Quality Education Fund

The Dedicated Funding Programme for Publicly-funded Schools

Part B: Project Proposal

Project Title: Smart Green Campus	**Project Number:** *2018/0136 (Revised)*

Name of School: CNEC Christian College

Direct Beneficiaries
(a) Sector: ☐ Kindergarten ☐ Primary ☑ Secondary ☐ Special School *(Please put a tick in the appropriate box(es).)*

(b) Beneficiaries: (1) Students: 300 (P4 – P6) and 700 (S1 – S6) ; (2) Teachers: 30 ; (3) Parents: 200 ;
(4) Others: 0

Project Period: 07/2019 to 07/2022

1. Project Needs

1.1	Project Aim(s)	The smart sustainable campus project aims at applying technology to establish energy saving model for reducing electricity consumption. It helps students understand that the saving of electricity consumption can reduce the emision of carbon dioxide associated with global warming. Different types of learning and teaching activities concerning renweable and non-renewable energy sources will be organised to cater for learner diversity in order to meet the learning needs of students with different abilities. Our school curriculum focuses on understanding the consumption of electricity from non-renewable energy sources associated with global warming. The development and use of renewable energy resources for generating electricity can build up a sustainable society. It can facilitate students' understanding of the nature of science and acquisition of science process skills in science-technology-engineering-mathematics (STEM) environment. It helps students to cultivate green lifestyles and become responsbile citizens. The goals of the project aim are as follows: - Enable students to acquire generic skills such as collaboration skills and communication skills in STEM curriculum to develop science process skills, problem-solving skills and self-learning skills for lifelong learning - Develop a school-based curriculum concerning energy resources across the subjects of science and geography to nurture students in sustainable ways for generating electricity and reducing electricity consumption - Implement the collaboration work of language across curriculum (LaC) of KLAs to integrate the learning content of English language, mathematics and information technology in analysing and presenting the data collected from the electricity consumption of various electrical devices - Establish a reading atmosphere through reading across curriculum (RaC) to promote reading to learn in science, geography, mathematics and English language curriculum - Promote an aesthetic education of visual arts and information technology to cultivate students for treasuring the beauty of nature in a sustainable environment through e-learning activities - Cater for the learner diversity in ability to develop a school-based curriculum framework to have various types of activities such as project works and workshops to meet students' learning needs - Set up a model of sustainable smart campus and arrange site visits for other schools for the promotion of renewable solar power

1.2	Innovative element(s)	Ravesteyn et al. (2014) have proposed the concept of a smart green campus that integrates information and technology into the new models of learning, smart sharing of resources and the energy management system of the electrical devices for monitoring energy efficiency. Grassl (2011) has introduced the innovative system designs in highly integrated digital controls of the outstanding award sustainable campus. Wong et al. (2012) have suggested the sustainable campus project for energy conservation and carbon reduction education. These journal articles give valuable innovative ideas to our school for the development of technology-based smart control system. According to our school plan for saving electricity, the sustainable strategies are as follows: reducing lighting level in daylighting, keeping optimal temperature and relative humidity air-conditioning and harvesting solar energy. Our school will set a smart and sustainable campus model to provide green education involved technology to the public on sustainability. A smart central control system of all electrical devices of the campus will be installed to observe, monitor, modify and adjust the room conditions remotely. Teachers and staff members will maintain their own comfort room conditions including lighting, airflow, air-conditioning, relative humidity and carbon dioxide content in air. Through this project, digital meters will be installed to collect operational data of electrical devices for monitoring the electricity consumption of classrooms and special rooms. The automation smart control system that controls lightings and air-conditioners to monitor classroom conditions and energy consumption. Using the data collected from carbon dioxide sensors, the system modulates indoor airflow through demand controlled ventilation electric fans to minimize electrical energy consumption by maintaining optimal carbon dioxide concentrations in classrooms. In integrating optimal conditions, healthy and high energy saving classrooms will be established. Using the data of electricity consumption of electrical devices in classroom basis, students can conduct discussions in class committee to design energy saving plan. [redacted] Our school will setup a task group to monitor energy consumption and conduct regular evaluations to ensure that the operating conditions of the smart control system will maintain high efficiency. The Smart Green Campus concept will provide a blueprint that best practices of our school will be shared to other schools. Smart Green Campus will promote the importance of sustainability to change the attitude of all stakeholders including teachers, students and parents.
1.3	Alignment with school-based / students' needs	- School's needs: Our school is aware of the rapid increasing expenses in the consumption of electricity. In order to reduce the electricity expenses, our school plans to use the technology to monitor our electricty usage. - Students' needs Our school curriculum framework emphasizes the development of students' character of responsibility and respect. Through learning and teaching activities, students can develop an attitude of responsible citizenship and a commitment to promote personal and community health. Students need to be aware of the limited supply of energy resources and concerns of the development of sustainable lifestyles in campus and society. Project works across the curriculum of KLAs can help students establish an holistic understanding that the implementation of sustainable policies can develop green lifestyles at home and in campus.

