remain at the Civic Centre to further decarbonise is to install ASHPs to replace the gas heating systems. This is covered in section 14 of the report.

12. Energy Conservation Measures: Moss Side Depot



12.1 A Display Energy certificate was not available for Moss Side Depot.

12.2 Lighting

12.2.1 We propose to install new LED energy efficient lighting to the following area, which will reduce connected loads and improve illumination levels:

- External
- Workshops

12.2.2 Whilst the whole centre was surveyed, new lighting has been excluded from areas where the existing lighting is reasonably efficient and providing sufficiently good lighting quality and where replacement would have a longer simple payback period.

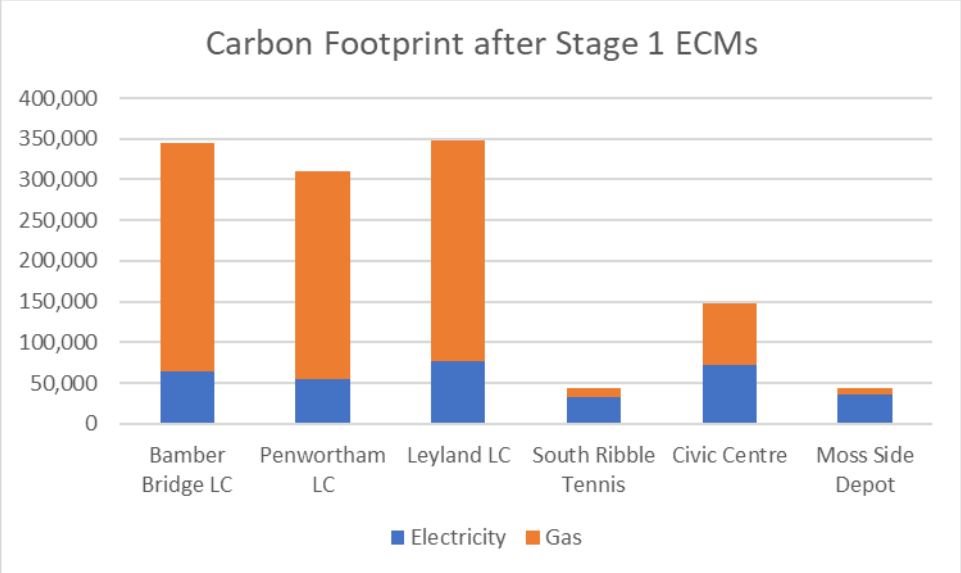
12.2.3 Emergency lighting will be replaced on a like-for-like basis. This proposal is intended to preserve and not improve existing emergency lighting provisions.

12.2.4 We have not included the reduction in maintenance costs within the energy payback calculations.

12.3 Electric space heating

12.3.1 It was noted during the survey that the workshops are heated by forced air gas heaters. For decarbonisation purposes it is recommended that the forced air gas space heaters be replaced with electric heaters such as infrared heaters. It is anticipated that this would likely increase the energy bill. However, improved efficiency could be achieved through the installation of roller shutter doors.

The below graph shows the residual Carbon footprint once all stage 1 ECMs are complete. This represents a saving of 10.1%, but leaves a residual carbon footprint of 1,238,739 kgCO_2e



13. Stage 2: Renewable technologies – Solar PV

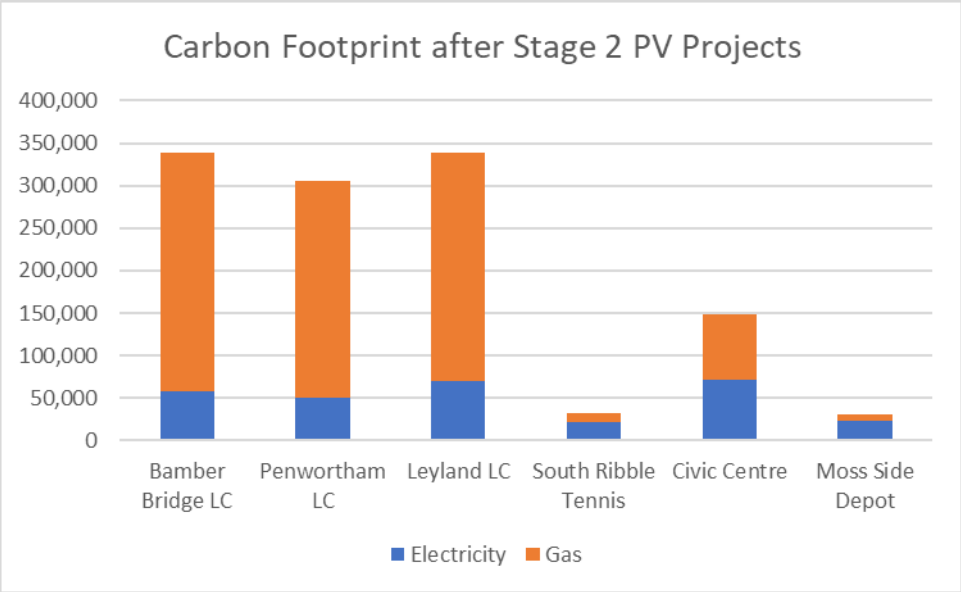
Recommendations	Estimated Annual Savings (£)	CO_2 (te)	(kWh)	Estimated Project Cost (£)
Bamber Bridge Leisure Centre	£4,033	6	27,312	£90,000
South Ribble Tennis Centre	£8,081	12	54,722	£53,200
Penwortham Leisure Centre	£3,529	5	23,893	£90,000
Moss Side Depot	£8,786	13	59,493	£80,000
Leyland Leisure Centre	£5,542	0	37,528	£125,000
Total	**£24,429**	**35**	**165,420**	**£438,200**

