SHERPA

new Solutions for Hydropower plants to Enhance operational Range, Performance and improve environmental impAct

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Consortium & Key figures

Total Budget: 3.8 M
Project duration: 42 months
Consortium: 7 partners

Figure: SHERPA Consortium partners

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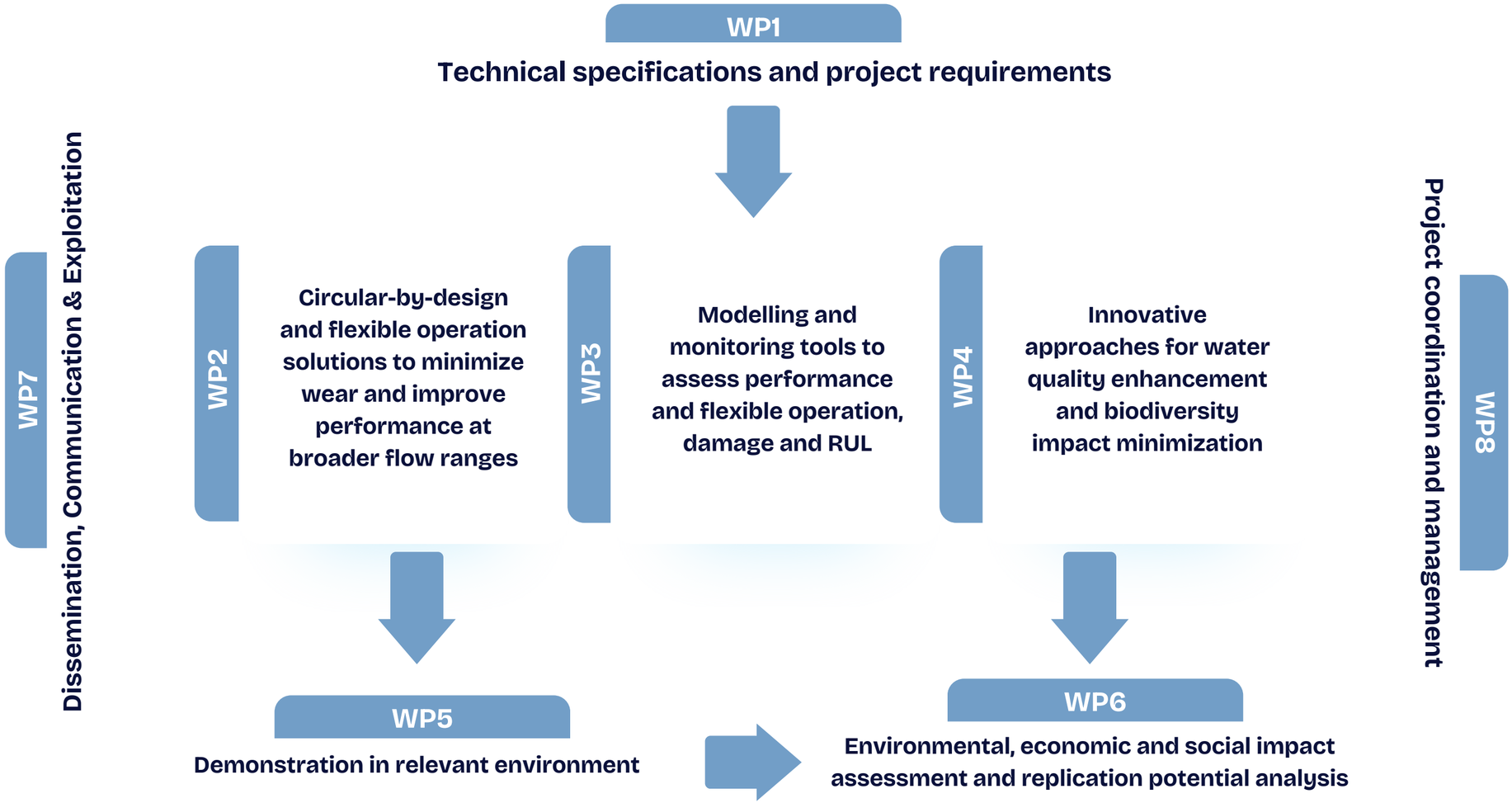
zabala
INNOVATION
EPRI
EUROPE
aimen
TECHNOLOGY CENTRE
Iberdrola
Generación
VOITH
INNOMERICS
AECOM