2. Project Feasibility

2.1	Key concept (s) / rationale(s) of the project	Our school curriculum focuses on understanding the consumption of electricity from non-renewable energy sources associated with global warming. The development and use of renewable energy resources for generating electricity can build up a sustainable society. It can facilitate students' understanding of the nature of science and acquisition of science process skills in science-technology-engineering-mathematics (STEM) environment. It helps students to cultivate green lifestyles and become responsbile citizens.
2.2	Applicant's readiness or ability/ experience/ conditions/ facilities for project implementation	Our school has been organising STEM education programme since 2016. Our teachers have rich experience in implementing STEM-related learning activities. In junior science curriculum, students have been well-trained in skills of practical work and problem-solving. Students are capable of conducting project-based learning activities. In order to further implement STEM education, our school plans to incorporate STEM education into school-based curriculum. Teachers-in-charge of STEM education have conducted collaborative work with teachers of other KLAs (Mathematics, Computer Literacy, Geography, English Languages and Information Technology) in the development of school-based curricula concerning smart and sustainable campus across KLAs. The learning activities of English language across curriculum (LaC) have established to develop language skills in the descriptions and analysis of the data collected from electricity consumption of electrical devices. In the promotion of reading to learn in reading across curriculum (RaC), our school have prepared rich resources of books and reading materials concerning sustainability across KLAs that help students develop an holistic understanding of the importance of sustainability in technology development society. The project provides valuable learning opportunities for students. Our school has adequate resources of equipment including [redacted] and dataloggers for students to conduct learning activities and project learning involved web-based activities and data collection. Our IT technicians have rich experience to assist learning and teaching activities involving technological equipment and web-based resources.
2.3	Principal's and teachers' involvement and their roles	**Project Supervisor:** Supervise and monitor the progress of the project; establish a Smart Green Campus (QEF) Task Group to organise and implement the electricity saving policies and learning and teaching activities **Project Coordinator:** Coordinate the resources of different parties involved; coordinate the implementation of the project and follow the working schedule; conduct evaluations to facilitate the progress of the project; arrange sharing workshops of project evaluations **Science Teachers** Collaborate with geography teachers to setup a school-based curriculum of energy resources; conduct workshops to promote STEM education; conduct collaboration work with other KLAs in LaC and RaC **English Language Teachers** Promote English language across KLAs in data-handling to describe, organise and analyse the data collected; launch a whole school approach to encourage reading across KLAs (RaC) **Mathematics Teachers** Collaborate with science teachers to prepare learning and teaching materials to handle school-based data of energy consumption **Information Technology and Visual Arts Teachers** Conduct competitions of e-Poster, e-Banner and e-Pamphlet to promote aesthetic education; organise and provide facilities and equipment for informational technology in learning and teaching activities
2.4	Parents' involvement / participation	Parents will visit the school to understand the innovative ideas concerning energy-saving strategies in our smart green campus. It will promote home-school co-operation. Parents will participate in workshops and activities organised by the school to promote and extend green lifestyles at home with the suggested tips. Parents will be encouraged to work together with their children to develop ways of energy saving at home. Students will apply and consolidate their knowledge obtained at home.

2.6 Implementation timeline

Implementation period *(MM/YYYY)*	Project activities
07/2019	Preparing tender documents for the smart energy monitoring system and automatic control Arrange site visits and user requirement meetings for the potential solution providers. Invite tenders of the smart campus system and solar power renewable energy system Tender selection
08/2019	Installation of the demo site of the smart energy monitoring system and automatic control Testing and system modification of the demo site
09/2019 – 05/2020	Installation of the smart energy monitoring system and automatic control in all required locations Construction of a green garden
09/2019 – 12/2019	Conduct teacher training workshops for planning and designing STEM learning and teaching activities Conduct meetings for the collaboration of teachers across geography and science to develop school-based curriculum on energy resources Develop the school-based reading across curriculum (RaC) and English language across curriculum (LaC) in mathematics
01/2020 – 05/2020	Implement the school-based curriculum on energy resources across subjects of geography and science for S2 students Implement the school-based reading across curriculum, RaC for S1 – S6 students Implement the program of Health Care Campus: Discuss health risk associated with air pollution and introduce AQHI to S1 – S6 students
06/2020	Conduct teacher training workshops for the control of the smart energy monitoring system and automatic control
07/2020	Site visit tour of sustainable campus for P4 – P6 students Workshops for non-renewable and renewable energy resources and search for sustainable energy resources for P4 – P6 students
08/2020	Annual evaluation of the project
09/2020 – 12/2020	Organise activities across curricula of visual arts and information technology in aesthetic education for promoting smart and sustainable campus Project learning of STEM-related investigative study conducted in Green Garden: Study CO_2 capturing capacity of different kinds of green plants and investigate the effect of the use of organic fertilizers (produced from food waste) for growing potatoes and tomatoes
01/2021 – 06/2021	Implement the school-based curriculum of Language (LaC) across Mathematics and English in data handling concerning the electricity consumption of classrooms for S1 - S3 students Project learning in STEM : Design and make a toy car for increasing efficiency in capturing renewable energy and energy conversion to kinetic energy Installation of the solar power renewable energy system
07/2021	Site visit tour of sustainable campus for P4 – P6 students and parents of P4 – P6 students Workshops for non-renewable and renewable energy resources and search sustainable energy resources for P4 – P6 students Site visit tour of sustainable campus for parents of S1 – S3 students
08/2021	Evaluation on learning and teaching activities. Modification of guidelines concerning reducing electricity consumption Annual evaluation of the project Revise the developed curriculum and learning and teaching activities. Teachers will further develop the school-based programmes and relevant learning activities in the coming school year
09/2021 – 12/2021	Project learning of STEM-related investigative study conducted in Green Garden: Study oxygen and carbon dioxide balance ecosystem of seaweeds under sunlight
01/2022– 05/2022	Implement the revised school-based curriculum of Language (LaC) across Mathematics and English in data handling concerning the electricity consumption of classrooms for S1 - S3 students Establish geographic information system through monitoring air pollution and acidity of rain sample of campus and nearby locations

06/2022– 07/2022	Conduct survey to evaluate the effectiveness of the project in the school-based programmes and the relevant learning activities Arrange staff development workshops to share the benefits and feedback of the project in staff meetings Organise seminars to share the best practices to other schools The Smart Green Campus Task Group and the teachers involved will evaluate the effectiveness of the project, Project evaluation and final report submission

2.7 Details of project activities

a. Student activity

Activity name	Content	Number of sessions and duration	Teachers' involvement	Expected learning outcomes
1.Learning Activity Data Handling	S1- S3 students Language (LaC) across Mathematics and English Curricula in data handling concerning the electricity consumption of classrooms The content includes data presentations, description and interpretation			
	S1 students Presentation and analysis of data of bar charts and broken line graphs using comparative and superlative adjectives and vocabularies in sentence patterns. For examples: more/less, increase/decrease rise/drop, lowest/highest, around , same, since/after, clearly, likely, generally, similarly, as….as, than As/when …decrease/increase, ….. decease/increase … increase/decrease from … to …	2 sessions 55 minutes for each session	To be taught by school teachers with relevant knowledge and experience	S1 Students can 1. construct pie charts and broken line graphs for electricity consumption; 2. use past tense to describe the data 3. use appropriate adjectives to present the data in sentence patterns; and 4. use appropriate comparative adjectives to compare the data.
	S2 students Presentation and analysis of data of histogram, frequency curve and cumulative frequency curve using comparative and superlative adjectives and vocabularies in sentence patterns. overall, significantly, steadily, slightly, gradually, rapidly The + comparative adj./adv. +…, the comparative adj./adv. + …	2 sessions 55 minutes for each session	To be taught by school teachers with relevant knowledge and experience	S2 Students can 1. construct histogram, frequency curve and cumulative frequency curve to present the data of electricity consumption; 2. use appropriate adjectives to describe the trend of the electricity consumption over a period of time; and 3. use the sentence pattern to show the relationship between electricity consumption and air temperature outside classrooms
	S3 students Presentation and analysis of data of mean, median, mode and modal class using comparative and superlative adjectives and	2 sessions 55 minutes for each session	To be taught by school teachers with relevant knowledge	S3 Students can 1. use mean, median and mode to compare the electricity consumption among

