T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

T Level Technical Qualification in Building Services Engineering for Construction (8710-30)

8710-033 Employer-Set Project

Exemplar – E Grade

Summer 2024

City & Guilds | eal

Contents

Introduction

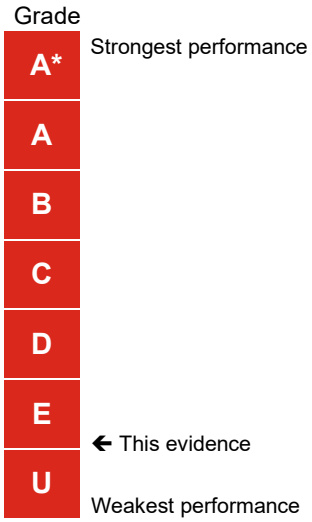
Summer 2024 Results

This document is aimed at providers and learners to help understand the standard that was required in the summer 2024 assessment series to achieve an E grade for the 8710-033 Building Services Engineering for Construction Employer-Set Project (ESP).

Providers and learners may wish to use it to benchmark the performance in formative assessment against this to help understand a potential grade that may be achieved if a learner was to attempt the next summative assessment series.

The Employer-Set Project is graded A* to E and Unclassified.

The exemplar evidence provided for the E grade displays the holistic standard required across the tasks to achieve the E grade boundary for the summer 2024 series. A slightly weaker performance would have resulted in an Unclassified (U) result being issued.



The Employer-Set Project brief and tasks can be downloaded from here.

Important things to note:

- We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments whilst also recognising the standards required for these qualifications (grading-arrangements-for-vtqsand-technical-qualifications-within-t-levels-in-the-academic-year-2023-to-2024).

- The exemplar evidence presented, as a whole, was sufficient to achieve the E grade. However, performance across the tasks may vary (i.e. some tasks completed to a higher/lower standard than an E grade).

Marking of this Employer-Set Project is by task and Assessment Objective, below is a summary of these along with the mark achieved by the evidence presented and the maximum mark available for each aspect.

Task	Assessment Objectives	Mark achieved	Max mark available
Task 1.1 Research	- AO1 Planning skills and strategies - AO2a Apply knowledge to the context of the project - AO3 Analyse contexts to make informed decisions - AO4c Use digital skills	4	9
Task 1.2 Report	- AO1 Planning skills and strategies	1	6
	- AO2 Apply knowledge and skills to the context of the project	3	12
	- AO3 Analyse contexts to make informed decisions	1	2
	- AO4 Use maths, English and digital skills	2	6
Task 1.3 Project plan	- AO1 Planning skills and strategies - AO3 Analyse contexts to make informed decisions - AO4a Use maths skills	2	8
	- AO2 Apply knowledge and skills to the context of the project	3	16
Task 1.4 Presentation	- AO1 Planning skills and strategies - AO3 Analyse contexts to make informed decisions - AO4b Use English skills	3	6
	- AO2 Apply knowledge and skills to the context of the project	5	12

Task 2.1 Collaborative problem-solving	- AO2 Apply knowledge and skills to the context of the project - AO3 Analyse contexts to make informed decisions - AO5a Carry out tasks	5	15
Task 2.2 Evaluation	- AO4b Use English skills - AO5b Evaluate for fitness for purpose	4	8

Task 1.1 Research

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1.1
Evidence title / description	Research notes (with record of sources)
Date submitted by candidate	DD/MM/YY

Types of electric vehicles charging points

22Kw fast public charger

50KW rapid public charger-rapidly charge to 80% then slow down the rate at which it charges for the last 20% to increase the battery durability.

350KW ultra-rapid public charger – 20 mins to 80%.This type is good to have in places such as car parks along with the 50KW charger as it allows customers who have been driving for a long time to quickly fill up their car whilst they go into the shop which would then increase the probability of the store and the customer will have a charged car.

Charger connection types

Type1:3KW-7KW-older cars and evs built in Asia

Type2:3KW-43KW-most common in the Uk for ev cars

CHAdeMO:25KW-100KW-used for rapid charging

CCS:50KW-350KW-used for rapid charging

https://www.britishgas.co.uk/smart-home/guides/electric-vehicles/charger-types.html

Charging with Virta-EV charging

By installing these charging stations within a car park, it will present an attractiveness towards the space bringing more customers in which will overall increase the profitability. At Virta they take care of it all from hardware to software and everything else in-between it all. As an owner of the charging stations, you are free to charge either per charged kw or by the duration of the stay which will allow the client to have full freedom to do by their personal preference which would make Virta a good option to have as a charging point as you will always have the chance to be flexible around it. With Virta, you gain access to over 500, 000 registered EV drivers and become part of a network of over 350,000 charging points together with Virta's roaming partners drawing more customers into the retail park overall increasing profits.

e.on

There installation package allows you to have the option to choose the hardware that is best suited for the client's needs and the site. they are all fitted by trained experts which will work around your schedule and not interrupt any regular business activity overall a viable choice as no work will have to be delayed so they can be installed therefore not effecting the profit. they provide an initial consultation followed by a complete project plan, giving you the option to include load management services and add extra renewable generation technologies, for that extra sustainability boost. https://www.eonenergy.com/business/commercial-ev-chargers/workplace-charging.html?utm_medium=cpc&utm_source=google&utm_campaign=generic

Advantages of EV charging

- Increased property value
- Lower emissions

- Better energy efficiency
- More customers
- Enviromental benefits e.g. carbon footprint
- Cost-effective

Disadvantages of EV charging

- Potential damage to the battery-using level 3 fast charging stations has the potential to degrade the battery faster than using level 1 or level 2
- Installing and maintaining them can be expensive
- Minor lack of reliability

https://www.quora.com/Are-there-any-disadvantages-to-having-an-electric-vehicle-EV-charging-station-at-a-residential-parking-lot-or-apartment-building#:~:text=1.,electricity%20usage%2C%20and%20ongoing%20maintenance.

Space-heating technology

heating of spaces especially for human comfort by any means (such as fuel, electricity, or solar radiation) with the heater either within the space or external to it.

