

TECH-6: Curriculum Vitae (CV) for Proposed Professional Staff

1. **Proposed Position:**

2. **Name of Firm:** Studio Ing. G. Pietrangeli s.r.l.

3. **Name of Staff:** **Alberto BEZZI**

4. **Date of Birth:** 15-05-1963 **Nationality:** Italian

5. **Education:** Master of Science, Civil & Hydraulic Engineering, University of Rome, 1991

6. **Membership of Professional Associations:**

Italian Consulting Engineers Register of Rome, n°16831 since 1992

7. **Other Training:**

Lecturer on Dams and Hydropower Development, Continuing Professional Education (CPE), Italian Consulting Engineers Register of Rome, 2014/2015

Various technical specialization courses, among which:

- Dams and Hydropower Development, Italian Consulting Engineers Register of Rome, 2014/2015

8. **Countries of Work Experience:** Albania, Bulgaria, Eritrea, Ethiopia, Italy, Nigeria, Sierra Leone, Tanzania, Turkey, Uganda, Zambia.

9. **Languages:**

	<i>Speaking</i>	<i>Reading</i>	<i>Writing</i>
English	Excellent	Excellent	Excellent
French	Fair	Excellent	Good
Italian	Mother Tongue		

10. **Employment Record:**

From: 1995 To: date

Employer: Studio Ing. G. Pietrangeli s.r.l.

Positions held:

From: 1991 To: 1995

Employer: FALC2000 S.r.l., Rome (Consortium of Civil Engineering Contractors)

Positions held: Civil & Hydraulic Engineer

11. **Detailed Tasks Assigned**

12. **Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned:**

BATOKA GORGE Hydro-Electric Scheme

Year: 2014 – in progress

Location: Zambia and Zimbabwe

Client: Zambezi River Authority

Main project features: Batoka Gorge (IP = 1600 MW) is a hydropower plant located on the Zambezi River between Victoria Falls and the existing Lake Kariba. The project is a trans-boundary plant having the following basic features:

- Batoka Dam (RCC Arch-Gravity Dam, H = 181 m, Crest Length = 767 m, Concrete volume V = 4 Mm3)
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- Spillway ($Q = 20.000 \text{ m}^3/\text{s}$, Radial gated on dam crest, No. 7 gates $14 \times 13 \text{ m}$)
- Headrace Tunnels (No. 4 (2+2) , $D = 8,9 \text{ m}$, $L = 250\text{---}450 \text{ m}$)
- Penstock Shaft (No. 4, $D = 7 \text{ m}$, $L = 120 \text{ m}$)
- Power House (No. 2, underground type, No. 4x2 Francis Turbines, $Q = 1000 \text{ m}^3/\text{s}$, $IP = 1600 \text{ MW}$)
- Transmission Lines ($L = 200 \text{ km} - 330 \text{ kV}$ in Zambia, $L = 140 \text{ km}$ 420 kV in Zimbabwe)

Position held:

Activities performed: Pre-feasibility study (Confirmation of scheme layout), Feasibility Study, Tender Design, Tender Documents

Bumbuna HEP Phase II - Hydroelectric Project

Year: 2014 – 2014

Location: Sierra Leone

Client: Salini Costruzioni S.p.A.

Beneficiary: Government of Sierra Leone

Main project features: The Bumbuna HEP – Phase 2, expansion works of the Bumbuna HPP, consist of:

BUMBUNA EXTENSION HEP:

- Power Intake (Forebay = 150 m , Intake = 8 m)
- Waterway Tunnel ($L = 1900 \text{ m}$, $D = 6 \text{ m}$)
- Penstock ($L = 500 \text{ m}$, $D = 4,8 \text{ m}$)
- Power house (No. 4 Francis turbines $4 \times 33 \text{ MW}$, max head = 125 m , max discharge = $132 \text{ m}^3/\text{s}$, $IP = 132 \text{ MW}$)
- Tailrace Canal ($L = 1670 \text{ m}$, Bottom width = 16 m)

Moreover the study including also the upstream Yiben HPP comprehending:

YIBEN HEP:

