



## Examples On How To Calculate Your Photovoltaic Financial Return

E-Harbours towards sustainable, clean and energetic innovative harbour cities in the North Sea Region



## INTRODUCTION

In this report, we provide an economical assessment for a solar photovoltaic (PV) installation at different UK locations. The economical assessment is based on the SAP method set within the MCS certification scheme for UK. The assessment describes the payback time, annual revenue generated by the installation and the annual anticipated generation from the PVs.

In summary, the assessment provides an estimation of the annual earnings from a photovoltaic system. The economic contribution is provided by the following benefits:

- Energy savings from using electricity generated on site (cost reduction on electricity bill)
- Earnings from Generation Feed in Tariff (FIT) from Government scheme
- Selling surplus electricity fed into the Network.

## SIZE OF THE PROPOSED HOUSE PV INSTALLATION

This analysis is based on the following PV installation characteristics:

- Installation of an integrated 4kW PV-system
- Household with an annual electricity consumption of 4,800 kWh
- Average electricity price of 15.92p/kWh.
- PV of Crystalline solar type which is integrated into the building with slope of 35° and South orientation.

## STEPS TO CALCULATE YOUR PHOTOVOLTAIC FINANCIAL RETURN

Herewith, find the three steps to calculate your photovoltaic financial return:

***Note: The below method can only be used by the United Kingdom residents, but it can equally be used for any countries. You only need to define the solar generation, the income you are making from selling electricity to the grid network, the electrical savings from not importing from the grid and the government incentive income (if you have a local government incentive).***

1. Identify the table with the nearest location to your property (see below tables).
2. Estimate how much solar electricity you use at your house on a daily basis during daylight hours (e.g., say 30% of electricity is sold to the grid network and you are able to consume 70% of solar power in your own house). The higher the percentage of your own



consumption during daylight hours, the higher the financial return of your solar installation will be.

3. Identify your eligibility rate for the FIT (Fee-In-Tariff – A United Kingdom Government Incentive for green power), in among the below three options:

- The **lower rate** (6.85 p/kWh<sup>\*1</sup>) applies to installations that do not meet the energy efficiency requirement. – i.e., users are not able to provide an Energy Performance Certificate (EPC). Such EPC should be of at least level D (or above). The EPC must be of the building where the solar system is to be installed. Note that an EPC is a certificate demonstrating how efficient a given building is.
- The **middle rate** (13.41 p/kWh<sup>\*1</sup>) is for multiple installation tariff. – i.e., this applies to installations that first meet the energy efficiency requirement (best EPC certificate). It also applies when the nominated recipient for FIT payments is already a nominated recipient for 25 or more solar PV installations.
- The **higher rate** (14.90 p/kWh<sup>\*1</sup>) is the standard tariff for installations that meet the energy efficiency requirement and do not fall into the definition of multiple installations.

4. When you have your location, the percentage of solar power you would use during the day (not at night as there is no solar power available) and your FIT tariff, you just need to look into one of the tables below what will be your annual income and payback time. Below summarises an example:

- a. Say that you live in Stonehaven. Then the table that is nearest to your location is Aberdeen. So you need to use the Aberdeen table.
- b. Say that you sold 20% of your solar power to the grid.
- c. Say that you use 80% of solar power in your house (using your household equipment such as computer, washing machine, dish washer, etc).
- d. Say that you have the higher FIT rate.
- e. Then you will earn £1018.64/year.
- f. You will have a payback time of 9.8 years.

\*1: The aforementioned FIT Rates are available till March 2014 and subjected to change.

## ECONOMICAL ASSESSMENT OF A 4KWH PV INSTALLATION

The tables below presents the annual earnings and payback time period for a Photovoltaic system in accordance with the energy used/sold share and FIT tariff rate.

The green cells represent the conditions with payback time less than 10 years.



