

# About the HYPOSO project – Hydropower solutions for developing and emerging countries

**Boosting Hydropower Beyond the Project**

26 February 2025

Online

Ingo Ball

HYPOSO Project Coordinator

WIP Renewable Energies

[www.hyposo.eu](http://www.hyposo.eu)

#hyposoEU



# Outline

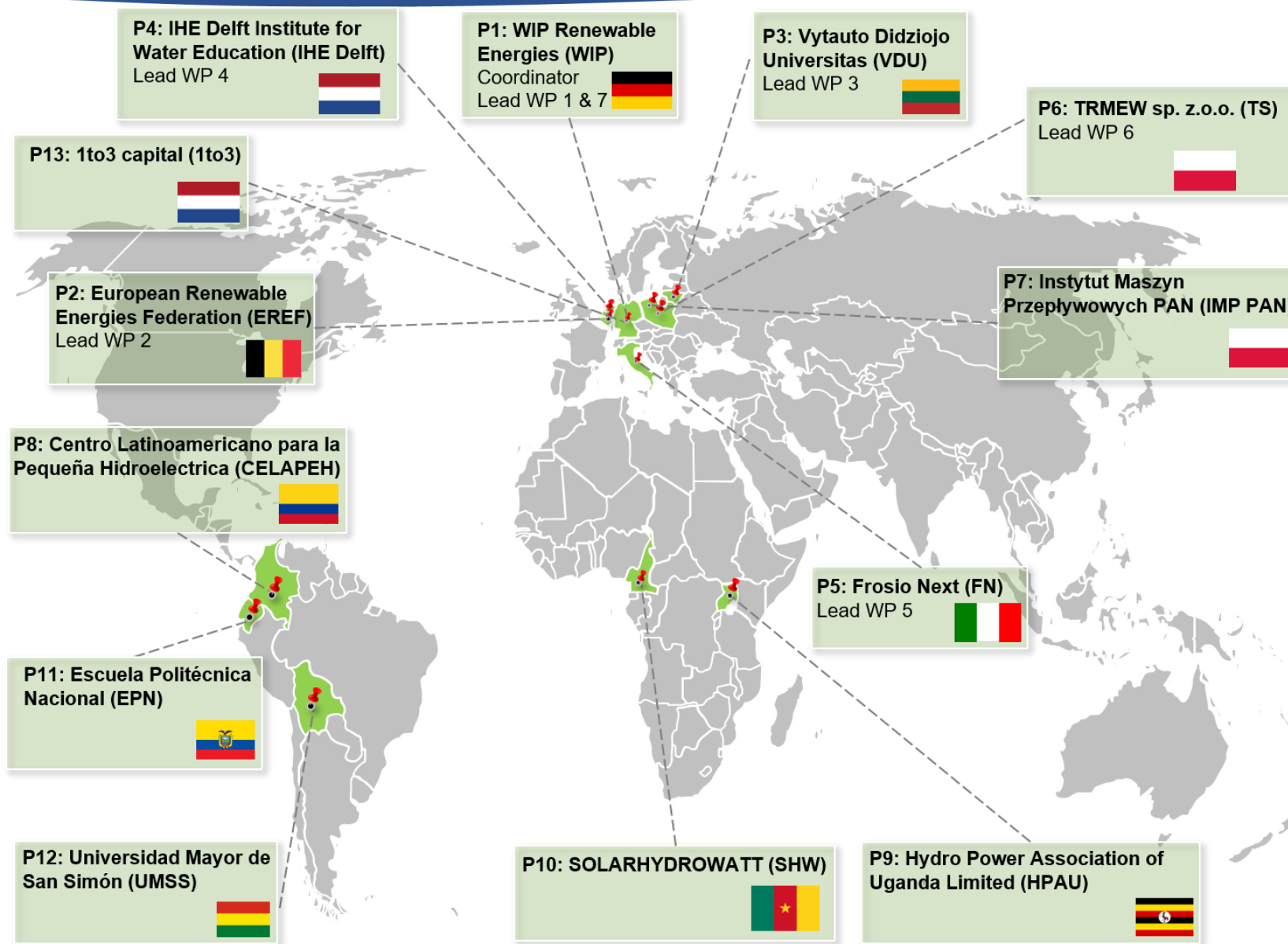
- General information & structure
- Objectives & impact
- Tools still available for use
- From the HYPOSO target countries



# General information

- Project title: **Hydropower solutions for developing and emerging countries**
- Project acronym: **HYPOSO**
- EU funded project within the **H2020 programme**
- Grant Agreement (GA) No: **857851**
- Budget: almost **2.94 million €**
- Starting date of the project: **1 September 2019**
- Duration: **45 months** (36 months + 9 months due to pandemic)
- Participants: **13** (5 research organisations – 8 enterprises (4 SME))
- 11 Countries: **Belgium, Bolivia, Cameroon, Colombia, Ecuador, Germany, Italy, Lithuania, the Netherlands, Poland, Uganda**





# Project Overview

- Support the European hydropower industry

by providing tools to best facilitate and consult selected target regions in Africa and Latin America with their know-how and expertise and enable more technology export for European companies.

