Annex C: Project Key Technical Data

Project Feature	Technical Data
NAKAI DAM	
Type	Concrete Gravity: Roller Compacted or conventional placed concrete
Crest level	Not to exceed El 541.5 m
Foundation level	El 493 m (approx.)
Maximum height	39 m
Crest length	325 m
Spillway	
Design inflow 5,000 year flood peak inflow	8,630 m^3/s
Probable Maximum Flood (PMF) 24 hour peak inflow	15,984 m^3/s
Type of gates	Radial
Number of gates	No less than 4
Flap gates	Installed on at least 2 of the radial gates
Sill level of Spillway gates	El 526.85 m
Riparian Release	
Equipment	Energy dissipating valve
Capacity at Minimum Operating Level (MOL)	2 to 10 m^3/s
NAKAI SADDLE DAMS	
Type	Earth or earth and rockfill
Number	13
Crest level	El 542.25 m
Total crest length	4.4 km (approx.)
NAKAI-NAN THEUN CATCHMENT AREA	
Area to Nakai Dam site	4,013 km^2
Average annual runoff	7,526 million m^3
NAKAI RESERVOIR	
Surface Levels	
Full Supply Level (FSL)	El 538.0 m
MOL	El 525.5 m
Maximum Water Level (MWL)	Not to exceed El 538.4 m with 5,000 year flood peak inflow and with all spillway gates open
Size of gates	Approx. 9.0 m x 6.6 m
Allowable Velocities	
Maximum velocity through trashracks	1.2 m/s
TUNNELS	
Power Conduit Headrace Tunnel	
Diameter	8.8 m
Length	1,498.5 m
Maximum velocity	5.7 m/s
Type	Concrete lined
Power Conduit Surge Shaft	
Diameter	8.8 m and increasing
Height	125 m
Type	Concrete lined
Power Conduit Pressure Tunnel	
Diameter	7.15 – 8.80 m
Length	1141 m
Maximum velocity	5.7 m/s in concrete lined sections 8.6 m/s in steel lined sections
Type	Concrete and steel lined
MANIFOLD	
Pelton Units	
Branches	1 to 2
Length	Approx. 80m
Diameter	1 x 2.5 m to 2 x 1.8 m

Project Feature	Technical Data
Francis Units	
Branches	2 to 4
Length	Approx. 55 m
Diameter	2 x 5.1 m to 4 x 3.6 m
NAM THEUN 2 POWER STATION	
Type	External surface station
Distance upstream from Nakai Dam	Approx. 40 km
Approximate Size	Length 120 m x width 35 m x height 50 m (maximum)
Number of units	6
Rated net head	348 m
Francis Units	
Number of units	4
Axis	Vertical
Unit rate power output at generator	251.3 MW
Terminals	
Capacity at FSL	996 MW
Capacity at MOL	966 MW
Average annual generation	5,636 GWh
Synchronous speed	333 rpm
Transformers	Single Phase: 12 x 18/500 kV + 1 spare
Pelton Units	
Number of units	2
Axis	Vertical
Unit rate power output at generator	42.7 MW
Terminals	
Capacity at FSL & MOL	75 MW for sale to EDL plus at least 6.5 MW for non-revenue capacity
Average annual generation	300 GWh
Synchronous speed	375 rpm
Transformers	Three Phase: 2 x 6.6 kV/115 kV
POWER STATION TAILRACE CHANNEL	
Bottom Width	70.2 m
Length	340 m
Type	Open cut, shotcrete lined batters
Discharge capacity	345 m^3/s
REGULATING DAM	
Total crest length	360 m
Embankment Section	
Type	Earth and rockfill
Crest elevation	El 179.5 m with rock bund to El 180.5 m
Gate Structure & Dam	
Type	Concrete Gravity Dam
Crest Elevation	El 179.5 m
Gates & Releases	
Regulating Dam Downstream Channel Release	3 bottom sluice
Regulating Dam Riparian Release (Nam Kathang)	1 sluice
Regulating Dam Spillway (Nam Kathang)	4 bottom sluice
Regulating Dam Irrigation Release	1 radial – 5 m^3/s
REGULATING POND	
Live volume	At least 8 million m^3
FSL	El 178.0 m
DOWNSTREAM CHANNEL	
Type	Open cut (lined and unlined) and tunnel
Total length	27 km
Maximum discharge capacity	315 m^3/s (plus natural inflows)
Outfall	Xe Bang Fai
Lined section	
Location	From regulating dam to aeration weir and from aeration weir to tunnel entrance
Length	16.7 km