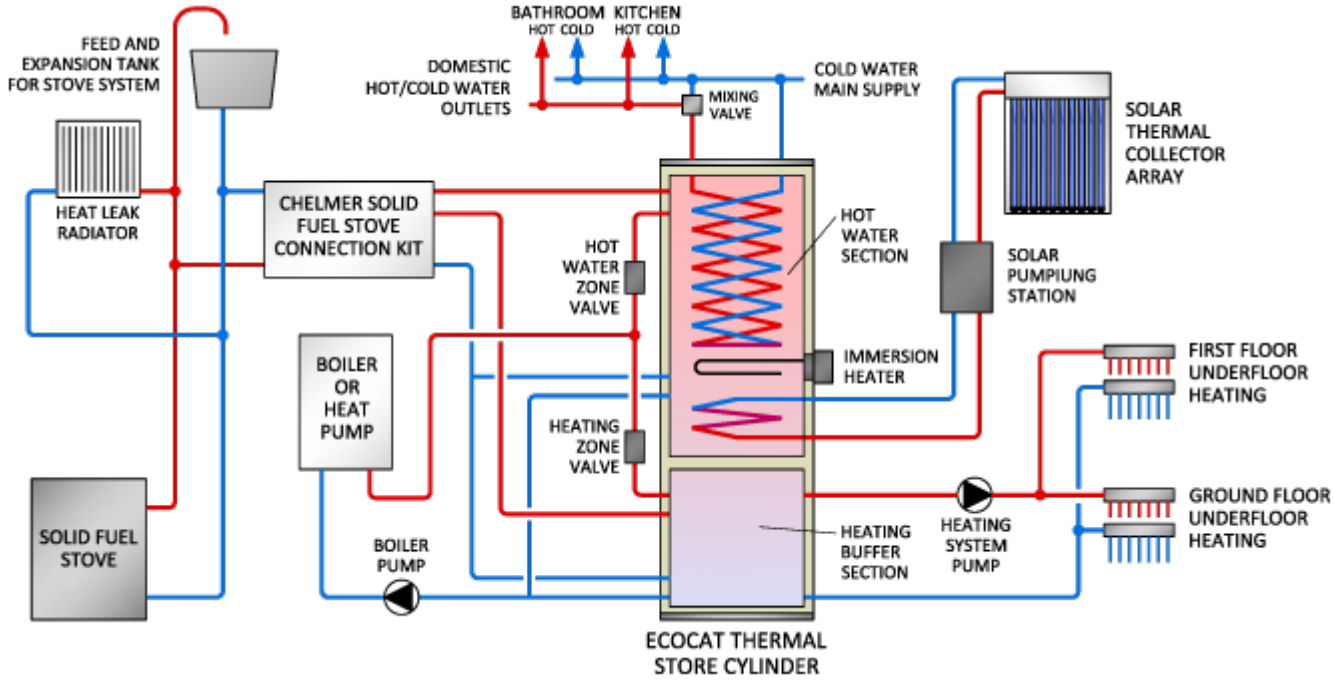
https://www.merriam-webster.com/dictionary/space%20heating#:~:text=%3A%20heating%20of%20spaces%20especially%20for,space%20or%20external%20to%20it

Heat store- A heat store differs from a conventional hot water cylinder in that the water in the store is not the water from the tap, Instead the store is filled with a mixture of water and inhibitors (additives to prevent corrosion) that remain there indefinitely.

1. Solar energy is added to the heat store via an indirect coil at its base which can heat the whole height of the store by convection (the movement of particles through a substance, transporting their heat energy from hotter areas to cooler areas.)
2. Back up heat is then used from lower solar energy days by a conventional boiler or an alternative method for example a heat pump.
3. The fluid from the heat store is circulated to the boiler, where it is heated to be returned at a higher temperature.
4. The tapping point where the fluid leaves the heat store is some way up the store, to leave a solar dedicated volume at the bottom that the boiler cannot heat.
5. Hot water is then heated on demand by the incoming cold water through a coiled pipe inside the heat store. As the cold water approaches the hot outlet it warms up so the volume in the store cools down.

Heat stores must be insulated because if not there is a higher risk of heat loss but because they are almost larger in size a reduction in the surface: volume ratio migrates against it. Space heating is provided by pumping heat store fluid from a tapping high up the heat store around the heating circuit and returning to a tapping near the bottom. Low temperature heating systems such as under-floor heating will give the best results, because low return temperatures mean that the solar panel is more often operating at lower temperatures and therefor higher efficiencies.

Heat storage improves the energy efficiency as it collects and processes the waste heat which would then overall energy consumption and reduce the companies carbon footprint.



Advantages

- Cheaper to run
- Modern versions have built in thermostat
- Use less energy when it isn't needed
- They are quiet making it convenient for public areas

Disadvantages

- Release More heat when not in

https://www.viridiansolar.co.uk/resources-3-8-solar-space-heating.html

Health and safety requirements associated with the installation of solar pv

Planning the work –identifying hazards

- How will workers be prevented from falling off the roof?
- How will workers be prevented from slipping down the roof slope?
- Has a risk assessment been carried out

Protecting others

Keep people away from the area below the work and make sure work area is child safe at the end of the day to prevent any accidents.

Working at height

- Scaffolding to only be erected and altered by a trained and competent scaffolder

- Make sure ppe is worn e.g. goggle, work boots, respiratory protection
- It should have a boarded working platform and full edge protection (double guard-rails and toe-boards) to stop people and tools from falling. Debris netting may also be necessary to prevent materials from falling on householders or neighbours.

Lifting

- Suitable lifting equipment is required as solar panels are heavy and expensive
- Make sure lifting equipment has valid certificates
- Inspect lifting equipment for any damages
- Never exceed the safe working load limit

Electricity

- Check for any overhead cables. Electricity supplies cables are uninsulated.
- The use of 110 v centre tapped earth or cordless portable equipment is preferred. If you are using 230/240 v power tools and equipment, ensure they are undamaged, and a residual current device (RCD) is used.

Commissioning

- Electrical installation must be carried out by a qualified electrician.
- All solar heating panels can become extremely hot and pose a significant burns hazard.

Future maintenance and access

- Larger installations may have fall protection systems which should be regularly inspected.
- Consideration must be given to future safe methods of access for maintenance of the panels themselves and other parts of the building e.g. chimney.

https://www.citb.co.uk/media/h1djmrxa/csk-gs001-solar-infomaster.pdf

Solar photovoltaic systems

The best solar panel used for commercial building is monocrystalline.

- They are made using monocrystalline silicon cells. Each one of the solar cells compromises a singular silicon crystal making it the most efficient type of solar panels.
- They have a hight temperature performance against different weather conditions
- Since they have the longest lifespan, many manufacturers offer a 25-year warranty on them.
- 200 – 350 kWp of energy generated from the sunlight
- Around $1-$1.50 per watt, there for a standard 6kw costs between $6,000-$9,00 all depending on the size of the project-bigger the project larger the overall cost
- However, the disadvantage of this type is that they require a lot of energy to produce and in the process has a lot of silicone waste.
- Another disadvantage is that they are expensive to set up.

Polycrystalline solar panels

They are well known for their characteristic blue colour design and are like monocrystalline panels in the sense that they use silicon crytals.However instead of just using a singular crystal they instead their cells compromise multiple silicon fragments melted and poured into square moulds.

- They are less energy efficient 15-17%
- A low heat tolerance means that they do not perform as well at extremely high and low temperatures
- The manufacturing process is cheaper and has little waste.
- Cost per watt ranges between 90p-$1 depending on the location this could then range to $1-$1.50
- Output of 240-300 watts

https://sistinesolar.com/types-of-commercial-solar-panels/#:~:text=The%20best%20solar%20panels%20for,have%20a%20shorter%20payback%20period.

Goverment grants/schemes for installation of technologies in retail buildings

Business energy efficiency grant

Many government schemes offer loans and grants to support businesses with reducing the impact that their business might have on the environment they typically help with:

→ Energy efficiency measures
→ Upfront costs on equipment
→ Waste management
→ Sustainable development initiatives

Ways you can access this:

→ Go to the government website
→ Ask your local council
→ National smart export guarantee

From 2022 the government have put 2 new schemes in place due to energy efficiency to replace the current domestic and non-domestic renewable heat incentives.