	vocabularies in sentence patterns for reflecting central tendency. exceed, reduce, minimum/ maximum, account for, explain, minority/majority nearly, almost, approximately, remain unchanged/steady/stable, sharply, extreme,		and experience	classrooms; 2. use grouped data to find out modal class of electricity consumption among classrooms; and 3. justify mean, median or mode to be the most appropriate one to reflect the central tendency
2.Learning Activity Carbon Footprint and Ways to Reduce it	S1- S6 students The content includes introducing carbon footprint associated with human activities; understanding weather change associated with global warming, developing students green lifestyle in school and conducting the greenest class competition for minimum electricity consumption	2 sessions 55 minutes for each session	To be taught by school teachers with relevant knowledge and experience	Students can 1. understand carbon footprint associated with the release of CO_2 and consequences of global warming and extreme climate changes; and 2. work with green secretaries of their classes to develop rules of green lifestyle for reducing carbon footprint in their classes in order to achieve the greenest class.
3.Learning Activity Harvest renewable energy for generating electricity	S1- S6 students Introduce the use of solar panels for capturing solar energy to generate electricity and the participation of [redacted]	Throughout the project period	To be taught by school teachers with relevant knowledge and experience	Students can 1. monitor the energy output; and 2. use solar energy output shown electricity bills to calculate the amount of carbon dioxide offset.
4.Learning Activity Health Care Campus	S1- S6 students The content includes: 1. discuss health risk of air pollution and precautionary measures 2. introduce AQHI	Throughout the project period	To be taught by school teachers with relevant knowledge and experience	Students can 1. monitor AQHI of the district of our school in real time basis; and 2. get appropriate health advice for outdoor activities
5.Learning Activity Discussion on energy resources	S1 students School-based curriculum on energy resources across subjects of geography and science. The content includes introducing renewable and non-renewable energy resources and discussing sustainable energy resources	2 sessions 55 minutes for each session	Geography and Science teachers	Students can 1. use tablets to conduct web-based search for renewable and non-renewable energy resources; 2. understand availability of energy resources in countries; and 3. understand sustainable energy resources in future.
6.Learning Activity Reading to learn	S1- S3 students Reading across curriculum (RaC) of subjects of English language, mathematics and science focusing on the topic: Protecting Environment Resources and Energy Conservation	2 sessions 55 minutes for each session	English Language, Mathematics Geography and Science teachers	Students can 1. understand energy conservation through reading newspaper articles; 2. consolidate the knowledge of preserving resources by English

				composition; and 3. acquire reasoning skills through the debate on whether we should use nuclear power or hydroelectric power.
7.Learning Activity IT in aesthetic education	S1- S3 students Activity across curricula of visual arts and information technology in aesthetic education for promoting a smart and sustainable campus The content in design includes using appropriate art elements and principles to express ideas; developing ideas from daily life experience; developing association, imagination to express message and connecting art creation with smart green campus and reflecting on aesthetic quality and appropriateness of expression in e-poster, e-banner and e-pamphlets	1 session (competition) One month	Arts, Information technology and science teachers	Students can 1. use resources of information technology in visual arts activities; and 2. use appropriate art elements and principal to convey ideas to design e-poster, e-banner and e-pamphlet for promoting activities concerning smart and sustainable campus. 3. generate ideas and express to communicate everyday life experience with the campaign of smart green campus in the design of e-poster, e-banner and e-pamphlet; and 4. evaluate the effectiveness of communication through visual presentation; give reasons and identify areas for improvement in artwork.
8.Learning Activity Develop optimal condition in classroom	S1- S2 students STEM Activities: Study relationship between environmental factors and electricity consumption	Throughout the project period	STEM-related subject teachers	Students can 1. use sensors to measure temperature, humidity, rainfall, sunlight level; 2. study different kinds of data collected for affecting electricity consumption; and 3. propose optimal conditions of classrooms.
9.Learning Activity Project Learning	S2 students STEM Activities: Design and make a toy car for increasing efficiency for a series of energy conversion shown below: solar energy to electrical energy to chemical energy in rechargeable cells to kinetic energy	2 sessions 55 minutes for each session	STEM-related subject teachers will serve as mentors. They will monitor students' learning progress and advise on their work.	Students can 1. use a 3D printer to make different shapes of toy cars; 2. compare the effect of air resistance on the movement of objects of different shapes; 3. use a camera to record the progress of the project; and 4. analyze of efficiency of energy consumption.
10.Learning Activity	S3- S6 students STEM Activities:	Throughout the	STEM-related subject	Students can 1. use drones to survey the

Project Learning	Establish geographic information system, use [redacted] to monitor common air pollutants (NO, NO_2, CO, SO_2) in air pollution of campus and measure the acidity of rain sample collected in campus and nearby locations.	project period	teachers will monitor students' learning progress and advise on their work.	geographic information of campus about intensity of sunlight, temperature and growth of plants; 2. monitor air pollution of campus; and 3. measure the acidity of rain collected from different locations around campus.
11.Learning Activity Project Learning	S1- S3 students Investigative Study in Green Garden Monitoring CO_2 capturing of different kinds of green plants and use organic fertilizers (produced from food waste) for growing potatoes and tomatoes	6 months	STEM-related subject teachers will monitor students' learning progress and advise on their work.	Students can 1. estimate CO_2 capturing capacity of plants using CO_2 sensor in varying light intensity; 2. develop optimal conditions for growth of plants; 3. use organic fertilizers to obtain high yield of potatoes or tomatoes in the garden; and 4. use [redacted] or [redacted] to record data for analysis.
12.Learning Activity Project Learning	S1- S3 students Investigative Study in Green Garden: Monitoring oxygen emission of the seaweed under sunlight and use organic fertilizer (biomass residue) for feeding seaweed in the oxygen and carbon dioxide balance ecosystem	6 months	STEM-related subject teachers will monitor students' learning progress and advise on their work.	Students can 1. use [redacted] or [redacted] to record oxygen produced from seaweed in aquarium tanks under monitoring intensity of sunlight by light sensors; 2. conduct fair tests to find out the optimal conditions for the growth of seaweed; and 3. use camera to record the progress of the project.
13.Learning Activity Renewable fuels	S3- S6 students Synthesis of biodiesel from used cooking oil and produce biogas from biomass Discuss the uses of renewable products and environmental protection of the practices	2 sessions 55 minutes for each session	Science teachers	Students can 1. understand chemical reactions that involve in synthesis of biodiesel and biogas; 2. suggest the uses of renewable products; and 3. explain the importance of the green practice.
14.Learning Activity Workshop	P4 – P6 Students Introduce non-renewable and renewable energy resources and search for sustainable energy resources	3 sessions Half day	STEM-related subject teachers	Students can 1. understand the difference between non-renewable energy and renewable energy resources; 2. construct simple models to capture renewable energy

