# **Questionnaire to prepare a quotation for your hydropower station**

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| Contact details | | | | |
| Company name | | | ............................................................................................ | |
| Person in charge | | | ............................................................................................ | |
| Street | | | ............................................................................................ | |
| Country/Zip Code/City | | | ............................................................................................ | |
| Phone | | | ............................................................................................ | |
| Fax | | | ............................................................................................ | |
| E-Mail | | | ............................................................................................ | |
|  | | | | |
| General project data | | | | |
| 1 | Project name | | ............................................................................................ | |
| 2 | Project location | | ............................................................................................ | |
|  | | | | |
| Turbine design data | | | | |
| 3 | Gross head  (elevation difference between upper water level (e.g. forebay/headpond/intake) and tailrace water level) | | | ......................... m |
| 4 | Net head  (gross head minus penstock losses (due to friction) and other losses) | | | ......................... m |
| 5 | Distance between turbine axis and tailrace water level | | | ......................... m |
| 6 | Elevation of the turbine axis (meters above sea level) | | | ..................... m.a.s.l. |
| 7 | Available water flow (discharge) | | | |
|  | Maximum flow: | ......................... m³/s during .............. months/year | | |
|  | Average flow: | ......................... m³/s during .............. months/year | | |
|  | Minimum flow: | ......................... m³/s during .............. months/year | | |
|  | * Please attach the flow duration curve or other river flow data | | | |

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| 8 | Total water discharge available for the turbines | | | | | | | | | | | | | ....................m³/s | | | | |
| 9 | Flow rate (discharge) per each turbine | | | | | | | | | | | | | ....................m³/s | | | | |
| 10 | Requested number of turbine units | | | | | | | | | | | | | ..................... | | | | |
| 11 | Preferred arrangement of turbine (if binding, otherwise WKV will quote the best solution) | | | | | | | | | | 🞏 horizontal | | | | | | | 🞏 vertical |
|  | | | | | | | | | | | | | | | | | | |
| Generator design data | | | | | | | | | | | | | | | | | | |
| 12 | Preferred voltage | .............................. kV | | | | | | | | | | | | | | | | |
| 13 | Preferred speed | .............................. rpm | | | | | | | | | | | | | | | | |
| 14 | Adjustable voltage range | …………………………… (e.g. ± 5%) | | | | | | | | | | | | | | | | |
| 15 | Power factor (cos phi) | ………..lag, ………..lead | | | | | | | | | | | | | | | | |
| 16 | Preferred short circuit ratio (SCR) |  | | | | | | | | | | | | | | | | |
| 17 | Cooling type | 🞏 air cooled (IC01) | | | | | | | 🞏 water cooled (IC81W) | | | | | | | | | |
| 18 | Temperature of | Air:  Min:….….°C; Max:……..°C | | | | | | | Water:  Min:……….°C; Max:……….°C | | | | | | | | | |
| 19 | Req. Inertia | J =.............................. kg·m2 (GD2 ≙ 4·J) | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Waterways and Penstock | | | | | | | | | | | | | | | | | | |
|  | Describe the waterway towards the turbine | | | | | | | | | | | | | | | | | |
| 20 | * Channel length and square area: width: …..….m; depth: …..….m; length: …..….m * Please attach drawings of the channel (different sections) | | | | | | | | | | | | | | | | | |
| 21 | * Penstock data | | | | | | | | | | | | | | | | | |
|  |  | Section I | | | Section II | | | Section III | | | | | Section IV | | | | Section V | |
|  | * Penstock length | ............ m | | | ............ m | | | ............ m | | | | | ............ m | | | | .............. m | |
|  | * Internal diameter (penstock) | ......... mm | | | ......... mm | | | ......... mm | | | | | ......... mm | | | | ........... mm | |
|  | * Material | …………. | | | …………. | | | …………. | | | | | …………. | | | | ……………. | |
|  | * Wall thickness | ......... mm | | | ......... mm | | | ......... mm | | | | | ......... mm | | | | ........... mm | |
|  | * Maximum allowed pressure surge In the penstock | ………............. % | | | | | | | | | | | | | | | | |
|  | * Please attach detailed drawings of the penstock (different sections) | | | | | | | | | | | | | | | | | |
| 22 | * Is a surge tank provided? | | | 🞏 yes | | | 🞏 no | | |  | | | | | | | | |
|  | * If a surge tank has been planned, please attach dimensions and drawings | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Mode of operation | | | | | | | | | | | | | | | | | | |
| 23 | * The unit will feed a public grid (parallel operation only), which means that in case of grid failure, the consumers, e.g. a factory, cannot be supplied with power. | | | | | | | | | | | | | | | 🞏 | | |
| 24 | * The unit will be operated separately from the grid (isolated operation) and parallel to the national grid, which means that in case of grid failure, the consumers, e.g. a factory, can be supplied with power. | | | | | | | | | | | | | | | 🞏 | | |
| 25 | * The unit will be operated isolated from the national grid only. | | | | | | | | | | | | | | | 🞏 | | |
|  | * In case isolated operation is required, please fill out the additional questions on the last page | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Grid data | | | | | | | | | | | | | | | | | | |
| 26 | Grid voltage | | | | | | | | | | | ................................ kV | | | | | | |
| 27 | Grid frequency | | | | | | | | | | | ................................ Hz | | | | | | |
| 28 | Auxiliary voltage (low-voltage level) | | | | | | | | | | | ................................ V | | | | | | |
| 29 | Maximum allowed power output to the grid/consumers | | | | | | | | | | | ............................... kW | | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Expected scope of supply | | | | | | | | | | | | | | | | | | |
| Turbine | | | 🞏 | | | High-voltage switchgear | | | | | | | | | 🞏 | | | |
| Governor | | | 🞏 | | | Transformer | | | | | | | | | 🞏 | | | |
| Gearbox (if any) | | | 🞏 | | | Diesel Emergency Unit | | | | | | | | | 🞏 | | | |
| Generator | | | 🞏 | | | Powerhouse crane | | | | | | | | | 🞏 | | | |
| Low-voltage (control & protection) | | | 🞏 | | | Consulting service | | | | | | | | | 🞏 | | | |
| Medium-voltage switchgear | | | 🞏 | | |  | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Attachments | | | | | | | | | | | | | | | | | | |
| * Flow duration curve (FDC) or other river discharge data | | | | | | | | | | | | | | | 🞏 | | | |
| * Please attach drawings of the channel (different sections) | | | | | | | | | | | | | | | 🞏 | | | |
| * Please attach detailed drawings of the penstock (different sections) | | | | | | | | | | | | | | | 🞏 | | | |
| * If a surge tank has been planned, please attach dimensions and drawings | | | | | | | | | | | | | | | 🞏 | | | |
| * Electrical Single Line Diagram (SLD) | | | | | | | | | | | | | | | 🞏 | | | |
| * In case of an already existing hydropower station, please attach design drawings and pictures. | | | | | | | | | | | | | | | 🞏 | | | |
| * Also, if project drawings already exist, please attach these to your enquiry. | | | | | | | | | | | | | | | 🞏 | | | |
| Please fill out the questionnaire as much as possible. Only with sufficient data can WKV prepare a quotation. | | | | | | | | | | | | | | | | | | |

