6.5.4 Does your university as a body utilise sustainable water extraction technologies on associated university grounds off campus?

Executive Summary of April 2022

https://services.qu.edu.sa/laravel-filemanager/files/shares/%D9%85%D9%84%D8%AE%D8%B5%20%D9%8A%D9%86%D8%A7%D9%8A%D8%B1.pdf [1]

10,354 cubic meters of sewage water were drained into the facilities and buildings of the university city and transported across 21 substations to the main station to be processed triple via the antenna rotation system without any stoppage

Searching for sustainable solutions for Saudi Arabia

https://www.timeshighereducation.com/hub/p/searching-sustainable-solutions-saudi-arabia [2]

Researchers at Qassim University are using the latest technologies to find sustainable power sources and environmentally friendly water management techniques

From turning date palm tree waste into renewable energy to harnessing the power of the sun, Qassim University is on a mission to find sustainable power solutions.

Investigating sustainable developments in energy, water and environmental engineering is one of the university's 10 priorities, set out in its 2020 to 2024 research strategy.

Sustainable technologies are crucial in Saudi Arabia, where wastewater, municipal and construction waste and air pollution pose environmental threats. The Saudi Vision 2030 has set a target to power half the country with renewable resources by 2030.

Qassim University is working on a host of solutions, from sludge management and waste recycling to sea and groundwater desalination.

One notable project, led by Professor Sulaiman Alyahya, is examining how this waste from date palm trees can be transformed into renewable energy.

The central Al-Qassim province has more than 8 million date palm trees. The trees produce a large amount of agricultural waste including dry leaves, stems and seeds. "A quarter of the date palm is waste and many of the farmers burn that waste, which of course produces CO2 emissions and harms the environment," says Alyahya. "We are really concentrating on how to convert this waste to energy."

An international group of researchers, including scientists from Iowa State University, is investigating how the latest technologies can turn the waste into renewable energy forms like biomass, bio-oil and biogas.

The researchers are using the new technique of autothermal pyrolysis, developed by Iowa State University's Bioeconomy Institute. The process is simpler and cheaper than conventional pyrolysis and does not require an external energy source.

“If we achieve this goal to convert the waste of date palms into energy, Saudi Arabia will have a reduction of almost 8,000 tonnes of CO2 emissions,” says Alyahya. “We will stop burning the waste of agriculture and at the same time create richer products.”

Solar power research is another focus for Qassim University. Dr Muhannad Alaraj, an assistant professor in the university’s Department of Electrical Engineering, is exploring how photovoltaic panels can transform light into power.

“We are investigating the economic effectiveness of PV panels in the Al-Qassim region. We’re also studying the effect and forecasting for those PV panels and we currently have a small PV system from which we are collecting the data,” says Alaraj.

“We have to consider the weather conditions and meteorological parameters. This is really important because in our region we have mostly sunny days, but sometimes there are sandstorms or clouds. We are trying to see the effect of this weather on PV panels. This will be really helpful to build a model to predict or estimate how much power or energy we will get from this PV panel each day.”

As one of the world’s most water-scarce nations, Saudi Arabia also needs innovative ideas for renewable water sources.

Dr Saleem AlSaleem, from the College of Engineering, is working on water and wastewater treatment, such as greywater treatment and using solar energy to treat saline water. His team is also developing solutions for solid waste management and tackling noise pollution.

AlSaleem is a member of the university’s Sustainable Development Centre, which oversees Qassim’s progress in its sustainability initiatives. The centre runs four greening projects, focusing on the curriculum, the campus, research and the university as an organisation.

AlSaleem and his colleagues say collaborating within and outside the university is important for a successful research project. Qassim’s scientific research deanship has launched a number of international cooporation grants and encourages faculty members to apply. “We can improve our work by encouraging collaboration,” says AlSaleem. “I am working with water companies and municipalities inside Saudi Arabia, and we also collaborate with researchers outside the country. For example, I am working with one professor in Malaysia and another in Italy.”

The university’s future research into sustainable developments will be boosted by a recently announced research chair for artificial intelligence. The chair will fund studies into AI across the university, including in agriculture and engineering.

“I’m currently working with five teams to see the role artificial intelligence can play in agriculture and renewable energy,” says Alyahya.