13.1 Photovoltaic Solar Electricity Generating System

13.1.1 Although the government have removed Feed in Tariff subsidy for Solar Photo Voltaic systems, the cost of PV has dropped dramatically over the last 5 years. This means that PV may still be financially viable. We recommend solar PV arrays be installed at the sites as in the table below;

Site	Size kW_p
Bamber Bridge Leisure Centre	38
South Ribble Tennis Centre	56*
Penwortham Leisure Centre	30
Moss Side Depot	70
Leyland Leisure Centre	61

The below graph shows the residual Carbon footprint once all stage 1 and 2 ECMs are complete. This represents a further saving of 3.1%, but leaves a residual carbon footprint of 1,195,647 $kgCO_2e$



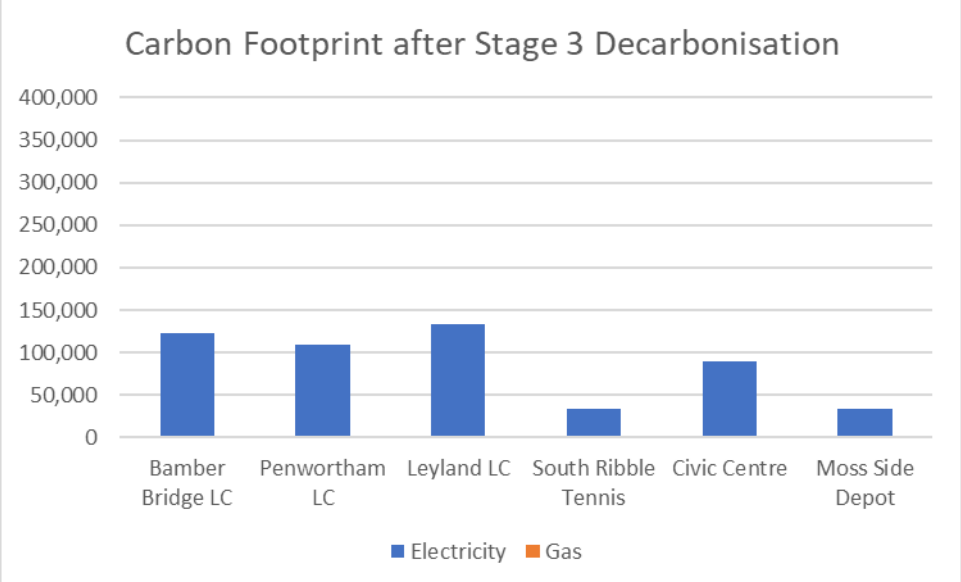
**It has been noted that there maybe potential for a larger solar PV array at South Ribble Tennis Centre despite there being a low electrical demand at site. If a larger array is viable then a battery storage system could be incorporated into the design. A 50kW battery storage system could help reduce electricity consumption. Further analysis of energy profiles would help determine the viability of a larger solar PV array and battery storage. We are aware that the site is in the process of having solar installed, but do not have full vision of the project.*

14 Stage 3: Decarbonisation

14.1 To achieve the plan of zero carbon by 2030 all natural gas consumption will need to be replaced. This can be achieved through heat pump technologies such ASHP, GSHP and WSPH. Here we have highlighted what the costs and CO_2 saving could be by installing ASHPs for each site. There is a negative monetary saving due to the installation of an ASHP unit. The ASHP will reduce the natural gas consumption but increase the electricity consumption. Due to the high efficiencies of heat pumps, there is a net reduction in energy consumption and carbon emissions. However, with the electricity and natural gas tariffs being approximately 11p/kWh and 2p/kWh respectively the running costs of the units increase.