Clean heat grant-upfront funding for businesses or households that integrate green heat technologies such as heat pumps

Green grass support scheme-a support funding to increase the amount of green gas in the national grid by biomethane injections.

https://www.ofgem.gov.uk/information-consumers/energy-advice-businesses/find-business-energy-efficiency-grants-and-schemes

Grant for a retrofit – green loan

Many banks support finance projects e.g. retrofit projects. By doing this they give out green loans to the business so they can upgrade their project. To apply to one of these you need a retrofit plan and security assets such as a property. The incentive for these loans is there can be scheduled repayements,varied and fixed interest rates.

Different types of contractors

Subcontractor- a person or business that undertakes to perform part or all the obligations of another's contract.

General contractor- General contractors both manage and coordinate every aspect of a project themselves

Stakeholder-Any group or individual that has invested interest in the long-term success of an organisation. Stakeholders can affect and be affected by the achievements of an organisations business objectives therefore it is an important aspect to work together

Internal stakeholders:

- Support or have concern for an organisation
- Benefit from their direct relationship with the organisation

External stakeholders:

- Do not have a direct relationship with an organisation
- Are not employed by the organisation
- Can still have been indirect effect on the organisation

Retrofitting

Retrofitting-to furnish (something, such as a computer, airplane, or building) with new or modified parts or equipment not available or considered necessary at the time of manufacture.

https://www.merriam-webster.com/dictionary/retrofit#:~:text=1,something%20previously%20manufactured%20or%20constructed

Retrofitting assessors-assess existing buildings to compile energy efficiency improvement plans

Retrofitting co-ordinators-gather data from retrofit assessors and check its accuracy.Produce imporvement plans for the installation of renewable energy technologies

Retrofitting to improve energy efficiency

Pas 2035:2019-specificatiom and best-practice guidance on retrofitting dwellings (domestic buildings) for improved energy efficiency it covers: assess dwellings, monitor and evaluate.

Advantages

- Energy savings
- Enviromental sustainability

- Increased property value
- Reduced emissions
- Safety considerations

Disadvantages

- Cost-upgrades are expensive
- Time- doing these changes could a lengthy process
- Risk-risks associated to changing a building

Bibliography

https://www.merriam-webster.com/dictionary/retrofit#:~:text=1,something%20previously%20manufactured%20or%20constructed

https://www.ofgem.gov.uk/information-consumers/energy-advice-businesses/find-business-energy-efficiency-grants-and-schemes

https://sistinesolar.com/types-of-commercial-solar-panels/#:~:text=The%20best%20solar%20panels%20for,have%20a%20shorter%20payback%20period.

https://www.citb.co.uk/media/h1djmrxa/csk-gs001-solar-infomaster.pdf

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https://www.britishgas.co.uk/smart-home/guides/electric-vehicles/charger-types.html

https://www.chelmerheating.co.uk/self-build/thermal-store-and-buffer-cylinders/ecocat-thermal-store-cylinder-system-example.html

Task 1.2 Report

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1.2
Evidence title / description	Report
Date submitted by candidate	DD/MM/YY

Task 1.2

In this report i will be covering suitable types of EV charging equipment,PV systems and their requirements ,installation costs for solar PV and a type of space-heating technology.Throughout my report i will identify the key health and safety aspects and the different types of goverment schemes/grants that are available for the retail retrofitting project and the best suited options for it.

EV charging

They are many different types of electric vehicle chargers such as: 22KW fast public chargers,50KW rapid public charger or even a 350 KW ultra-rapid public charger.However, depending on location or model of car, the chargers perform at different rates.There are many advantages of EV charging for example it increases the property value,it also gives of less emmisions having an overall positive impact on the enviroment.This type of charging is also more cost effective than petrol cars as fuel is not needed to be paid for.Even though there are many advantages there is also a few disadvantages such as the charging port could cause potential damage to the battery,this can be seen as level 3 fast charging stations have the potential to degrade the battery faster than using level 1 or level 2.Another disadvantage is that the installation and the manufacturing can be expensive to perform which could limit the options for a client.

Firstly, the 22KW fast charger allows a car to charge at a normal pace which means that it isn't as efficient as the other types of chargers as it take longer for the car to charge meaning cutomers would have to wait longer periods of time for their car to charge.However this could also benefit the overall profit of the retail park as people will have to spend more time there meaning more money will be going into the companies within the retail park.

Differently to the 22KW charger the 50KW allows a car to charge at a faster pace making it a efficient option to consider.The purpose of this charger is it allows the battery to be more durable making its life-span increase overall having a positive outcome for both customers and employees.This is because it takes less time to charge which could be more convinient for the customers as they could be in a rush or for the employees that need their car charging whilst they are at work.

The 350KW electric vehicle chargers are ultra-rapid public chargers that allow the car to charge to 80% in 20 minutes making it the most efficient.This is a good charger to have alongside the 50KW in a car park as it allows the customer to make a quick pit stop if they have been driving for a long time and need to quickly charge their car battery.By having this fast charger in the retail car park it will help bring cutomers in as it is the quickest way which means more people would want to go to that one.

Overall, the best option for the retail park would be the 22KW as there is a less likely potential for the battery to be damaged by the charging ports.This would also have financial benefits towards the retail park because the customers are waiting longer they will shop for longer increasing the sale profits without having damage to their car.

pv system

The best solar panel used for a commercial building such as a retail park would be the monocrystalline.These type of panels are made using monocystalline silicon cells where

each of the solar cells comprimises a singular silicon crystal making it the most efficient type of solar panels.Since having a higher temperature performance again different weather conditions it makes them the most popular and durable type of pv system as they are less likely to be damaged during strong winds or storms.Differently polycrystalline has a low heat tolerance meaning that they do not perform as well at extremely high and low temperatures resulting in them not being the best choice for this project. All pv systems need to be located in direct sunlight or where enough sunlight is projected to produce enough energy to power large quantities.Another point to consider when installing a pv system is the typical weather conditions the location displays as you wouldn't want to put a solar panel in a location that is known for extreme conditions as it has a higher potential to be damaged and it is expensive to replace or fix.

Monocystalline solar panels have the longest life-span compared to the other types of panels and because of this many maufacturers have a 25 year warranty on them making them the more reliable.Another key element is that they produce around 200-35 KW of energy from the sunlight making them a more enviromentally friendly option as they use the energy from the sun to power their units instead of non renewable sources.Costing for this type of panel can range from around $1-$1.50 per watt,therefore for a standard 6KW it would cost between $6,000-$9,000 depending on the size or the location.Where as polycrystalline is less energy efficient than monocrystalline which does not correspond to the clients specification as they want to utilise renewable technologies and wants to ensure the efficient use of energy.

Following this, there are some disadvantages to take into consideration when planning to use monocrystalline as it requires alot of energy to produce/manufacture making the installation costs more expensive to install and manufacture.During the manufacturing process of the panels it produces alot of silicon waste that will not be useful and could cause potential harm to the enviroment as the waste could end up in landfill leading to soil erossion.

Total installation costs for the pv system

Installing pv systems can range in price depending on size,location and material.On average a singular solar panel costs around £200 per m^2 to install.The client for this project would need all 8 units to have solar panels installed which totals up to 505m^2 of flat roof surface for the colar panels to be placed.Since there is a large area to be covered this would have an increase in the overall cost as more solar panels would need to be installed.The calculation to work out the installation costs are as followed:

25+20+80+85+118+97+15+65=505m^2

505m^2x£200=£101,000

So, the estimated overall cost for 505m^2 of solar panels to be installed over the 8 units would be on average £101,000.However,the client states they want to use as many renewable and enviromentally sustainable technolgies as possible and investing in solar panels would be a eco-friendly option for their project plan.

