Hydropower Solutions

HYPOSO

Framework conditions for small hydropower – experiences from three continents

FINAL CONFERENCE

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

Outline

- Information on HYPOSO Task 6.1. Workshops on the framework conditions for hydropower in the target countries (WFC)
- Workshops and their conclusions in Africa
- Workshops and their conclusions in Latin America
- Experiences from Europe

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Work Package 6

Goal: bringing together European hydropower industry representatives with local stakeholders to accelerate the market uptake of EU hydropower technologies in the target countries

WP leader: TRMEW

Partners: all

Task 6.1 Workshops on the framework conditions for hydropower in the target countries (WFC)

Organized in all 5 target countries.

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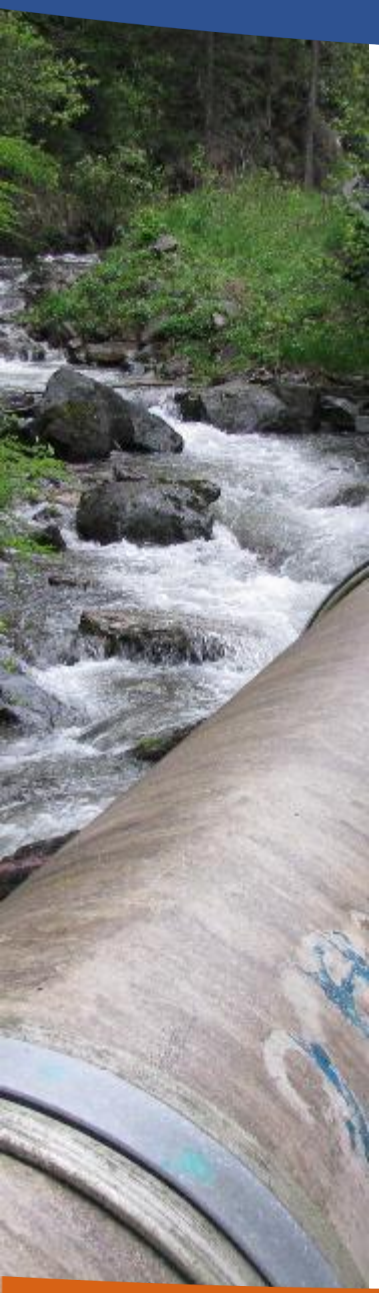

Workshops on Framework Conditions for Small Hydropower

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Aims:

- Discuss about the framework conditions for the development of small hydropower projects in each target country based on:
  - the analysis performed by the HYPOSO experts;
  - presentation of selected case studies;
  - presentations from private and public sector;
- Discuss about the actual situation and needs for hydropower in target countries;
- Discuss about proposals of facilitating the conditions of small hydropower projects development;
- Make draft proposals of recommendations.

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Workshop on Small Hydropower Framework Conditions in Cameroon

Cameroon, Yaoundé – 28 January 2022

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Workshop on Small Hydropower Framework Conditions in Uganda

Uganda, Kampala – 15 March 2023

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AFRICA – areas for improvement

FINANCIAL CHALLENGES

- High upfront costs and limited access to early-stage support/Problems with financing prefeasibility studies – C&U
  - ✓ Funding options analysis for the selected projects is a part of the feasibility study. This analysis should result in some models which could be used as examples for other projects. The analysis should comprise more than just standard solutions but also some new models of acquiring funds.
- Encouraging potential investors (need to guide investors) – C
- The problem of the financial capacity of local site owners/developers to meet the financial requirements – U&C
- Local commercial banks available instead of investment/development banks - C
- High interest rates due to the perceived high risks of the investment – C & U
- Lack of guaranty from the governments or local banks - C
- Money transfer issues - C
- No support for funding project maturation process - C
- Need for insurance cover for HP projects – U

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AFRICA – areas for improvement

REGULATIONS

- **Bureaucracy for developing hydro projects & the need of a one-stop shop** which could enable getting all necessary licences and concessions for small hydropower investment in one place, instead of costly and time-consuming practice of applying for permits in numerous institutions (expiring of permits) – C & U
- **The need of a feed in tariffs mechanism** - recommended as an important regulation -supportive and easy for small hydropower, facilitating and encouraging small hydro investments - C
- **The need of standardized procedures** - shortcomings in establishing the renewable energy development framework, rules, and conditions - C

✓ A kind of partnership in exchanging information, started at the workshop between stakeholders from Uganda and Cameroon and led to a first very practical effect - sharing the PPA template elaborated in Uganda.

