



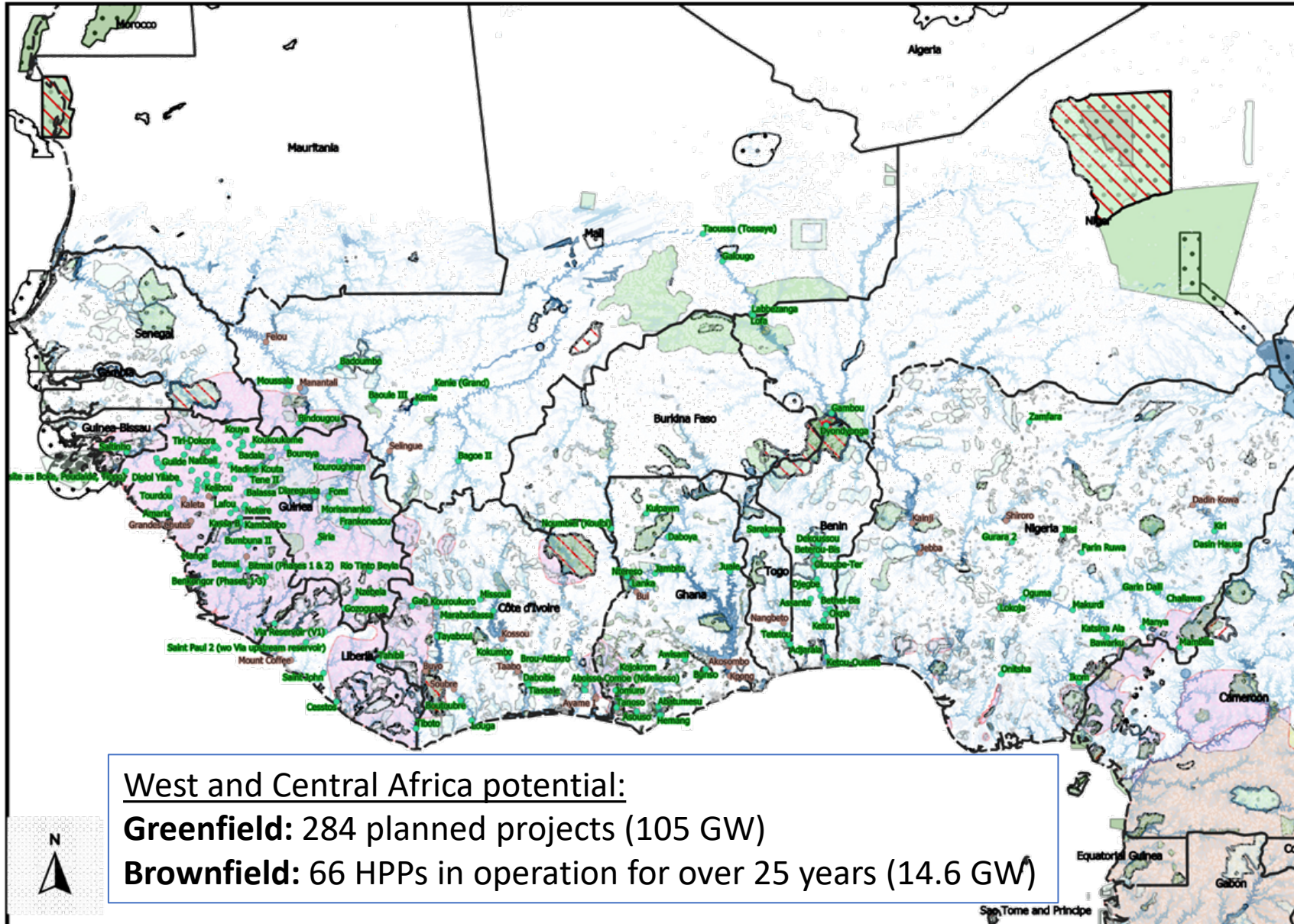
The Role of Hydropower in Clean Energy Transition

A World Bank Perspective on Environmental and Social Standards

THE BIG PICTURE: Sustainability is all about dignity

- Today 770 million people live without **access to electricity**, mostly in Africa and Asia.
- Around 2 billion people around the world do not have **access to clean and safe drinking water**, and approximately 3.6 billion people – 46% of the world's population – lack **adequate sanitation services**.
- **Education**. About 258 million children and youth are out of school
- **Unemployment**. The average for 2023 based on 101 countries was 7.12 percent. The highest value was in South Africa: 34.72 percent and the lowest value was in Thailand: 1 percent.
- After growing 3.1 percent last year, the **global economy** is set to slow substantially in 2023, to 2.1 percent, amid continued monetary policy tightening to rein in high inflation, before a tepid recovery in 2024, to 2.4 percent.