- Stimulate the energy transition in developing and emerging countries

by the market uptake support that shall lead to win-win situations and focus on sustainable and locally adapted solutions.

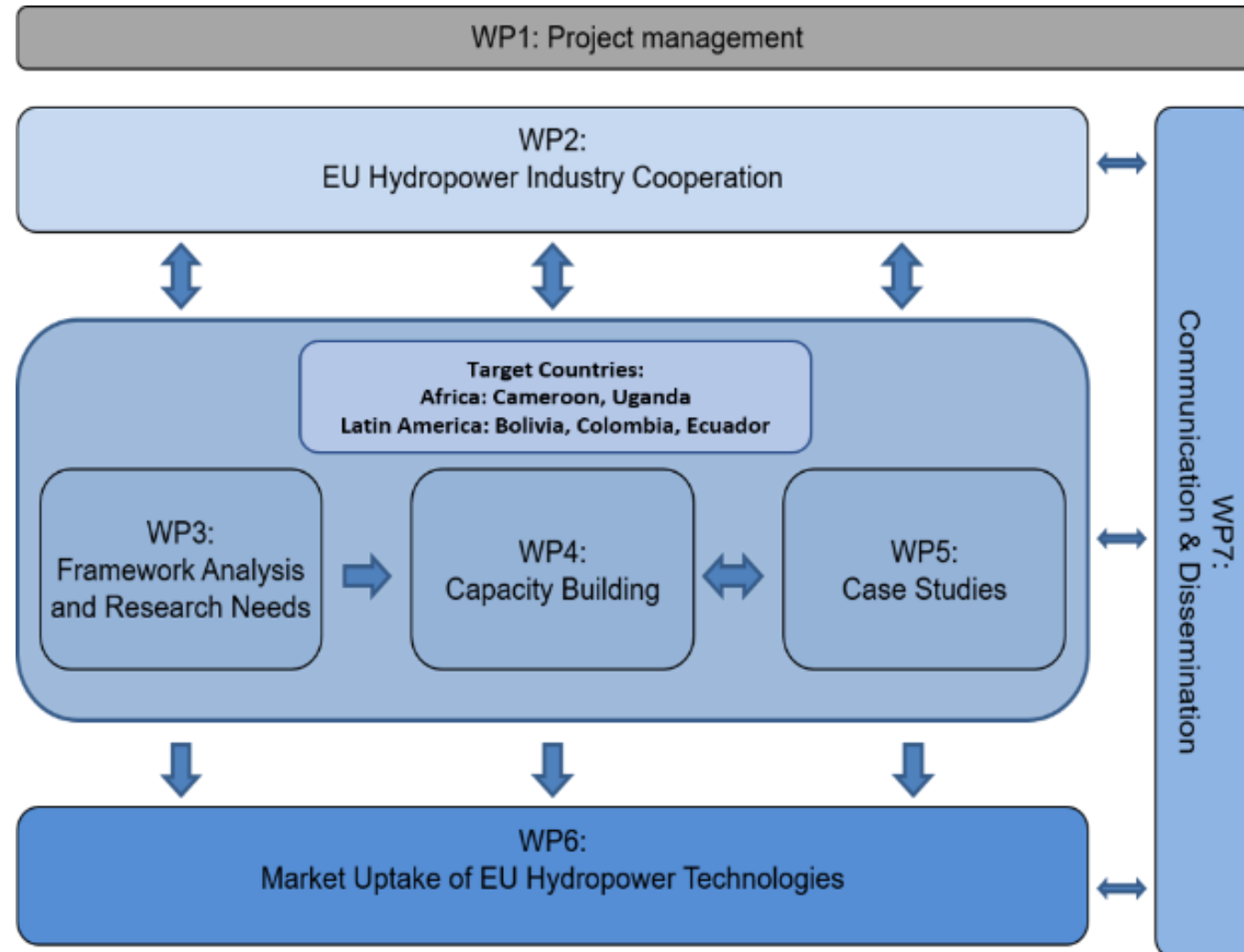


# Objectives

- **Mapping** (EU hydropower industry, > 2,000 potential hydropower sites and **stakeholders in target countries**)
- **Framework analysis** of target countries
- **Capacity building** activities
- **15 Case studies** (5 MoU)
- **Online platform** (providing sector information, enabling contacts)
- **b2b Workshops** (in Colombia, Uganda and the Netherlands)
- **Study tour** in Europe