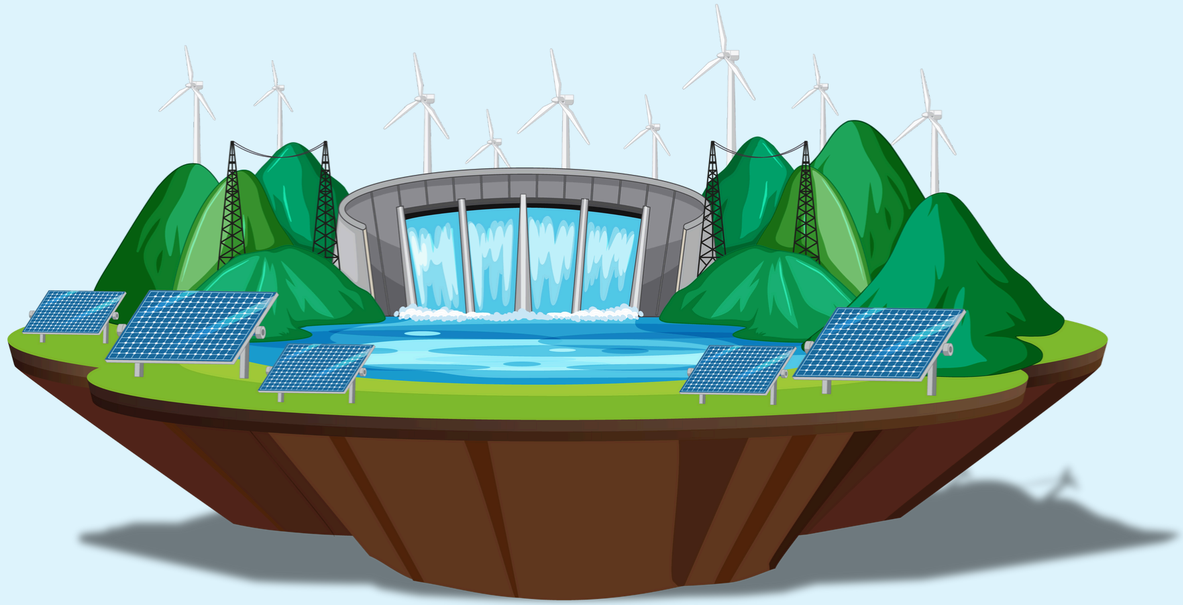

WP1
Technical specifications and project requirements
WP7
Dissemination, Communication & Exploitation
WP2
Circular-by-design and flexible operation solutions to minimize wear and improve performance at broader flow ranges
WP3
Modelling and monitoring tools to assess performance and flexible operation, damage and RUL
WP4
Innovative approaches for water quality enhancement and biodiversity impact minimization
WP8
Project coordination and management
WP5
Demonstration in relevant environment
WP6
Environmental, economic and social impact assessment and replication potential analysis

The Key Role of Hydropower Generation

“Forgotten giant of low-carbon electricity needs a sweeping policy and investment push to put it in line with net zero goals and to support a faster expansion of solar and wind” IEA (International Energy Agency) special report shows.

Hydroelectric power, key to a greener future:

- **Reusable Resource**
- **Control Function**
- **Flexible**
- **Grid Stability and reliability**
- **Support broader environmental and social goals**
- **Make possible other technologies Wind and Solar**



Hydroelectric Technology: **The Need for Further Advancement**

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SHERPA’s objectives

Main objective: **develop and validate innovative technologies** for refurbishing current HPPs through:

AM METALLIC PATCHES AND COATINGS TO MINIMIZE DAMAGE AND ENHANCE RESISTANCE TO CAVITATION

NEW STRATEGIES TO ADAPT ROTATIONAL SPEED DEPENDING ON THE FLOW RANGE.

ADVANCED AIR INJECTION SYSTEMS TO IMPROVE WATER QUALITY AND EFFICIENCY

NEW RUNNER DESIGNS ADAPTED TO E-FLOWS INCREASING PERFORMANCE.