Health and safety requirements for solar PV

Health and safety is a important requirement to take into consideration whilst installing solar panels because it could cause accidents or serious harm to either yourself or the people surrounding you.It is also a legal requirement on a work site to provide document such

as:accident reports,near misses,risk assessments or a tool box talk.This all allows for a safe work enviroment by reducing the risk of injury.

Starting of by having a plan of work which allows the person to identify any hazards and ask themselves questions such as 'has a risk assessment been carried out?' or 'how will workers be prevented from falling of the roof?'.These are important questions to ask as if a hazard is identified action will need to be took to make sure they don't turn into something worse or prevent the hazard causing harm.

Another requirement is protecting others around you by keeping people away from the area below where work is taking place and make sure that the area of work is child free at the end of the day to prevent any accidents from happening.

Working at height regulations is one of the most important ones to take into consideration as most of the work when installing solar panels is done on the roof of the unit.When building a scaffold only trained and competent scaffolders can erect and alter the scaffold.PPE must be worn at all times whilst working at height and while on the site grounds to prevent anything falling onto you and for your own safety and others.All working platforms must have full edge protection either double guard-rails or toe-boards to stop people and tools from falling down onto people or the surface below. Debris netting may also be necessary to prevent materials from falling on householders or neighbours.

When lifitng equipment for the installation of the panels suitable lifting equipment is required as the panels are heavy and expensive.You would also need to make sure that all the equipment has valid certificates and are up to date.All of the lifting equipment needs to be inspected before and after work to identify any damages that may have occured and to get them reported and sorted to prevent injuries.Whilst working you should never exceed the safe working load limit as this could cause damage to either yourself or to the equipment that is being used at the time.

government grants/schemes

One of the government grants that are in place is the energy efficiency grant. Many government schemes offer loans and grants to support businesses with reducing the impact that their company might have on the environment. They typically help with energy efficiency measures,upfront costs on equipment,waste management and sustainable development initiatives.This could benefit the retrofitting retail project as they are looking to install things such as a green area, a range of water technologies and refitting all units with new fixtures and fittings which will be expensive to do. So by getting one of these grants it will help them fund their project and invest in eco-friendly ideas such as the plantation of trees and wild garden areas.

There is also a scheme called the green loan which is a grant for a retrofit. Many banks support finance projects like this retail future retrofit project as they give out the green loans to the business so they can upgrade their project without worrying about the funding. To apply to one of these you need a retrofit plan and security assets such as a property or land . The incentive for these loans is there can be scheduled repayements,varied and fixed interest rates meaning that it is fully flexible for the company to work around the payments how they feel comfortable with.This grant also relates to the clients wants for a carbon nuteral and sustainable enviroment both aiming for the same overall outcome.

From 2022, the government have put 2 new schemes in place due to energy efficiency rates to replace the current domestic and non-domestic renewable heat incentives.One of these being the clean heat grant by giving upfront funding for companies that integrate green heat technologies such as heat pumps into their project and the other being Green grass support scheme which is a support funding to increase the amount of green gas in the national grid by biomethane injections.Both of these schemes meet the clients wants throughtout the project making them a good option to consider.

However, overall i think the best scheme/grant to use for this project is the green loan as for the employer it is a fully flexible aspect meaning they can work around it themselves to pay the loan back and not worry about not being able to pay at a certain time/date whereas the other options dont guarantee that outcome which could cause the employer unease.

Space heating technology

Space heating technology refers to the heating or cooling of an area which can be controlled by the client.This specific type of technology is only used for occasions using auxiliary heating.There are many examples of space heating technologies including wall units which release hot or cold air from a unit placed on the wall or ceiling,portable heaters which can be moved from one area to another and stoves which allow a room to reach a higher temperture.

For the retail park project,my chosen space heating technology would be a wall unit as it allows hot and cold air to be able to move around the room increasing either the cold air flow within the unit or heat up the specific space.The wall unit transerfers energy from the wall into the unit generating heat to source for the hot air therefore allowing the cold/hot air to pass through into the room.This can all be controlled by the client as they could change the room temperature from the panel on the heater to increase or decrease depending in their preferance.They are 100% energy efficient as they don't use fossil fuels to collect the energy having a overall low impact on the enviroment as co2 is not being released into the atemosphere.By using this type of technology benefits on a larger scale can be put into perspective as rooms can be controlled and monitored based on their temperature making both the employers and the customers feel both comfortable and happy whilst being in that enviroment.Leading on from this, if the customer feels regulated at a certain temperature they will more likely be there longer which would increase sales for the employer having an overall positive overview.

Therefore, this would be the best option for the employer as the project brief states that the client 'wishes to ensure the efficient use of energy' which can be presented through this space-heating technology as it is 100% energy efficient.

summary

In conclusion,the employer can use many diferent energy efficient new technologies to advance their project to the best energy performance possible.By installing solar panels they decrease the amount of greenhouse gases going into the atemopshere, also making sure all health and safety requirements are being met to reduce the risk of accidents happening whilst working on the project.Many of these ideas mentioned in the report meet both the clients and the employers requirements and would have a positive impact on the surroundings and the project itself.