# Structure



# Impact in numbers









Country		Bolivia	Cameroon	Colombia	Ecuador	Uganda	Total
Potential of Small Hydropower (SHP)	Total [MW]	200	970	25,000	296	200	26,666
	Remaining %	>23	>99	>99	>65	>70	
Defined capacity limit of SHP [P]		< 5 MW	< 10 MW	< 10 MW	< 10 MW	< 20 MW	
Cost per installed kW		1,300 -8,000 US \$/kW					
Goal for installed MW per target country as consequence of HYPOSO (only SHP)		5	10	50	20	5	90
Amount of additional EU investment in target countries through project activities, million US \$ (roughly 50% of installed cost)		8	15	75	30	8	136





# Impact in target countries



	BOLIVIA	COLOMBIA	ECUADOR	CAMEROON	UGANDA
	 increase rural electrification (73%)	 increase share of Renewable Energies (10% coal)	 increase share of Renewable Energies (37% oil)	 increase electrification rate (urban: 57-64% rural: 22-28%)	 increase electrification rate (urban: 71% rural: 8%)
	➤ HP experts	➤ HP experts	➤ HP experts	➤ HP experts	➤ HP experts
	local jobs	local jobs	local jobs	local jobs	local jobs

# Tools still available for use

- Handbook about European (Small) Hydropower Technologies
- Capacity building course
- Replicable Pre-Feasibility Study
- HYPOSO Platform (incl. PFS on demand)
- HYPOSO Map



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# Handbook on European SHP Technologies

HYPOSO Handbook (EN, ES and FR)

<https://www.hyposo.eu/en/sector-information/>

- Introduction
- Small Hydropower Systems
- Overview of Hydropower System Components
- SHP Development Process
- Project Finance for international Small Hydropower Projects
- Conclusion



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# Live capacity building

## Capacity Building Courses (WP4)

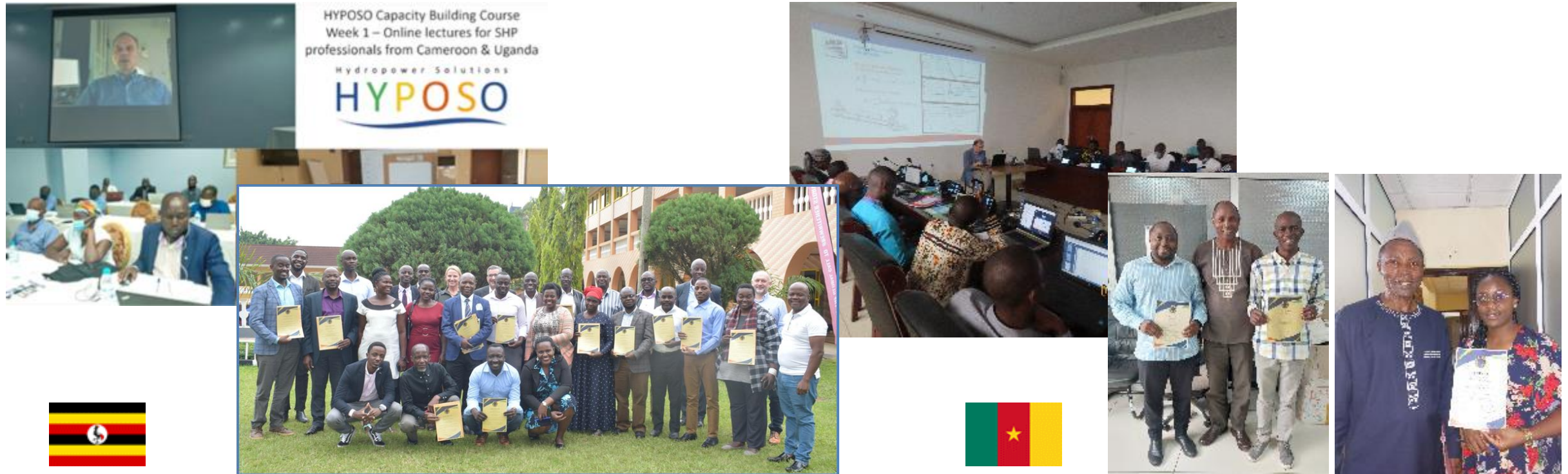
Realisation of Capacity Building Courses for stakeholders from Bolivia and Ecuador.