Hydropower Projects in Sub-Saharan Africa- WAPP AREA - Greenfield and Brownfield projects



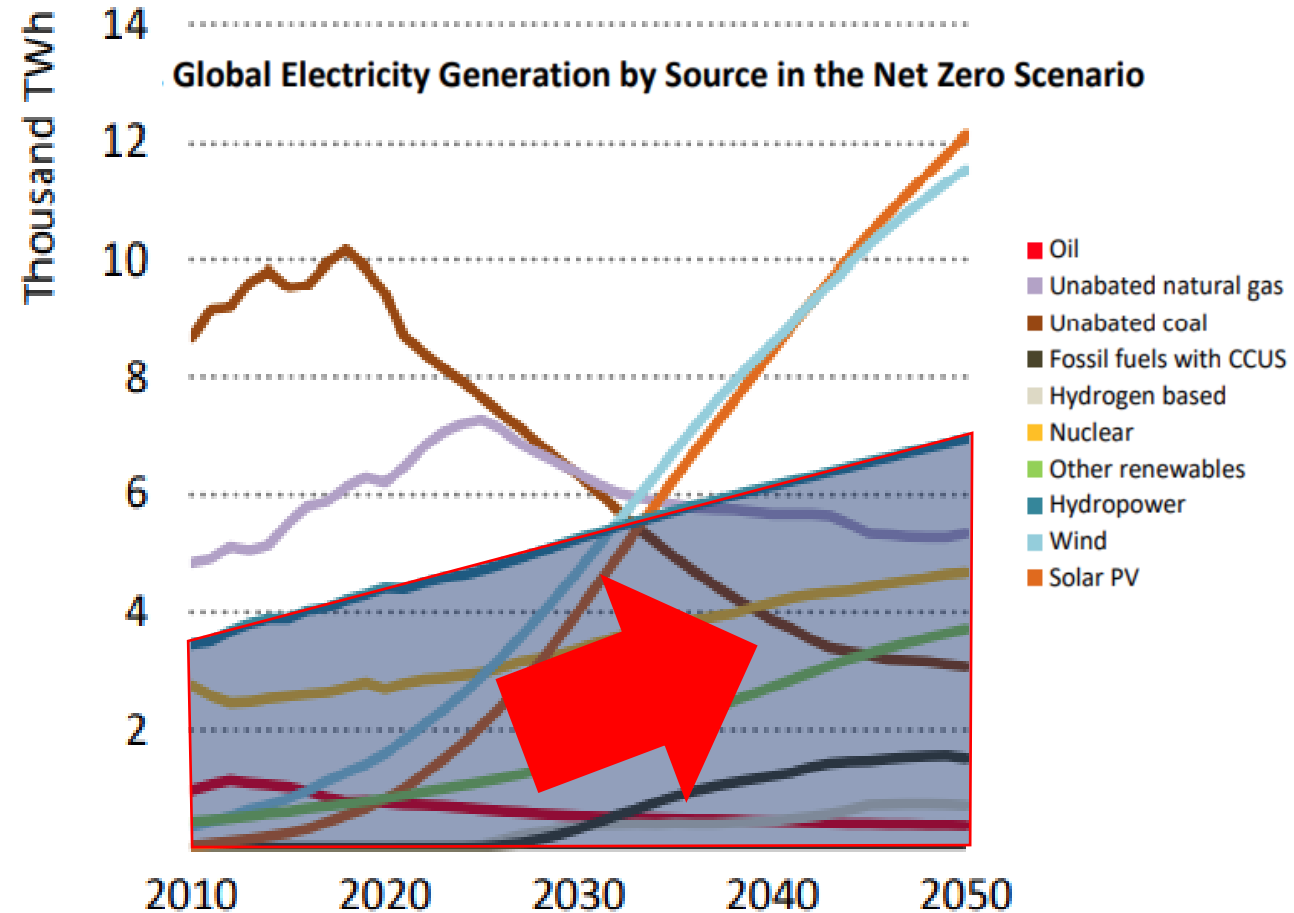
Legend

- Country borders
- GREAT APES
- Pan troglodytes
- IFC ROADMAP PROJECTS
- Brownfield
- Greenfield
- BIODIVERSITY
- WPA Ia to VI
- World Heritage sites
- AZE
- KBA
- AZE

West and Central Africa potential:
Greenfield: 284 planned projects (105 GW)
Brownfield: 66 HPPs in operation for over 25 years (14.6 GW)

Hydropower is back

- Backbone of the energy transition
- Low-carbon
- Dispatchable and flexible to integrate variable renewable energy (wind, solar...)
- IEA Net zero calls for doubling the existing installed capacity by 2050
