# **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?
 | 🞏 |