				resources; and 3. use [redacted] and [redacted] to record data concerning energy changes.
15.Learning Activity Sharing ideas of green lifestyle	P4 – P6 Students Site visit tour of a sustainable campus	3 sessions Half day	STEM-related subject teachers	Students can 1. have ideas about the methods used in electricity saving facilities; 2. know renewable solar energy generated by solar panels; and 3. get ways of green lifestyle for reduction carbon footprint.
16.Learning Activity Home-School Cooperation	Parents of S1 – S3 Students Site visit tour of a sustainable campus and understand how to convert food waste to organic fertilizers used for growing plants in Green Garden	3 sessions Half day	STEM-related subject teachers	Parents can 1. have ideas about the methods used in electricity saving facilities; 2. work with their children to participate in planting seedlings in Green Garden ; and 3. promote ways of green lifestyle at home.
17.Learning Activity Sharing ideas of green lifestyle	Parents of P4 – P6 Students Site visit tour of a sustainable campus	3 sessions Half day	STEM-related subject teachers	Parents can 1. have ideas about the methods used in electricity saving facilities; 2. know renewable solar energy generated by solar panels; and 3. get ways of green lifestyles for reduction carbon footprint
18.Learning Activity Sharing ideas of smart green campus	Teachers Site visit tour of a sustainable campus	3 sessions Half day	STEM-related subject teachers	Teachers can 1. understand how the smart control system and facilities can reduce electricity consumption; and 2. know STEM-related activities can promote green lifestyles of students.

We will ensure the safety of the participants and observe school activities guidelines.

LaC activities in handling data of electricity consumption Prepare worksheets to provide the practice of the integrative use of English in order to develop students' generic skills and linguistic competence for effective communication in handling data in real life situations. Revise the worksheets and teaching contents by using the new data of electricity consumption for next school year	
S1	1. Use broken line graphs to present variations of electricity consumption of different electrical devices over a period of time. 2. Use pie-charts to present the portions of the electricity consumption of different electrical devices at different seasons. 3. Use the following language terms and sentence patterns

	more/less, increase/decrease, rise/drop, lowest/highest, around, same, clearly, likely, generally, similarly As/when …decrease/increase from … to …, ….. decease/increase from … to (i) Describe the trends of broken line graphs of electricity consumption for these electrical devices. (ii) Compare the percentages of electricity consumption of different electrical devices in different seasons shown in pie-charts.
S2	1. Use electricity consumption of air-conditioners of classrooms to prepare grouped data of different class intervals that can be used to form frequency distribution tables for the construction of histograms at different air temperatures outside the classrooms 2. Use appropriate adjectives to describe the differences between histograms at different air temperatures overall, steadily, slightly, gradually, rapidly, nearly, almost, 3. Use the sentence pattern to show the relationship between electricity consumption and air temperature The + comparative adj./adv. +…, the comparative adj./adv. + …
S3	1. Use three averages (mean, median, mode) to represent the central tendency of a set of data of the electricity consumption of classrooms. 2. Using the following language terms to present explanations. exceed, reduce, minimum/maximum, account for, minority/majority, approximately, remain unchanged/steady, sharply, extreme, significantly, (i) Justify mean, median or mode to be the most appropriate one to reflect the central tendency of a set of data (ii) Compare two sets of data of the electricity consumption of classrooms by using suitable averages.
Learning and teaching activities related energy resources in school-based curriculum	
1.	Carbon Footprint and Ways to Reduce in science curriculum for S1 – S3 students •Conduct web-based search to introduce carbon footprint associated with the release of CO_2 and consequences of global warming and extreme climate changes. •Reduce carbon footprint to lower down consumption of energy resources such as non-renewable fossil fuels (coal, petroleum and natural gas) and renewable energy resources (hydroelectric power and solar power) •Calculate carbon footprint associated with different kinds of human activities such as different kinds of transports, food and diet, leisure activities, lightning devices and catering styles. Use online website resource to measure carbon footprint •Discuss green lifestyles in campus to reduce carbon footprint such as encouraging practice by recycling aluminium can, plastic bottles and paper. •Value education cultivates and develops students to be responsible citizens for sustainable development of society. •Set up class representative to work with class teacher for developing rules of green lifestyle for reducing carbon footprint in their classes in order to reducing consumption of electricity
2.	Harvest renewable energy for generating electricity in science curriculum for S1 – S3 students •Introduce future renewable solar power to reduce the consumption of non-renewable energy resource. •Study underlying principle how solar cells can capture solar energy •Learn government policy for sustainable future through supporting development of renewable energy resource and introduce the upload of renewable energy to a power grid. •Site visit to show operations of a renewable solar panel system for generating electricity and state how the system is connected to a power grid. •Monitor the renewable solar energy output and use the solar energy output shown on electricity bills to calculate the amount of carbon dioxide offset.
3.	Discussion on sustainable energy resources across curricula of geography and science for S2 students •Introduce renewable and non-renewable energy resources •Understand sustainable energy resources in future. •Conduct workshops to set up a simple solar energy system in school classrooms and show how to convert solar energy to electrical energy for storage in accumulators. Demonstrate how accumulators to recharge electronic devices. •Discuss the reliable energy resources by interclass debate activity and acquire reasoning skills through the debate on whether we should use nuclear power or hydroelectric power in a sustainable society. •Conduct project learning of future sustainable and innovative development of energy sources. It cultivates students to apply their knowledge and nurture their collaboration skills, communication skills, critical thinking skills and problem solving skills •Visit renewable energy facilities (using landfill gas for synthesis of town gas or generate electricity in power station) to know the new sustainable energy resources.
4.	Renewable biofuels (biodiesel and biogas) in curriculum of chemistry for S3 – S6 students