- Third largest energy source in the electricity mix by 2050



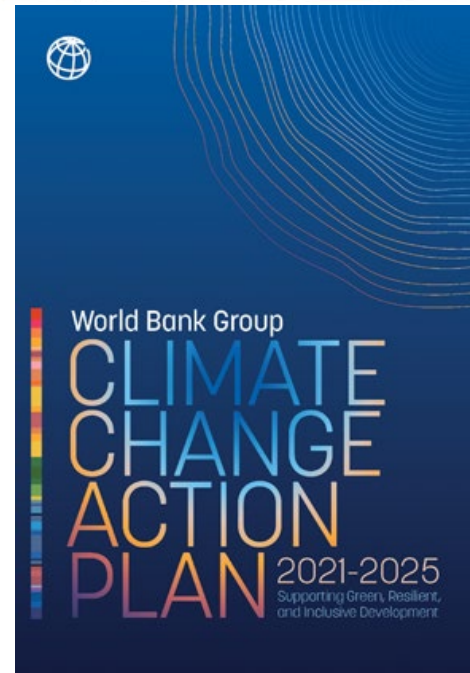
GLOBAL CONTEXT

- With a critical target for affordable, reliable, sustainable and modern energy for all, all RE technologies will be needed
- The International Renewable Energy Agency (IRENA) has estimated that 850 GW of additional hydropower capacity, including pumped storage hydropower, would be required by 2050 in order to meet the Paris Agreement temperature goals;
- The International Energy Agency (IEA) has estimated that at least 1300 GW of new hydropower capacity would need to be added in order to achieve Net Zero by 2050

