

### Small Scale Hydro Calculator

Name/Location of Watercourse:

Intake Elevation (m)	<input type="text" value="400"/>	Kinematic Viscosity	<input type="text" value="1.31E-06"/>
Turbine Elevation (m)	<input type="text" value="250"/>	Roughness Coef (mm)	<input type="text" value="0.003"/>
Head (m)	<input type="text" value="150"/>		
Pipe Length (m)	<input type="text" value="1200"/>		
Hydraulic Gradient	<input type="text" value="0.1250"/>		
Turbine Eff. (%)	<input type="text" value="80"/>		

### Low Flows Summary

Annual	Monthly											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Annual mean flow	0.14											
Annual Q95 (m³/s)	0.024											
P (%)	5	10	20	30	40	50	60	70	80	90	95	99
Q (m³/s)	0.439	0.315	0.208	0.152	0.117	0.091	0.072	0.056	0.043	0.031	0.024	0.016
Monthly mean Q95	5	10	20	30	40	50	60	70	80	90	95	99
Q (m³/s)	0.23	0.20	0.18	0.13	0.093	0.063	0.055	0.074	0.10	0.16	0.20	0.23
Q (m³/s)	0.099	0.052	0.051	0.041	0.031	0.023	0.018	0.016	0.018	0.025	0.045	0.052

### Cost of System

**Sizing Turbine**

Turbine Rating (kW)

Chosen Pipe Diameter (m)

**Operational Range**

Rated Flowrate (m³/s) 0.0849

Turbine Cut in flow 0.029731566

Cut out flow 0.1061842

**Cost Breakdown**

Est. Pipe Cost (per m) £113.22

Est. Cost of Pipe £136,858

Est. Cost of Turbine £133,400

Groundwork/Power House £50,000

Transmission Distance (km) 11kV  33kV

Overhead  Underground

Est. Transmission Cost £580,000.00

Est. CapEx £989,258

Est. OpEx £11,850

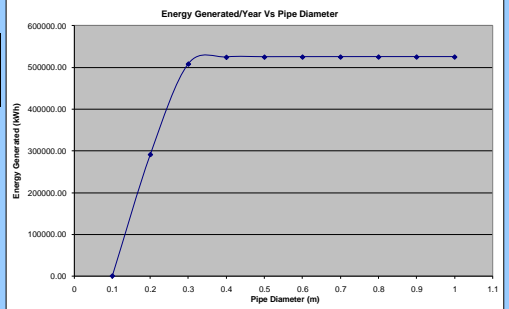
**Feed-in Tariff**

FTTS Range	Generation Price (£)	Export	Total
< 15kW	0.199	0.03	0.229
>15 - 100 kW	0.178	0.03	0.208
>100kW - 2MW	0.11	0.03	0.14
>2MW - 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	385.71	£80.23
0.2	291486.26	£60,629.14
0.3	508662.44	£105,801.79
0.4	524838.86	£109,166.48
0.5	525302.47	£109,262.91
0.6	525443.21	£109,292.19
0.7	525495.79	£109,303.12
0.8	525518.51	£109,307.85
0.9	525529.43	£109,310.12
1	525535.15	£109,311.31



### Payback Period

Tax rate	<input type="text" value="35"/>	%	Turbine (kW)	100.00
Long term interest rate	<input type="text" value="7"/>	%	Pipe Dia. (m)	0.40
Long term inflation rate	<input type="text" value="2"/>	%		
% of profits to debt repayment	<input type="text" value="100"/>	%		

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	£989,258	£109,166	£82,948	£11,850	£74,798	£34,368	£22,339	-£876,919	£22,339
2	£876,919	£111,350	£81,384	£12,087	£73,471	£37,879	£24,621	-£852,297	£24,621
3	£762,297	£114,577	£79,681	£12,369	£71,990	£41,587	£27,032	-£826,266	£27,032
4	£635,266	£118,849	£77,769	£12,679	£70,349	£45,924	£29,576	-£798,690	£29,576
5	£495,688	£124,165	£75,688	£12,927	£68,525	£49,640	£32,266	-£769,422	£32,266
6	£343,440	£129,520	£73,440	£13,183	£66,523	£54,006	£35,104	-£728,318	£35,104
7	£178,318	£134,938	£71,084	£13,455	£64,367	£58,674	£38,098	-£684,220	£38,098
8	£90,220	£140,409	£68,515	£13,742	£62,477	£63,471	£41,256	-£636,964	£41,256
9	£46,964	£145,936	£65,828	£14,044	£60,832	£68,994	£44,586	-£604,378	£44,586
10	£04,378	£151,519	£63,066	£14,361	£59,327	£74,665	£48,097	-£566,281	£48,097
11	£56,281	£157,158	£60,231	£14,693	£57,824	£80,496	£51,789	-£522,492	£51,789
12	£04,483	£162,852	£57,334	£15,039	£56,363	£86,467	£55,697	-£473,795	£55,697
13	£448,787	£168,601	£54,287	£15,398	£54,925	£92,076	£59,804	-£388,991	£59,804
14	£388,991	£174,404	£51,192	£15,769	£53,501	£97,823	£64,129	-£324,862	£64,129
15	£04,864	£180,261	£48,047	£16,151	£52,097	£103,716	£68,564	-£256,298	£68,564
16	£86,298	£186,172	£44,852	£16,544	£50,610	£109,745	£73,199	-£186,109	£73,199
17	£182,692	£192,137	£41,607	£16,947	£49,147	£115,900	£77,932	-£114,177	£77,932
18	£104,168	£198,156	£38,312	£17,360	£47,702	£122,200	£82,854	-£63,323	£82,854
19	£00,334	£204,229	£34,967	£17,782	£46,280	£128,622	£87,971	-£16,352	£87,971
20	£0	£210,356	£31,572	£18,213	£44,893	£135,169	£93,382	£0	£93,382