



Crichton Castle



Operazione co-finanziata dall'Unione Europea, Fondo Europeo di Sviluppo Regionale, dallo Stato Italiano, dalla Confederazione elvetica e dai Cantoni nell'ambito del Programma di Cooperazione Interreg V-A Italia-Svizzera. (Codice progetto 603882)

Introduzione

Dating back to the 14th century, and now under the supervision of Historic Environment Scotland, Crichton Castle is situated in the luxuriant Scottish region of Midlothian, at the head of the River Tyne. In 2019, a new photovoltaic system was installed on the upper part of the castle to replace a previous installation.

Sources: [HiberAtlas \(I\)](#), [HiberAtlas \(II\)](#), [Julia Morrison \(HES\)](#)

Integrazione estetica

The photovoltaic modules are not visible from the area surrounding the castle, as they are hidden by the existing parapet. The result is that the historical nature of the castle and the surrounding landscape have not been affected by the works. As the installation is also reversable, it respects the aesthetic aspects of the monument.

Integrazione energetica

The photovoltaic energy produced is used to power the castle's heating and lighting systems, as the building is not connected to mains electricity. The photovoltaic modules are connected to a series of batteries (13.9 kWh) that can provide up to 26 hours of autonomous power. This is more than sufficient as the castle is open for just 6 hours a day.

Integrazione tecnologica

The photovoltaic modules (Kyocera) are connected to the level surface of the castle using the pre-existing mounting are connected to the cables present from the previous system. They are more efficient than the modules substituted (22.2%).

Processo decisionale

Due to its isolated position, Crichton Castle is not connected to mains power. This is why the electricity required to satisfy the energy demands of the building needed to be generated onsite. In the past, this was the task of a petrol-fuelled generator, a device that was noisy and polluting, and which required the castle staff to regularly handle inflammable substances. In 2005, the switch was made to photovoltaic technology, which covered the energy demands of the lighting system, a card reader and a fax, but not those of the heating system. For this reason, in 2019 the photovoltaic system was substituted with a larger and more efficient one, almost doubling the available power. The system of batteries was also updated, increasing the storage capacity. The photovoltaic installation at Crichton Castle is in line with the goals of Historic Environment Scotland to increase the energy from renewable sources.

Lessons learnt

Crichton Castle is an example of photovoltaic energy being introduced in protected areas and can be

replicated elsewhere.

The updating of the old photovoltaic system has permitted:

- a significant reduction in the use of the petrol-fuelled generator to power the heating system. The system in use is also due to be modified in order to reduce consumption and adapt it to the availability of solar energy.
- the lighting system to be used for longer periods of time without requiring the use of the generator.
- the installation of an increased number of lighting units throughout the site, which has improved the experience for visitors.
- the powering of a computer and an electric cash register in the office.

Measures were adopted to reduce to a minimum the quantity of waste produced by the project. The materials, modules and batteries substituted were conserved and are available for re-installation on another site, while most of the cabling, which was in good condition, was maintained.

DATI EDIFICIO

Tipologia progetto	Riqualificazione
Destinazione d'uso	Culturale
Vincolo	Edificio vincolato
Tecnica di costruzione edificio	Preindustriale
Indirizzo edificio	Crichton, Pathhead, United Kingdom

Sistemi BIPV

DATI SISTEMA BIPV

Anno integrazione BIPV	2019
Active material	Monocrystalline silicon
Trasparenza modulo	Opaco
Tecnologia modulo	Strati di vetro, FV riconoscibile, moduli standard
Potenza sistema [kWp]	1.8
Area sistema [m²]	5
Dimensioni modulo [mm]	1,427 x 652 x 35.7
Orientamento moduli	South-West
Inclinazione moduli [°]	25

COSTI SISTEMA BIPV

Stakeholders

Produttore componenti BIPV

KYOCERA Europe GmbH

Fritz-Müller-Straße 27, Esslingen, Germany

pv-support@kyocera.de +49 (0)711-93934998

https://uk.kyocera.com/products/solar_electric_systems/



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Installation of photovoltaic modules with the use of a crane © Historic Environment Scotland



System components © Historic Environment Scotland



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Autore caso studio:

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