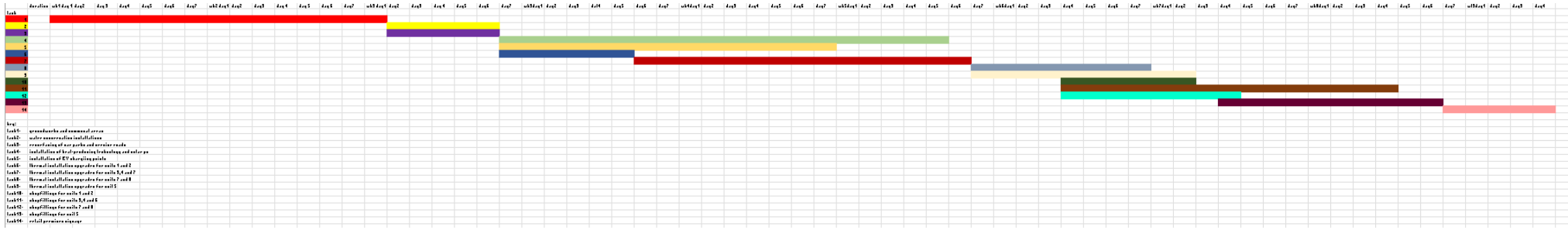
Task 1.3 Project plan

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

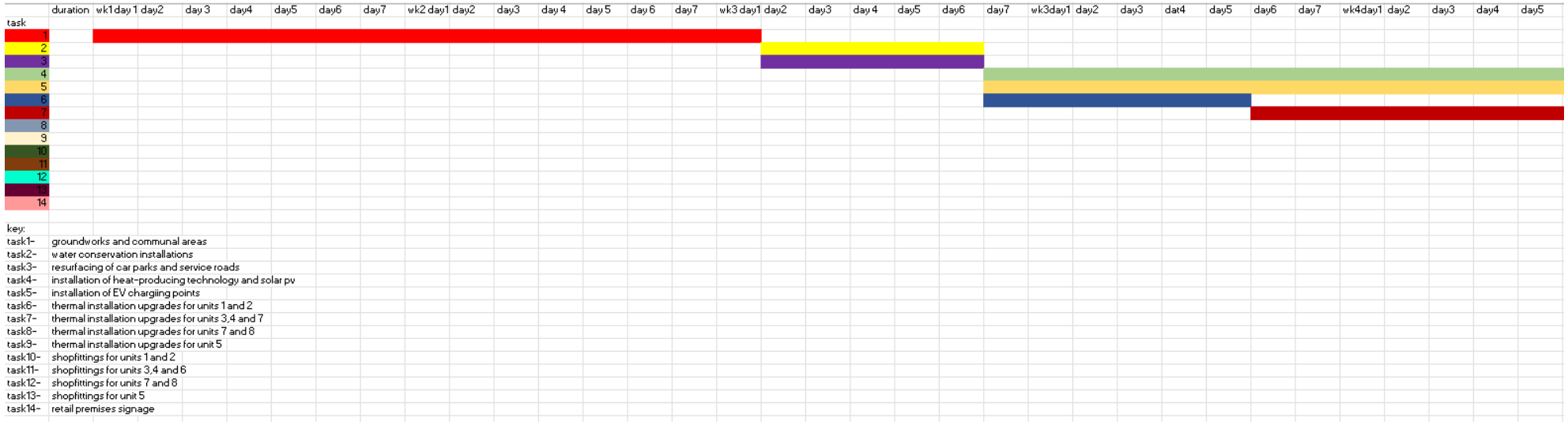
Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1.3
Evidence title / description	Programme of works Supporting statement
Date submitted by candidate	DD/MM/YY



task	description
1	groundworks and communal areas
2	water conservation installations
3	resurfacing of car parks and service roads
4	installation of hydroponics technology and solar pv
5	installation of EV charging points
6	thermal installation upgrades for units 1 and 2
7	thermal installation upgrades for units 3,4 and 7
8	thermal installation upgrades for units 7 and 8
9	thermal installation upgrades for unit 5
10	shopfittings for units 1 and 2
11	shopfittings for units 3,4 and 6
12	shopfittings for units 7 and 8
13	shopfittings for unit 5
14	retail premises signage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wk2 day1 day2 day3 day 4 day 5 day 6 day7
wk3 day1 day2 day3 day 4 day5 day6 day7
wk3day1 day2 day3 dat4 day5 day6 day7
wk4day1 day2 day3 day4 day5
task
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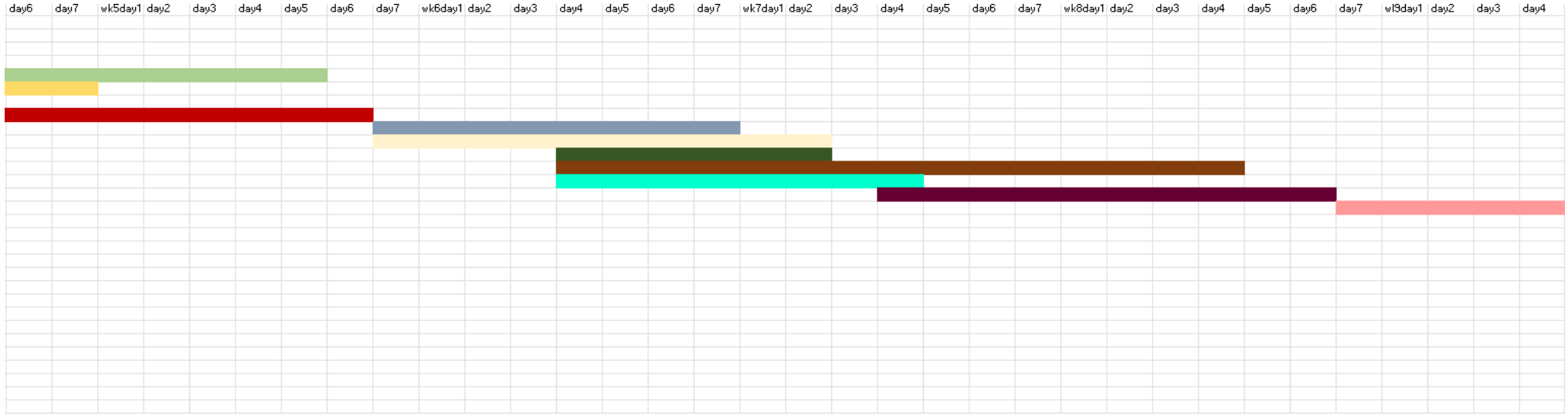
14
key:
task1- groundworks and communal areas
task2- water conservation installations
task3- resurfacing of car parks and service roads
task4- installation of heat-producing technology and solar pv
task5- installation of EV chargiing points
task6- thermal installation upgrades for units 1 and 2
task7- thermal installation upgrades for units 3,4 and 7
task8- thermal installation upgrades for units 7 and 8
task9- thermal installation upgrades for unit 5
task10- shopfittings for units 1 and 2
task11- shopfittings for units 3,4 and 6
task12- shopfittings for units 7 and 8
task13- shopfittings for unit 5
task14- retail premises signage


day6 day7 wk5day1 day2 day3 day4 day5 day6 day7
wk6day1 day2 day3 day4 day5 day6 day7
wk7day1 day2 day3 day4 day5 day6 day7
wk8day1 day2 day3 day4 day5 day6 day7
wl9day1 day2 day3 day4

Refer to the edexcel spreadsheet attatched named task1.3-chart

On my spreadsheet that i have created i have named each task from 1-14 and made a key at the bottom to state what the task corresponds to.I have also colour co-ordinated the chart to allow clear vision on what duration goes to which task so it is clearer for someone looking at it which makes it simplier to read and understand.The chart that i have created is also organsided based on weeks and the days within the week.I have done this to show exactly what days of the week the person should be on sit working and what days they should be completed by.This will allow the contractor to carefully plan their work between the time slot they are given which will have an overall better impact on the whole project as if everything goes to plan then they will finish on time saving both the contractors and the employer money as they will not have to run the project overtime.

It is important for the contractors to finish within their time span because if not then the task after them wont be able to commence due to them not being finished.This would then have a financial impact on the comapnies as they will loose money from the time they are not able to work and everything would have to be pushed back to make sure that every task can be completed.However this could also cause problems in later dates as comapanies are contracted to certain jobs which have date requirements meaning if their construction schedule is pushed back it will also impact future projects aswel.

To reduce the risk of the costruction schedule being pushed forward or back the employer and the companies can make a gantt chart to clearly identify when a task should start and when a task should end.The employer should set up meetings to discuss the design brief with the different companies and give their perspectives on things such as:time,money,equipment etc.

In the chart some of the tasks can overlap this means that the tasks can both be carried out at the same time as the other one.This allows the project to speed up as just one thing isnt being done at a time.However considerations need to be took into place for when certian tasks cant be carried out when others are because some tasks require the other one to be finished to be carried out so if they are scheduled together then problems will arise ruining the schedule all together.Becasue of this problem it is important for the time frame to be secheduled carefully and all parties be involved and on baord with the plan to avoid any confusion on anyones side.