Recommendations	Estimated annual change		Estimated Project Cost (£)
	(£)	CO_2 (kge)	
Bamber Bridge Leisure Centre	-£1,290	235,594	£675,000
South Ribble Tennis Centre	-£216	71,863	£375,000
Penwortham Leisure Centre	-£1,170	214,403	£675,000
Moss Side Depot	-£187	49,486	£305,000
Leyland Leisure Centre	-£1,250	227,492	£675,000
Civic Centre	-£349	58,543	£375,000
Total	**-£2,864**	**857,381**	**£3,080,000**

The below graph shows the residual Carbon footprint once all stage 1 and 2 and 3 ECMs are complete. This represents a further 49.0% saving but leaves a residual carbon footprint of 520,510 $kgCO_2e$ based purely on electrical load. We refer back to section 4 where our recommendation is for procurement of REGO certified electricity to reduce this further.



15. ECMs and Decarbonisation budget plan

15.1 We have denoted in the table below what the total budget could be to improve energy efficiency, save energy and achieve zero carbon if all the projects are carried out over the 8 year period from 2022 to 2030. Further to this, the graphics denote the estimated total savings and carbon reduction which will be in place on completion of all project installations by 2030.

Year	Projects	Cost
1	South Ribble Tennis Centre - AHU and ASHP	£475,000
2	South Ribble Tennis Centre - ECMs and Solar PV	£169,600
3	Bamber Bridge and Penwortham Leisure Centre - ECMs	£314,200
4	Bamber Bridge Leisure Centre - ASHP	£675,000
5	Bamber Bridge - Solar PV and Penwortham Leisure Centre ASHP	£855,000
6	Leyland Leisure Centre - ECMs, Solar PV and ASHP	£855,400
7	Civic Centre - ASHP	£375,000
8	Moss side - ECMs, Solar PV and ASHP	£419,000
Total		**£4,138,200**

16. Economic Payback Periods

16.1 There is a clear economic benefit for the leisure facilities and the council buildings, not only are we reducing the current running costs, but we are also ensuring these buildings remain viable by future proofing the leisure centres' second highest cost – energy and ensuring the council buildings will be operational and in good repair for many years to come. On a like-for-like basis, the proposed energy conservation measures in Stage 1 across the buildings will generate estimated annual **savings of £49,541** which, over the eight-year duration to 2030, provides an estimated economic **benefit of £**396,328 (at today's relatively low tariffs).

16.2 Given that energy costs over the last 20 years have increased by 300% and are forecasted to rise by BEIS, by reducing consumption now, this will lessen the effect of large increases in the future, delivering an even greater economic benefit. Building in a conservative 5% compounded increase in energy costs will result in a **saving of £413,667** over the eight years. Furthermore, the Councils, as owners of the assets will have much improved leisure facilities that should remain viable and operational for many years to come.

16.3 Further economic benefits can be achieved through implementation of Stage 2 across the buildings which will generate estimated annual **savings of £24,429** which, over the eight-year duration to 2030, provides an estimated economic **benefit of £195,432**, (at today's relatively low tariffs).

16.4 With 5% compounded increase in energy costs, **Stage 2 will result in a saving of £203,982** over the eight years.

17. Maintenance Savings

17.1 Apart from lighting projects, where we have incorporated a modest saving associated with anticipated reduced lamp replacement, we have excluded maintenance, chemical savings and future energy increases from the simple payback calculations.

18. Lead in time / Delivery

18.1 Working alongside the management and staff at each building, we will minimise the lead in time as much as is possible, but further detailed design would be needed to create accurate project plans.

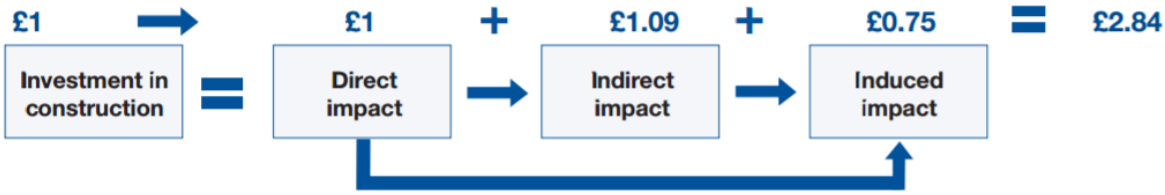
19. The Public Services (Social Value) Act 2012

19.1 Environmental

The overall decarbonisation proposal reduces carbon emissions for the Councils by a total of **857,381 kgCO_2e** i.e. 62.2%.