	•Introduce renewable biofuels (biodiesel and biogas) as future sustainable energy resources. •Discuss the uses of renewable biofuels as green practice to reduce the consumption of non-renewable energy resources (coal, petroleum and natural gas) •Understand the structure of organic raw materials for the synthesis of biodiesel and biogas. •Set the procedure manual to conduct experiments involved in the decomposition of organic matter to biogas and the conversion of used cooking oil to biodiesel.
5.	Reading to learn across curriculum (RaC) concerning energy resources Implementation Plan for the Reading Scheme Topic: Sustainability of Energy Resources and Environmental Conservation Target: S1 – S3 students Objectives: 1. To enhance students' problem solving skills and critical thinking skills through reading texts with themes related to energy resources and development of sustainable future energy resources. 2. To broaden students' exposure and their knowledge in renewable and non-renewable energy resources. 3. To nurture students' understanding of the aspects of environmental conservation Activities and Strategies: Reading newspaper articles Students are required to search and read relevant books or information. The themes for S1, S2 and S3 are "Sustainable energy resource in future", "Carbon footprint, global warming and green lifestyles" and "Renewable biofuels and environmental protection" respectively. Books Recommendation Teachers and students regularly share and recommend relevant books or reading materials for students. Teachers design different themes of writing tasks on issues related to the development in science and technology concerning sustainable energy resources. Sharing Sessions Students present and share their reading experiences and achievements in their classes. They share the questions posted in the worksheet for class discussion.

b. Teacher training

Activity name	Content	Number of sessions and duration	Hired personnel	Expected learning outcomes
Training workshop (Teachers and clerks)	Smart Campus System Training Session	1 session 2 hours	System developers arranged by solution provider	Teachers are able to login and control the smart campus system.
Teacher training workshop (6 hours)	Teacher training workshops will be organised for teachers of STEM-related subjects. The content includes: 1. Use of [redacted] and [redacted] 2. Set the learning goals and design the learning activities 3. Plan the assessment of learning goals	2 sessions 3 hours	Trainer for STEM education in using [redacted] and [redacted]	Teachers are able to design the STEM learning activities involved [redacted] and [redacted] Teachers are able to assess learning goals.

c. Equipment (including installation of new fixtures or facilities)

	Details of equipment to be procured	Contribution to fulfilment of the project aim(s) and if applicable, the expected utilization rate
1	104 sets of energy manager	Collect the data of energy consumption, indoor carbon dioxide content, temperature and relative humidity of classrooms to deliver relevant learning and teaching activities with reference to the data.
2	152 nos. of 1-phase energy measurement transducers	
3	214 nos. of 3-phases energy measurement transducers	
4	188 nos. of wireless air conditioning IR controllers	
5	270 nos. of wireless lighting switches	
6	82 nos. of wireless carbon dioxide sensors	
7	82 nos. of wireless temperature & humidity	

	Sensors	
8	164 nos. of wireless output modules (exhaust fan control)	
9	12 sets of gateway	
10	Solar power system-include 30 nos. of solar panels with power inventor	Generate renewable energy and deliver the relevant learning and teaching activities with reference to the date
11	One software of video editing	For editing video clips
12	One computer server	For energy monitoring and control system. For file storage of the system file Online E-platform of learning and teaching resources
13	One notebook computer	For student activities
14	Four video recorders	
15	Four sets of sensors (CO_2 content in air, soil moisture, soil pH)	
16	Four drones	
17	Two food waste composters	
18	30 sets [redacted]	
19.	30 sets [redacted]	

d. Construction works

	Details of the construction works proposed	Contribution to fulfilment of the project aim(s) and if applicable, the expected utilization rate
1	Install and set up a smart lighting control system in 24 typical classrooms, 14 special rooms and the school hall	The smart control system controls lightings, exhaust fans, and air conditioners in classrooms. The system monitors and records the energy consumption of electrical devices. Moreover, carbon dioxide sensors, temperature and relative humidity sensors collect the data of indoor air conditions. The data collected can be used for the investigation of the optimal conditions of classrooms and the development of energy saving plans.
2	Install and set up a smart ventilation system in 24 typical classrooms, 14 special rooms and school hall	
3	Install and set up a smart air conditioning control system in 24 typical classrooms, 14 special rooms and school hall	
4	Install and set up an energy management unit in 24 typical classrooms, 14 special rooms and school hall	
5	Install a solar power system	Generate renewable energy and deliver the relevant learning and teaching activities with reference to the data
6	Install 244 power sockets for sensors and gateways, 150 neutral wire for smart lighting control and 86 LAN ports for gateway and energy manager	Provide the power, neutral wire and LAN port for system sensors and gateways
7	Set up a green garden	Setup cost of a garden including soil, bricks, seedlings and rain drainage facilities

e. Features of the school-based curriculum to be developed

- Science Education

  Our school science curriculum focuses on the development of students' understanding of the application of technology in scientific thinking skills of practical work. Junior science teaching activities help students concern about the limited supply of non-renewable energy resources such as fossil fuels and nuclear energy and recent development of renewable energy resources such as solar power and wind power. Thus, students are ready to acquire the innovative ideas about saving electricity consumption and generating renewable energy.

  Our students are able to carry out investigative STEM activities which develop students' logical thinking and problem-solving for self-directed learning.

  Kipnis and Hostein (2008) have found that the different stages of inquiry practical work promote metacognitive activities concerning the regulation of cognition such as strategic planning, monitoring progress and searching logical explanations.

  Problem-based learning across KLAs encourages students to engage the problems on real-life situation, to think scientifically, critically and creatively and to solve problems collaboratively. Students should be able to: identify

problems related to a given situation or scenario; understand and define the problem, discover what they need to know to tackle it; generate alternatives; develop and test solutions; and justify their suggested solutions.
Jansson et al. (2015) have summarized the several benefits of using problem-based learning including enhanced creative thinking ability, self-regulated learning skills and self-evaluation.

- Collaboration work across curriculum
  - Collaboration for developing school-based curriculum concerning energy across the curricula of science and geography

    Science and geography teachers support the development of the school-based curriculum that integrates of teaching content concerning energy resources in both subjects for more effective management of time allocated. It helps students acquire generic skills for the application of knowledge across different subjects.

