

LIVING WILLOW THEATRE
PENLANOLE

Sun and Wind power Shakespeare

'probably the first static theatre facility in the UK
powered entirely by a stand alone energy system',

Philip Bowen The Living Willow Theatre



Key Points:

Three 125Wp, 12V PV Solar Panels

Rutland Furlmatic 1803 Windcharger (12V)

Combined installed capacity an estimated 0.85kW

Background

Shakespeare Link, an independent, professional theatre company located on an organic small holding at Penlanole, was founded in 1992 by Susanna Best and Phil Bowen. It achieved charitable status in 1994. In April 2006, the Living Willow Theatre, a scaled down, living version of The Globe Theatre, was planted and became the home of Shakespeare Link.

Rationale

The Living Willow Theatre is an entertainment and educational facility developed by the community, for the community. It is renowned for its environmentally sound, holistic identity. To build on this ethos, the aim of the project was to develop a stand alone energy system to:

- power the stage lighting and sound in the Living Willow Theatre and Hay Barn (wet weather cover)
- power tools used by volunteers
- provide lighting and power for simple household appliances within the converted stable block (workshop space, reference library and costume store)



Costs and Funding Sources

Total equipment cost £4,993 for an estimated installed capacity of 0.85kW

Total Project Cost (including VAT, installation/labour, generator tower, ancillary items and concrete) £7,410

Grant was provided by the Energy for Sustainable Communities (ESC) Project run by Severn Wye Energy Agency on behalf of Glasu. The ESC Project was financed through Objective 2 Structural Funds of the European Union. Match funding was provided by volunteer time, funding from the Bryant Trust and Shakespeare Link's own resources.

Technology

Three 125Wp polycrystalline cell, white tedlar universal frame LoPro J-Box MC 12V PV panels

Due to the variability of sunlight, PV modules are normally connected to charge batteries for DC stand alone systems, or connected to mains grid (AC) through an inverter. They are maintenance free, do not cause any noise or pollution and produce power even under an overcast sky. They are quick and easy to install with little site preparation and the modular design allows for easy expansion of the system.

Rutland Furlmatic 1803 Windcharger - Generates 36W @ 11mph, 340W @ 22mph up to 750W peak, cut in speed 6 mph, 12V, 1.8m rotor diameter. If the wind speed increases above 33mph, the furling tail progressively turns the turbine out of the wind. This is a 3-bladed turbine with a composite glass fibre construction. It is a powerful battery charger and can be used in hybrid systems with solar panels.

Two Rolls Solar 500 6V, 963Ah (c100) batteries

2kW 12V sine wave inverter 0-100A charger

Controller and display

The estimated installed capacity of the turbine and the PV cells is 0.85kW. This is sufficient capacity to provide lighting and sound for productions in the Living Willow Theatre and the Hay Barn. It also provides electricity for power tools and use of the converted stable block.

Interpretation

The ESC project has funded an interpretation board that provides details of the system and gives information about the technology used on site.

For Further Information



Shakespeare Link, The Living Willow Theatre, Penlanole, Llanwrthwl, Nr Llandrindod Wells, Powys LD1 6NN
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THEATR YR HELYG BYW
PENLANOLE

Haul a Gwynt Teg i Shakespeare

'mwy na thebyg dyma'r theatr sefydlog gyntaf yng ngwledydd Prydain sy'n derbyn ei thrydan i gyd o system ynni annibynnol'

Phil Bowen Theatr yr Helyg Byw



Pwyntiau Allweddol:

Tri Phanel Haul Ffotoltaidd 125Wp, 12V

Llwythwr Gwynt Rutland Furlmatic 1803 12V

Gallu cyfunol i gynhyrchu trydan amcangyfrifedig o 0.85kW

Cefndir

Cafodd Shakespeare Link, cwmni theatr proffesiynol annibynnol sy'n gweithredu ar dyddyn organig ym mhentref Penlanole, ei sefydlu ym 1992 gan Susanna Best a Phil Bowen. Enillodd statws elusennol ym 1994. Ym mis Ebrill 2006 fe blannwyd Theatr yr Helyg Byw, sef fersiwn fyw ar raddfa fechan o Theatr y Globe, a ddaeth yn gartref i Shakespeare Link.

