

# KALIGANDAKI GORGE HYDROPOWER PROJECT

## SALIENT FEATURES

| SN             | FEATURES                                     | CHARACTERISTICS                      |
|----------------|--|--------------------------------------|
| <b>GENERAL</b> |  |                                      |
| 1              | Name of Project                              | Kaligandaki Gorge Hydropower Project |
| 2              | Type of the Scheme                           | Run of River                         |
| 3              | Catchment Area                               | 3,570 sq km                          |
| 4              | Net head                                     |                                      |
| 5              | Design Discharge                             | 39.07 m <sup>3</sup> /s              |
| 6              | Design Flood Discharge at Intake (1:100)     | 586.41 m <sup>3</sup> /s             |
| 7              | Design Flood Discharge at Powerhouse (1:100) | 723.19 m <sup>3</sup> /s             |
| 8              | Install Capacity                             | 164 MW                               |

## PROJECT LOCATION

|   |              |  |
|---|--------------|--|
| 1 | Latitude     | 280 31' 15" N to 280 36' 15" N   |
| 2 | Longitude    | 830 37' 15" E to 830 40' 00" E   |
| 3 | Project Area | Thasang and Annapurna Rural Municipality, Mustang District, Dhaulagiri Zone and Province 4 |

## TECHNICAL INFORMATION

|   |                               |       |
|---|-------------------------------|-------|
| 1 | <b>Cofferdam</b>              |       |
|   | Height above River Bed        | 3.0 m |
|   | First Phase Cofferdam Length  | 150 m |
|   | Second Phase Cofferdam Length | 160 m |

| SN       | FEATURES                               | CHARACTERISTICS                 |
|----------|--|---------------------------------|
| <b>2</b> | <b>Headworks and Intake Structures</b> |                                 |
|          | Weir Type                              | Free Flow Ogee Weir             |
|          | Weir Water Way Length                  | 40 m                            |
|          | Undersluice Water Way Length           | 2 no x 5.0 m                    |
|          | Crest Elevation of Weir                | 1870.36 m                       |
|          | Crest Level of Undersluice             | 1861.89 m                       |
|          | Crest Level of Intake                  | 1867.89 m                       |
|          | Undersluice Gates and Stoplogs         | 2 no x 5 m x 10 m               |
| <b>3</b> | <b>Intake</b>                          |                                 |
|          | Design Discharge                       | 39.07 m <sup>3</sup> /s         |
|          | Type                                   | Side Intake                     |
|          | No of units                            | 4                               |
|          | Length and Size                        | 3.5 m x 1.7 m                   |
| <b>4</b> | <b>Gravel Trap</b>                     |                                 |
|          | Type                                   | Underground, Vertical Flushing  |
|          | No of Units                            | 2                               |
|          | Dimension (Length x Width)             | 20.0 m x 8.0 m                  |
|          | Normal Flow Depth                      | 4.90 m                          |
|          | Particle Size to be settled            | >2 mm                           |
|          | Spillway Length                        | 20.0 m                          |
|          | Length of Flushing Tunnel              | 93 m                            |
|          | Size of Flushing Tunnel                | 2.5 m x 2.0 m                   |
| <b>5</b> | <b>Desander</b>                        |                                 |
|          | Type                                   | Underground, Vertical Flushing  |
|          | No of Units                            | 2                               |
|          | Dimension (Length x Width)             | 134 m x 16 m                    |
|          | Normal Flow Depth                      | 8.87 m                          |
|          | Inlet Transition Length                | 30 m                            |
|          | Outlet Transition Length               | 18 m                            |
|          | Particle Size to be settled            | > 0.2 mm                        |
|          | Length of Flushing Tunnel              | 270 m                           |
|          | Size of Flushing Tunnel                | 2.5 m x 1.3 m                   |
| <b>6</b> | <b>Headrace tunnel</b>                 |                                 |
|          | Shape Excavation                       | (Horse shoe), Lining (Circular) |
|          | Diameter of Tunnel up to Manifold      | 3.20 m                          |
|          | Length                                 | 38 m                            |
|          | Diameter of Tunnel beyond Manifold     | 4.50 m                          |
|          | Length                                 | 6.10 km                         |
|          | Invert level of Tunnel Inlet           | 1860.36 m                       |
|          | MOL at Tunnel Inlet                    | 1867.94 m                       |
|          | Type of Lining                         | Shotcrete, Concrete             |