# Live capacity building

## Capacity Building Courses (WP4)

Realisation of Capacity Building Courses for stakeholders from Uganda and Cameroon.



# Ongoing capacity building



A screenshot of a web browser displaying the course page for "HYPOSO – Capacity Building for Small Hydropower Development" on the OCW IHE DELFT platform. The browser address bar shows the URL "https://ocw.un-ihe.org/course/view.php?id=138". The page features a navigation menu on the left with categories like "Start here", "General", "Course Information", and "2. Basics of hydropower". The main content area includes a course title, a breadcrumb trail (Course &gt; Settings &gt; Participants &gt; Grades &gt; Reports &gt; More &gt;), a list of 17 course modules, and a "General Information" section with links for "Introduction", "For Whom?", "Learning Objectives", "References", and "Lecturer". The IHE DELFT logo and UNESCO affiliation are also visible.

**OPEN**

Register: <https://ocw.un-ihe.org/enrol/index.php?id=138>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857851.



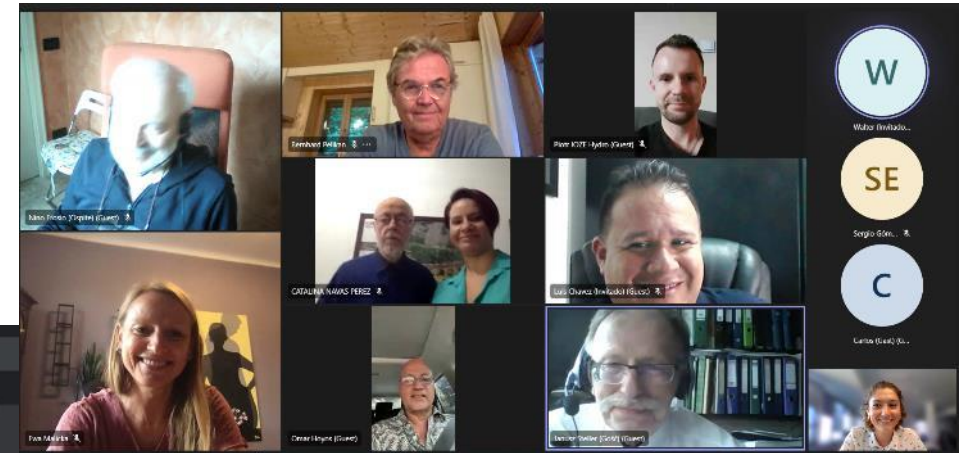
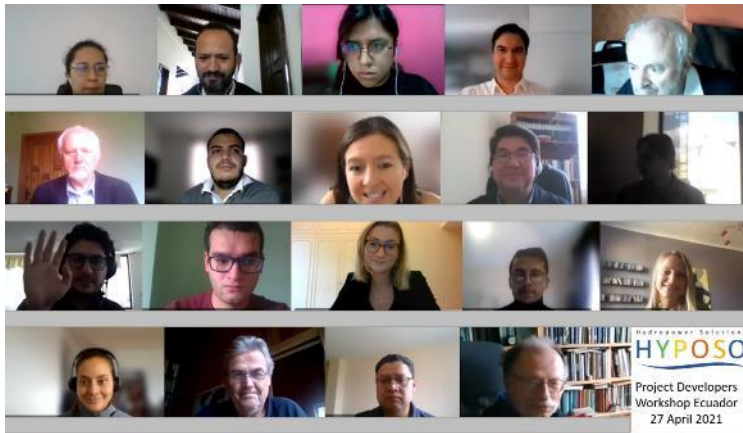
# Tools still available for use

- Handbook about European (Small) Hydropower Technologies
- Capacity building course
- **Replicable Pre-Feasibility Study**
- HYPOSO Platform (incl. PFS on demand)
- HYPOSO Map



# Starting of the PFS...

## Project developer workshops (WP5)



Baratti is presenting

**HYPOSO**

Project Developers Workshop Ecuador  
27 April 2021

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**Work Package 5 - Case studies**

**Task 5.1 - Project developer's workshop for case studies BOLIVIA**

**Aim: presentation of 3 high potential hydropower sites**

Presentation by Beatrice Baratti (FROSIO NEXT S.r.l.)  
 Wednesday, 16<sup>th</sup> March 2022; Brescia (ITALY)

www.hyposo.eu  
 #hyposo2020

Beatrice Baratti

ANDRES GONZA...

Unknown

FERNANDO AR...