When these tasks are being carried out it is important that health and safety regulations are being followed to reduce the risk of injurly which would lead to the project having delays.There are many ways that a construction site can make sure they are following regualtions for example making sure that risk assesments are being performed and carried out professionaly and correctly.This will allow the feeling of comfort and stability whilst working on the site as risks have been minimised.Another way is to make sure that all equipment is carefully checked for any damage and make sure that certificates are up to date.If a tool was to be broken they will need replacing as soon as the damage has been spotted as this is a big risk to injuries whilst working as the tool could be unpredictable.Some of the tasks presented in this project have requirements to work from a height,this needs to be carefully examined and checked and make sure only trained professionals use lifting equipment.

By taking everything into consideration and if all parties comply then the project should be finished on time making the client happy.If the project was not to be finished on time this might have an effect on the clients plans and delay the opening of the retail park which would not only decrease profit but also make the cutomers unhappy.This could potentially cause the retail park to have a bad reputation as people would expect the park to open but if the dates are pushed back it would cause concerns and disruption.

Task 1.4 Presentation

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1.4
Evidence title / description	Presentation slides Note: Presentation recording is not included with this document. Please refer to the Observation Record below the presentation slides for commentary
Date submitted by candidate	DD/MM/YY

Retrofit project

INCLUDING: SPACE HEATING TECHNOLOGY,EV CHARGING POINTS AND GOVERNMENT GRANTS/SCHEMES.

intro

During this PowerPoint I will be explaining about space heating technologies and the option i would of chosen.

Another topic I will be talking about is Ev charging points and the advantages and disadvantages linked to it.

Finally I will be discussing government grants/schemes that the employer should take into consideration whilst planning the project.

retrofitting

what is retrofitting?

-to furnish (something, such as a computer, airplane, or building) with new or modified parts or equipment not available or considered necessary at the time of manufacture.

advantages	disadvantage's
Improved energy savings	Cost upgrades are expensive
Environmentally sustainable	Timescale is long
Increased property value	Risks associated to changing the building
Reduced co2 emissions	
Safety considerations	

space heating technology

space heating technology heats spaces mainly for humans to provide comfort by using either fuel, electricity or solar radiation with the heater either within the space or external to it.

This specific type of heating is only used on occasions which use auxiliary heating. Examples of space heating technologies are:

- wall units
- stoves
- portable heaters

wall units

For the retrofit project I would chose to install wall units in each individual unit as it allows the temperature of the room to increase by flowing hot air through the unit or decrease the temperature by releasing cold air into the room.

How does a wall unit work?

A wall unit transfers energy from the walls to then be transferred into the unit in the room which would then power the unit allowing the materials inside to either heat up or cool down depending on what the client wants.

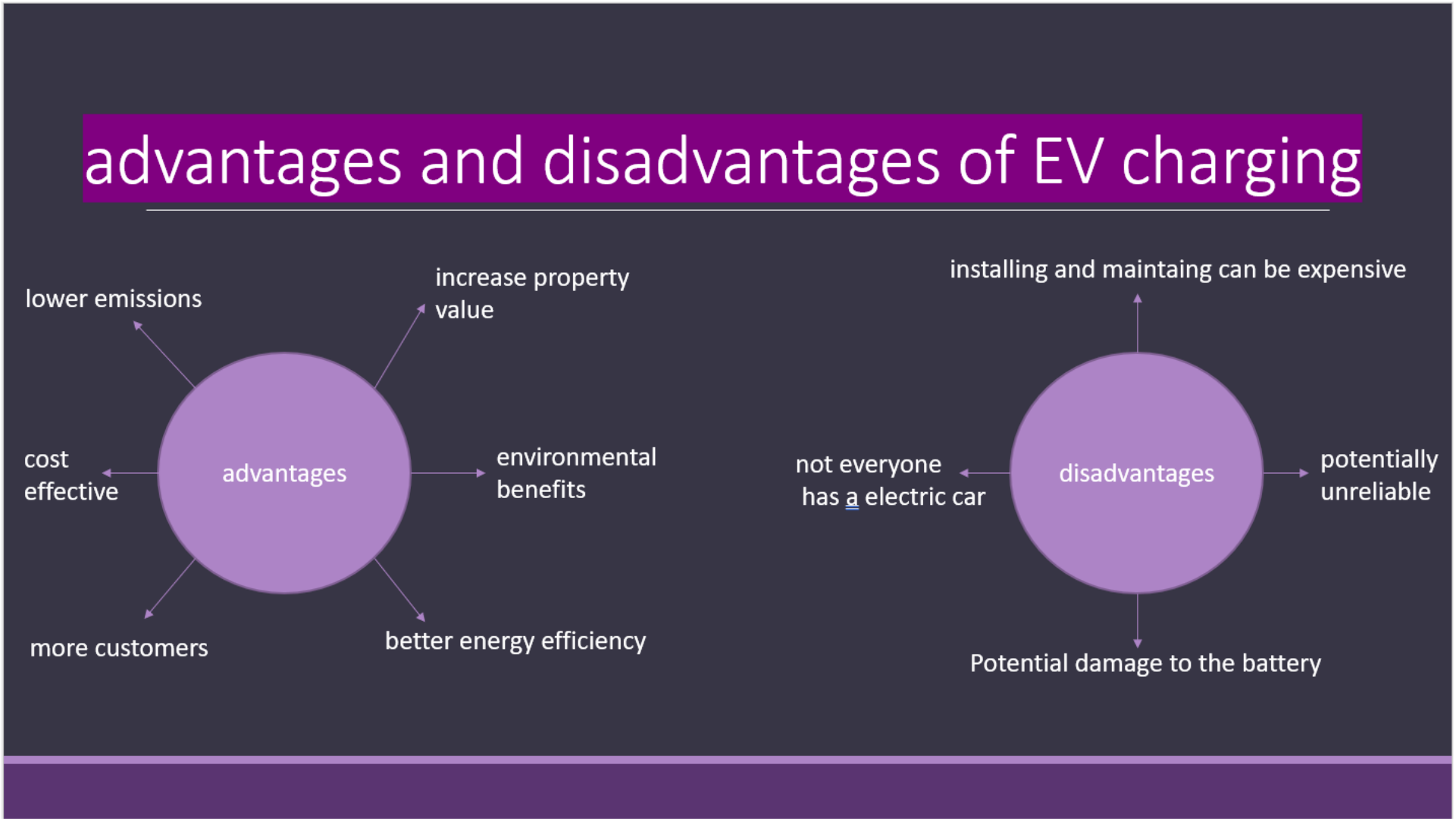
Benefits of a wall unit.

- One benefit of a wall unit is that the temperature of the room can be controlled and maintained by the client.
- Another benefit is if customers come into the unit the temperature can be changed to their preference making it an overall comfortable experience for them.
- it is an energy efficient approach as the unit doesn't use fossil fuels to power it meaning less c02 is going into the atmosphere meeting the clients request with having different energy efficient technologies.