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|----|---------------------------------------|-----------------------|
| 7  | <b>Surge Tank</b>                     |                       |
|    | Diameter                              | 12 m                  |
|    | Height                                | 41 m                  |
|    | Level of Surge Tank Crown             | 1885.80 m             |
|    | Steady State Water Level              | 1860.58 m             |
| 8  | <b>Penstock</b>                       |                       |
|    | Diameter                              | 3.8 m                 |
|    | Length                                | 1470 m                |
|    | Nos. of Branches near turbine         | 8                     |
|    | Diameter of Each Branch               | 1.30 m                |
| 9  | <b>Powerhouse</b>                     |                       |
|    | Type                                  | Semi-Underground      |
|    | Dimension                             | 61 m x 61 m x 33 m    |
|    | Floor Elevation                       | 1350.85 m             |
|    | Invert Level of Tailrace              | 1335.25 m             |
| 10 | <b>Turbine</b>                        |                       |
|    | Type of Turbine                       | Vertical Axis, Pelton |
|    | Number of Units                       | 8                     |
|    | Turbine Axis Level                    | EI 1342.75 m          |
|    | Installed Capacity                    | 164 MW                |
|    | Net Head                              | 511.05 m              |
|    | Turbine Efficiency                    | 91 %                  |
|    | Transformer Efficiency                | 96 %                  |
|    | Generator Efficiency                  | 96 %                  |
|    | Overall Efficiency                    | 83%                   |
| 11 | <b>Tailrace Canal</b>                 |                       |
|    | Type                                  | Rectangular           |
|    | Size                                  | 4 m x 3.5 m           |
|    | Length                                | 400 m                 |
|    | Invert Level of Tailrace Outlet       | 1334.45 m             |
|    | Tail Water Level (1:1000 Years Flood) | 1333.95 m             |
| 12 | <b>Switchyard</b>                     | 93 m x 67 m           |
|    | Size                                  | 8                     |
|    | Transformers                          |                       |
| 13 | <b>Transmission Line</b>              |                       |
|    | Transmission Voltage                  | 220 kV                |
|    | Line Length                           | 1.5 m                 |
|    | Connection Point                      | Dana Sub-station NEA  |

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|----|----------|-----------------|
|----|----------|-----------------|

### CURRENT STATUS OF THE PROJECT

|   |                         |   |
|---|-------------------------|---|
| 1 | Feasibility Study       | Completed                                   |
| 2 | Detailed Project Report | Completed                                   |
| 3 | EIA/IEE                 | Approval Process at Ministry of Environment |
| 4 | PPA and PPA Rate        | Approval Process at Ministry of Environment |
| 5 | Land Acquisition        | Completed                                   |

### DEVELOPMENT MODALITY

|   |                             |   |
|---|-----------------------------|---|
| 1 | Development modality        | BOOT Model  |
| 2 | Role of Government of Nepal | <ul style="list-style-type: none"> <li>■ Land acquisition, facilitation and project security</li> <li>■ Facilitating various legal approvals/permits for the smooth operations of the project like generation license, EIA approval</li> <li>■ Facilitation for FDI approval in fast track</li> <li>■ Facilitation in social mitigation</li> </ul>  |
| 3 | Role of Private Sector      | <ul style="list-style-type: none"> <li>■ Plan, design, finance, engineer, construct, and develop the envisioned facilities and other components of the project</li> <li>■ Operate, maintain and manage the project facility throughout the Concession Period</li> <li>■ Collection of revenues from the project during the Concession Period</li> <li>■ Handover to the Government after the Concession Period</li> </ul> |
| 4 | Development Period          |   |
|   | a. Pre-Construction Period  | 1 year  |
|   | b. Financial Closure        | 2 years   |
|   | c. Construction Period      | 5 years   |
|   | d. Concession Period        | 30 years  |

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|----|----------|-----------------|
|----|----------|-----------------|

### INDICATIVE FINANCIALS

|   |   |                     |
|---|---|---------------------|
| 1 | Total Project Cost (including Interest During Construction) | 269.50 Million US\$ |
| 2 | Interest Rate (including hedging cost)                      | 10%                 |
| 3 | Project IRR   | 15.16%              |
| 4 | Equity IRR  | 19.16%              |
| 5 | Project Benefit-Cost Ratio                                  | 1.77                |

### CONTACT DETAILS

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