Tewkesbury Leisure Centre: Conversion from Gas to Heat Pump for Space & Water Heating, linked to Solar PV

Heat Pump Scenario	Data	HP Notes
Current Annual Heat Demand - Gas in kWh	1,632,377	N/A: modern control systems in place as TLC is a new build
Demand Reduction (DR) from time savings	0	
Demand Reduction from temp savings (after savings from time reductions applied)	0	N/A: modern control systems in place as TLC is a new build
New potential demand from DR savings	1,632,377	
Demand after Combustion losses removed	1,469,139	Moderen Plant assumed at 90% efficient
COP of A-2-A	4	Space heating assumed at 35% for pool area & 35% for all other areas
COP of A-2-W	3	Pool heating demand assumed to be 20% max of total heating consumption
Demand of A-2-A	257,099	70% of total current gas consumption
Demand of A-2-W	146,914	30% of total current gas consumption
Total New Heat Demand - kWh	**404,013**	25% of current gas demand
Assumed cost of gas/kWh (incl. Climate Chage Levy	2.24	recaulculated based on 2017 unit rate (p/kWh)
Assumed cost of elec/kWh (incl. Climate Chage Levy	12.8	based on pre CCL 2019 data
Estimated current annual operating cost	£36,565	
Estimated annual operating cost of new system	£51,714	
Potential revenue - Renewable Heat Incentive (2.75p/kWh)	£11,110	Worth considering Ground Source HP as RHI returns significantly higher, although install costs higher
Total potential annual cost benefit	-£4,038	Business Case requires PV savings from avoided imported elec
Current Annual Emissions from gas consumption	339.14	
Estimated Annual Emissions from Heat Pump system	127.66	using 2019 conversion factors
Tonnes CO2e annual saving	**211.48**	**62.35%** reduction in emissions

Tewkesbury Leisure Centre

Solar PV Impact : Heat Pump Emissions Off-set (2030 Projected Emissions)

System Sizing by Area

Area required	2,250 m2
Estimated capacity	450.00 kWp

System Capacity & Export

PV system chosen capacity	450 kWp
Solar collection factor (shading)	100 %
Current electricity tariff	12.8 p/kWh
kWh used on-site (offset)	80 %
Deemed export rate	20 %

Export Generation

Bonus for exported units	5.5 p/kWh

Generation Breakdown

- Annual Generation	405,000	kWh
- Offset units	324,000	kWh (80% est)
- Exported units	81,000	kWh

Annual Revenue Breakdown

Export bonus payment	£	4,455
Potential Import savings	£	41,472
Total Benefit	**£**	**45,927**

Economics

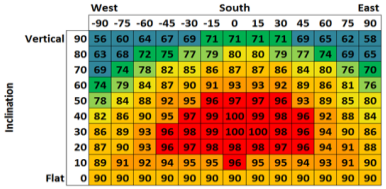
Full installed COST	£	315,000
Cost per kWp	£	700
Basic ROI		14.6%
Simple Payback	**6.9**	**years**

Panel Data

Panel type	Mid Performance
Specific peak output	200 W/m2
Annual output	900 kWh/kWp

CO2e Off-set of Heat Pump demand: Based on projected electricity emissions in 2030

Scenario	T/CO2e	Equiv Elec kWh
Based on projected 2030 emission factor for electricity	39.19	404,013



Likely Installed Costs (excl. any necessary infrastructure costs)

Solar PV - 25kW	£ 1,000	/kWp
Solar PV - 100k	£ 800	/kWp
Solar PV - 250k	£ 700	/kWp