  - Collaboration work for English language across curriculum (LaC) KLAs

    Teachers of English language will prepare teaching materials concerning vocabularies, comparative terms, sentence pattern and grammatical styles for data handling including description, analysis and conclusion in Mathematics Education. The data of the energy consumption of classrooms, laboratories, staff rooms and school office will be used in the school-based curriculum. LaC advocates the integration of language learning and content that can enhance students' language proficiency and understanding of the academic content. Effective implementation of LaC enables students to integrate the subject content through language and practise their language skills for communicating clearly about the content based on subject-specific conventions and styles. Pearson et al. (2010) have found that science learning entails and benefits from embedded literacy activities and that literacy learning entails and benefits from being embedded within science inquiry. Science and mathematics teachers can collaborate with English teachers to facilitate LaC through:

    setting realistic goals, drawing up a plan or schedule of work to facilitate transfer of English language knowledge and relevant language skills, writing experimental procedures, describing observations, applying charts and graphs in describing patterns and data presentation, giving explanations of experimental results and writing investigation reports.

  - Collaboration work for reading across curriculum (RaC) of KLAs

    Our school will form a task group of teachers of different subjects and librarians to set a reading scheme that will promote reading habits across KLAs. The collaboration will focus on reading to learn and the task group will choose articles and news concerning energy resources, global warming, sustainable environment and green lifestyles. The activities will encourage students to read a wide range of materials across different subject contents and text types to facilitate the development of a culture of "reading to learn" and cultivate students to appreciate the value of reading. Tong et al. (2014) have suggested that the infusion of reading into science education is beneficial to emphasize reading to learn with continued support in reading literacy of English language for ensuring success in learning science.

  - Collaboration work across curriculum for aesthetic education

    Collaboration work of teachers of visual arts and information technology facilitates learning and teaching through effective curriculum organisation. Teachers will conduct workshops to instruct students to use computers for designing e-Poster, e-Banner and e-Pamphlet for promoting the activities of the implementation of smart and sustainable campus in a whole school context.

- Whole School Approach Life-Planning in Student Development

  Our school will plan and organize activities that help students develop an attitude of responsible citizenship and a commitment to promote personal and community health at home and in school. Students will become lifelong learners in social, ethical, economic, environmental and technological areas for establishing sustainable lifestyles.

f. Other activities

- Developing Collaborative Problem Solving Skills in Project Learning
  The expected achievements of students in collaborative problem solving skills enable students' ability to solve problems with synergised efforts through effective division of labour as well as incorporation of information from multiple sources of knowledge, perspectives and experiences. Compared to individual problem solving, collaborative problem solving has distinct advantages because it enhances the creativity and quality of solutions through stimulation brought by the ideas of group members. Students take initiative to propose plans or make adjustments to the plans and roles in changing situations. They show mutual respect and support when dealing with difficult situations.

- Environmental Protection Group
  The student leaders of the group will be responsible for planning and organising green activities in class-based and school-based levels. The class representative will give feedback about the difficulties in the implementation of green policies. The activities initiate class spirit through energy saving rules. The student leaders will promote class-based activities and monitor the implementation of green practice concerning saving electricity consumption.

- Promotion of Sustainability of Campus to Primary School Students and Their Parents through Site Visit and STEM Activities
  STEM Education Task Group will organise site visits for students of primary schools to understand the importance of a sustainable campus. Moreover, STEM Education task group will plan workshops with practical work for students to raise their concerns of sustainable ways of using energy resources and to cultivate them for the technology development of renewable energy resources in future.

- Promotion of Home-School cooperation with the Parents of S1-S3 Students through Site Visit and STEM Activities of Sustainability of Campus
  STEM Education Task Group will organise site visits for parents of S1-S3 students to understand the importance of a sustainable campus. Moreover, STEM Education task group will organise activities concerning reduction carbon footprint that will help parents understand how to convert food waste to organic fertilizer for the growth of seedlings in Green Garden. In home-school cooperation activities, it will promote the ways of reducing carbon footprint that encourages students and parents to have green lifestyles at home.

- Establish a STEM Team for Promotion the Project Activities
  STEM Education Task Group will form a STEM Team of student leaders who will assist science teachers to conduct STEM workshops concerning renewable energy resources for P4-S3 students. Student leaders will organize the activities concerning home-school cooperation with the parents of P4-S3 Students through Site Visit.

- Promotion of Sustainability of Campus to Other Schools through Site Visit
  Smart green task group will organise site visits for teachers of other schools about the smart energy monitoring system with automatic control that can monitor the electricity consumption and develop the optimal air-conditioning classrooms for learning and teaching activities. The sharing seminars will be conducted to introduce how STEM-related activities can raise students' concerns of sustainable ways of using energy resources and cultivate them for the technology development of renewable energy resources in future.

2.8 Budget

Total Grant Sought: HK$1,926,000

Budget Categories*	Breakdown for the budget items		Justifications
	Item	**Amount (HK$)**	
Service	Energy management and saving workshops including curriculum planning and learning activity design 880 x 8 hours	7,040	Conduct energy management and savings workshops to nurture students' development of STEM. Hands-on experience will be provided to students for learning energy management, applying consumption data and data analysis skills, developing innovativeness, exploring and implementing energy savings solutions.
	Provide mobile app for smart phone / tablet and energy manager web portal	120,000	By using the mobile app and web portal developed by the service provider, real-time energy and environmental monitoring, remote/auto control, data visualization and extraction of electricity consumption data of various electrical devices for learning activities.
Equipment	74 sets of energy manager	180,000	Collect the data of energy consumption, indoor carbon dioxide content, indoor temperature and relative humidity to deliver relevant learning and teaching activities with reference to the data.
	122 nos. of 1-phase energy measurement transducers	14,000	
	174 nos. of 3-phases energy measurement transducers	52,000	
	128 nos. of wireless air conditioning IR controllers	74,000	
	150 nos. of wireless lighting Switches	30,000	
	52 nos. of wireless carbon dioxide sensors	65,000	
	52 nos. of wireless temperature & humidity sensors	35,000	
	104 nos. of wireless output modules (Exhaust fan control)	20,800	For remote exhaust fan on/off control and to be triggered by CO_2 sensor.
	12 sets of gateway	21,000	Allow communication of signals between devices.
	Solar power system-include 30 nos. of solar panels with power inventor	80,000	Generate renewable energy and deliver the relevant learning and teaching activities with reference to the data
	One software of video editing	7,000	For editing video clips
	One computer server	10,000	For energy monitoring and control system For file storage of the system file Online E-platform of learning and teaching resources
	One notebook computer	5,000	For student activities
	Four video recorders	14,000	
	Four sets of sensors (CO_2 content in air, soil moisture, soil pH)	3,000	
	Four drones	12,000	
	Two food waste composters	13,000	
	30 sets [redacted]	15,000	
	30 sets [redacted]	4,500	

