

### Small Scale Hydro Calculator

Name/Location of Watercourse:

Intake Elevation (m)  Kinematic Viscosity

Turbine Elevation (m)  Roughness Coef (mm)

Head (m)

Pipe Length (m)

Hydraulic Gradient

Turbine Eff. (%)

### 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 (%)	Q (m³/s)														
1	5	0.439	5	0.23 m³/s	0.20 m³/s	0.18 m³/s	0.13 m³/s	0.093 m³/s	0.063 m³/s	0.055 m³/s	0.074 m³/s	0.10 m³/s	0.16 m³/s	0.20 m³/s	0.23 m³/s
2	10	0.315	10	0.099 m³/s	0.092 m³/s	0.051 m³/s	0.041 m³/s	0.031 m³/s	0.023 m³/s	0.018 m³/s	0.016 m³/s	0.018 m³/s	0.025 m³/s	0.045 m³/s	0.052 m³/s
3	20	0.208	20	0.0616	0.0693	0.0505	0.0335	0.0265	0.0151	0.0154	0.023	0.0311	0.0478	0.0573	0.0645
4	30	0.152	30	0.491	0.453	0.388	0.255	0.189	0.118	0.098	0.156	0.227	0.35	0.425	0.5
5	40	0.117	40	0.353	0.289	0.273	0.182	0.119	0.085	0.064	0.1	0.15	0.231	0.291	0.34
6	50	0.091	50	0.266	0.214	0.21	0.142	0.09	0.067	0.05	0.073	0.109	0.18	0.215	0.252
7	60	0.072	60	0.215	0.169	0.169	0.116	0.074	0.055	0.042	0.054	0.08	0.141	0.175	0.2
8	70	0.056	70	0.18	0.136	0.136	0.098	0.063	0.046	0.037	0.042	0.062	0.111	0.143	0.162
9	80	0.043	80	0.147	0.11	0.111	0.083	0.054	0.04	0.033	0.035	0.048	0.086	0.116	0.131
10	90	0.031	90	0.095	0.075	0.077	0.061	0.041	0.031	0.025	0.024	0.031	0.05	0.074	0.089
11	95	0.024	95	0.071	0.06	0.06	0.049	0.035	0.026	0.021	0.019	0.022	0.035	0.055	0.065
12	99	0.016	99	0.069	0.052	0.051	0.041	0.031	0.023	0.018	0.016	0.018	0.025	0.045	0.052
				0.046	0.041	0.041	0.032	0.024	0.018	0.015	0.014	0.015	0.014	0.031	0.033

### Cost of System

**Sizing Turbine**

Turbine Rating (kW)

Chosen Pipe Diameter (m)

**Operational Range**

Rated Flowrate (m³/s)

Turbine Cut in flow  Cut out flow

**Cost Breakdown**

Est. Pipe Cost (per m)

Est. Cost of Pipe

Est. Cost of Turbine

Groundwork/Power House  include the costs for powerhouse

Transmission Distance (km)

Overhead

Underground

Est. Transmission Cost

Est. CapEx

Est. OpEx

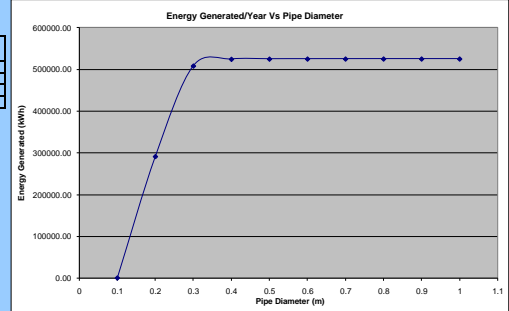
**Feed-in Tariff**

FTS 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

**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  %

Long term interest rate  %

Long term inflation rate  %

% of profits to debt repayment  %

Turbine (kW)

Pipe Dia. (m)

Year	Investment	Generation	Debt Interest	Annual OpEx	Total	Pre-Tax	Net	Cumulative	Debt Capital
	Balance	Income	Repayment		Outgoings	Profit/Loss	Profit/Loss	Profit/Loss	Repayment
1	£319,258	£109,166		£22,348	£34,198	£74,968	£48,720	-£270,529	£12,182
2	£307,076	£111,350	£21,495	£12,087	£33,582	£77,768	£50,549	-£219,980	£12,637
3	£294,438	£113,577	£20,611	£12,369	£32,938	£80,637	£52,414	-£167,566	£13,104
4	£281,335	£115,849	£19,693	£12,671	£32,269	£83,580	£54,321	-£113,236	£13,592
5	£267,753	£118,165	£18,743	£12,927	£31,570	£86,596	£56,267	-£56,951	£14,072
6	£253,681	£120,520	£17,758	£13,083	£30,841	£89,688	£58,297	-£1,346	£14,574
7	£239,107	£122,938	£16,737	£13,345	£30,083	£92,867	£60,367	£61,792	£15,085
8	£224,018	£125,398	£15,681	£13,612	£29,293	£96,105	£62,461	£124,111	£15,612
9	£208,401	£127,906	£14,588	£13,884	£28,472	£99,434	£64,632	£188,802	£16,158
10	£192,243	£130,464	£13,457	£14,162	£27,619	£102,845	£66,840	£255,652	£16,712
11	£175,531	£133,073	£12,287	£14,445	£26,742	£106,341	£69,174	£324,774	£17,283
12	£158,260	£135,735	£11,073	£14,734	£25,811	£109,923	£71,650	£395,224	£17,863
13	£140,388	£138,449	£9,827	£15,029	£24,855	£113,594	£73,835	£470,060	£18,458
14	£121,929	£141,218	£8,535	£15,329	£23,864	£117,354	£76,280	£546,340	£19,070
15	£102,869	£144,043	£7,200	£15,638	£22,836	£121,207	£78,781	£624,124	£19,698
16	£83,167	£146,924	£5,821	£15,949	£21,770	£125,154	£81,350	£703,474	£20,337
17	£62,825	£149,862	£4,388	£16,265	£20,665	£129,197	£83,978	£790,452	£20,995
18	£41,830	£152,859	£2,928	£16,593	£19,521	£133,338	£86,670	£877,122	£21,667
19	£20,163	£155,917	£1,411	£16,925	£18,335	£137,580	£89,421	£965,551	£22,357
20	£0	£159,035	£0	£17,263	£17,263	£141,772	£92,152	£1,058,701	£0