- **Need to engage government** to provide solutions to overcome the barriers - U
- **Need for representation** of HP developers on government consultative forums and the need for representation of government at hydropower sector's events – U
- **Favouring large hydropower** schemes by the government to export energy to neighbouring countries – C
- **Difficulties in establishing a private company** in the hydropower sector - C

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AFRICA – areas for improvement

CAPACITY BUILDING/EXPERTISE

- Need for capacity training activities with practical application of the knowledge acquired by further development of projects – C & U
  - ✓ Over 67 applications to the capacity building courses
- Need for local expertise on hydropower designing – U & C
  - ✓ Need of outcomes from feasibility studies to be shown to HYPOSO pilot projects developers
- Lack of knowledge and/or information by applicants to develop hydropower projects and mistakes made by them in applications – U

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AFRICA – areas for improvement

INFRASTRUCTURE/DATA

- Lack of infrastructure to deliver electricity generated in planned SHPPs to the power grid leading to risk of non-bankability of projects - U
- Scarcity of in-depth information to develop sites identified in the HYPOSO Map – U
- Impacts of climate change and need to regularly update the HYPOSO Map - U

✓ Need of continuation of HYPOSO

- Scarcity of information on hydrology, climate, potential and other statistical data, especially for rural areas - C

OTHERS

- Low social acceptance of hydropower projects and harsh acceptance from some rural communities due to ancestral uses of water - C

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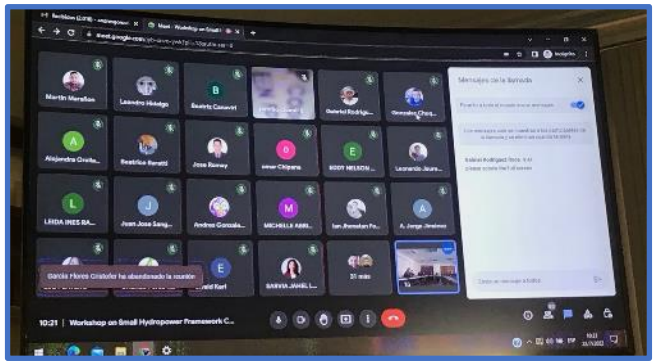
Workshop on Small Hydropower Framework Conditions in Bolivia

Bolivia, Cochabamba – 22 July 2022



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Workshop on Small Hydropower Framework Conditions in Ecuador

Ecuador, Quito – 26 July 2022

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Workshop on Small Hydropower Framework Conditions in Colombia

Medellin, Colombia – 28 February 2023

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LATIN AMERICA – areas for improvement

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REGULATIONS

- Lack of political and economic incentives to SHP development - prioritising large hydropower – C & E
- Lack of regulations for SHP even in basic issues - case by case regulations applied = no guarantees for investors about decisions on costly projects - B
- Need for improvement of legislation with regards to regulations on SHP (lack of legal clarity, certainty and decisiveness) – E
- Need for simpler approach towards SHP projects (regulatory norms were developed for large hydro and are difficult to fulfil by small hydro, in Colombia changed regulations under preparation) – E&C
- Long and demanding environmental license procedure (reforms under preparation) - C
- Pre-feasibility studies for SHP are relatively more demanding and expensive than for large hydro and many project developers are reluctant to make required pre-investments - C
- Need for clear distinction between small and large hydro – E & C
- A one stop shop recommended - existing regulations often come from a few authorities – B
- Need for stability of tariffs at least for projects payback period – E
- Need for improvement of water fees system - E
- Government authorities do not recognize the significance of SHP as a reliable and regular source of clean energy and give preference to other sources, mainly solar, wind and biomass – C
- Need to define strategies for the development of SHP through public-private partnerships - E

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LATIN AMERICA – areas for improvement

FINANCIAL CHALLENGES

- Need to improve the allocation of the existing “green credits” - problems with access – E
- Fiscal incentives and financial resources mainly allocated to other RES – C
- No "Project Finance" physical collateral – E
- Need to improve organizational structures and financing mechanisms for encouraging the development of SHP projects - B

CAPACITY BUILDING

- Little experience in private hydropower projects (only 3-4 private companies in Bolivia) and lack of SHP specific expertise – B, C
- Need for better access to information on projects development procedures- E
- Poor O&M personnel qualification - SHP owners’ budget for O&M capacity building is in many cases reduced or neglected resulting in frequent shutdowns and damages – C
- Poor capacity building facilities and programs for design and construction of SHP plants and associated works - C
- No specialised hydropower or hydropower engineering study program (hydropower is usually part of renewable or energy studies or even civil or mechanical engineering - B