Project Feature	Technical Data
From Regulating Dam to Aeration Weir	
Distance	8.3 km
Type	Concrete/gabion/reno mattresses/rock lined
Bottom Width	20 m
Batters	2H: 1V
From Aeration Weir to Tunnel Entrance	
Distance	8.4 km
Type	unlined with selected rock protection
Unlined section	
Location	From tunnel exit to Xe Bang Fai confluence
Length	Approx. 9.4 km
Type	Unlined
Downstream Channel Tunnel	
Type	Concrete lined
Length	0.98 km
Diameter	Approx. 9.5 m
Xe Bang Fai Confluence	
Type	Rockfill batters protection
TRANSMISSION LINES	
500 kV Transmission Line	
Circuits	Double circuit AC, 3 x 1272 MCM ASCR
Origin	500/115 kV Nam Theun 2 Substation
Destination (ultimate)	EGAT's Roi Et 500 kV substation
Length (including 500 kV Mekong Crossing)	138 km
Length in Thailand (by EGAT)	159 km (from Mekong Crossing)
Height	Approx. 65 – 70 m
Voltage	500 kV
500 kV Mekong Crossing	
Location	Near Savannakhet
Circuits	Doulbe circuit AC, 3 x 1272 MCM ASCR
Towers	Two anchor towers, located inland from the river banks (one in Lao PDR, one in Thailand); Two suspension crossing tower, located on the river banks (one in Lao PDR, one in Thailand); and Two intermediate suspension tower, located in the river on the respective side of the international border (one in Lao PDR, one in Thailand).
Length (from the two anchor towers)	Approx. 2,400 m
Height	Approx. 80 m
Minimum clearance between the conductors and the maximum level of Mekong (100 years flood)	22 m
115 kV Transmission Line	
Circuits	Double circuit AC, 3 x 477 MCM
Origin	Nam Theun 2 500/115 kV Substation
Destination (ultimate)	Thakhek 115/22 kV Substation
Length	70 km
Voltage	115 kV
Height	Approx. 30 m
SUBSTATIONS	
Nam Theun 2 500/115 kV Substation	
Type	Outdoor, air insulated
Incoming circuits	2 from Nam Theun 2 Power Station
Outgoing Circuits	2 to 115/22 kV Nam Theun 2 Substation
Nam Theun 2 115/22 kV Substation	
Type	Outdoor, air insulated
Incoming circuits	2 from Nam Theun 2 500/115 kV Substation
Outgoing Circuits	2 to Thakhek 115/22 kV Substation
Local supply transformer	115/22 kV; 20 MVA
Thakhek 115/22 kV Substation (by EDL)	
Type	Outdoor, air insulated
Incoming circuits	2 from Nam Theun 2 115/22 kV substation and 2 from Nakon Phanom
Outgoing Circuits (future by EDL)	4 to Pakxan/Savannakhet
Local supply transformer	2 x 115/22 kV; 30 MVA each

Project Feature	Technical Data
22 kV switchgear (outdoor type)	12 circuits
Thakhek 22 kV distribution line	Future – by EDL
ROAD & BRIDGE WORKS	
Road – rehabilitated	76 km plus additional resettlement village access roads
Road – new	56.7km
Bridges – rehabilitated and new	Ban Thalang Bridge (over Nam Theun), Nam Nian, Nam Kathang, Nam Gnom, Ban Itak, Down-stream Channel, other locations
Nakai dam access road (new road)	15.4 km
Resettlement Roads (rehabilitation)	Approx. 30 km
RESIDENCE NAM THEUN	
Facilities	46 Permanent Houses 1 Guest House Miscellaneous Services