19.2 Social value

Where our works are not of a specialist nature, we commit to using local labour and suppliers wherever possible, therefore maximising the benefit of the investment to the local community. The consultants LEK for the UK Contractors Group, demonstrated that every £1 spent on construction output generates £2.84 in total economic activity.



20. Implementation and Training

20.1 Leisure Energy recognises the importance of staff training at all levels for the successful implementation and continued benefits of any energy project.

20.2 As part of the delivery of these works, all relevant staff will receive training on the new energy works. This will involve an overview of the works together with the part staff will play in their delivery. This will be supported by bespoke training for the technical teams, where there will be pre-installation training to explain the principles of, for example, night time environmental settings. After the project's installation, there will be specific training / handover in respect of technical innovations such as the water treatment. This is to ensure the staff understand the new technology and how it operates on a proactive rather than reactive basis i.e. through modulation.

21. Capital Works Assumptions / Exclusions

21.1 Assumptions:

- Costs include design (for our specified works)
- There are no pool closures because of our works
- Temporary pool ventilation will be provided (where required)
- Inflation allowance is excluded
- Mechanical and electrical plant is suitable for the proposed energy works
- Undertaken on a like for like comparison exercise
- All maintenance is undertaken / controls are left unaltered
- No changes to opening times

21.2 Exclusions:

- South Ribble Borough Council internal project delivery fees
- Works identified in stock condition survey
- Asbestos surveys and / or removal
- Cost increases due to project start delays
- Existing ductwork is handed over free from builder's rubble / debris

22. Promoting the Savings

22.1 Our proposed energy works make a significant commitment to the local community and carbon emissions reduction, however as most of these works are often unseen i.e. water controllers / AHU / controls they do not get the recognition they deserve.

22.2 Leisure Energy, in conjunction with South Ribble Borough Council propose to actively promote the energy / carbon reduction measures by installing 'energy banners' before the works start. The aim is to raise awareness of these often unseen works by demonstrating the savings in simple recognisable terms e.g. electricity savings equivalent to number of TVs. Typically, the banner will be located around the centre e.g. front entrance, pool hall etc. Examples of how the banners will look is shown below.

23. Appendices:

Site Summaries:

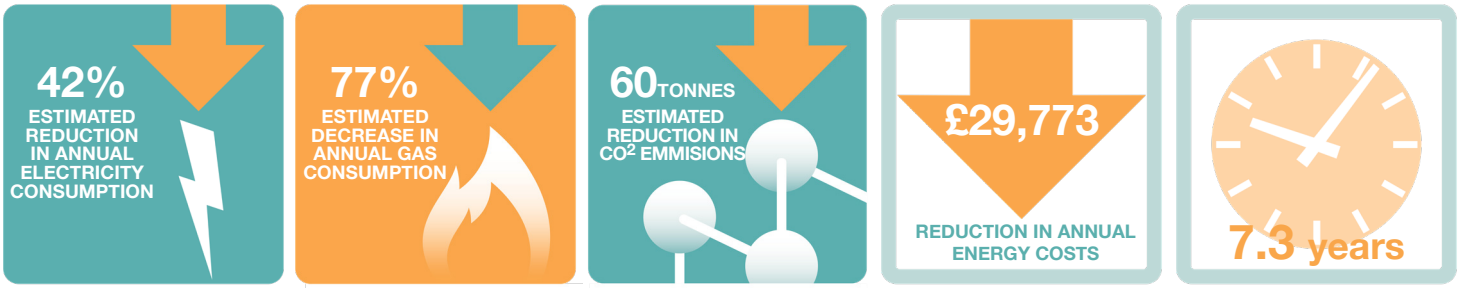
- Bamber Bridge Leisure Centre
- Leyland Leisure Centre
- Penwortham Leisure Centre
- South Ribble Tennis Centre
- Moss Side Depot

Leisure Energy Team

LeisureEnergy
Sustainable savings

South Ribble Borough Council

LOCAL AUTHORITY	SOUTH RIBBLE BOROUGH COUNCIL
PROJECT TITLE	SOUTH RIBBLE TENNIS AND FITNESS CENTRE
DATE	JUNE 2021
PREPARED BY	JAMIE HARRIS



CENTRE DETAILS	
USEFUL FLOOR AREA (according to display energy certificate)	5468m³