- RCC Dam ($H = 86 \text{ m}$, Crest Length = 665 m , Concrete volume $V = 0,95 \text{ Mm}^3$)
- Power house (No. 2 Francis turbines $2 \times 33 \text{ MW}$, max head = 81 m , max discharge = $47 \text{ m}^3/\text{s}$, $IP = 65 \text{ MW}$)

Position held:

Activities performed: Feasibility study

MITA HILLS dam refurbishment and upgrading

Year: 2011 – 2012

Location: Zambia

Client: Lunsenfwa Hydropower Company

Main project features: The upgrade of the existing Mita Hills dam (Earthfill/Rockfill, $H = 40 \text{ m}$, $L = 330 \text{ m}$) includes what follows to increase the reservoir volume and for refurbishment:

- Current set-up / proposed set-up :
 - Reservoir ($V_{\text{RES}} = 680 \text{ Mm}^3$ / $V_{\text{RES}} = 850 \text{ Mm}^3$)
 - Spillway ($N^{\circ}2$ gates $9 \times 9 \text{ m}$, $N^{\circ}2$ erodible fill embankments $L = 20 \text{ m}$ / $N^{\circ}2$ gates $10 \times 12 \text{ m}$, $N^{\circ}1$ emergency fuse gate $L = 40 \text{ m}$)
- Intake Tower ($H = 80 \text{ m}$, $N^{\circ}2$ Radial Gates)

Position held:

Activities performed: Assessment of the Existing Plant, Pre-Feasibility Studies, Feasibility Design for the refurbishment and upgrading

GRAND ETHIOPIAN RENAISSANCE Hydroelectric Power Plant ($IP = 6,000 \text{ MW}$)

Year: 2010 – in progress

Location: Ethiopia

Client: Salini Costruttori S.p.A.; Beneficiary : EEPKO

Main project features: The hydroelectric power plant ($IP = 6,000 \text{ MW}$) includes:

- Reservoir ($V_{\text{RES}} = 63,000 \text{ Mm}^3$)
 - Main dam (Gravity RCC type, $H = 155 \text{ m}$, $L = 1,780 \text{ m}$)
 - Saddle dam (Rockfill dam type, $H = 45 \text{ m}$, $L = 4,800 \text{ m}$)
 - Spillway (No. 6 gates $14 \times 15,5 \text{ m}$, $Q = 10,500 \text{ m}^3/\text{s}$)
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- Power Waterways (Penstocks No 15, L= 180 m, D = 8.5 m)
- Diversion culverts (N°4, L =210 m, D = 8 m, Diversion Flood = 3,000 m³/s)
- Powerhouses (No. 2, Outdoor, Q=1,550m³/s, Design Head=135 m, N°10+6 Francis Turbines, Energy production = 15700 GWh/year)
- Switchyard (No. 2, No. 15 bays 400 kV, No. 15+30 transf. 20/400 kV)
- Bridge (L =260 m, W = 10 m, Max span length = 72 m, Piers No 6)

Position held:

Activities performed: Feasibility study, Basic Design, Final Design (Level 1), Construction Design (Level 2), Supervision of Construction for the EPC Contractor

MUCHINGA Hydropower Plant (IP = 255 MW)

Year: 2010 - 2012

Location: Zambia

Client: Muchinga Power Company

Main project features: Hydropower project (IP = 255 MW) exploiting the waters regulated by the existing Mita Hills dam, including the following works:

- Mkushi Dam (Arch type, H = 120 m, L = 350 m)
- N°2 Power Tunnels (L= 9+8 km, D = 5)
- Penstocks (N°3, D = 2.2 m, L = 1,000 m)
- Power House: (Outdoor, N° 3 x 85MW Pelton Turbines)

Position held:

Activities performed: Conceptual Design, Feasibility study (up to investigations)

GIBE IV Hydroelectric Power Plant (IP = 1,480 MW)

Year: 2008 - 2009

Location: Ethiopia

Client: Salini Costruttori S.p.A., Beneficiary : EEPCO

Main project features: Gibe IV (IP = 1,480 MW) is the 4th stage of the Gibe-Omo cascade and includes the following works :