Corporate commitments



SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD



**GREEN
RESILIENT, AND
INCLUSIVE
DEVELOPMENT**



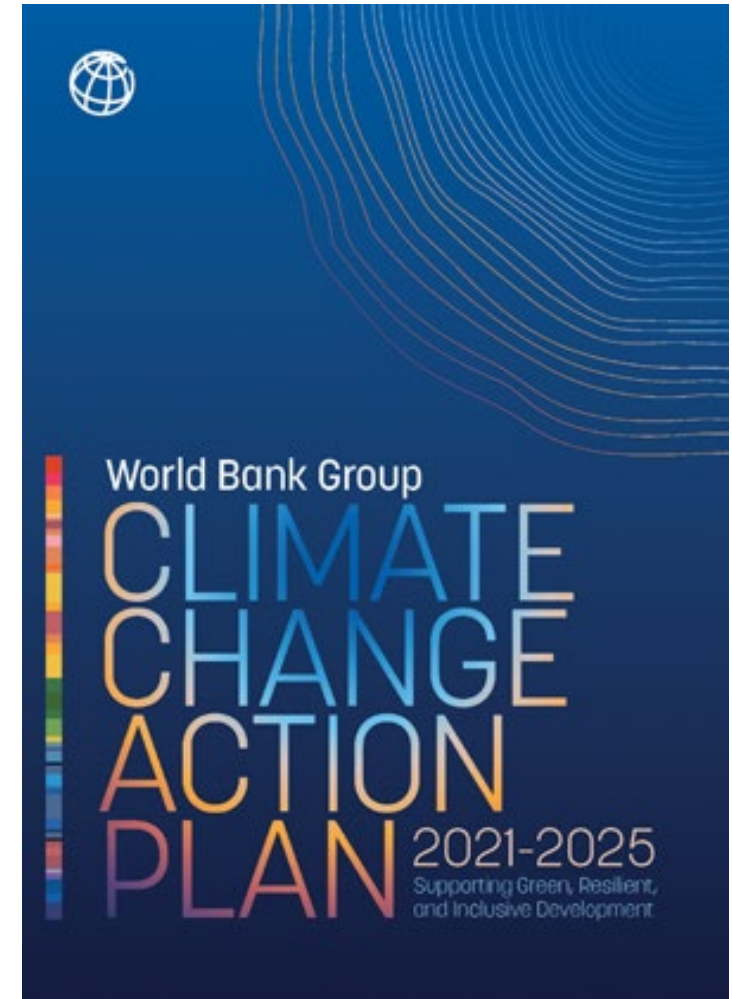
October 2021



A strong business line at the Bank: Since 2002, 131 hydropower projects, for a total investment of \$17 billion in 68 countries. Currently Upper Cisokan PS in Indonesia

WB is committed to supporting sustainable hydropower

- The WBG will support countries in developing sustainable and resilient hydropower, while not damaging the ecosystems, and the associated water storage needed, including through regional cooperation to advance complementary investments across countries.”
- “the WBG is committed to supporting countries to develop and finance hydropower projects that are well suited to local conditions and are resilient to climate change.”
- The WB supports hydropower when part of the low-carbon development pathway of a country / region



Hydropower's role is changing ...

	TRADITIONAL ENERGY MARKET - YESTERDAY	ENERGY TRANSITION - TODAY	NET-ZERO EMISSIONS - TOMORROW
Hydropower role	<ul style="list-style-type: none"> • Generate energy - baseload and hourly peaking 	<ul style="list-style-type: none"> • Enable integration of VRE (i.e., wind and solar) and facilitate energy transition/grid decarbonization 	<ul style="list-style-type: none"> • Support VRE generation which will determine operation patterns of the power system
Grid services	<ul style="list-style-type: none"> • Balance energy supply 	<ul style="list-style-type: none"> • Ensure grid stability and reliability through ancillary services such as frequency regulation, voltage support, active power-loss compensation, black start 	<ul style="list-style-type: none"> • Store surplus VRE generation and provide increased grid resiliency (e.g., enhanced energy balancing and frequency regulation) through pumped storage hydropower and other storage technologies
Multipurpose benefits		<ul style="list-style-type: none"> • Flood protection, irrigation support, water supply and recreation 	
Sustainability	<ul style="list-style-type: none"> • No defined/ unique industry standard 	<ul style="list-style-type: none"> • Hydropower Sustainability Guidelines are voluntary 	<ul style="list-style-type: none"> • Sustainable hydropower development is the norm • Renewable energy projects contribute to biodiversity protection and conservation

Environmental and Social Framework

PROTECTING PEOPLE AND THE ENVIRONMENT IN INVESTMENT PROJECTS



Our Environmental and Social Policies help to:



Why do we have Environmental and Social Policies?

- Environmental and social policies help ensure that **people and the environment** are **protected** from potential adverse impacts in investment projects. Such policies also improve the **outcome and effectiveness** of projects.
- In addition, support for strengthening the capacity of Governments to implement environmental and social policies, increases **sustainability and impact** beyond the World Bank portfolio.

Protection of
people &
environment

Better project
outcomes and
effectiveness

Multiplier
effect beyond
World Bank-
financed
projects

The Environmental and Social Framework

The World Bank's Environmental and Social Framework:

- ✓ applies to investment projects.
- ✓ boosts protections for people and the environment; promote capacity- and institution-strengthening and country ownership; and enhance efficiency for both the Government and the World Bank.
- ✓ consolidates the World Bank's environmental and social policies and harmonizes them with those of other development institutions.
- ✓ makes important advances for the World Bank in areas such as transparency, accountability, nondiscrimination, and public participation.