FACILITIES	
MAIN POOL	NO
TEACHING POOL	NO
LEISURE POOL	NO
GYM	YES
SPIN ROOM	YES
SPA AREA	NO
SPORTS HALL	NO
TENNIS COURTS	YES
CHANGING ROOMS	YES
SQUASH COURTS	NO
CAFE	YES
CRECHE	NO
ALL WEATHER PITCH	YES

IMPROVEMENT DETAILS	
AIR HANDLING: CHANGING	×
AIR HANDLING: TENNIS COURTS	×
AIR HANDLING: SPORTS HALL	×
AIR SOURCE HEAT PUMP	✓
BEMS CONTROLS	×
BOILER	×
ELECTRICITY AND GAS AMR SUB-METERING	×
INSULATION: PLANT ROOM	×
INSULATION: OTHER	×
LIGHTING: TENNIS COURTS, SPIN ROOM	✓
LIGHTING: EXTERNAL, KITCHEN, CHANGING	✓
LOW FLOW SHOWERS	×
POOL COVERS	×
POOL PUMP CONTROLS	×
POOL PUMP MOTORS	×
SOLAR PHOTOVOLTAIC	✓

South Ribble Tennis & Fitness Centre

Overview of proposed energy conservation measures

Leisure Energy, an award winning energy specialist for leisure centres, has reviewed the energy consumption at the facility and proposes that the annual consumption at South Ribble Tennis and Fitness Centre can be reduced by proven and 'targeted' energy interventions using energy efficient technologies.

Working in partnership with South Ribble Borough Council, Leisure Energy will deliver these proposed energy conservation measures, estimated to reduce the annual energy consumption by £29,773 from a total capital investment of £216,400 with a simple payback of 7.3 years on a like for like basis.

Annual and estimated consumption

	Current	Estimated	Savings	% savings
Electricity	271,311 kWh	158,289 kWh	113,022 kWh	42%
Gas	257,623 kWh	59,571 kWh	198,052 kWh	77%
CO_2	105 tonnes	45 tonnes	60 tonnes	58%

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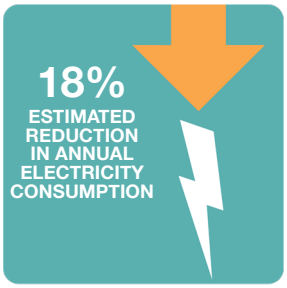
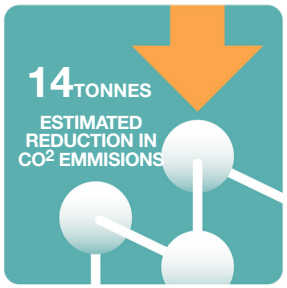
South Ribble Borough Council

LOCAL AUTHORITY	SOUTH RIBBLE BOROUGH COUNCIL
PROJECT TITLE	BAMBER BRIDGE LEISURE CENTRE
DATE	JUNE 2021
PREPARED BY	JAMIE HARRIS





CENTRE DETAILS	
USEFUL FLOOR AREA	2321m^3
(according to display energy certificate)	

FACILITIES	
MAIN POOL	YES - 25M
TEACHING POOL	NO
LEISURE POOL	NO
GYM	YES
FUNCTIONAL TRAINING	NO
STUDIO	YES
SPA AREA	NO
SPORTS HALL	YES
SQUASH COURTS	NO
CAFE	NO
CRECHE	NO
ALL WEATHER PITCH	NO
SOFT PLAY	NO

IMPROVEMENT DETAILS	
AIR HANDLING: CHANGING	×
AIR HANDLING: POOL HALL	✓
AIR HANDLING: SPORTS HALL	×
AIR SOURCE HEAT PUMP	✓
BEMS CONTROLS	×
BOILER	×
ELECTRICITY AND GAS AMR SUB-METERING	×
GROUND SOURCE HEAT PUMP	×
HOT WATER PUMP CONTROLS	✓
INSULATION: PLANT ROOM	×
INSULATION: OTHER	✓
LIGHTING: SELECTED AREAS	✓
LIGHTING: POOL HALL & SPORTS HALL	×
LOW FLOW SHOWERS	×
POOL COVERS	×
POOL PUMP CONTROLS	✓
POOL PUMP MOTORS	✓
SOLAR PHOTOVOLTAIC	✓

Overview of proposed energy conservation measures

Leisure Energy, an award winning energy specialist for leisure centres, has reviewed the energy consumption at the facility and proposes that the annual consumption at Bamber Bridge Leisure Centre can be reduced by proven and 'targeted' energy interventions using energy efficient technologies.