- RCC Gravity Dam (H = 165 m, L = 725)
- Gated Spillway (N°9 radial gates, Dimen. 12x19, Q = 22,000 m³/s)
- Power Waterways (No 2, L = 0.8 km, D = 12 m)
- D/S Rockfill Cofferdam (H = 27 m, L = 117 m)
- Outdoor Power House (N°8x185 MW Francis turbines)

Position held:

Activities performed: Reconnaissance Project, Feasibility Study

KYOGA-NILE HPPs Cascade (Kamdini + Kibaa + Murchison, IP_tot = 6,010 MW)

Year: 2008 - 2009

Location: Uganda

Client: Salini Costruttori S.p.A.; Beneficiary: Ministry of Water and Environment

Main project features: The basic features of the cascade are the following.

Kamdini (Karuma) is the 1st plant of the Kyoga-Nile HPPs cascade and includes :

- Rockfill Dam (H = 30 m, L = 480 m, V_{res} = 68 Mm³)
- Headrace Canals (L = 5.7 km, Bottom width =15 m)
- Tailrace Tunnels (N° 2, L = 4 km, D = 14 m)
- Underground PH (N°10 Francis turbines, IP = 1,260 MW, H_{net} = 64 m)

Kibaa is the 2nd plant of the Kyoga-Nile cascade and includes :

- Rockfill Dam (H = 53 m, L = 2,150 m, V_{RES} = 300 Mm³)
- Headrace Canals (L = 10 km, Bottom width = 14 m)
- Tailrace Tunnels (N°2, L = 4.5 km, D = 14 m)
- Underground PH (N°16 Francis turbines, IP = 2,600 MW, H_{net} = 131 m)

Murchison is the 3th plant of the Kyoga-Nile cascade and includes :

- Rockfill Dam (H = 44 m, L = 1,300m, V_{RES} = 170 Mm³)
 - Headrace Canal (Bottom Width = 14 m; L = 0.7 km)
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- Tailrace Tunnels (N° 2, L = 5.5 km, D= 14 m)
- Underground PH (N° 14 Francis Turbines, IP = 2,150 MW, H_{net} = 107 m)

Position held:

Activities performed: Pre-feasibility study, Feasibility study

MAMBILLA Hydroelectric Power Plant (IP = 4,000 MW)

Year: 2008 - 2009

Location: Nigeria

Client: Salini Costruttori S.p.A.

Main project features: The hydroelectric Power Plant includes the following works :

- Gembu Dam (RCC dam, H = 100 m, L = 515 m)
- Sumsum Dam (RCC dam, H = 35 m, L = 460 m)
- Nghu Dam (Rockfill dam, H = 95 m, L = 680 m)
- Water transfer Tunnel (L = 16 Km, D = 6 m)
- Headrace canal (L = 3.1 Km, Width = 15 m)
- Power Shaft (N° 16, D = 5.25 – 8.40 m, Total L = 1,000 m)
- Underground PHs (N°2, N°16 Turbines Pelton, Q = 88 m³/s, IP = 16x250 MW)

Position held:

Activities performed: Pre-Feasibility study, Feasibility study

BUMBUNA Transmission Line

Year: 2006 - 2009

Location: Sierra Leone

Client: Ministry of Energy & Power, Government of Sierra Leone

Main project features: Assessment, rehabilitation and reconstruction of the high-voltage transmission line from Bumbuna to Freetown, including the following works:

- Transmission Line (L = 205 km, Voltage = 161 kV)
- N°2 Step-down Transformers in Freetown (Rated Voltage = 161/33/11.5 kV)
- Interposing Transformer in Bumbuna (V = 13.8/34.5 kV)
- Step-down Transformer in Makeni (V = 34.5/11 kV)
- Pole Transformers (V = 34.5 kV/ 415 V)
- Shield Wire Scheme (V = 34.5 kV)

Position held:

Activities performed: Feasibility Study, Preliminary Design, Tender Documents, Final Design, Supervision of works

BELES Multi-Purpose Project (IP = 460 MW)