Linus Jurevičius

Bernhard Polikan

24 others

- Dennis Vera
- Efrain Herrera - ENDE
- Eva Malicka
- Fabi To
- FERNANDO ARTURO LED...
- Gabriel Rodriguez Roca
- GALO OSVALDO MUÑOZ...
- Jaime B.Ch.
- Liliana Rodriguez Alvarez



# Starting of the PFS...

## Project developer workshops (WP5)



# ...working on the PFS

## Case studies (WP5)

Excursions to assess potential hydropower sites in **Cameroon** and **Uganda**



# ...working on the PFS

## Case studies (WP5)

Excursions to assess potential hydropower sites in **Bolivia, Ecuador and Colombia**



# Replicable Pre-Feasibility Study

[https://www.hyposo.eu/HYPOSO\\_Publications/HYPOSO\\_public\\_D5.2\\_FN.pdf](https://www.hyposo.eu/HYPOSO_Publications/HYPOSO_public_D5.2_FN.pdf)

50 pages

- General regional description
- General site description
- Hydrology and sediment transport
- Layout alternatives
- Project description
- Feasibility check and risk analysis
- Conclusion and recommendations

HYPOSO

Table of Contents

- 1 Introduction.....
- 2 Information about Deliverable .....
- 3 General regional description .....
- 3.1 Administration .....
- 3.2 Geography.....
- 3.3 Social structure .....
- 3.4 Energy consumption .....
- 3.5 Climate.....
- 4 General site description.....
- 4.1 Selected river and site location .....
- 4.2 Existing studies or projects .....
- 4.3 Available mapping.....
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- 4.3.2 Thematic mapping.....
- 5 Hydrology and sediment transport.....
- 5.1 Catchment area.....
- 5.1.1 Size.....
- 5.1.2 Max. and min. elevation .....
- 5.1.3 Gradient.....
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- 5.1.6 Geology.....
- 5.1.7 Land use.....
- 5.1.8 Stream network.....
- 5.2 Precipitation.....
- 5.2.1 Gauging stations .....
- 5.2.2 Calculation .....
- 5.3 Rivers.....
- 5.3.1 Gauging stations .....
- 5.3.2 Discharge calculation.....
- 5.3.3 Runoff model .....

HYPOSO D.5.2

#### 4 General site description

The typological variety of hydropower plants recommends a first classification according to the following structure, based on three criteria:

Head: Low High

System: weir type diversion type

Operation: run off storage

*Figure 7 - Varieties of hydropower plant types (own graph)*

Not all of the criteria can be combined, keeping in mind logics:

	low head	high head
weir type	run off / storage	run off / storage
diversion type	run off / storage	run off / storage

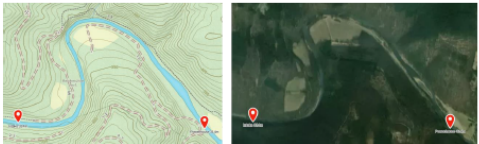
*Figure 8 - HPP combinations (own table)*

On the basis given, any project can be classified and described with its main constructive elements which are:

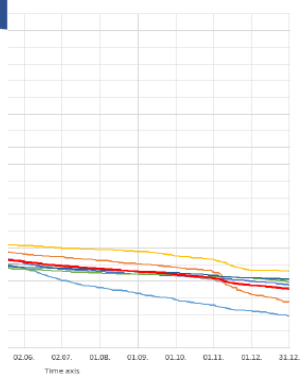
- Weir or dam (eventually spillway)
- Water intake (lateral, bottom, others)
- Solid material protection (eventually: trash rack, intake sill, sand trap)
- Water conveyance (channel, tunnel, pipeline)
- Powerhouse with EM equipment

#### 4.1 Selected river and site location

The selection of the river reach to be exploited is usually the result of on-site exploration and work on maps. Gaia GPS – originally designed for trekking but not for hydropower design – is an excellent tool, offering information about topography with a rather precise height resolution and aerial view. A preliminary decision can be taken and illustrated in the tool.



*Figure 9 - Topographical (Mapaorta, 2023) and satellite image (Google Earth, 2023)*



*Flow duration curve (own figure)*

curve, that can be used for further on calculation.

te respective river it will be necessary to find another that should be considered is an acceptable similarity in

lowgrading of the values in relation to the size of the

model will exceed the capacity within a pre-feasibility model needs very precise data of the catchment but r of the output data will be similar to the quality of the

4 15 26



# Tools still available for use

- Handbook about European (Small) Hydropower Technologies
- Capacity building course
- Replicable Pre-Feasibility Study
- HYPOSO Platform (incl. PFS on demand)
- HYPOSO Map



# HYPOSO Platform

- Meeting Platform
- HYPOSO Business Cases (on demand)
- Access to HYPOSO Map

## Welcome to the HYPOSO Platform!

The HYPOSO Platform shall gather stakeholders from Africa, Latin America, and Europe, to work together in hydropower projects for the goal of a more sustainable future.