Budget Categories*	Breakdown for the budget items		Justifications
	Item	Amount (HK$)	
Works	Install and set up smart lighting control system in 24 typical classrooms, 14 special rooms and school hall.	110,000	Using a mobile app of the smart control system to control lightings, exhaust fans and air conditioners in classrooms in order to monitor the energy consumption of the classrooms. The system monitors the indoor conditions of classrooms and records the data of carbon dioxide content, temperature and relative humidity in classrooms. Students can conduct group discussion to investigate the relationship among these data. Group discussion of students develops plans for the use of the automatic control system to set a well-ventilated classroom with a comfortable temperature and relative humidity. Moreover, students can use real-time data of energy usage of various electrical devices to set the optimal conditions of classrooms with the consideration of the designs of energy saving plans.
	Install and set up smart ventilation system in 24 typical classrooms, 14 special rooms and school hall.	100,000	
	Install and set up smart air conditioning control system in 24 typical classrooms, 14 special rooms and school hall.	200,000	
	Install and set up energy management unit in 24 typical classrooms, 14 special rooms and school hall.	100,000	
	Install a solar power system	166,000	Generate renewable energy and deliver the relevant learning and teaching activities with reference to the data
	Installing 244 power sockets for sensors and gateways , 150 neutral wire for smart lighting control and 86 LAN ports for gateway and energy manager.	300,000	Provide the power, neutral wire and LAN port for system sensors and gateways.
	Setup a green garden	50,000	Setup cost of a garden including soil, bricks, seedlings and rain drainage facilities
General expenses	Audit fee	15,000	
	Miscellaneous	60	
Contingency	Contingency fee for the project	102,600	
	Total Grant Sought (HK$):	**1,926,000**	

Justifications for necessity for a large scale of construction and installation of work

To encourage a whole school participation of energy saving activities, a smart energy control system will be installed in the 24 classrooms (4 classes in each form, from S1 to S6) and 14 special rooms (4 science laboratories, computer room, multi-media learning centre, music room, 2 libraries, Geography room, STEM room, fitness room, student activity centre and art room) and the school hall.

In order to cultivate our students to lead a green lifestyle on a holistic basis, a large variety of learning and teaching activities will be conducted in classrooms and special rooms so as to maximize the effectiveness of smart energy system in the 3-year implementation period.

To better utilize the educational use of the smart energy control system installed, students' environmental knowledge can be enriched through special curriculum planning across different subjects. By holding different learning activities that involve the participation of students, teachers, non-teaching staff and parents, it is hoped that the awareness of environmental protection can be enhanced.

To share the project outcomes, we will take the initiative to invite students from the neighbor schools, parents and

alumni to visit our campus and collect their feedback.

We will also share with the community some of our environmental protection activities through our school webpage (Smart Green Campus) in which relevant news regarding the development of sustainable energy resources will be updated. Moreover, seminars and workshops will be conducted for the community, when appropriate.

To conclude, it is hoped that the school will be able to serve as a model in establishing a Smart Green Campus, and play a role in raising the public awareness of environmental protection in the community.

Declaration

Our school ensures that the procurement of goods and services is made on an open, fair and competitive basis with measures taken to avoid conflict of interest in the procurement process. Our school will not have any alteration to school premises (including structural alteration and conversion, change of room use, etc) in this project. Our school will observe all the rules and regulations of the Electrical and Mechanical Services Department on alternation and installation of electrical facilities.

After the end of QEF project period, our school will settle the post-project maintenance cost of the proposed facilities in order to ensure their smooth operation.

Estimated usage rate of the proposed rooms involved new proposed school-based curriculum		
	Proposed rooms	Total no. of 50 minute-lesson per year
1.	12 Standard Classrooms (F1- F3)	240
2.	12 Standard Classrooms (F4- F6)	120
3.	4 science laboratories (integrated science, physics, chemistry, biology), STEM room	800
4	computer room, geography room, art room, music room	200
5.	libraries, multi-media learning centre, student activity centre, fitness room, school hall	200

3. Expected Project Outcomes

3.1	Deliverables / outcomes	☑ Learning and teaching materials 1. Worksheets of data handling involved the use of vocabularies and sentence patterns for LaC learning activities. 2. Teaching kits (lesson plans, worksheets and resources) for learning and teaching activities of the following topics • Carbon footprint in our lifestyles and ways to reduce it. • Harvest renewable energy for generating electricity 3. Working plans and the results for the development of the optimal conditions in classrooms associated with energy consumption for learning and teaching activities. 4. Procedure manuals, experimental worksheets and video clips for the synthesis of renewable biofuels. 5. Guidelines and reports of group work of students for the project learning of the sustainable energy resources across the curricula of geography and science 6. Reading resources for reading to learn across curriculum (RaC) concerning sustainability of energy resources and environmental conservation. 7. Outstanding students' art works of e-posters, e-banners and e-pamphlets for the promotion of the activities of smart green campus project. 8. An online geographic information system showing the data of intensity of sunlight, temperature, air quality and acidity of rain collected in campus and nearby locations. 9. Outstanding students' writing articles on preserving energy resources, developing sustainable renewable energy resources and promoting green lifestyles

		10. Video clips for carrying out practical work of the investigative studies in STEM-related subjects and the reports of the project learning. All the above learning and teaching materials will be uploaded to the online resource platform of the smart green campus project in our school website.
3.2	Positive impact on quality education/ the school's development	The smart green campus project will help our school plan and develop the scheme of saving electricity to nurture students about understanding the importance of green lifestyles for the sustainability of the development of society. The teachers involved will formulate and develop the school-based curricula across KLAs to enhance the STEM education that students will acquire learning skills to be self-directed learners. The project will promote the whole school learning and teaching activities for Language across Curriculum (LaC) and Reading across Curriculum (RaC). These activities can facilitate and cultivate students to be lifelong learners in the society with the rapid advancement in technology.

3.3 Evaluation

Please state the methodologies of evaluating project effectiveness and provide the success criteria.