Year: 2005 - 2011

Location: Ethiopia

Client: Salini Costruttori S.p.A., Beneficiary: EEPKO

Main project features: Beles is a Multi-Purpose Project on Lake Tana for Hydroelectric purposes and irrigation. The main works of the project include :

- The use of the natural Lake Tana as reservoir (Total Storage = 32,270 Mm³)
- Intake (No. 5+2 bays, W = 43 m, Q = 160 m³/s)
- Headrace tunnel (L = 11 km, D = 8 m)
- Surge Shaft (L = 91 m, D = 18 m)
- Penstock Shaft (L = 286 m, D = 6.5 m)
- Underground Power House (Dimensions = 82x17x38 m, No. 4 Francis turbines, Design Head = 332 m, Design flow = 160 m³/s, IP = 4x115 MW)
- Transformer cavern (Dimensions 41x13x10 m, No. 4 OFWF transformers, 400/15 kVA)
- Tailrace tunnel (L = 7 km, D = 8 m)

Position held:

Activities performed: Feasibility study, Basic Design, Final design, Construction design, Consultancy during construction

GIBE III Hydroelectric Power Plant (IP = 1,870 MW)

Year: 2005 – in progress

Location: Ethiopia

Client: Salini Costruttori S.p.A., Beneficiary : Ethiopian Electric Power Corporation

Main project features: Gibe III (IP = 1,870 MW) is the 3rd stage of the Gibe-Omo cascade and will become the world's highest RCC dam. The project includes the following works :

- Reservoir ($V_{RES}=14,700 \text{ Mm}^3$)
- RCC Gravity Dam ($H=235 \text{ m}$, $L_{CREST}=620 \text{ m}$, $V_{RCC} = 6.5 \text{ Mm}^3$)
- Spillway (at dam crest, No. 7 gates $14 \times 17.5 \text{ m}$, $Q = 18,600 \text{ m}^3/\text{s}$)
- Middle outlet (in the dam body, No.2, $Q = 1600 \text{ m}^3/\text{s}$, $L=100 \text{ m}$, $D=5\text{m}$)
- Rockfill Cofferdam ($H = 50 \text{ m}$, $L = 205 \text{ m}$, Zig-Zag PVC membrane)
- Main Diversion Tunnels (No. 2, $L = 1.1 \text{ km}$, $D = 14 \text{ m}$)
- Preliminary Diversion Tunnel (No. 1, $L = 1.1 \text{ km}$, $D = 7 \text{ m}$)
- Power Waterways (No 2, $L = 1.0 \text{ km}$, $D = 11 \text{ m}$)
- Surge Shaft (No. 2, $D = 20 \text{ m}$, $H = 60 \text{ m}$)
- Outdoor Power House ($N^{\circ}10 \times 187 \text{ MW}$ Francis turbines, Design Head = 211 m , $Q = 950 \text{ m}^3/\text{s}$, Dimensions = $220 \times 34 \times 46 \text{ m}$)
- Switchyard (No. 5 line bays 400 kV , No. 5 transformers $15/400 \text{ kV}$)

Position held:

Activities performed: Reconnaissance design, Investigations, Feasibility Study, Basic Design, Final Design, Construction Design, Technical Supervision during Construction

BUSALLETTA Dam Upgrade

Year: 2005 - 2008

Location: Italy

Client: Mediterranea delle acque S.p.a.

Main project features: Upgrade of the existing Busalletta dam, for water supply, increasing of the dam height and reservoir volumes. The project includes what follows :

- Current set-up / proposed set-up :
 - Reservoir ($V_{RES} = 5 \text{ Mm}^3$ / $V_{RES} = 6.5 \text{ Mm}^3$)
 - Dam (Concrete gravity dam, $H = 50 \text{ m}$ / $H = 53 \text{ m}$)
 - Spillway (Ogee Overflow / Gated spillway with No. 5 flap gates, Dim. $2.1 \times 12 \text{ m}$)

Position held:

Activities performed: Pre-feasibility and Feasibility study

GIBE II Hydroelectric Power Plant (IP = 420 MW)