Network Water Quality Conference in Buraidah continues its activities

https://www.spa.gov.sa/1823762 [3]

The Network Water Quality Conference continued its activities today, at the King Khalid Cultural Center in Buraidah, where three dialogue sessions were held that included 8 working papers.

The first session, chaired by the Vice President of Qassim University for Graduate Studies and Scientific Research, Dr. Ahmed Al-Turki, discussed three working papers on the first of which came under the title **"Quality of groundwater**" by Dr. Hussein Al-Ajmi Groundwater, where he explained that **it constitutes approximately 98% of fresh water and constitutes almost 60% of the sources of drinking water supply projects in the Kingdom, while the second paper was entitled "Plastic pipes used for drinking water in networks and homes" in which Engineer Turki Al-Shahrani talked about the advantages of plastic pipes and that they Environmentally friendly, while Dr. Ahmed Al-Arifi presented the third paper entitled "Desalination Industry in the Kingdom of Saudi Arabia" in which he touched on the water challenges facing the Kingdom and the history of the desalination industry and some statistics locally and globally.**

The second session, chaired by the Director General of the Water Regulation Department at the Ministry, Dr. Abdulaziz Al-Shuaibi, discussed three working papers, the first of which dealt with "Promising desalination methods" presented by Dr. Ibrahim Al-Mutaz, in which he explained that there are techniques still in the process of experimentation such as desalination by the process of humidification, dehumidification, desalination by freezing method and others, and the second paper discussed the topic of "Optimal design of water purification plants to reduce waste from wastewater" by Dr. Mohammed Heikal, in which he explained that water purification plants produce daily quantities of The third paper was entitled "Specifications of transported water and its impact on the shelf life of transport systems and their reflection on the quality of water arriving to the consumer" presented by Dr. Saud bin Murshid, in which he highlighted the operational technical specifications applied to the transport systems of sweet water in the Kingdom.

The third session, chaired by Dr. Bader Al-Baridi, former Director of Studies and Designs Department at the General Directorate of Water in Qassim, dealt with two working papers, the first of which discussed the topic of "Protection of buried carbon iron pipes used in the transport of water from corrosion", in which Eng. Hamad Ababtain spoke about the importance of protecting carbon iron pipes because it is the nerve of the project to continue serving as long as possible, while the second and last

paper in this session was presented by Dr. Ali Al-Hamza entitled "Monitoring of organic and inorganic pollutants in the water produced." From the plants of the Saline Water Desalination Corporation" in which he pointed out that the World Health Organization's standard specifications for drinking water showed the results that organic and inorganic pollutants in the water produced from desalination plants are within the limits allowed by the World Health Organization.

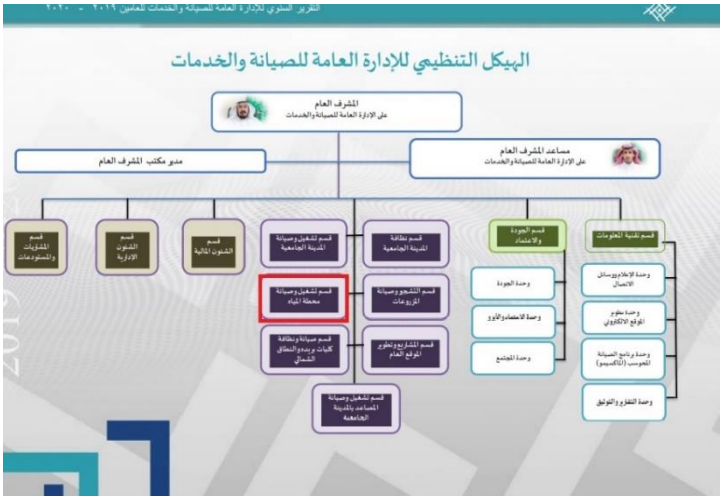
Water Plant Operation and Maintenance Section

