

Small Scale Hydro Calculator

Name/Location of Watercourse:

Intake Elevation (m)	400	Kinematic Viscosity	1.31E-06
Turbine Elevation (m)	250	Roughness Coef (mm)	0.003
Head (m)	150		
Pipe Length (m)	600		
Hydraulic Gradient	0.250		
Turbine Eff. (%)	80		

Low Flows Summary

Annual	Monthly														
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec			
Annual mean flow	0.055														
Annual Q95 (m³/s)	0.032														
P (%)	Q (m³/s)														
1	5	0.201	5	0.298	0.299	0.228	0.144	0.099	0.078	0.089	0.133	0.19	0.241	0.253	0.293
2	10	0.136	10	0.208	0.179	0.159	0.1	0.066	0.048	0.06	0.089	0.126	0.186	0.187	0.217
3	20	0.082	20	0.136	0.108	0.101	0.061	0.036	0.028	0.034	0.05	0.075	0.115	0.117	0.139
4	30	0.055	30	0.086	0.077	0.073	0.041	0.022	0.019	0.022	0.031	0.048	0.08	0.083	0.097
5	40	0.039	40	0.071	0.057	0.055	0.031	0.016	0.014	0.015	0.021	0.033	0.057	0.065	0.072
6	50	0.028	50	0.053	0.043	0.044	0.025	0.012	0.01	0.01	0.014	0.023	0.043	0.049	0.052
7	60	0.02	60	0.04	0.032	0.034	0.02	0.009	0.008	0.007	0.01	0.015	0.032	0.036	0.038
8	70	0.014	70	0.03	0.024	0.025	0.016	0.007	0.006	0.005	0.007	0.011	0.023	0.027	0.028
9	80	0.009	80	0.021	0.017	0.018	0.012	0.006	0.004	0.004	0.005	0.006	0.015	0.02	0.02
10	90	0.005	90	0.014	0.011	0.013	0.008	0.004	0.003	0.003	0.003	0.004	0.009	0.014	0.014
11	95	0.003	95	0.01	0.008	0.01	0.007	0.003	0.002	0.002	0.002	0.003	0.007	0.01	0.01
12	99	0.002	99	0.007	0.006	0.007	0.005	0.002	0.001	0.001	0.001	0.002	0.004	0.006	0.005

Cost of System

Sizing Turbine

Turbine Rating (kW)

Chosen Pipe Diameter (m)

Operational Range

Rated Flowrate (m³/s) 0.0637

Turbine Cut in flow 0.022298675

Cut out flow 0.0796381

Cost Breakdown

Est. Pipe Cost (per m) £94.45

Est. Cost of Pipe £56,667

Est. Cost of Turbine £231,400

Groundwork/Power House £35,000 include the costs for powerhouse

Transmission Distance (km) 11kV 33kV

Overhead Underground

Est. Transmission Cost £0.00

Est. CapEx £213,067

Est. OpEx £10,100

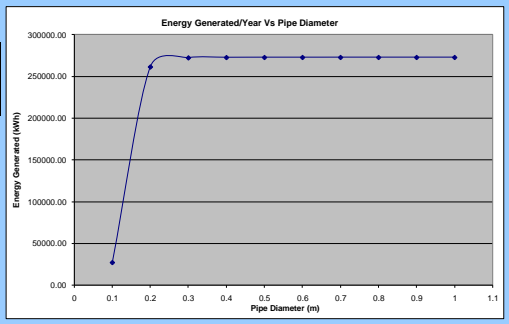
Feed-in Tariff

FTTS Range	Generation Price (£)	Export	Total
< 15kW	0.199	0.03	0.229
> 15 - 100 kW	0.178	0.03	0.208
> 100kW - 5MW	0.11	0.03	0.14
> 5MW - 5MW	0.045	0.03	0.075

Tariff Price £0.208

Revenue Forecast

Pipe Diameter (m)	Energy Generated per year (kWh)	Revenue per year (£)
0.1	26792.25	£5,500.09
0.2	261523.51	£54,936.89
0.3	272449.07	£56,669.41
0.4	272820.80	£56,746.73
0.5	272898.07	£56,762.80
0.6	272921.57	£56,767.69
0.7	272930.36	£56,769.51
0.8	272934.16	£56,770.30
0.9	272936.99	£56,770.69
1	272936.95	£56,770.88



Payback Period

Tax rate	35%	Turbine (kW)	75.00
Long term interest rate	7%	Pipe Dia. (m)	0.30
Long term inflation rate	2%		
% of profits to debt repayment	35%		

Year	Investment Balance	Generation Income	Debt Interest Repayment	Annual OpEx	Total Outgoings	Pre-Tax Profit/Loss	Net Profit/Loss	Cumulative Profit/Loss	Debt Capital Repayment
1	£213,067	£56,669	£14,915	£10,100	£25,015	£31,655	£20,676	-£192,491	£7,819
2	£205,248	£57,803	£14,367	£10,302	£24,669	£33,133	£21,537	-£170,955	£8,184
3	£197,064	£58,969	£13,796	£10,508	£24,303	£34,656	£22,577	-£148,428	£8,560
4	£188,504	£60,136	£13,195	£10,718	£23,913	£36,225	£23,546	-£125,882	£8,947
5	£179,557	£61,341	£12,569	£10,933	£23,502	£37,839	£24,596	-£103,327	£9,346
6	£170,210	£62,588	£11,915	£11,151	£23,066	£39,502	£25,676	-£80,711	£9,757
7	£160,464	£63,878	£11,232	£11,373	£22,646	£41,213	£26,788	-£58,062	£10,180
8	£150,224	£65,195	£10,519	£11,602	£22,121	£42,974	£27,931	-£35,466	£10,615
9	£139,495	£66,537	£9,776	£11,834	£21,610	£44,767	£29,112	-£12,811	£11,062
10	£128,267	£67,925	£9,002	£12,070	£21,072	£46,653	£30,324	£9,547	£11,523
11	£117,074	£69,360	£8,196	£12,312	£20,507	£48,573	£31,574	£21,120	£11,997
12	£105,075	£70,841	£7,353	£12,558	£19,913	£50,548	£28,856	£43,976	£12,485
13	£92,291	£72,367	£6,481	£12,809	£19,291	£52,580	£34,177	£78,153	£12,987
14	£78,603	£73,938	£5,572	£13,065	£18,638	£54,670	£35,536	£113,689	£13,504
15	£64,000	£75,554	£4,621	£13,337	£17,964	£56,801	£36,933	£150,622	£14,035
16	£48,484	£77,217	£3,645	£13,610	£17,238	£58,932	£38,371	£188,993	£14,581
17	£32,044	£78,928	£2,624	£13,885	£16,489	£61,036	£39,840	£228,834	£15,143
18	£14,672	£80,681	£1,564	£14,162	£15,705	£63,144	£41,369	£269,203	£15,720
19	£6,272	£82,476	£464	£14,441	£14,885	£65,245	£42,934	£310,137	£16,314
20	£0	£84,313	£0	£14,724	£14,714	£67,843	£44,598	£351,735	£0