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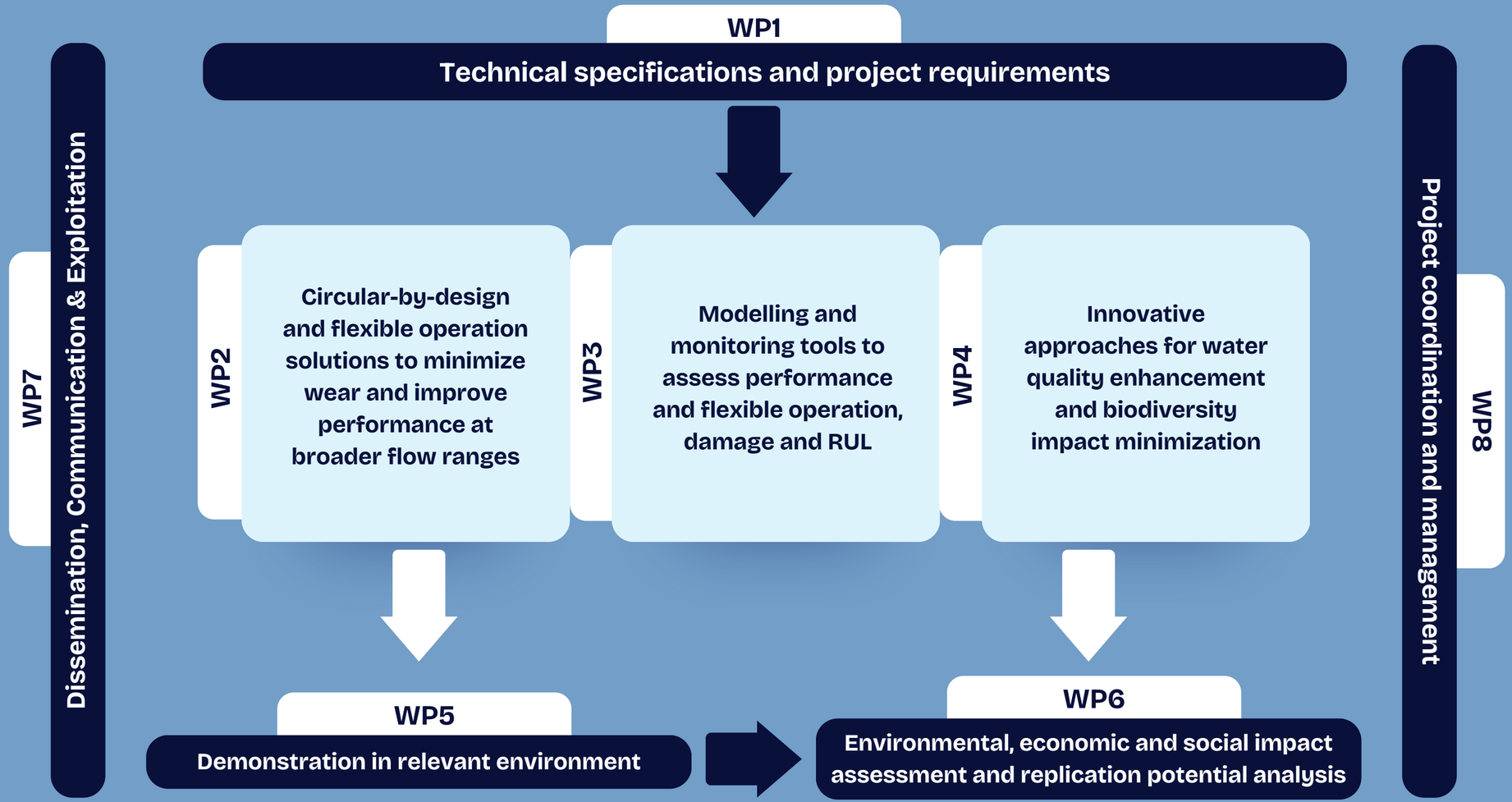
SHERPA’s WP and methodology