Working in partnership with South Ribble Borough Council, Leisure Energy will deliver these proposed energy conservation measures, estimated to reduce the annual energy consumption by £9,467 from a total capital investment of £15,600 with a simple payback of 16.4 years on a like for like basis.

Annual and estimated consumption

	Current	Estimated	Savings	% savings
Electricity	364,636 kWh	300,532 kWh	64,104 kWh	18%
CO_2	359 tonnes	345 tonnes	14 tonnes	4%

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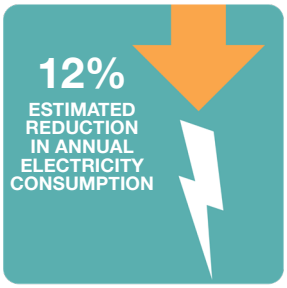
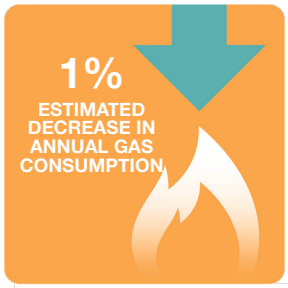
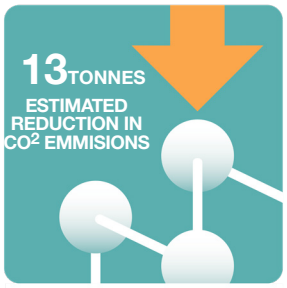
Sustainable savings

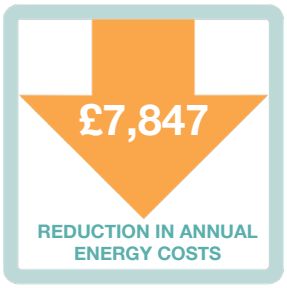
South Ribble Borough Council

LOCAL AUTHORITY	SOUTH RIBBLE BOROUGH COUNCIL
PROJECT TITLE	LEYLAND LEISURE CENTRE
DATE	JUNE 2021
PREPARED BY	JAMIE HARRIS









CENTRE DETAILS	
USEFUL FLOOR AREA (according to display energy certificate)	3167m^3

FACILITIES	
MAIN POOL	YES - 25M
TEACHING POOL	YES
LEISURE POOL	YES
GYM	YES
STUDIO	YES
SPA AREA	NO
SPORTS HALL	YES
SQUASH COURTS	YES
CAFE	NO
CRECHE	NO
ALL WEATHER PITCH	NO
SOFT PLAY	NO

IMPROVEMENT DETAILS	
AIR HANDLING: CHANGING	×
AIR HANDLING: POOL HALL	×
AIR HANDLING: SPORTS HALL	×
AIR SOURCE HEAT PUMP	✓
BEMS CONTROLS	×
BOILER	×
ELECTRICITY AND GAS AMR SUB-METERING	×
INSULATION: PLANT ROOM	✓
INSULATION: OTHER	×
LIGHTING: POOL HALL, SPORTS HALL,	✓
LIGHTING: FITNESS SUITE, STUDIO, CHANGING	✓
LIGHTING: SQUASH COURT, ASSOCIATED AREAS	✓
LOW FLOW SHOWERS	×
POOL COVERS	×
POOL PUMP CONTROLS	×
POOL PUMP MOTORS	✓
SOLAR PHOTOVOLTAIC	✓

Overview of proposed energy conservation measures

Leisure Energy, an award winning energy specialist for leisure centres, has reviewed the energy consumption at the facility and proposes that the annual consumption at Leyland Leisure Centre can be reduced by proven and 'targeted' energy interventions using energy efficient technologies.

Working in partnership with South Ribble Borough Council, Leisure Energy will deliver these proposed energy conservation measures, estimated to reduce the annual energy consumption by £7,847 from a total capital investment of £55,400 with a simple payback of 7.1 years on a like for like basis.

Annual and estimated consumption

	Current	Estimated	Savings	% savings
Electricity	414,487 kWh	364,356 kWh	50,131 kWh	12%
Gas	1,485,626 kWh	1,473,252 kWh	12,374 kWh	1%
CO_2	360 tonnes	347 tonnes	13 tonnes	4%