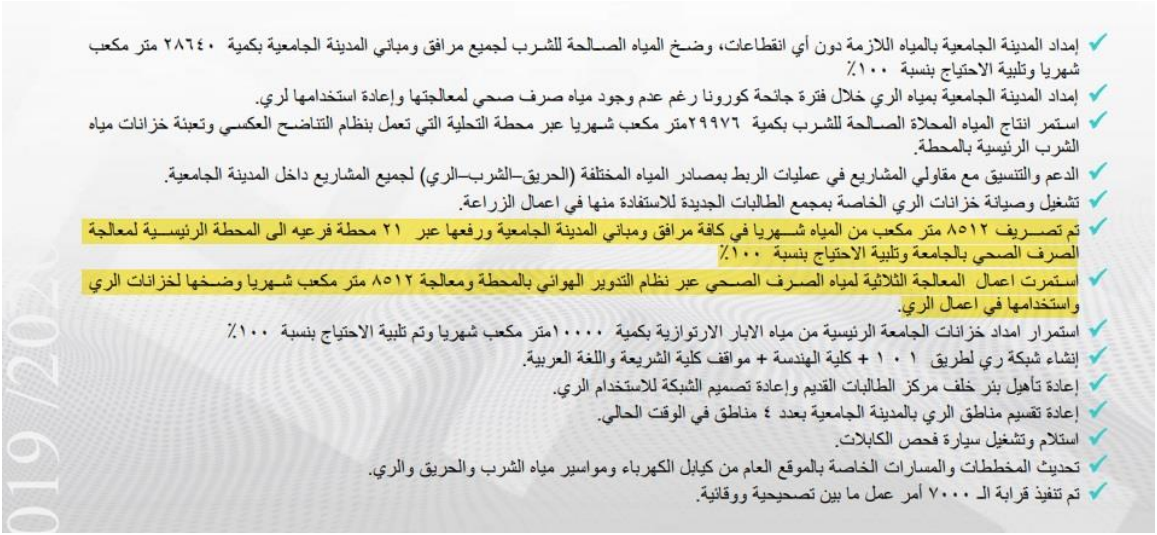
https://services.qu.edu.sa/content/p/56 [4]

Annual Report

General Administration of Maintenance and Services

https://services.qu.edu.sa/laravel-filemanager/files/shares/%D8%A7%D9%84%D8%AA%D9%82%D8%B1%D9%8A%D8%B1%20%D8%A7%D9%84%D8%B3%D9%86%D9%88%D9%8A%20%D8%A7%D9%84%D8%A7%D8%AF%D8%A7%D8%B1%D8%A9%20%D8%A7%D9%84%D8%B9%D8%A7%D9%85%D8%A9%20%D9%84%D9%84%D8%B5%D9%8A%D8%A7%D9%86%D8%A9%20%D9%88%20%D8%A7%D9%84%D8%AE%D8%AF%D9%85%D8%A7%D8%AA1.pdf [5]





- 8512 cubic meters of water were discharged per month in all facilities and buildings of the University City and lifted through 21 substations to the main treatment plant University sanitation and 100% meeting the need
- The tertiary treatment of wastewater will be carried out through the plant's air circulation system and the treatment of 8512 meters per month and pumping it to irrigation tanks and use it in irrigation work.

Water Operation and Maintenance Section Tasks

https://services.qu.edu.sa/content/p/102 [6]

As shown above, the main task of the water section is the treatment of the wastewater from the bathrooms to the outside of the university, treatment of the rainwater from the roofs and balconies in the university.

This mission refers to Al Fahad Company:

Al-Fahahd Company

https://alfahhad.sa/en/Abouten [7]

شركة أحمد سليمان الفهاد وأولاده - مساهمة مقفلة

Ahmed Soliman Al Fahhad & Sons Co. (Closed Joint Stock)

Al Fahhad is one of the leading clean-ups, operating and maintenance companies, which provides a variety of services from urban cleanliness, the operation, operation and maintenance of debris and buildings.

It is one of the largest companies in Saudi Arabia that has gained the respect and trust of all partners and customers, This distinction is based on the company's interest in qualified personnel, holders of higher education degrees, and persons with experience and specialization from Saudi Arabia, who meet the Criteria for employment adopted by the ministry of Labor and official organizations.

It has always sought to gain the satisfaction of its clients through the provided services in its various projects. It encouraged them to expand their areas of activity and to engage in other industries, enterprises, financial and real estate investment and a lot of other works.

Al-Fahad receives the project of operation and maintenance of the university city at Qassim University

https://alfahhad.sa/blog?id=1211646143 [8]

Haitham Al-Jilani – Qassim Ahmed Sulaiman Al-Fahad & Sons received the work on the operation and maintenance project of Qassim University from the Arab Field Group Company on 19/04/2019, after several equipment that preceded this receipt, including the preparation of housing for technicians and engineers in the project and after taking a group of technicians on efficiency from all departments (civil, mechanics, electronics, electricity, refrigeration and air conditioning) and the company was keen to choose high competencies.

