



#### PROJECT SUMMARY:



#### CLIENT

Swansea Bay University Health Board

#### PROJECT

4MW Solar PV Installation providing electricity for Morryston Hospital

#### TIMESCALE:

2020 – 2022

## PROJECT OVERVIEW

Morryston Hospital became the first in Wales to develop its own full-scale solar farm as part of its comprehensive decarbonisation plan. The installation was delivered at the nearby Brynwhillach Farm, with electricity being transported to the hospital via a 3km private wire network.

The project saw us work in partnership with the Health Board to develop the project and ensure it met their energy requirements, whilst being within budget. The final design is capable of supplying 4MW of electricity from 10,000 solar PV panels stretching across 14 hectares of land.

## VITAL SOLUTION

As the project was delivered via the RE:FIT framework we were required to compile an Investment Grade Proposal which demonstrated the technical and financial viability of the projects as well as providing the client with an energy performance contract which guarantees agreed key performance indicators.

Our team designed and installed the complete solar system including the in-field framework and solar PV panels, private wire network, in-hospital electrical works and security system. All works were carried out in accordance with the Distribution Network Operator to ensure full compliance with their standards and regulations.

The solar farm will deliver approximately £500,000 per year in energy savings and circa 1,000 tonnes of carbon reduction per annum.

#### Maximising Carbon Savings With A Multi-Phase Approach

Vital Energi used Phase 1 of the Re:fit project to reduce the energy usage across the Health Board's Estate by installing a range of energy conservation measures. This resulted in a reduction of over 3.58m kilowatt hours for Morryston Hospital which accounts for approximately 19% of its electricity usage.

Because Phase 1 was successful in reducing the hospital's electricity demand, the solar farm now provides a higher percentage of the electricity they use, accounting for almost a quarter of the electricity consumed by Morryston Hospital. This approach to the Re:fit phases ensured maximum decarbonization.

#### Minimising Environmental Impact

Our team took full responsibility for preparing the 20,000m<sup>2</sup> site and organized the geotechnical and topographical surveys as well as checking the soil acidity and resistivity.

#### THE BENEFITS:

- > Comprehensive commercial solution which reduces risk to the client and delivers guaranteed savings
- > Guaranteed significant carbon reductions
- > Outstanding structural engineering to remove CHPs in working order, within tight tolerances
- > Work programme designed to reduce disruption

▶ The project stretches across two fields, covering 14 hectares and includes 10,000 solar PV panels capable of generating upto 4MW of electricity.



*“Vital were very accommodating and mobilised on site well. Very good quality of installation and workmanship, complies and integrates with the hospital system well. They have been extremely collaborative; they have a good attitude and support us well.”*

GERAINT WILLIAMS - PROJECT DIRECTOR AT GEP ENVIRONMENTAL LTD

We employed a flexible frame system which was capable running over any mounds or bumps across the two fields. This system meant that we didn't have to undertake any invasive ground works and there was minimal impact on the environment.

#### **Rapid Installation of the Solar PV Panels**

Due to the size of our in-house expertise and nation-wide supply chain we were able to allocate 28 operatives on site who installed over 300 panels per day, once the framework had been set up. They installed approximately 4,500 panels within two weeks and the full 10,000 panel installation was completed in just over 5 weeks.

#### **Connecting The Solar Farm To The Hospital's Electrical Infrastructure**

The electricity is transported from Brynwhillach Farm to Morriston Hospital via a 3km private wire high voltage cable. Our team took responsibility for gaining all permissions, undertaking all trenching, installation and reinstatement whilst ensuring minimal disruption during the installation.

Morriston Hospital has a main intake switch board which distributes power throughout the site. We extended this switchboard to allow the solar farm to be connected and worked closely with the Distribution Network Operator to ensure our solution was fully compliant with their standards.

#### **Creating a Smarter Solar Farm**

Vital created a smart solar PV system which was G99 compliant, secure and capable of responding to changes in the national grid. Whilst traditional systems would go offline in response to changes in the grid's frequency, our system has a limited ability to feed into the fault,

helping to make the grid more stable.

The solar arrays are connected as strings, with 28 panels in each string. These strings are monitored by our SCADA system which can assess if each string is performing as expected. This allows early detection and diagnosis of each string of panels and allows our engineers to address any issues.

#### **Designing with a “Safety First” Approach**

Due to the critical nature of the hospital's electricity supply it was essential that the contribution from the solar farm would not compromise the continuity of supply. Our team designed a scheme which delivers electricity at a slightly higher voltage than the grid to make it easier to utilise and, when available, will always be the first choice of supply. During the night, when the solar farm isn't generating electricity, the hospital will revert to taking electricity from the grid.

In the unlikely event of grid failure, the hospital will take electricity from its back up generators and the solar farm will disconnect until it is safe to bring it back online.

#### **Ensuring Long-Term Budget Certainty**

As part of the RE:FIT framework, all clients receive an energy performance contract which guarantees certain KPIs in important areas such as carbon reductions and energy savings which gives the Health Board budget certainty.

During the investment grade proposal process we performed an extensive energy survey on Morriston Hospital. This involved us taking their metered electricity data from previous years, looking at their day and night-time tariffs and the carbon emissions factor

of the grid electricity used. We then took this information and fed it into a commercial model which demonstrated the potential savings.

On this project we guaranteed that the solar farm will deliver over £487,000 in energy savings which amounts to a reduction of 17.9% in energy costs. Additionally, the project will deliver carbon savings of almost 1,000 tonnes per year which equates to 10% of the hospital's yearly emissions.

We use Vital View, our bespoke software to monitor performance and provide regular, monthly reports to the client so they can have full confidence in the performance of the Solar Farm.

#### **On-Site Security and Performance Monitoring**

The solar PV farm marked a significant monetary investment and it was important that the site will be safe and secure for the duration of the project's design life. We delivered a 2m high fence which will secure the perimeter of the site and a CCTV which will allow the site to be monitored by hospital personnel.

#### **Long-Term Operation & Maintenance**

We have agreed a operation and maintenance schedule which will see us ensure the long-term performance of the scheme. This involves regular visits to site to check the framework, panels and electrical systems, in addition to the constant remote monitoring via our SCADA system.

We have also ensured the essential consumables and spare parts on are on-site to enable easy maintenance and have also taken responsibility for the groundskeeping and litter management.