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LATIN AMERICA – areas for improvement

INFRASTRUCTURE/DATA

- Lack of manufacturing capacity for SHP components, very few companies offering services or equipment - spare parts must be imported, leading to shutdown periods, damages, generation and revenues decrease, in many cases to such a point where capital debt cannot be repaid – C & B
- Restrictions about data access (national and private institutions) - B
- Lack of physical facilities for SHP equipment testing and applied research – C
- Lack of technical information – E
- No effective technical integration of small hydropower plants into the electricity system - E

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LATIN AMERICA – areas for improvement

OTHERS

- Recommendation to create small hydropower associations – other RES technologies (solar, wind, biomass, large hydropower) enjoy strong support from powerful lobbies and industries to influence government policies according to their interests – B, E & C
  - ✓ CELAPEH launched the idea of a Colombo-European Association for SHP, aimed to strengthening cooperation among European and Colombian SHP stakeholders (as a follow up of HYPOSO main objective) and join efforts to become a strong voice on behalf of SHP. CELAPEH is committed to take the lead on the efforts to shape and create the association.
- Need to emphasise the significance of the supply of electricity from small hydropower projects to local communities to provide benefits from these kinds of projects (starting with isolated grids and then connecting the SHP plants to the national grid) - B
- Need to emphasise the significance of energy recuperation combining portable and wastewater systems with hydropower – E
- Social concerns and community's opposition growing rapidly, because of environmental and social impacts of large hydro plants, and communities hardly understand differences between large and small hydropower plants, "Environmental" groups fomenting rejection – C, E
- Need to encourage link between private companies (i.e., equipment manufacturing and/or distribution within the hydropower sector) and local institutions (e.g., national government, universities, and local companies) - B

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EUROPE

The following European legislation is relevant for hydropower (national regulations must be consistent with these acts):

- Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) (**RED II**),
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (**Habitats Directive**),
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (**Birds Directive**),
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (**Water Framework Directive**),
- Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programs on the environment (**Strategic Environmental Assessment Directive - SEA Directive**),
- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (**EIA Directive**),
- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (**Revised EIA Directive**), and
- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (**Floods Directive**).

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EUROPE

- RED II calls on EU Member States to promote and facilitate the development of renewable energy projects renewables (including SHP) to reach EU ambitious targets for the share of in the EU's energy consumption.

- Based on that EU countries have introduced renewable energy policies supporting electricity generation from RES, including support mechanisms for SHP and goals to increase the share of renewable energy.

- The goals set for SHP development might never be reached in many countries and the development of SHP has been significantly slowed down by the environmental requirements and legislation, which means:
  - Long and complicated authorization and licensing process which must include comprehensive assessments of environmental concerns with respect to the European, national and federal regulations but also the welfare of stakeholders such as fisheries, tourist or recreation groups.
  - Strict environmental conditions and expectations - regarding hydromorphology, ecological minimum flow, fish up- and downstream migration possibility, installation of fish friendly turbines, free sediment transport along rivers etc. - restrict electricity generation and jeopardize technical and economic viability of many new and existing projects.

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EUROPE

OTHER LIMITATIONS

- **Natural limitation for hydropower development in** Europe is the availability of local hydrological potential, especially hydraulic head. It limits the development of hydropower potential in the countries with low head potential. In those with high head potential much of the technical hydropower potential has been already developed.
- **Perception of SHP** as a source of moderate amounts of green electricity at the cost of significant interference with the environment.
- **Disregarding the multipurpose character of SHP installations** and numerous benefits for water management and the environment as well as local power grids they provide.
- **Insufficient support** for new or existing SHP schemes and difficulties with finding the required initial capital investment - reported in some countries.

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EUROPE

- Given the recent geopolitical development in Europe and the resulting energy crisis, the European Commission issued a recommendation on speeding up permit-granting procedures for renewable energy projects, accompanied by guidance to help the Member States speed up permitting for renewable energy plants.

- This should allow the rapid development of SHP projects.

- However, this does not preclude the obligation to assess the environmental impacts of SHP projects in the light of the European legislation and in particular the Habitats Directive, Birds Directive and Water Framework Directive.

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Thank you!

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