Year: 2003 - 2010

Location: Ethiopia

Client: Salini Costruttori S.p.A., Beneficiary : EEPCCO

Main project features: Gibe II (IP = 420 MW) is the 2nd project of the Gibe-Omo cascade, making us of the waters regulated by the upstream Gilgel Gibe dam, and includes the following works:

- Concrete Gravity Dam ($H=49\text{m}$, $L=140\text{m}$, $V_{RES} = 1.9 \text{ M}^3/\text{s}$)
- Spillway (at dam crest, $Q = 2325 \text{ m}^3/\text{s}$)
- Intake ($L = 24 \text{ m}$, $H = 33 \text{ m}$, No. 2 roller gates)
- Power Tunnels ($L = 26 \text{ km}$, $D = 6 \text{ m}$, $Q = 101 \text{ m}^3/\text{s}$)
- Penstocks (No 2, $L = 1.2 \text{ km}$, $D = 2.4 \text{ m}$)
- Surge Shaft ($H = 94 \text{ m}$, $D = 18 \text{ m}$)
- Power House (Outdoor, No. $4 \times 105 \text{ MW}$ Pelton turbines, Design Head = 510 m , $Q_{des} = 110 \text{ m}^3/\text{s}$, Dim. $120 \times 25 \times 36 \text{ m}$)
- Switchyard (No. 2 line bays 400 kV , No. 4 transformers $400/15 \text{ kV}$)
- Access Roads (No. 3, $L = 30 + 35 + 5.5 \text{ km}$)

Position held:

Activities performed: Reconnaissance design, Investigations, Basic Design, Final Design (Level 1 design) and Construction Design (Level 2 design) , Technical Assistance during Construction

SANTU MIALI Hpp (IP = 27 MW) – Refurbishment and Upgrade

Year: 2003 - 2010

Location: Italy

Client: Sardinia Water Authority (Ente Acque della Sardegna ENAS)

Main project features: Refurbishment and upgrade of the Santu Miali hydropower plant, including:

- Reservoir (Daily regulated Vol. = 1.4 Mm^3)
- Headrace Tunnel (L = 750 m, D = 4.25 m)
- Surge Shaft (H = 33.5 m, D = 8.20 m)
- Underground Power House (Dimensions 34x16x31 m, No. 1 Francis Turbine, 27.5 MW)
- Main Transformer (N°1, Nominal voltage = 9 / 150 kV, Rated power = 320 MVA)

Position held:

Activities performed: Preliminary design, Final design and Tender documents , Supervision of works (up to installation of the EM equipment)

UVINI Hpp (IP = 15.8 MW) - Refurbishment and Upgrading

Year: 2003 - 2010

Location: Italy

Client: Ente Autonomo del Flumendosa (EAF)

Main project features: Refurbishment of the Uvini hydropower plant:

- Reservoir (Total Reservoir Vol. = 320 Mm³)
- Penstock (Diameter = 4.50 m)
- Underground Power House (D (circular plan) = 17 m, H = 29.4 m)
- Electromechanical Works: N° 2 Turbines (Kaplan + Francis), Total IP = 15.8 MW
- Main Transformers (N° 2)

Kaplan: No-load ratio = 9 / 70 kV, Rated power = 17.5 MVA

Francis: No-load ratio = 0.4 / 15 kV, Rated power = 1.6 MVA

Position held: Hydraulic Expert, Team Leader for Final Design and Supervision of Construction

Activities performed: Preliminary design, Final design and Tender documents , Supervision of works (up to installation of the EM equipment)

SAN LORENZO Hydropower Plant (IP = 1.2 MW)

Year: 2003 - 2008

Location: Italy

Client: Ente Autonomo del Flumendosa (EAF)

Main project features: Mini hydroelectric plant located on the water supply pipeline network of southern Sardinia, including the following works:

- Outdoor Power House (L=16 m, W= 10 m, H= 7 m)
- Electromechanical Works (N°1 Francis Turbine, IP = 1,250 kW, Max. Q = $1.2 \text{ m}^3/\text{s}$, Design Head = 117 m)
- Three-Phase Synchronous Alternator (6 kV/1,600 kVA, E = 7.2 GWh)