On Sunday, 30/08/1440H corresponding to 05/05/2019G, the contract was signed between Qassim University and represented by the Rector of the University, Prof. Dr. Abdulrahman bin Hamad Al-Daoud, and Ahmed Sulaiman Al-Fahad & Sons Company, a closed contribution represented by the project manager, Mr. Eng. Abdulaziz bin Abdulrahman Al-Saif. The signing of the contract was also witnessed by the Director of the Contract and the Director of the Support Services Department, as well as the presence of the honorable coordinator of projects of the health sector.

The number of employees in the contract is (290) two hundred and ninety employees, and the purpose of this contract is to carry out work (operation and maintenance of the university city of Qassim University) and this includes the provision of materials, equipment and all necessary requirements in accordance with the terms of the contract and its documents. Eng. Abdulaziz Al-Saif, Project Manager, stated that this project is one of the largest projects of the company in the field of maintenance and operation as the company is considered a leader in the field of maintenance and all fields in the Kingdom and is considered a successful step towards working in the field of universities and education in general, wishing the success of the project and looking forward later to taking other projects at the university and outside as this is characteristic of major companies such as Al-Fahad Company. The members of the university also added their wishes for the success of the company in the project as Al-Fahad Company is one of the largest companies in the Kingdom.

Preparation of Al-Fahad Project for Operation and Maintenance at Qassim University for the academic year

https://alfahhad.sa/blog?id=652608494 [9]

Haitham Al-Jilani - Al-Qassim The operation and maintenance project at Qassim University of Ahmed Sulaiman Al-Fahad & Sons Company has prepared a closed contribution throughout the past period since the end of the study during the vacation period to receive the new academic year at Qassim University, so the company has equipped all buildings and colleges at the university and repaired any malfunctions that hinder the practice of study life. Where Al-Fahad is

considered a pioneer in the field of maintenance in the Kingdom, so the malfunctions of air conditioning, electricity and mechanical works have been repaired so that the colleges and laboratories with all their equipment are equipped for the use of faculty members and students and the company does not spare any time or effort in the maintenance of systems in a manner that befits its position from what is required by maintenance and operation work as it has technicians of high efficiency and work at any time according to the requirements of work and despite the abundance of colleges and buildings at Qassim University, the company was able to receive the academic year without any Problems and thankfully the company wishes a successful academic year for all students.

Al-Fahad receives the project of operation and maintenance of the university city at Qassim University

https://alfahhad.sa/blog?id=1211646143 [10]

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Al-Daoud signs two contracts worth more than 25 million riyals for a water treatment plant and wireless network project

https://www.qu.edu.sa/content/news/891

His Excellency Prof. Dr. Abdulrahman bin Hamad Al-Dawood, Rector of the University, signed on Sunday morning, 19/9/1439 AH, two contracts for the implementation of several projects with a total value of more than 25 million riyals, and the signed contracts included the project of completing the infrastructure of wireless networks, the project of implementing the buildings of the wastewater treatment plant, and the animal waste treatment plant at the agricultural research and experiment plant. Al-Daoud signed a project to complete the infrastructure of wireless networks worth 17,742,708 million riyals with Al-Jeraisy Corporation for Computer Services, and also signed a public works project contract for the implementation of the buildings of the wastewater treatment plant and the animal waste treatment plant at the agricultural research and experiment station worth 7,899,413 million with Rakan Contracting Company. After signing the contracts, Al-Daoud stressed the need for the implementing companies and their employees to abide by the terms and conditions of the contract, to achieve the interests of both parties, and in the interest of the development of the educational process in all units of the university city and the vaus colleges.

Training course entitled (The Impact of Sediment Load on the Efficiency and Operation of Irrigation Systems - Treatment of Irrigation Water to Eliminate Sediment) in cooperation with the Agricultural Training Center in Qassim on 28/1/1440 by Dr. Ahmed Al-Zuhair

https://cavm.qu.edu.sa/content/news/1331 [11]

A training course entitled Sources of Water Pollution with Sediments, in cooperation with the Agricultural Training Center in Qassim on 27/1/1440 for Dr. Ahmed Al-Zuhairi.

https://cavm.qu.edu.sa/content/news/1330 [12]