



NWEF - RHI

Workshop

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Deep joy- your Financial Director says you can have a maximum £60k to install some renewable energy systems.

Objective

To arrive at the best renewable energy solution.

Let's assume we have already discounted....

Wind turbines- they don't work in cities

Small scale hydro- the Irwell isn't up to it

Bio-mass- you have nowhere to store the fuel

Ground source – just isn't practical

Objective

You need to start pulling together some energy data

You have an office building with a nice flat roof- not over shaded in the centre of Manchester.

- You have recorded the following annual energy use
- Heating 900,000 kWh gas, 4.0 p/kWh
- Hot water 45,000 kWh gas 4.0 p/kWh
- Electricity 800,000 kWh elec 9.5 p/kWh

The building is occupied 52 weeks of the year

FiTs and RHI

You know you can get the following Government support.

Energy Source Feed-In Tariff	Scale	Tariff (p/kWh)	Duration (years)
Solar PV	≤4 kW new	37.8	25
Solar PV	≤4 kW retrofit	43.3	25
Solar PV	>4-10kW	37.8	25
Solar PV	>10 - 100kW	32.9	25
Renewable Heat incentive			
Solar thermal	≤200 kW retrofit	8.5	20

I feel a spreadsheet coming on



Base Data

You obtain these figures from the renewables suppliers

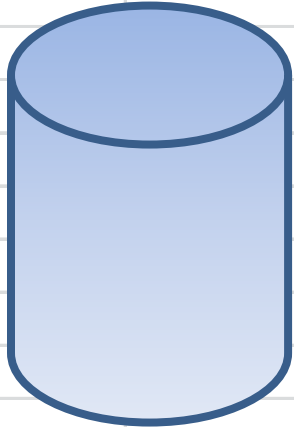
				Base data			
PV	Cost	600	per m2	Solar thermal	Cost	£1,000	per m2
	Peak output	150	W/m2		Peak output	450	W/m2
	Generation	120	kWh/m2		Generation	400	kWh/m2
	Carbon saved	0.06408	tonnes		Carbon saved	0.08	tonnes
FiTs	≤4 kW new	37.8	p/kWh	RHI	≤200 kW retrofit	8.5	p/kWh
	≤4 kW retrofit	43.3	p/kWh				
	>4-10kW	37.8	p/kWh				
	>10 - 100kW	32.9	p/kWh				
Energy cost	Electricity	9.5	p/kWh	Energy cost	Gas	4.0	p/kWh
Sell back	Electricity	2.5	p/kWh				

Option 1 – all PV

Why?

Because PV has the best tariffs

Option 1	PV system						
	Capital cost		£60,000				
	Panel area		89 m ²				
	Peak output		13 kW				
	Annual generation		10,667 kWh				
	Energy cost saved	£	709				
	Energy sold	£	80				
	Feed in Tarrif	£	3,509				
	Total cost benefit	£	4,299				
	Payback		14 Years				



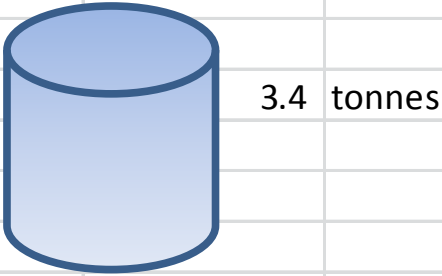
5.7 tonnes

Option 2 – Maximum solar thermal

Why?

Because gas is set to rise more than electricity

Option 2	Solar thermal						
	Capital cost		£60,000				
	Panel area		67 m ²				
	Peak output		30 kW				
	Annual generation		26,667 kWh	gross			
	Annual generation		18,667 kWh	useful			
	Energy cost saved	£	747				
	Feed in Tarrif	£	2,267				
	Total cost benefit	£	3,013				
	Payback		20 Years				

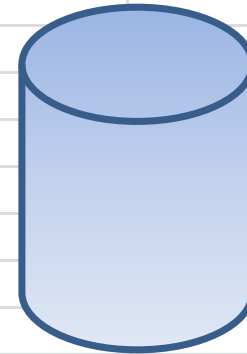


Option 3 – Maximise the grants

Why?

Because the FiTs and RHI are worth more than the energy saved.

Option 3	Combined system						
PV	Capital cost	£	18,000				
	Panel area		27 m ²				
	Peak output		4 kW				
	Annual generation		3,200 kWh				
	Energy cost saved	£	304				
	Energy sold		nil				
	Feed in Tarrif	£	1,386				
Solar thermal	Capital cost	£	44,000				
	Panel area		49 m ²				
	Peak output		22 kW				
	Annual generation		19,556 kWh				
	Energy cost saved	£	704				
	Feed in Tarrif	£	1,662				
	Total cost benefit	£	4,056				
	Payback		15 Years				



5.3 tonnes

Conclusion to this exercise