Position held:

Activities performed: Investigations, Preliminary design, Final design and tender documents, Supervision of the works

SIMBIRIZZI Hydropower Plant (IP = 1,2 MW)

Year: 2003 - 2008

Location: Italy

Client: Ente Autonomo del Flumendosa (EAF)

Main project features: Mini hydroelectric plant located on the water supply pipeline network of southern Sardinia, including the following works :

- Outdoor Power House (L=18 m, W= 10 m, H= 7 m)
 - Electromechanical Works (N°1 Francis Turbine, IP = 1,300 kW, Q = $2 \text{ m}^3/\text{s}$, H = 75 m)
-

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- Three-Phase Synchronous Alternator (6 kV/1,700 kVA, E = 6.5 GWh)

Position held:

Activities performed: Investigations, Preliminary design, Final design and tender documents, Supervision of works

RIO MANNU Gravity Dam for Water Supply and Irrigation

Year: 2003 - 2006

Location: Italy

Client: Consorzio di Bonifica della Sardegna Centrale

Main project features: Dam for water supply and irrigation to be built in two phases, including the following works :

- Phase 1: Gravity Dam (H = 19 m, $V_{RES} = 400.000 \text{ m}^3$)
- Phase 2: Gravity Dam (H = 28 m, $V_{RES} = 2.000.000 \text{ m}^3$)
- Spillway (Q = $685 \text{ m}^3/\text{s}$, L = 84m)
- Outlet works (Q = $36 \text{ m}^3/\text{s}$, No. 2 gates = roller + sliding)

Position held:

Activities performed: Preliminary, Final design and Detailed design

ARDA CASCADE Hydroelectric Power Plant

Year: 2001 - 2002

Location: Bulgaria

Client: Enel Power S.p.A.

Main project features: The Arda cascade includes three existing hydropower plants (IP= 106 + 60 + 103 MW) and three proposed hydropower plants: Madan (IP = 47 MW), Sarnitsa (IP = 69 MW) and Ardino (56 MW + Mini hydro 2 MW).

The feasibility study of Ardino HPP includes:

- RCC Arch-Gravity dam (H=110 m, L=365 m)
- Spillway (Q = $2,500 \text{ m}^3/\text{s}$, No.6 flap gates 6x 6 m)
- Outdoor Power House (No. 2 Francis turbines 2x28 MW)
- No. 1 mini hydro (IP = 2 MW, E = 12.4 GWh/y)

Position held:

Activities performed: Review of all feasibility studies, in collaboration with Enel Power, Feasibility study of Ardino Hpp (including design of dam and appurtenances)

KALIVAC Hydroelectric Power Plant (IP = 108 MW)

Year: 2000 - 2001

Location: Albania

Client: Enel Power S.p.A.

Main project features: Hydropower Plant (IP = 108 MW) including the following works:

- Concrete Gravity Dam (H=80 m, L=375m, $V_{RES}=350 \text{ Mm}^3$)
- River Diversion (Q = $2,500 \text{ m}^3/\text{s}$)
- Spillway (Q = $4500 \text{ m}^3/\text{s}$, N° 15 flap gates 5.5 x 12.5 m)
- Outlet (N°2, $Q_{MAX}=540 \text{ m}^3/\text{s}$)
- Intake (N°2, $Q_{MAX}=285 \text{ m}^3/\text{s}$)
- Outdoor Power House (N°2 Kaplan + N°1 Francis turbines)

Position held:

Activities performed: Investigations, Preliminary design, Final design of the civil works

DANKEL Multi Purpose Project including water transfer, hydro (IP = 500 MW), port

Year: 1997 - 2000

Location: Eritrea

Client: Salini Costruttori S.p.A.; Beneficiary: Government of Eritrea

Main project features: Dankel Multipurpose Project includes:

- External port (Red Sea) and Internal port
 - Canal A (L = 30 km, W = 15-50 m, H = 9 m, navigable)
 - Sariga Rockfill Dam (L = 1.5 km, H = 18 m)
-