Ev charging

Ev charging stations are places where electric cars go to charge. There are many different type of charging points such as:

- 22Kw fast public charger
- 50KW rapid public charger-rapidly charge to 80% then slow down the rate at which it charges for the last 20% to increase the battery durability.
- 350KW ultra-rapid public charger – 20 mins to 80%.This type is good to have in places such as car parks along with the 50KW charger as it allows customers who have been driving for a long time to quickly fill up their car whilst they go into the retail park also increasing the profit for the employer.
- The most common type of charger connections in the uk is typically the ones between 2:3KW-43KW.
- The best option for this project would be the 22KW charging points as there is a less likely potential for the battery to be damaged by the ports overall increasing the durability of the car. This would also have financial benefits towards the retail park because the customers are waiting longer they will shop for longer increasing the sale profits without having damage to their car.


advantages and disadvantages of EV charging
lower emissions
increase property value
cost effective
advantages
environmental benefits
more customers
better energy efficiency
installing and maintaing can be expensive
not everyone has a electric car
disadvantages
potentially unreliable
Potential damage to the battery

government grants/schemes

Many government schemes offer loans and grants to support businesses with reducing the impact that their business might have on the environment they typically help with:

- energy efficiency measures
- up-front costs on equipment
- waste management
- sustainable development initiatives

You can gain access to these from:

- government website
- local council

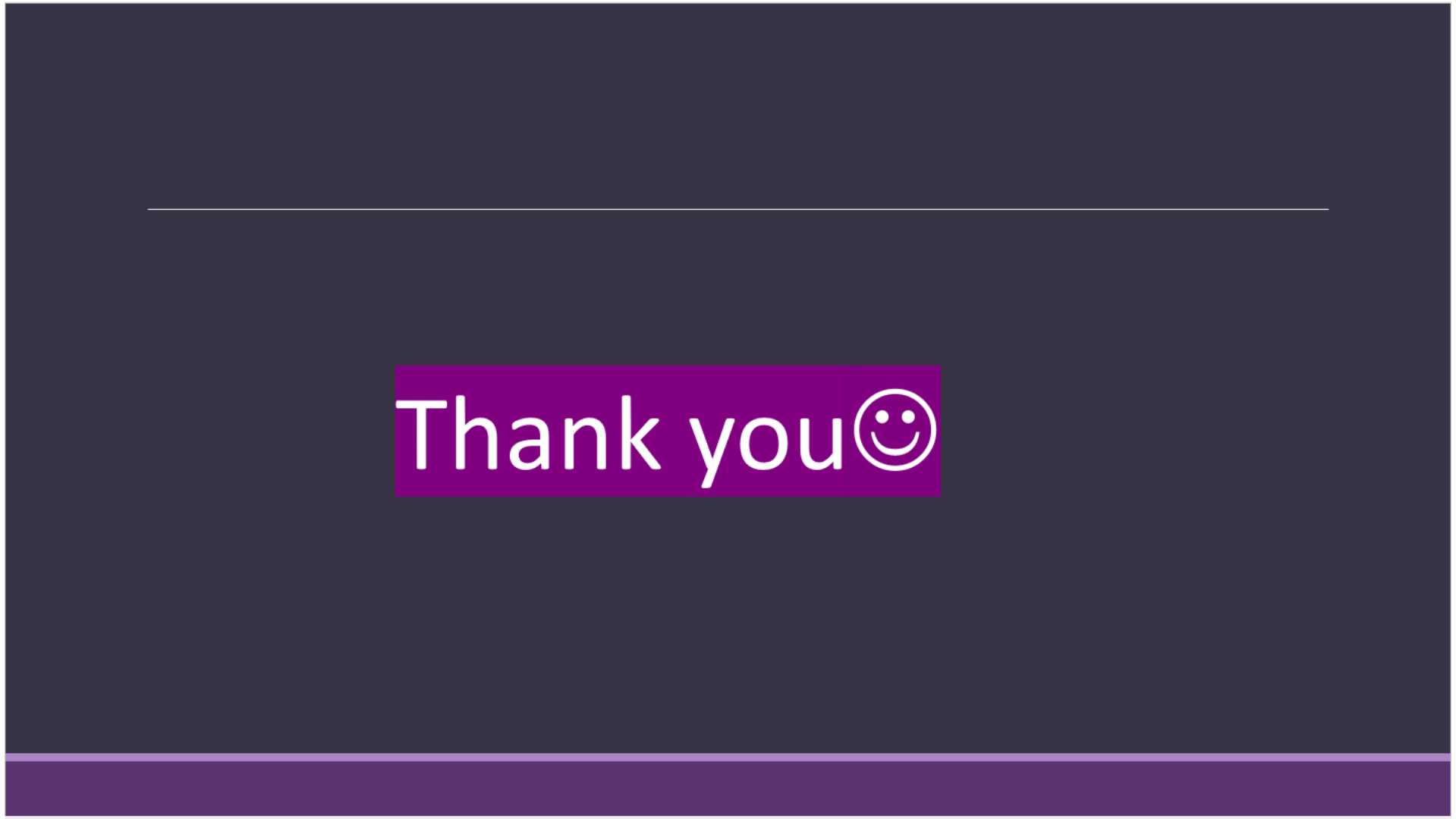
green loan grant

Many banks support finance projects like the retail future retrofit project as they give out the green loans to the business so they can upgrade their project without worrying about the funding. To apply to a green loan you need a retrofit plan and security assets such as a property or land .

The incentive for these loans is:

- ✓scheduled repayments
- ✓varied and fixed interest rates

This means that it is a fully flexible loan which the company can work around making it the best option for this project. This grant also relates to the clients wants for a carbon neutral and sustainable environment both aiming for the same overall outcomes.


Thank you☺

Employer-Set Project - Observation Record (Task 1.4)

8710-30 T Level Technical Qualification in Building Services Engineering for Construction

8710-033 Core: Employer-Set Project (Summer 2024)

Candidate name	<first name> <surname>
City & Guilds Candidate No.	ABC1234
Date	DD/MM/YY

Provider name	<provider name>
City & Guilds Provider No.	999999a

Record observation notes below to inform external marking. **Notes must be detailed, accurate and differentiating. They should identify areas of strength and weakness to distinguish different levels of performance quality for each of the prompts below.**

Structure/detail
The presentation is structured and follows a logical approach most of the time in response to the task because of effective planning.

Techniques
Techniques used to deliver the presentation are mostly effective. The technical information provided is accurate most of the time with valid reasoning.

Terminology
Terminology used is mostly accurate with minor errors. The content provided is in the most grammatically correct but does not always consider target audience.

Theories and concepts
Theories and concepts relating to the Core knowledge and Core skills conveyed through the presentation - these may not always be accurate or be directly linked to the brief requirements.

Communication
Communication of concepts and theories is sometimes effective. The delivery of technical information may lack accuracy and clarity for the audience.

Tutor questions to candidate	Candidate responses
When choosing a heating system, what are some of the crucial factors in terms of efficiency?	Their emissions and their cost, as well as how they work overall.
In construction, there are buildings that are well insulated and there are buildings that are not well insulated. What is the impact of insulation on the efficiency, do you think?	It keeps the heating.
For the project you have been given, what type of charging points would you propose?	It would have been 50 kW.

Any other aspects

Tutor signature	Date
X	DD/MM/YY

If completing electronically, double click next to the 'X' to add an electronic signature once the record is **finalised**.

Task 2.1 Collaborative problem-solving

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	2.1
Evidence title / description	Collaborative problem-solving group discussion notes Draft email Note: Collaborative discussion recording is not included with this document. Please refer to the Observation Record below for commentary
Date submitted by candidate	DD/MM/YY

Task 2.1

<first name> <surname>

Option 1

Disadvantages

- 15% more expensive
- Only has access to the global market
  less options
- Pay more for a longer guarantee.
- [redacted]

advantages

- Quicker delivery
- More reliable as has multiple branches
- Option for whole of the UK not just one part.
- Better for a bigger project.

