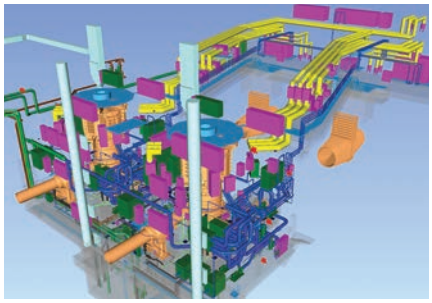
Balance Of Plant

A solution for plant integration

Flexible integrated solutions designed to respond to customer's requirements

FLEXIBLE SCOPE

- New installation or upgrade of an existing plant
- Small or large projects
- Hydro power plants (including Pumped Storage Power plants) and pump plants



ADVANCED 3D TOOLS

Alstom uses 3D tools for design, resulting in increased reliability and accurate scoping, as well as reduced cost and commissioning or outage time.

SERVICING YOUR PLANT ANYTIME ANYWHERE

Use Alstom BOP services either on a planned or an emergency basis to maximise the reliability of operations

From **Water** to **Wire**

Balance Of Plant, or BOP, designates all the systems and equipment surrounding the generating units and control systems which are necessary for hydro power plant operations and the evacuation of energy. Alstom is the only equipment manufacturer with in-house knowledge and integration of all components and systems, from water intake gates to electrical sub-stations.

ALSTOM SOLUTION

With its complete and optimised turnkey approach based on extensive expertise in hydro plant engineering, Alstom provides an all-round solution that supplies the utmost functionality and reliability:

- Technical coordination
- Interfaces management with civil works and other contractors
- Optimised arrangement of the entire power house equipment, including partners and all other contractors

EXTENSIVE EXPERIENCE IN PROJECT IMPLEMENTATION & EQUIPMENT INTEGRATION

Alstom BOP engineering is positioned to match operator's requests.
With its power plant constructor's experience and expertise from more than 25% of the global hydro installed base, Alstom brings the entire project from A to Z to a successful conclusion on schedule.

1. Specification

2. Design

3. Execution

4. Services

KEY BENEFITS

- **Optimised interfaces**: use of synergies due to internal optimisation of products and processes
- **Know-how along the full chain**: skilled people and proven processes required by customers for complex projects and maintenance
- **Lead time reduction, cost decrease**: complete coordination to ensure a smooth transition through to completion

RPWR/PRSHT/BOP/EN/3.2015/FRA/2667

FULL SCOPE BOP ENGINEERING

Alstom masters all technical activities from tender stage to final acceptance, including optimised definition, specification, supplier follow-up and site support, for the following equipment and systems:

- **Energy evacuation**: HV equipment, bus ducts, generator circuit breaker, main transformer and substation, etc.
- **Electrical auxiliaries**: MV/LV distribution, control power supply DC & UPS, emergency diesel, SFC, etc.
- **Mechanical auxiliaries**: handling systems, cooling system, drainage, dewatering, HVAC (heating, ventilation, air conditioning), oil treatment, fire protection system, water treatment, etc.
- **Miscellaneous systems**: telephone, CCTV, access control, fire detection, etc.

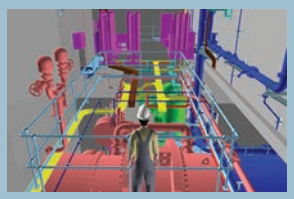
KEY REFERENCES

Turnkey projects

- Bujagali (Uganda), 5 x 50 MW
- Bakun (Malaysia), 4 x 300 MW
- Son La (Vietnam), 6 x 400 MW

Electromechanical lot

- Huizhou (China), 8 x 300 MW (PSP)



Service & Retrofit

- Guri (Venezuela), 3D modelling reverse engineering
- N'Seke (DRC), complete rehabilitation
- Tyso 2 (Norway), Control System + e-BOP

SERVICING YOUR PLANT ANYTIME ANYWHERE

Alstom Hydro PlantLife® programme aims at maintaining plant availability, keeping plants running at optimum efficiency, and increasing plant performance throughout their lifecycle.

Based on three modules, PlantLife® is designed to respond to plant's lifecycle challenges:

- Assess: evaluate & analyse
- Secure & Extend: maintain optimum performance
- Reset & Upgrade: modernise for more profitability

ZERO DEVIATIONS
IN HIGH RISK ACTIVITIES

A stringent EHS approach

CLEAN **POWER**
CLEAR **SOLUTIONS™**

REDUCING COST OF ELECTRICITY

–6 months

Up to 6 months* saved thanks to Alstom's turnkey approach resulting in shorter lead time and reduced cost.

INCREASING FLEXIBILITY & RELIABILITY

+/–85%

accuracy with PDMS 3D modelling reverse engineering.

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*Case study of Bujagali: 5 units commissioned in only 6 months.

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