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- Canal B (L = 23 km, W = 30-60 m, H = 9 m, navigable)
- Mendah Concrete Dam (L = 300 m, H = 22 m)
- Hydropower plant (IP = 500 MW, E = 1000 GWh)

Position held:

Activities performed: Investigations, Master plan (preliminary project), Feasibility Study

DIRE DAM Water Supply

Year: 1996 - 1998

Location: Ethiopia

Client: Salini Costruttori S.p.A.; Beneficiary: Addis Ababa Water and Sewerage Authority

Main project features: Dam for water supply to Addis Ababa includes the following works :

- Dam (Earth Dam type, L=1,980m, H=46m, $V_{RES}=19\text{Mm}^3$, $Q=500\text{m}^3/\text{s}$)
- Canal (L = 200 m, W = 40 m)
- Intake Tower (H = 48.6 m, Steel Footbridge L = 150 m)
- Pipeline (Pipe Diameter = 700 mm, L = 10 km)

Position held:

Activities performed: General review of the design, Dam stability analysis, Final design of intake works, spillway, valve chamber and footbridge

BUMBUNA Hydroelectric Power Plant (IP = 50 - 275 MW)

Year: 1995 – in progress

Location: Sierra Leone

Client: Ministry of Energy & Power, Republic of Sierra Leone

Main project features: Hydroelectric Plant to be constructed in 5 phases, with 275 MW in final phase. The plant currently operating, having IP = 50 MW, includes :

- Rockfill dam (H = 88m, L = 44 m, $V_{RES} = 410 \text{ Mm}^3$)
- Multi-purpose water tunnels (No. = 2, L = 2x620 m, D = 9m)
- Spillway (No. 2 morning glory, $Q = 3000 \text{ m}^3/\text{s}$)
- Outdoor Power house (No. 2 Francis turbines, IP = 2 x 25 MW)
- Transmission line (161 kV, L = 205 km)

Position held:

Activities performed: Final design revision and update, Supervision of Works, Monitoring and assistance during operation (Plant on Line since 2010)

BOSA Dam Refurbishment and Upgrading

Year: 1995 – 2009

Location: Italy

Client: Sardinia Autonomous Region, Ministry of Public Works Dam Division

Main project features: Change in destination of use of the existing Bosa Dam for drinking water supply and irrigation. The project includes the installation of regulating gates on the existing unregulated bottom outlet together with the refurbishment of the dam. Main works are:

- Bottom outlet gates (No. 4, roller + sliding, $H \times W = 5 \times 3.5 \text{ m}$)
- Dam abutments stabilization
- Dam monitoring System

Position held:

Activities performed: Preliminary, Final design, Supervision of the works

GILGEL GIBE Hydroelectric Power Plant (IP = 200 MW)

Year: 1995 - 2003

Location: Ethiopia

Client: Enel Power S.p.A., Beneficiary : EEPKO

Main project features: Gilgel Gibe (IP = 200 MW) is the 1st hydropower plant of the Gibe-Omo Cascade. The main works of the project include:

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- Rockfill Dam (H = 40 m, L = 1,600 m, $V_{RES} = 850 \text{ Mm}^3$)
- Bottom outlet (L = 220 m, D = 1.5 m, $Q = 25 \text{ m}^3/\text{s}$)
- Spillway (L=48m, $Q = 2,250 \text{ m}^3/\text{s}$, Gates: N°4 flap 12x8.5m)
- Power Tunnel (L = 8.8 km, D = 5.5 m)
- Surge Shaft (H = 110 m, D = 14 m)
- Underground Power House (Dimensions 83x22.5x41 m, No. 3 Francis turbines IP = 3x66,7 MW , $Q_{des} = 100 \text{ m}^3/\text{s}$, Design head = 220 m)

Position held:

Activities performed: Feasibility study, final design, tender documents, tender supervision, Supervision of construction

BUSALLETTA Dam Upgrade and Refurbishment

Year: 1995 – 2002

Location: Italy

Client: Acquedotto Nicolay S.p.A., Genoa

Main project features: Upgrade and refurbishment of the outlet works of the existing Busalletta dam, for water supply, including :