The HYPOSO Platform is composed of three different parts:

- the **HYPOSO Meeting Platform**, where hydro stakeholders from Europe, Africa and Latin America are invited to present themselves in a company/organisation profile, and can actively – using the filter categories, see below – search for potential business partners or can be found by other Platform members doing so.
- the **HYPOSO Map**, an online GIS map, showing information about background & infrastructure, climate & hydrology, operational hydropower plants, and hydropower resources (i.e., potential sites) in the HYPOSO target countries Bolivia, Colombia and Ecuador in Latin America, and in Cameroon and Uganda in Africa.
- the **HYPOSO Business Cases**, which are altogether 15 different interesting and promising potential small hydropower sites in the HYPOSO target countries, already assessed to the pre-feasibility status. The sites shall be developed and realised in cooperation between local stakeholders and the European hydropower industry. The first ones (six sites in Africa) will be available in summer 2022.



[Discover the HYPOSO Map >](#)

## The HYPOSO Business Cases

Information about the HYPOSO Business Cases are expected to be available from June 2022 on.

## HYPOSO Meeting Platform

Find your future business partners in the HYPOSO Meeting Platform. Use the filter functions (categories) to find the right contacts for your purposes as quickly as possible.

### Filter categories:

Africa  all  Stakeholders (all) 



Hydro Power Association of Uganda Ltd.

A not-for-profit organisation, formed and duly incorporated in Uganda on June 10th 2014 as a Company Limited by Guarantee. HPAU seeks to contribute to the national,



RWENZORI POWER LTD.

Rwenzori Power Ltd (RWEPO) is an establishment in Uganda that started in 2014, with the main aim of developing renewable energy systems ranging from solar, peat,



Marma Technical Services Ltd

Marma Technical Services Ltd (MTSL) is a Private registered limited liability company based in Uganda since 2004. Our core venturing activities are:





# HYPOSO Platform

## HYPOSO Business Cases (on demand)



**Bolivia – H-BO\_01**

Region: West of Bolivia (northeast of La Paz)

Typology: mean head ROR plant, short time storage

Rated flow: 70.00 m<sup>3</sup>/s

Head: 73 m

Installed capacity: 40.21 MW

Expected energy production: 228.5 GWh/y

Specific investment costs: ~ 8.308 €/kW

Interested in the site? Contact HYPOSO:

Email: [business-cases@hyposo.eu](mailto:business-cases@hyposo.eu)  
Subject: Bolivia – H-BO\_01



**Bolivia – H-BO\_02**

Region: West of Bolivia (northeast of La Paz)

Typology: mean head ROR plant, short time storage

Rated flow: 45.00 m<sup>3</sup>/s

Head: 31 m

Installed capacity: 10.77 MW

Expected energy production: 43 GWh/y

Specific investment costs: ~ 16.005 €/kW

Interested in the site? Contact HYPOSO:

Email: [business-cases@hyposo.eu](mailto:business-cases@hyposo.eu)  
Subject: Bolivia – H-BO\_02



**Bolivia – H-BO\_03**

Region: Central West Bolivia (north of Cochabamba)

Typology: high head diversion, storage option

Rated flow: 9.00 m<sup>3</sup>/s

Head: 229 m

Installed capacity: 16.15 MW

Expected energy production: 15.6 GWh/y

Specific investment costs: ~ 2.248 €/kW

Interested in the site? Contact HYPOSO:

Email: [business-cases@hyposo.eu](mailto:business-cases@hyposo.eu)  
Subject: Bolivia – H-BO\_03

