

The feasibility of installing PV on some of the cycle network in Newtown.

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## 1. Executive summary

One of the aims of this Open Energy project was to investigate the renewable energy potential of the green spaces in Newtown, which means either space devoted to solar PV panels, or using the biomass in some way. This report investigate whether the green spaces could be used to deploy solar PV panels.

The conclusion is that PV panels do not appear to be appropriate for the green spaces. Without the Feed in Tariff, the economics for this scale of installation is very far from being viable, and constructing a man-made structure on the green spaces for mounting PV panels on is very unlikely to get planning permission, even if combined with some other function that provided additional benefits.

## 2. Introduction

Various sites around Newtown were investigated as possible Solar PV installations for a community scheme. To be viable as a community scheme the installation would have to be significantly larger than domestic scale to be able to absorb the overhead costs that would be associated with a community scheme.

The original remit of the project was to generate energy from the green spaces, and the obvious way of doing this is to put PV panels on some of these green spaces.

The green spaces are well used as recreation space, so there would be opposition to using these green spaces purely for energy generation, and so some way was sought to be able to combine solar panels with improving the amenity of these spaces. One option to do this would be to mount PV panels on a structure that had other beneficial use such as a covered walkway for cycling and walking.

This feasibility looks at the option of installing solar PV panels on one of the cycle paths across Dolerw Park

The document will cover:

- Planning issues
- Physical structure and installation
- Grid connection
- Overall financial viability

## 3. A Canopy over bike paths

A canopy over some of the bike paths in the town could provide a structure to mount PV panels on, and also provide other benefits. These would include that it would protect walkers and cyclists from the weather, and to enable these paths to be lit at night and hence make them more attractive to use after dark.

There is significant anecdotal evidence that many people are deterred from using these paths in winter because of the lack of lighting, and lighting could be incorporated with in the design as the electricity connection would already be present. This project would therefore support active travel as a secondary benefit.



#### **4. Choice of route**

The choice is dictated by a number of factors, the main ones being shade, ease of getting permissions, ease of grid connection, visual impact, and access to an electricity consumer.

Shade:

Many of the cycle paths through the town do experience significant shade. Cycle paths tend to skirt the perimeter of the open spaces and hence tend to be close to or under vegetation. This would seriously reduce any yield that would be obtained and strongly influences the choice of route.

Ease of getting landowner permissions:

Obtaining landowner permission is often one of the most challenging aspects of installing new solar PV installations and hence only routes that are in control of Open Newtown or the Town Council were considered. The route between Cambrian Bridge (by MacDonalds) and Llanllwchaiarn would be an ideal location as there are already requests for this to be better lit at night, but this is not on Open Newtown controlled land so would be difficult to get permissions.

Cost of connection:

The cost of an electricity connection is usually a significant cost within the total project costs. The only way of obtaining these costs is to ask for a quote from the DNO (in this case, Scottish Power). Only one request has been made for costings, for the route that has been investigated in most detail.

Visual Impact:

Visual impact is going to be a significant issue and difficult to mitigate. The nature of the green spaces and divisive history of renewable energy installations means that any significant structure on the green spaces would face significant opposition.

Access to an electricity consumer:

The economics of a PV installation are going to be significantly improved if the electricity could be used by an end user rather than exported to the grid. Unfortunately, there are very few large electricity consumers that would be easily connected to any of the cycle network without significantly increasing the connection cost.

#### **5. The Dolerw Bridge to Dolerw Park Drive route**

The route selected to investigate in more details is the path between Dolerw Bridge and Dolerw Park Drive.





This is one of the lesser shaded routes in the town and crosses Dolerw Park from Dolerw Bridge to the housing below Milford Road in Dolerw Park Drive.

As with any of the routes looked into there is not a suitable electricity consumer near enough for a direct wire to, so the electricity would have to just be sold to the grid.

Visual impact is probably more significant than some other routes that are more shaded.

## 6. Grid connection

Scottish Power were approached to see what the cost of connecting such a scheme to the grid would be. A budget estimate was received that to connect 150 kW would cost around £60,000 and a suitable connection point was available at the Dolerw Park Drive end of the path.