- Refurbished Outlet Tunnel ($Q = 50 \text{ m}^3/\text{s}$, L = 211 m, D = 2.4 m)
- Upgraded energy dissipator ($Q = 50 \text{ m}^3/\text{s}$, ski jump type)
- Outlet Canal (L = 40, W = 15 m)

Position held:

Activities performed: Final design and supervision of construction of the refurbishment and upgrade of the outlet works, Dam break studies

ARCICHIARO Dam for Multipurpose uses

Year: 1995 – 2006

Location: Italy

Client: Ente Risorse Idriche del Molise (ERIM)

Main project features: Reservoir for multipurpose uses including:

- Rockfill Dam (H = 89.3 m, L = 270 m, $V_{RES} = 11.1 \text{ Mm}^3$)
- Concrete Weir (H= 29 m)
- Spillway (L = 85 m, $Q = 447 \text{ m}^3/\text{s}$)
- Penstock (L=3.2 km)
- Access road (L=3.1 Km, Lane Width = 7.0 m, N°2 Bridges)

Position held:

Activities performed: Final and Detailed Design, Supervision of construction

LIMONLU Hydroelectric Power Plants (IP = 50 / 76 MW)

Year: 1995 - 2000

Location: Turkey

Client: TGT Electric Power Construction, Ministry of Energy & Natural Resources

Main project features: Limonlu hydropower cascade comprises No. 4 plants on the Lamas River to be built in two phases (Phase 1 = 50 MW, Phase 2 = 26 MW). The works of the first phase include:

- Weir (H = 8 m, L = 40 m)
- Power Tunnels (5 km, D=3 m)
- Surge Tank (H = 16 m, D = 12 m)
- Penstocks (2 No., L tot = 3 km; D=2-1 m)
- Power Houses (2 No., Francis turbines, IP = 20 + 30 MW)
- HV Transmission Line (154 kV; L = 1.2 km)

Position held:

Activities performed: Final Design, Tender Documents of the Phase 1 (50 MW). Preliminary design for Phase 2 (26 MW)

BIFERNO dams system for irrigation

TECH-6: Curriculum Vitae (CV) for Proposed Professional Staff

Year: 1995 - 1998

Location: Italy

Client: Ente Risorse Idriche del Molise (ERIM)

Main project features: The Biferno Irrigation Project included the following 3 dams and irrigations works.

Rio Grande Dam:

- Rockfill Dam (H = 40 m, L = 505 m, V = 1.1 Mm³)
- Spillway (L=90 m, Q = 370 m³ /s)
- Irrigation works (A = 2600 Ha)

Colle D'Anchise Dam:

- Gravity dam (H=29m, L=175m, V=0.075Mm³)
- Mini Hydro (No. 2, IP = 110 and 280 kW)

San Massimo Dam:

- Rockfill dam (H= 55 m, L = 310 m, V = 1.3 Mm³)
- Spillway (L=160 m, Q = 970 m³ /s)

Position held:

Activities performed: Feasibility study, Environmental and Social Impact Assessment

Publications:

- D. Battaglia, A. Bezzi, F. Birindelli, M. Rinaldi e E. Vettrano - Fluorescent Tracer Tests for detection of dam leakages: the case of the Bumbuna Dam - Sierra Leone IECS, 2013
- E. Baratti, A. Montanari, A. Castellarin, J. L. Salinas, A. Viglione, and A. Bezzi - Estimating the flood frequency distribution at seasonal and annual time scales, Hydrology and Earth System Sciences, December 2012
- F.M. Renna, Andrea Guerini, Paolo Zenocchini, U. Fratino, Alberto Bezzi - Hydroelectric plant discharge emergency system: technical issues and experimental results, 4th IAHR International Symposium on Hydraulic Structures, 9-11 February 2012, Porto, Portugal
- Petry B., Bezzi A. - Rehabilitation and completion works at Bumbuna Falls HEP: a case history of interrupted and continued implementation activities, 2008

13. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

[Signature of staff member or authorized representative of the staff] Date: _____
Day/Month/Year

Full name of authorized representative: _____