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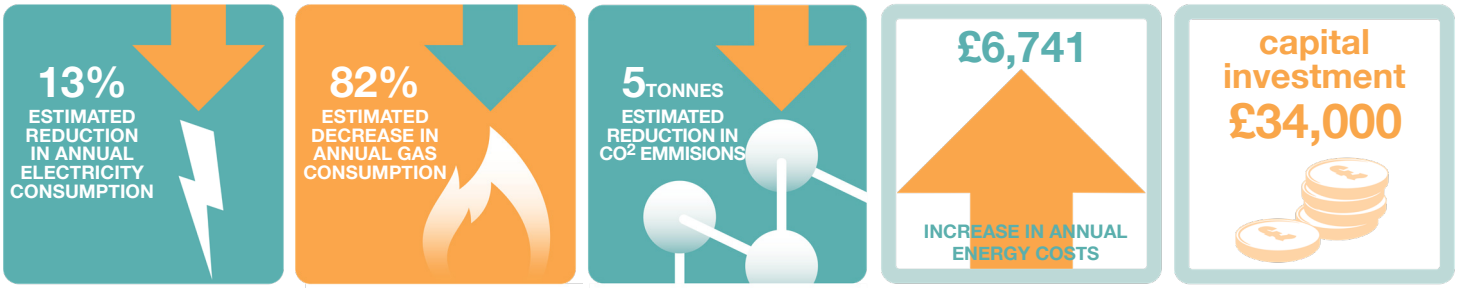
LOCAL AUTHORITY	SOUTH RIBBLE BOROUGH COUNCIL
PROJECT TITLE	MOSS SIDE DEPOT
DATE	JUNE 2021
PREPARED BY	JAMIE HARRIS



CENTRE DETAILS	
USEFUL FLOOR AREA (according to display energy certificate)	N/A

FACILITIES	
OFFICES	YES
RECEPTION	YES
WORKSHOPS	YES

IMPROVEMENT DETAILS	
AIR HANDLING UNIT	×
AIR SOURCE HEAT PUMP	×
BEMS CONTROLS	×
ELECTRICITY AND GAS AMR SUB-METERING	×
INSULATION: PLANT ROOM	×
INSULATION: OTHER	×
INFRARED HEATING	✓
LIGHTING: INDOOR	✓
LIGHTING: OUTDOOR	✓
LOW FLOW SHOWERS	×
INTELLIGENT WATER MANAGEMENT: MAIN POOL	×
INTELLIGENT WATER MANAGEMENT: LEISURE POOL	×
SOLAR PHOTOVOLTAIC	✓

Overview of proposed energy conservation measures

Leisure Energy, an award winning energy specialist for leisure centres, has reviewed the energy consumption at the facility and proposes that the annual consumption at the Moss Side Depot can be reduced by proven and 'targeted' energy interventions using energy efficient technologies.

Working in partnership with South Ribble Borough Council, Leisure Energy will deliver these proposed energy conservation measures, estimated to reduce the annual gas and electricity consumption by 13% and 82% respectively from a total capital investment of £34,000, with a 47% reduction in carbon emissions.

Annual and estimated consumption

	Current	Estimated	Savings	% savings
Gas	223,264 kWh	39,304 kWh	183,960 kWh	82%
Electricity	195,830 kWh	170,203 kWh	25,628kWh	13%
CO_2	82 tonnes	43 tonnes	39 tonnes	47%

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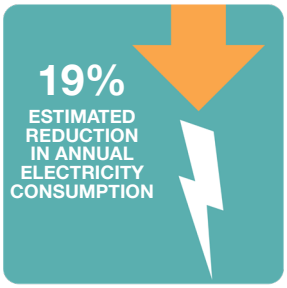
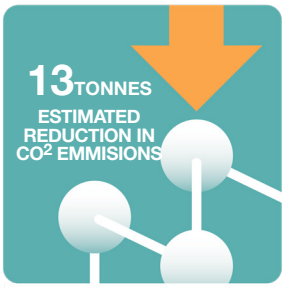
LOCAL AUTHORITY	SOUTH RIBBLE BOROUGH COUNCIL
PROJECT TITLE	PENWORTHAM LEISURE CENTRE
DATE	JUNE 2021
PREPARED BY	JAMIE HARRIS





CENTRE DETAILS	
USEFUL FLOOR AREA (according to display energy certificate)	1785m^3

FACILITIES	
MAIN POOL	YES
TEACHING POOL	NO
LEISURE POOL	NO
GYM	YES
STUDIO	NO
SPA AREA	NO
SPORTS HALL	NO
SQUASH COURTS	YES
CAFE	NO
SOFT PLAY	NO
SPORTS PITCHES	YES