Rhesymwaith

Canolfan adloniant ac addysg yw Theatr yr Helyg Byw, a ddatblygwyd gan y gymuned er lles y gymuned. Mae wedi ennill enw da oherwydd ei hunaniaeth gyfannol, amgylcheddol gadarnhaol. Nod y prosiect oedd adeiladu ar sail yr ethos hwn trwy ddatblygu system ynni annibynnol er mwyn:

- rhedeg goleuadau a sain llwyfan Theatr yr Helyg Byw a'r Sgubor Wair (lle dan do ar gyfer tywydd gwlyb)
- rhedeg yr offer trydan a ddefnyddir gan y gwirfoddolwyr
- sicrhau golau a thrydan ar gyfer taclau cartref syml yn y stablau addasedig (y gweithdy, y llyfrgell gyfeirio a storfa'r gwisgoedd)



Costau a Ffynonellau'r Cyllid

Costiodd yr holl gyfarpar £4,993 ar gyfer capasiti cynhyrchu trydan amcangyfrifedig o 0.85kW

Cyfanswm Cost y Prosiect (gan gynnwys TAW, gosod/llafur, tŵr generadur, eitemau ategol a choncrît) £7,410

Darparwyd grant gan Brosiect Ynni i Gymunedau Cynaliadwy (ESC) a weithredir gan Asiantaeth Ynni Hafren Gwy ar ran Glasu. Ariannwyd Prosiect ESC trwy Gronfeydd Strwythurol Amcan 2 yr Undeb Ewropeaidd. Darparwyd cyllid cyfatebol trwy amser gwirfoddolwyr, cyllid oddi wrth Ymddiriedolaeth Bryant ac adnoddau Shakespeare Link ei hun.

Technoleg

Tri phanel ffotoltaidd LoPro J-Box MC 12V 125Wp, â chelloedd polygrisialaidd, â ffrâm gyffredinol o ddeunydd tedlar gwyn

Gan fod nerth goleuni'r haul yn amrywio, mae modwlau PV yn arfer cael eu cysylltu â batris gwefru ar gyfer systemau DC annibynnol, neu â'r prif rwydwaith cyflenwi (AC) trwy wrthdröydd. 'Does dim angen gwaith cynnal a chadw arnynt, 'dydyn nhw ddim yn achosi sŵn na llygredd, ac maen nhw'n cynhyrchu trydan hyd yn oed dan wybren gymylog. Gellir eu gosod yn gyflym ac yn ddi-drafferth, 'does dim angen llawer o waith paratoi ar y safle, ac mae'r dyluniad modwlar yn ei gwneud hi'n hawdd i helaethu'r system.

Llwythwr Gwynt Rutland Furlmatic 1803 – Yn cynhyrchu 36W @ 11 fya, 340W @ 22 fya hyd at gynnyrch brig o 750W, cyflymder cysylltu 6 mya, 12V, rotor 1.8m ar ei draws. Os yw cyflymder y gwynt yn codi'n uwch na 33 mya, mae'r gynffon blygu'n graddol droi'r tyrbein allan o'r gwynt. Tyrbein 3 llafn yw hyn wedi'i adeiladu'n gyfansawdd o wydr ffibr. Mae'n llwythwr batris grymus, a gellir ei ddefnyddio mewn systemau cymysgryw ar y cyd â phaneli ynni haul.

Dau fatri Rolls Solar 500 6V, 963Ah (c100)

Gwefrydd 2kW 12V â gwrthdröydd sindon 0-100A

Rheolydd ac arddangosydd

Amcangyfrifir mai capasiti gosod y tyrbein a'r celloedd PV yw 0.85kW. Mae hyn yn ddigon i ddarparu'r goleuadau a'r sain ar gyfer cynrychiadau yn Theatr yr Helyg Byw a'r Sgubor Wair. Yn ogystal mae'n darparu ynni ar gyfer offer trydanol a gweithgareddau yn y stablau addasedig.

Dehongli

Mae prosiect ESC wedi ariannu bwrdd dehongli sy'n rhoi manylion am y system a gwybodaeth am y dechnoleg sy'n cael ei defnyddio ar y safle.

Am ragor o wybodaeth

the
living willow theatre
mid wales
shakespeare centre

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