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Pilot plants

At the Mediterranean Basin

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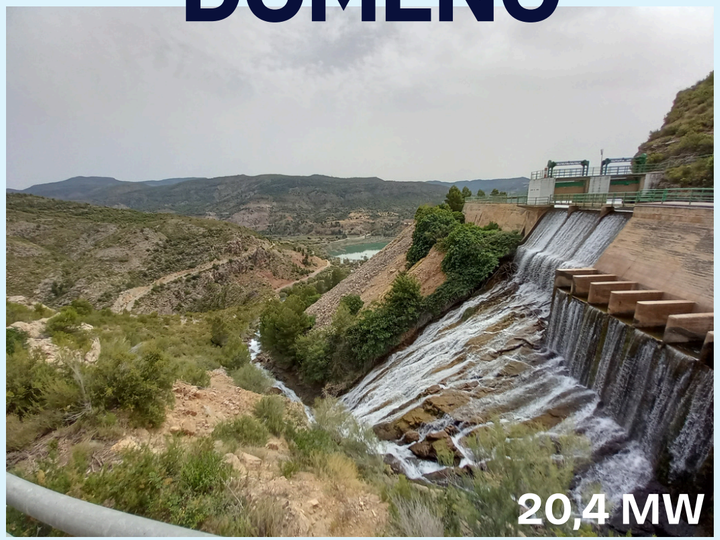
BENAGÉBER

The Benagéber hydroelectric plant has 2 horizontal shaft Francis turbines and is located at the foot of the Benagéber reservoir dam of the Turia river.

1. To operate at lower flow rates for prolonged periods of time without vibration problems occuring
2. To extend the operational range down to the ecological flow

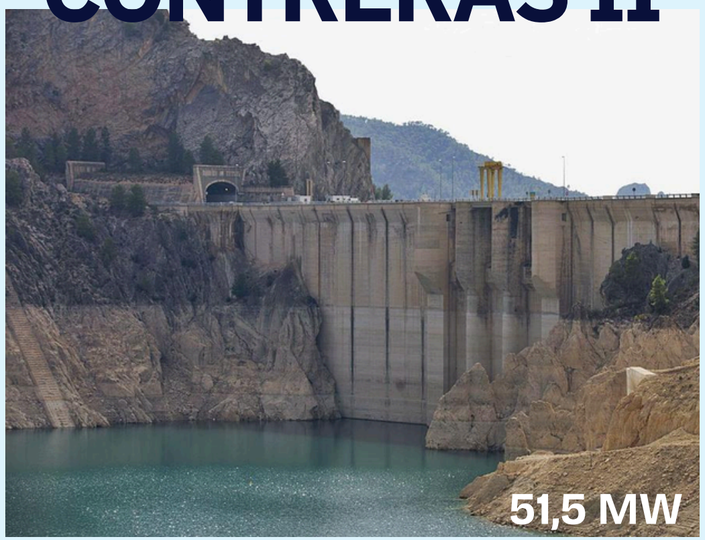
DOMEÑO



The Domeño hydroelectric power station has 1 vertical shaft Francis turbine next to the Domeño reservoir dam on the Turia river. The plant receives the water channeled from the Benagéber outlet to irrigation (Lliria Canal). It also provides water for irrigation which is given priority.

1. To operate the groups with lower flows with a new runner design

CONTRERAS II



The Contreras hydroelectric plant has 2 vertical shaft Francis turbines next to the Contreras reservoir dam on the Júcar river. Group 1 of the plant was modified to reduce the size of the impeller to use it as an ecological group, therefore reducing its power.

1. To operate the groups with lower flows with a new runner design
2.

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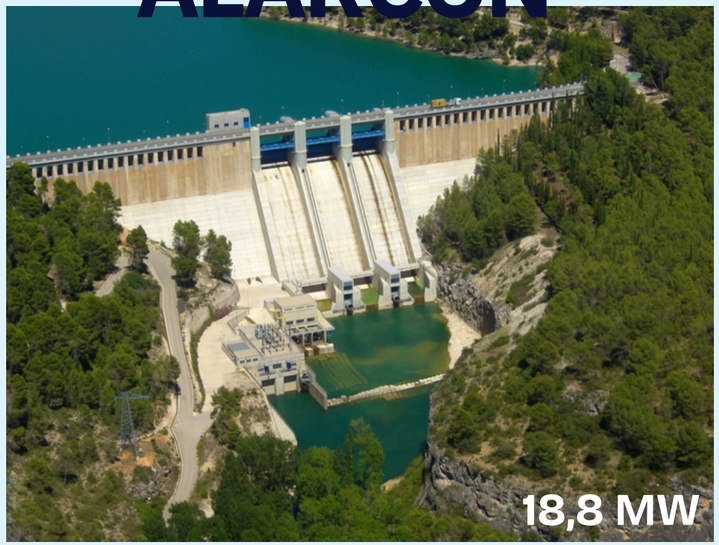
ALARCÓN