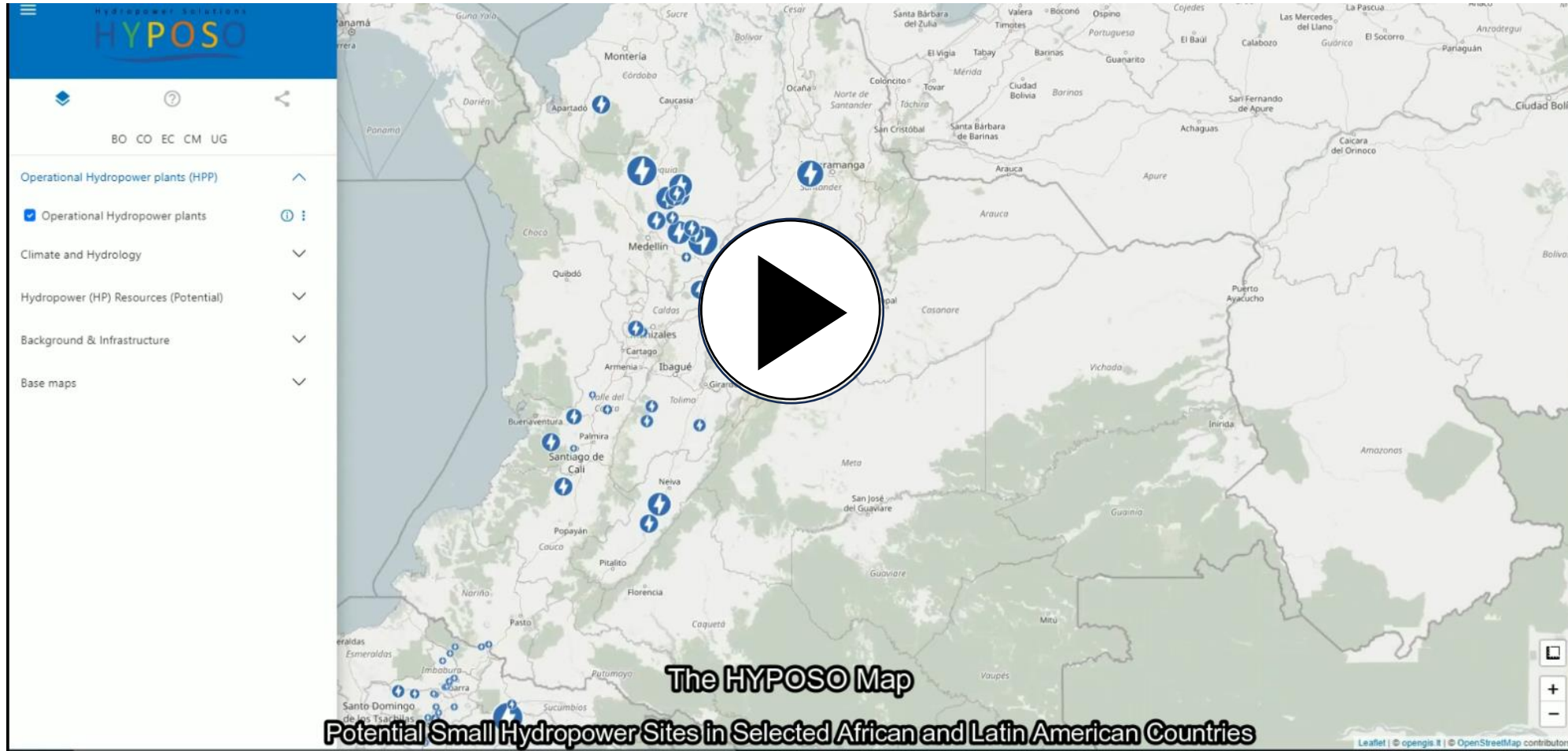


# Tools still available for use

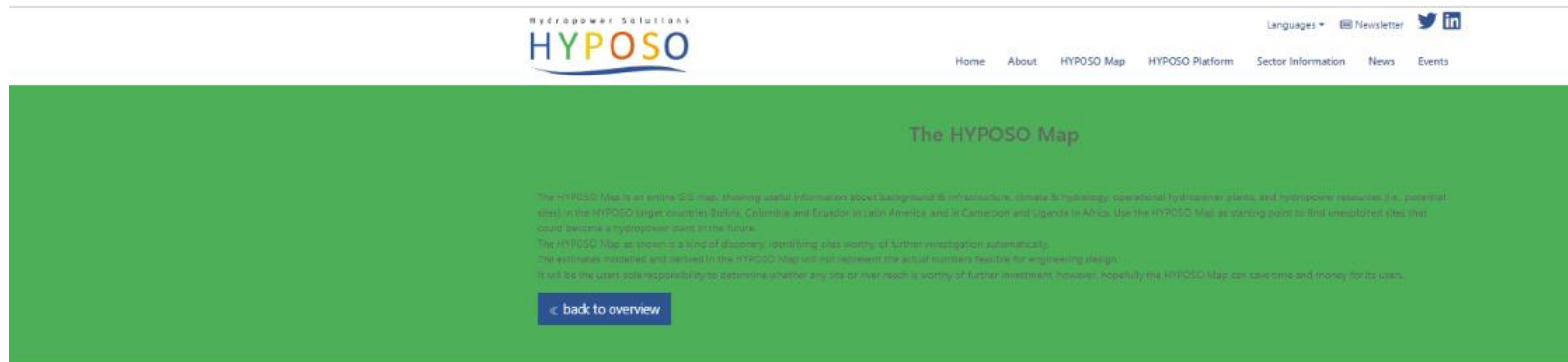
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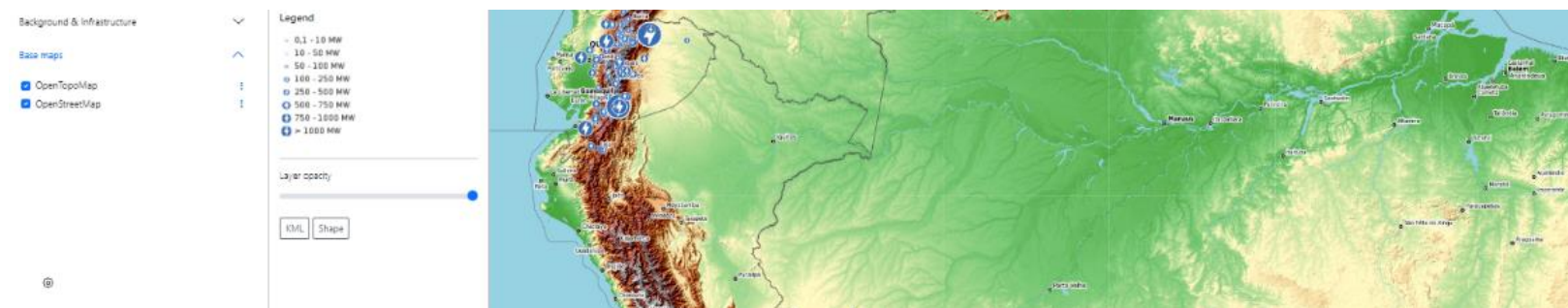
# The HYPOSO Map



# The HYPOSO Map



For further information, contact: Linas Jurevičius ( [linas.jurevicius@vdu.lt](mailto:linas.jurevicius@vdu.lt) )

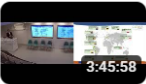



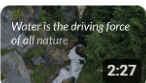


# Not to forget...

- Framework Condition Workshops  
 > Policy recommendation papers  
<https://www.hyposo.eu/en/sector-information/>
- Financial Assessment of 15 SHP cases  
[HYPOSO D5.4 1to3.pdf](#)



- Videos

	<b>HYPOSO Final Event</b> The HYPOSO Project ended with a Final Event in which the project outcomes were presented. Find...
	<b>HYPOSO Study Tour - May 2023</b> One highlight of the HYPOSO project was the HYPOSO Study Tour which was organised in May...
	<b>HYPOSO - Useful tools for the hydro sector</b> In the second video, main outcomes of the HYPOSO project (the HYPOSO Map and the...
	<b>The HYPOSO Map</b> One impressive result of the HYPOSO project is the HYPOSO Map, an online tool for hydropower...
	<b>HYPOSO &amp; the EU Hydropower Industry</b> The European Hydropower Industry stands for excellent performances and services. The EU...



# Finally, from the HYPOSO friends

- Cameroon

- funding of the selected projects (have a look at the PFS for the sites in Cameroon)