ABERDEEN							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1097.60	1043.70	805.70	9.1	9.6	12.4
10%	90%	1058.12	1004.22	766.22	9.5	10.0	13.1
20%	80%	1018.64	964.74	726.74	9.8	10.4	13.8
30%	70%	979.16	925.26	687.26	10.2	10.8	14.6
40%	60%	939.68	885.78	647.78	10.6	11.3	15.4
50%	50%	900.20	846.30	608.30	11.1	11.8	16.4
60%	40%	860.72	806.82	568.82	11.6	12.4	17.6

EDINBURGH							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1075.65	1022.83	789.59	9.3	9.8	12.7
10%	90%	1036.96	984.14	750.90	9.6	10.2	13.3
20%	80%	998.27	945.45	712.21	10.0	10.6	14.0
30%	70%	959.58	906.75	673.51	10.4	11.0	14.8
40%	60%	920.89	868.06	634.82	10.9	11.5	15.8
50%	50%	882.20	829.37	596.13	11.3	12.1	16.8
60%	40%	843.51	790.68	557.44	11.9	12.6	17.9

INVERNESS							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1038.02	987.04	761.96	9.6	10.1	13.1
10%	90%	1000.68	949.71	724.63	10.0	10.5	13.8
20%	80%	963.34	912.37	687.29	10.4	11.0	14.5
30%	70%	926.01	875.03	649.95	10.8	11.4	15.4
40%	60%	888.67	837.69	612.61	11.3	11.9	16.3
50%	50%	851.33	800.36	575.28	11.7	12.5	17.4
60%	40%	814.00	763.02	537.94	12.3	13.1	18.6



LEEDS							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1128.96	1073.52	828.72	8.9	9.3	12.1
10%	90%	1088.35	1032.91	788.11	9.2	9.7	12.7
20%	80%	1047.74	992.30	747.50	9.5	10.1	13.4
30%	70%	1007.14	951.70	706.90	9.9	10.5	14.1
40%	60%	966.53	911.09	666.29	10.3	11.0	15.0
50%	50%	925.92	870.48	625.68	10.8	11.5	16.0
60%	40%	885.31	829.87	585.07	11.3	12.1	17.1

LERWICK							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	969.02	921.44	711.32	10.3	10.9	14.1
10%	90%	934.17	886.58	676.46	10.7	11.3	14.8
20%	80%	899.31	851.73	641.61	11.1	11.7	15.6
30%	70%	864.46	816.87	606.75	11.6	12.2	16.5
40%	60%	829.60	782.02	571.90	12.1	12.8	17.5
50%	50%	794.75	747.16	537.04	12.6	13.4	18.6
60%	40%	759.89	712.31	502.19	13.2	14.0	19.9

LONDON							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1182.27	1124.21	867.85	8.5	8.9	11.5
10%	90%	1139.75	1081.69	825.33	8.8	9.2	12.1
20%	80%	1097.22	1039.16	782.80	9.1	9.6	12.8
30%	70%	1054.70	996.64	740.28	9.5	10.0	13.5
40%	60%	1012.17	954.11	697.75	9.9	10.5	14.3
50%	50%	969.64	911.59	655.23	10.3	11.0	15.3
60%	40%	927.12	869.06	612.70	10.8	11.5	16.3



NEWCASTLE							
Energy Percentage (%)		Annual earnings (£)			Payback time in years		
Sold	Used	higher rate	middle rate	lower rate	higher rate	middle rate	lower rate
0%	100%	1138.37	1082.47	835.63	8.8	9.2	12.0
10%	90%	1097.42	1041.52	794.68	9.1	9.6	12.6
20%	80%	1056.48	1000.57	753.73	9.5	10.0	13.3
30%	70%	1015.53	959.63	712.79	9.8	10.4	14.0
40%	60%	974.58	918.68	671.84	10.3	10.9	14.9
50%	50%	933.64	877.73	630.89	10.7	11.4	15.9
60%	40%	892.69	836.79	589.95	11.2	12.0	17.0

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