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| If isolated operation is required, please fill out the following | | | | |
| 1 | How many days per year is isolated operation required? | | ......................... days | |
| 2 | What is the max. load of the local grid (e.g. 500 kW)? | | ......................... kW | |
| 3 | What is the type of the consumers / load? For example: | | | |
|  | * Mostly households with [fluorescent](http://dict.leo.org/ende?lp=ende&p=DOKJAA&search=fluorescent&trestr=0x801) light, television, fridge, etc.? * Small factories with motors or machinery? * In case of Industry, what is the max. load (max. consume) and what type (e.g.motor, heater, stone breaker (washer))? | | 🞏 | | |
| 🞏 | | |
| Type: ……………  ......................... kW | | |
| 4 | What is the maximum load step (biggest load which will be switched on in one step?)E.g. heater with ........ kW or motor with ......... kW | | Type: ……………  ......................... kW | |
| 5 | What is the powerfactor of the local grid, e.g. | |  | |
|  | * During night time 0, ……. lag up to 0,………. lead * During day time 0, ……. lag up to 0,………. lead | |  | |
| 6 | Does the hydro operate in parallel with other small stations e.g. a diesel power station or any other type of power station? Please submit an overview of the grid (grid plan). | | 🞏 Yes 🞏 No | |
|  | Type of the other station (s) | ............................................................................................ | | |
|  | Output of the other station (s) | ......................... kW | | |
| 7 | What is the type of distribution lines? | | |  |
|  | Typical 3 wire – single conductor overhead line? | | | 🞏 |
|  | Insulated cables system | | | 🞏 |
| 8 | In case of grid parallel and isolated operation, what is required? | | |  |
|  | * After grid failure, the powerhouse shuts-down and restarts to build-up the isolated network? | | | 🞏 |
|  | * Uninterruptable operation from grid parallel to isolated operation and once grid is available automatic back-synchronization? | | | 🞏 |