Option 2

Disadvantages

- only one branch - restricted areas
- older company
- Established in 2018
  more experience
- less support
- not communal for everyone.
  only in North
  travel issues

Advantages

- 10 year guarantee
- more on-hand service
- Discounts up to 15%
  more common
- More reliable.
- More experienced - better quality
- wider range of options
- Bigger projects - wider range

Overall, the best option for the Retrofit retail Park would be option 2 as it is more reliable on a larger scale and is more [redacted] cost effective.

DD/MM/YY

Dear Sir/Madam,

today i will be writing to inform you about two potential replacement suppliers who have been shortlisted option 1 being UK Renewable supplies and option 2 being Global renewable supplies.

Firstly, i will be talking to you about UK renewable supplies which was established in 2021 and operates throughout the uk.This is good knowledge to know as this means that the company is relatively new meaning that it uses advanced technolgies which are overall better for the enviroment and better quality products making it more durable and reliable.The supplier also stocks UK-manufactured renewable technology systems and components which is good as the materials are locally sourced making them good quality and more enviromentally friendly as the components would not have to be shipped over from somewhere else,reducing the co2 emmissions.However delivery times can vary depending on the chosen technolgy meaning that if their was a time schedule on the project then this might become an issue.All of the UK equipment used carries a 5 year guarantee with an option to extend it but comes with a cost which some complanies might not be able to afford.Another disadvantage to this supplier is they are 15% more expensive than other suppliers whereas option 2 can offer discounts of up to 15% making option 2 a more affordable approach for someone on a tight budget.The company also provides an onsite support service,where they will send a company rep to site if there is any issues encountered durin gthe installation or the commissioning of the components.This would be a good thing to have as you will get on-hand help rather than over the telephone which could cause confusion.

Where as company 2 was established in 2018 making it an older company but only has one branch in the north of England meaning it is not a fully operating company and could only be sourced from in the North which means the rest of the country might not have full access.However the supplier has full access to world-wide manufactured renewable technology sytems and components which are distributed directly from the manufcture.This would be helpful as delivery times may be shorter than option 1 meaning it is a good option for projects which have a shorter time scale.This is also a good option as all the equiment has a 10 year guarantee making it more reliable for a larger scale project.Due to the size of the company it can also offer discounts of up to 15% making it cost effective for someone on a budget making it comfortable and flexible for everyone. The company also provides a telephone and a web-based support service whoch could cause issues with communication as the person on the phone can not see what is going on which could cause confusion on both ends.

Overall,i think the best option for this project would be option 2 as it is more cost-effective and holds a longer 10-year guarantee and offers up to 15% discounts allow everyone to be

bale to afford it.Whereas option 2 it is 15% more expensive than other companies meaning it is not accessible to everyone.

Thank you,looking forward to hearing from you.

best regards <first name>.

Employer-Set Project - Observation Record (Task 2.1 Collaborative problem-solving)

8710-30 T Level Technical Qualification in Building Services Engineering for Construction

8710-033 Core: Employer-Set Project (Summer 2024)

Candidate name	<first name> <surname>
City & Guilds Candidate No.	ABC1234
Date	DD/MM/YY

Provider name	<provider name>
City & Guilds Provider No.	999999a

Record observation notes below to inform external marking. **Notes must be detailed, accurate and differentiating. They should identify areas of strength and weakness to distinguish different levels of performance quality for each of the prompts below.**

Communication skills
Communication skills are appropriate and are clear most of the time with a willingness to discuss some details in other's contributions that supports progress in the task. Levels of engagement with others was generally consistent throughout.

Collaboration/contribution
Made contribution throughout the task to discussions. Solutions proposed in solving the task issue were relevant, logical, technically correct and thought through most of the time so progress in the task was made but not always timely.

Methods to solve the problem
The approach to planning for the task is mostly well-considered and shows a mostly logical approach. The task brief has been considered in some detail. There is limited application of core skills evidenced in relation to the proposed solution. Some ideas are briefly considered. A limited number of advantages or disadvantages are considered for solutions presented, but with limited justification provided.

Any other aspects

Tutor signature	Date
X	DD/MM/YY

If completing electronically, double click next to the 'X' to add an electronic signature once the record is **finalised**.

Task 2.2 Evaluation

Assessment number (eg 1234-033)	8710-033
Assessment title	Employer-Set Project

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	2.2
Evidence title / description	Evaluation
Date submitted by candidate	DD/MM/YY

Task 2.2-evaluation

Whilst doing my work i belive that most of my tasks met the requirements and was performed to the best of my ability as i inturpretated the clients wants and needs into my work and refered to the project brief throughout.Overall on relection there may be some things i would change if i was to do it again.

Task1.1-research

During this task i researched and noted down key information based upon the bullet points given on the worksheet.I then used my notes to help me in future tasks which benefitted my alot a it helped me to complete other tasks to a higher ability because i had the correct notes to look back on.However looking back i would double check my notes to make sure it was the correct thing based of what the bullet point was asking to avoid confusion in later tasks.During this task i gained english and digital skills which would help my later on.

Task1.2-report

I evaluate that i have written a good report based on my findings and wrote about each bullet point in detail.I also used good english skills to advance my writing to make it clear and easy to understand.One thing i would change is to make sure i look back on my work and read over it again to look for spelling and grammar mistakes.Overall i believe that the report was my most successful task during the whole esp as i met the requiremetns and used my research to conduct a well written piece.

Task 1.3-project plan

When doing this task i struggled with creating the gantt chart and the written part which could have lowered my perfomance.If i was to do this again i would follow the bullet points and make sure i knew how to do a gantt chart before to of made it easier for myself.My supporting statement wasn't to the best of its abilities as i was short on time meaning that i couldnt of added all the information on the bullet points into my work meaning i didnt fully meet the requiremetns for the task.

Task 1.4-presentation

In my eyes i think the presentation went well and i concluded a detailed powerpoint which included key information on all aspects of the project.I used my research and report to create the presentation which helped me alot as the reasearch i had collected i exapnded on making it easier to write.However,in the presentation i talked quietly which could have impacted my performance so next time i would need to be more confident whilst performing to increase my grade.

Task 2.1-collaborative problem-solving

I belive that this task went really well as the conversation was flowing and me and my partner shared eachothers opinions on the two options and came to an overall agreement on which one would be the best for the project.We confidently discussed both advantages and

disadvantages of both suppliers and jotted down notes inbetween to help with the email.However,the conversation wasnt too long so next time i would expand more on certain aspects to lengthen the conversation.By doing this it helped increase my communication and problem-solving skills.

Conclusion

In these tasks i have gained skills such as:researching,communication,teamwork,planning skills,digital skills,english skills and independence.These skills will benefit me in the future with real clients as i would have to perfom and explain my ideas and concers to them in the correct manner which i have done throughout this project.Overall,i believe that i have performed to the best of my ability and did the best i can whilst gaining the appropriate skills.

Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

T: 0300 303 53 52

E: **technicals.quality@cityandguilds.com**

W: **http://www.cityandguilds.com/tlevels**

Web chat available **here**.

The T Level is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.