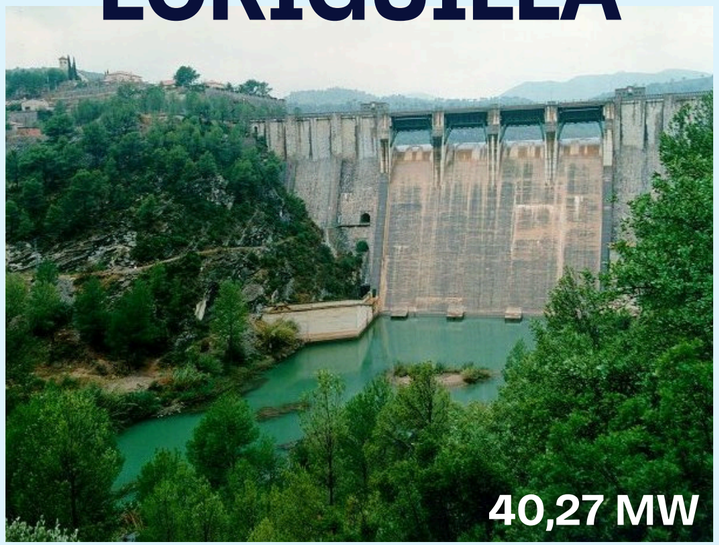
The Alarcón hydroelectric plant has 2 identical vertical Kaplan turbines next to the dam of the Alarcón reservoir on the Júcar river.

1

To operate the group below the minimum design flow in prolonged periods of time, reaching the ecological flow

2

LORIGUILLA



The Loriguilla HPP has one vertical shaft Kaplan turbine and is located at the Loriguilla reservoir in the Turia river.

1

To extend the operation range to the ecological flow

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Pilot plants

At the Sil Basin

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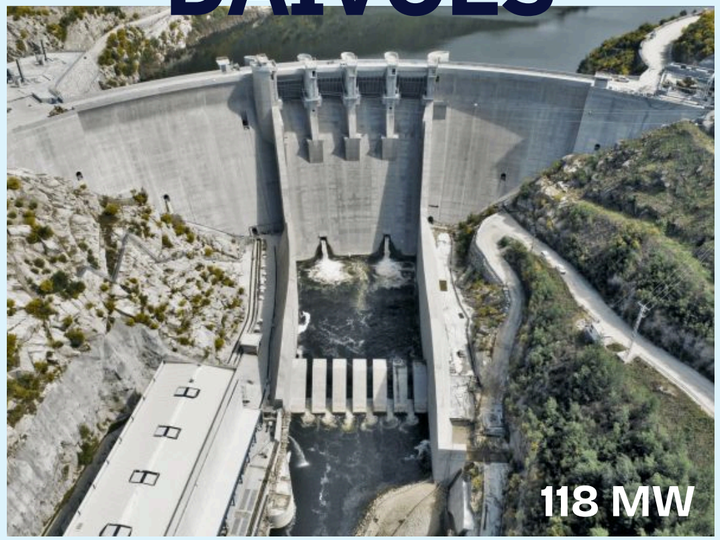
ALTO TAMEGA

The Alto Tâmega hydroelectric power station has 2 identical vertical Francis turbines next to the Alto Tâmega reservoir dam on the Tâmega river. The installed power is 160 MW. The main purpose of these two groups is to launch the Gouvães bombs in a Back-to-Back startup.

1 To improve water quality 2

DAIVOES



The Daivoes hydroelectric plant has two vertical Francis units+one ecological unit.

1 Reduce the technical minimum 2

SAN ESTEBAN

The San Esteban II hydroelectric plant hasone vertical Francis turbine next to the dam of the San Esteban reservoir on the Sil river.

1 Flexibility

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Thank you!

SHERPA, new solutions
for hydropower plants

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