IMPROVEMENT DETAILS	
AIR HANDLING: CHANGING	×
AIR HANDLING: POOL HALL	✓
AIR HANDLING: SPORTS HALL	×
AIR SOURCE HEAT PUMP	✓
BEMS CONTROLS	×
BOILER	×
ELECTRICITY AND GAS AMR SUB-METERING	×
INSULATION: PLANT ROOM	×
INSULATION: OTHER	×
LIGHTING: POOL HALL, FITNESS SUITE	✓
LIGHTING: SQUASH COURTS, PLANT ROOMS	✓
LIGHTING: EXTERNAL & SPORTS PITCHES	✓
LOW FLOW SHOWERS	×
POOL COVERS	×
POOL PUMP CONTROLS	×
POOL PUMP MOTORS	×
SOLAR PHOTOVOLTAIC	✓

Overview of proposed energy conservation measures

Leisure Energy, an award winning energy specialist for leisure centres, has reviewed the energy consumption at the facility and proposes that the annual consumption at Penwortham Leisure Centre can be reduced by proven and 'targeted' energy interventions using energy efficient technologies.

Working in partnership with South Ribble Borough Council, Leisure Energy will deliver these proposed energy conservation measures, estimated to reduce the annual energy consumption by £9,195 from a total capital investment of £158,600 with a simple payback of 17.2 years on a like for like basis.

Annual and estimated consumption

	Current	Estimated	Savings	% savings
Electricity	321,092 kWh	258,828 kWh	62,264 kWh	19%
CO_2	323 tonnes	310 tonnes	13 tonnes	4%

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Leisure Energy

Leisure Energy are an award-winning energy consultancy and principal contractor, who specialise in identifying and delivering energy conservation measures for the leisure sector. Our unique solution is to identify long term energy savings, reduce 'waste' whilst improving the water and air quality of the pool environment.

Leisure Energy provides an end to end solution: our proposal included within this submission is based upon an energy audit, the findings will be delivered by Leisure Energy who acts as principal contractor.

Sustainability

We believe that sustainability is as much about making a positive commitment to the environment as it is to the wider community where we work.

Wherever possible, we will support and promote sustainable communities by using local labour and local suppliers. We understand the importance of the fabric first approach; our supply chain aims to ensure that we improve the fabric after we have left – not make it worse.

Exclusions

- South Ribble Borough Council internal project delivery fees
- Works identified in stock condition survey
- Asbestos surveys and/or removal
- Cost increases due to project start delays
- Existing ductwork is handed over free from builder's rubble/debris

Assumptions

- Costs include design (for our specified works)
- Lead in time 6 weeks from receipt of order
- There are no pool closures because of our works
- Temporary pool ventilation will be provided
- Inflation allowance is excluded
- Mechanical and electrical plant is suitable for the proposed energy works
- Undertaken on a like-for-like comparison exercise
- All maintenance is undertaken/ controls are left unaltered
- No changes to opening times
- Mobile water laboratory is installed with results analysed before works start

Our expert team

Neil Bland, Managing Director
MEng (Hons) ICEng AMIE

Neil has worked in the energy industry for nearly 20 years and has vast experience of energy projects in all types of retail, public sector, commercial and industrial buildings. Notable blue chip businesses he has worked directly for include the University of Manchester, Tesco, Centrica and Viridor. He has also worked as a consultant to many companies such as Sainsbury's, Pret a Manger, Prezzo and various NHS Trusts. As well as energy reduction projects, Neil has also run an energy procurement consultancy team, data analytics teams and maintenance teams.

Jamie Harris, Energy Manager
BEng (Hons) CEM Chartered Energy Manager

Jamie is a Chartered Energy Manager and has worked in Energy Management for 11 years. Having previously worked with RUMM, nPower Business Solutions, Bristol Water and Consort Energy Management, Jamie has experience in energy management, consulting, engineering and data analysis. He has worked with Universities, manufacturing facilities and water companies and helped identify, implement energy savings in excess of £5million. Also, he has carried out solar, hydro, and other renewable technologies feasibility studies.

Georgina Cambell, Project Manager

Georgina has an engineering and energy background, having worked as a Project/Contract Manager for several companies including Avanti Gas, Orona and SCX Special Projects and being responsible for large scale bespoke installations. This has involved site management on nuclear power stations and large gas depots. Additionally, she has been involved in the production of CDM and Health & Safety documentation introducing new structures and systems.

Ashley Davison, Assistant Project Manager

Ashley has a project management background in the construction industry, providing remedial and renovation solutions to some of the UK's largest housebuilders. With a wealth of experience managing construction projects from the perspective of principal contractor, Ashley brings a depth of knowledge of CDM 2015 and H&S responsibilities. He also had a technical career within the marine composites industry, building some of the world largest super yacht masts.

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