	Item for evaluation	Methodologies and Success Criteria
1	Enable students to acquire generic skills such as collaboration skills and communication skills in STEM curriculum	By questionnaire surveys, 80% of the students agree that the project can enable the students to acquire generic skills.
2	Nurture students in the sustainable ways for generating electricity and saving electricity consumption in the school-based curriculum concerning energy resources across the subjects of science and geography	By questionnaire surveys, 80% of the students agree that the project can nurture the students in the sustainable ways for generating electricity and saving electricity consumption.
3.	Implement the collaboration work of language across curriculum (LaC) of KLAs to integrate the learning content of English language, mathematics and information technology in analysing and presenting the data collected from the consumption of electricity of various electrical devices	By group interviews, 80% of teachers agree that the project can implement collaboration work of language across curriculum. By questionnaire surveys, 80% of the students agree that the project can help the students in analysing and presenting the data collected from the consumption of electricity of various electrical devices.
4.	Establish a reading atmosphere through reading across curriculum (RaC) to promote reading to learn in science, geography, mathematics and English language curriculum	By group interviews, 80% of teachers agree that the project can establish a reading atmosphere through reading across curriculum. By questionnaire surveys, 80% of the students agree that the project can help the students develop the habit of reading in learning activities.
5.	Promote an aesthetic education of visual arts and information technology to cultivate students for treasuring the beauty of nature in a sustainable environment through e-learning activities	By questionnaire surveys, 80% of the students agree that the project can help the students treasure the beauty of nature in a sustainable environment through e-learning activities
6	Cater for the learner diversity in ability to develop a school-based curriculum framework to have various types of activities such as project works and workshops to meet students' needs	By group interviews, 80% of teachers agree that the school-based curriculum can cater for learner diversity in project works and workshops.

3.4 Sustainability of the project

Subject Level

The curriculum will focus on the advanced technology development of generating electricity from renewable energy resources such as solar power, wind power, biodiesel and biomass. Workshops for students will be introduced to raise the concerns for the importance of developing renewable energy resources in order to minimize the releases of carbon dioxide associated with global warming. Through the science and geography integrated curriculum, students should be aware that water resources and solid wastes are the next issue under consideration for the development of a smart and sustainable campus.

School Level

Velazquez et al. (2006) have suggested that the successful implementation plan involves Plan-Do-Check-Act (PDCA) cycle. The first stage of the PDCA cycle needs to identify what is going wrong and to generate ideas for solving the problems raised. In the second stage, the selected proposal will implement in a small scale for evaluation. Next, check refers to review if the proposed changes are achieving the desired result or not. Finally, the next step is to implement those tasks after modification. It is always necessary to go through the cycle again for solving new challenges and problems.

Our school will apply financial resources from Quality Education Fund to set up a technology-focused smart sustainable resource centre. The joint-school activities will be conducted to allow the sharing of learning insights and ideas concerning green lifestyles in campus. Primary school students will be invited to visit our school to find out more about the application of new technology for building up a smart and sustainable campus. Our school will set the next mission concerning smart uses of water resources, recycling solid wastes of paper and plastic in order to minimise water consumption and solid wastes. The whole school approach will promote paperless environment by using electronic documents, notes, test papers, parent letters and minutes of meetings. For establishing a plastic less campus, our school will promote smart lifestyles involving reduction of plastic wastes and will establish sustainable ways for the collection of plastic wastes and the conversion of plastic wastes to marketable products.

Declaration

Our school will bear all possible consequences resulted from the proposed construction/alternation/additional works or change of room use, including but not limited to the impact on relevant grants and provisions. We understand that if the existing special rooms are converted for other uses, relevant grants and provisions may be affected.

3.5 Dissemination

Please provide a dissemination plan for sharing the good value of the project with the school sector.

The list of activities and items will be disseminated is as follows

1. Workshops for students (Primary 4 to Secondary 2)
2. Seminars for parents (Primary 4 to Secondary 3)
3. Seminars for teachers of other schools
4. Project work
5. Online E-platform
6. e-Poster, e-Banner and e-Pamphlet
7. 5 video clips concerning practice of green campus
8. 20 video clips of the conduction of investigative studies
9. 20 reading articles concerning smart and sustainable campus
10. Under the permission of Education Bureau, the reports of the progress of implementing a sustainable campus will be listed in the resources for public access.

Declaration

Our school confirms the copyright of the deliverables/materials developed through this project will be vested with the QEF and note that any reproduction, adaption, distribution or provision of the deliverables to the public for commercial purposes by the service provider is strictly prohibited.

3.7 Assets Usage Plan

Category	Item / Description	No. of Units	Total Cost	Proposed Plan for Deployment
Audio and video equipment	Four video recorders	4	14,000	Project learning activities
Computer hardware	Notebook computer	1	5,000	Learning and teaching activities
	Computer server	1	10,000	Access online resources
Computer pocket-size	[redacted]	30	15,000	STEM workshop
	[redacted]	30	4,500	
Computer software	Video editing	1	7,000	Editing video recording of practical work of science
Drones		4	12000	STEM activities
Electronic device	Energy manager	74	180,000	Collect energy consumption data to deliver learning and teaching activities
	1-phase energy measurement transducers	122	14,000	
	3-phases energy measurement transducers	174	52,000	
	Gateway	12	21,000	
	Wireless air conditioning IR controllers	128	74,000	
Food waste composters	Handling food waste	2	13,000	Learning and teaching activities
Sensors	CO_2, soil moisture, soil pH	4	3,000	Project learning activities
	Wireless carbon dioxide sensors	52	65,000	Collect data for monitoring room conditions
	Wireless temperature & humidity sensors	52	35,000	
Solar panels with power inventor		30	80,000	Generate renewable energy and deliver the relevant learning and teaching activities
Wireless Output Modules	Exhaust fan control	104	20,800	Learning and teaching activities
Wireless Lighting Switches		150	30,000	

3.8 Report Submission Schedule

My school commits to submit proper reports in strict accordance with the following schedule:

Project Management		Financial Management	
Type of Report and covering period	**Report due date**	**Type of Report and covering period**	**Report due date**
Progress Report 01/07/2019 - 31/12/2019	31/01/2020	Interim Financial Report 01/07/2019 - 31/12/2019	31/01/2020
Progress Report 01/01/2020 - 30/06/2020	31/07/2020	Interim Financial Report 01/01/2020 - 30/06/2020	31/07/2020
Progress Report 01/07/2020 - 31/12/2020	31/01/2021	Interim Financial Report 01/07/2020 - 30/06/2020	31/01/2021
Progress Report 01/01/2021 - 30/06/2021	31/07/2021	Interim Financial Report 01/01/2021 - 30/06/2021	31/07/2021
Progress Report 01/07/2021 - 31/12/2021	31/01/2022	Interim Financial Report 01/07/2021 - 31/12/2021	31/01/2022
Progress Report 01/01/2022 - 30/06/2022	31/7/2022	Interim Financial Report 01/01/2022 - 30/06/2022	31/7/2022
Final Report 01/07/2019 - 31/7/2022	31/10/2022	Final Financial Report 01/07/2022 - 31/07/2022	31/10/2022

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