## 7. Planning permission

Planning advice was sought from the PCC planning department (pre-application advice) to see if such a development would get approval.

The main issue highlighted was the fact that it would visually break up the panorama of the open space in the middle of the town. This would have to be weighed up against other benefits, but the likelihood was that it would be rejected on these grounds.

Another issue would be whether it would be detrimental to the function of the floodplain to absorb flood water, although this was seen as a lesser potential problem.

The final issue would be possible light pollution if the scheme incorporated night lighting. This again was probably manageable if the lights had appropriate controls e.g. fitted with motion sensors so that they are not on all the time.

Overall the main issue was likely to be the visual impact. The natural landscape that the park provides is seen as being an intrinsic part of the value of the park. Any sort of man-made structure that broke up this feeling of space would likely receive significant opposition, even if that structure provide many benefits. This issue with planning is the main reason that investigation in this project was not taken further, and would apply to any significant installation of renewable energy on the Newtown green spaces.

## 8. Canopy design:

The design of such a canopy was investigated. There are various cycle canopies on the market designed for storage of bikes, and the canopy for a path could just be extended versions of these.

The need for groups to be able to walk or cycle along would dictate that a twin-legged style (as the example on the left) would be preferable to a single-legged style (as per on the right).

If the concept could be done, it could easily be fabricated and manufactured locally as there are metal fabrication companies available locally.



### 8.1.1. Approximate costings and payback

Approximate costs for the major components of the project were estimated as follows:

#### PV panels

The length of the path is approx. 250m. If the canopy was 4m wide, this would provide an area of about 1000 square meters, which would be sufficient for about 125 kW of installed PV capacity. Based on a price of £560 per installed kWh, the cost for this quantity of PV would be about £66,000

#### Canopy supply and erection

The cost of supply for a 250m pathway would be in the order of £150,000, and a further £20,000 was allowed for the cost of installation. This is based on the cost of commercial bike shelters (similar to those above) being about £1500 per 3m section. In reality, a bespoke solution, fabricated in Newtown would be sought but the price would be expected to be similar.

There would be other small costs to cover such as project management, legal costs, planning permission etc. The total capital cost would be likely to be in the region of £300,000.

Note that this is about 5 times more than building PV in an open field as in a normal commercial solar farm.

## 9. PV yield

The total capacity of the panels would be approx. 125 kW.

The yield of electricity from such as scheme can be calculated using the estimator tool at <https://ec.europa.eu/jrc/en/pvgis>.

This route has relatively little shading so the yield estimation should be fairly accurate and is estimated at approximately 120,000 kWh per year.

Typical household electricity usage (excluding heating) in the UK is about 3,731<sup>1</sup> kWh per year. This means that this installation would provide the equivalent of about 32 homes, i.e. about 0.6% of the houses in Newtown.

The income from this would be about £6,000 based on a grid wholesale price of 5.5p/kWh.

## 10. Financial viability.

The financial viability very poor, as can be expected if the income is £6,000 p.a. and the capital cost is £300,000.

This can be put into a financial model. This indicates that to be viable, either the cost would have to be subsidised by about 90%, or the income would have to rise by a factor of 4 to about 22p/kWh (which by coincidence, is roughly the retail price of electricity).

The clear message from the financial model is that a scheme such as this is not self-funding, and a large proportion of the installation cost would have to come from a grant. The scale of this would be in the order of £150,000 - £200,000 which would be the cost of the installation over and above the cost of installing that capacity of PV in the cheapest way.

## 11. Conclusion

A project of this type is very unlikely to happen in the near future.

Solar PV is expected to deliver a large proportion of our electricity in the future, but the trend is that this capacity is being built in remote locations that are of low agricultural value and visually well shielded.

In towns such as Newtown, PV is still appropriate for rooftop installation on domestic housing and other buildings that have high electricity consumption, but the economics and visual aspects do not work for any scheme that would incorporate solar PV panels within the green spaces of Newtown.

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