- dissemination of the untapped hydropower potential assessed (HYPOSO Map)

Contact: Joseph Kenfack ( [joskenfack@yahoo.fr](mailto:joskenfack@yahoo.fr) )

- Colombia

- Potential SHP Palace
- Site owners are looking for receiving offers or support
- a third party to develop the project would be best

Contact: Sergio Gómez Echeverri ( [sergiogomez@consultoraendemica.com](mailto:sergiogomez@consultoraendemica.com) )



# Finally, from the HYPOSO friends

- Bolivia
  - Check the three potential sites at the HYPOSO PlatformContact: Fernando Ledezma ( [fernandoledezma.p@fcyt.umss.edu.bo](mailto:fernandoledezma.p@fcyt.umss.edu.bo) )
- Uganda
  - Potential SHP projects are being worked on – European partners involved
- Ecuador
  - Contact can be enabled



# Any questions?





Hydropower Solutions

**HYPOSO**

Thank you!

Contact:

[ingo.ball@wip-munich.de](mailto:ingo.ball@wip-munich.de)



[www.hyposo.eu](http://www.hyposo.eu)  
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AGRICULTURE  
ACADEMY



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857851.

Hydropower Solutions

**HYPOSO**

# Thank you!

Contact:

[ingo.ball@wip-munich.de](mailto:ingo.ball@wip-munich.de)

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A compact summary of latest news and of ongoing activities in our project and event department

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