Key Characteristics of the Environmental and Social Framework

The World Bank's Environmental and Social Framework is designed to be:



Systematic

- ✓ Applies 10 Standards with explicit objectives
- ✓ Assesses a broad set of E&S risks and impacts consistently
- ✓ Involves ongoing Stakeholder Engagement



Modern

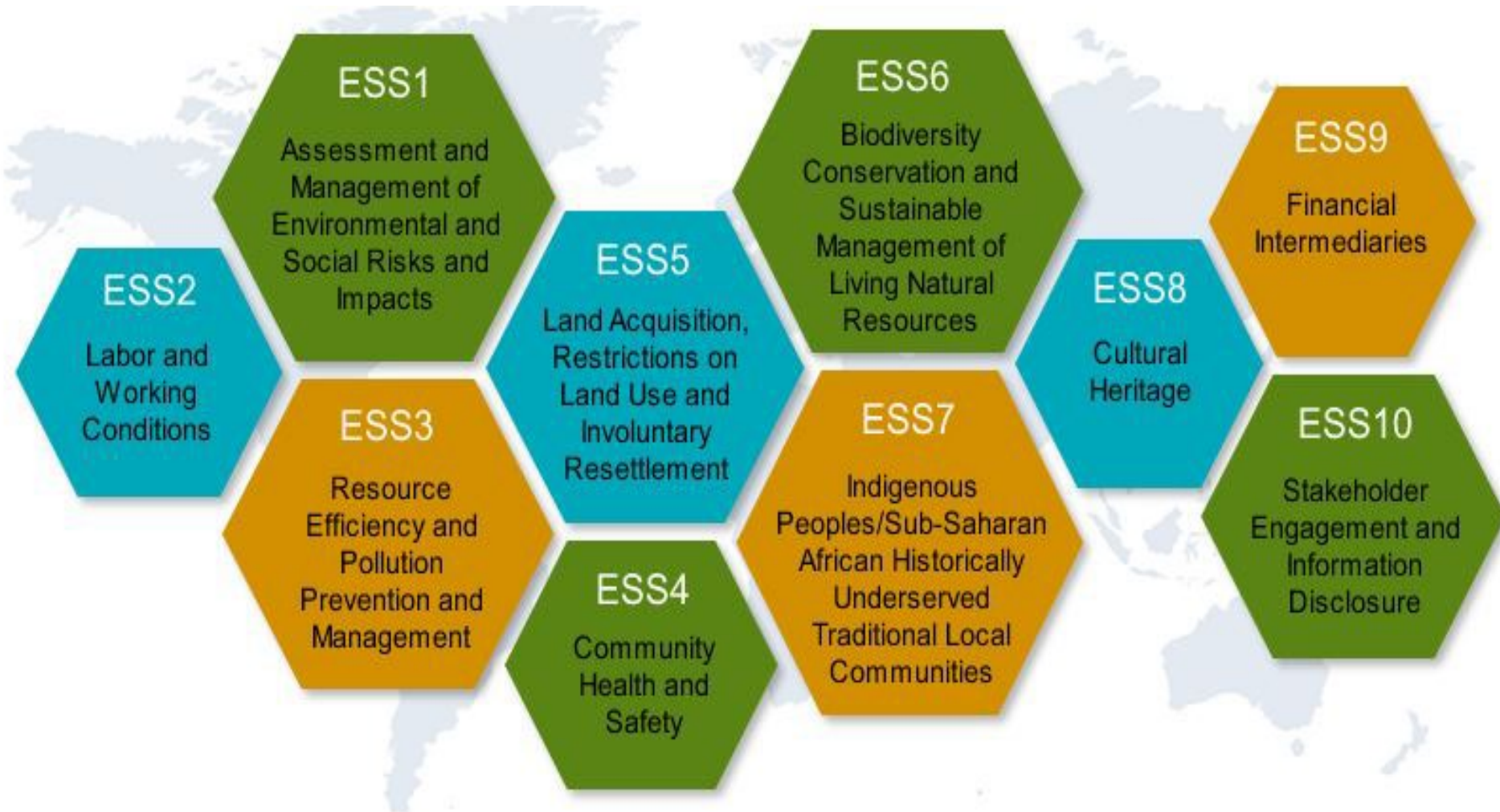
- ✓ Responds to challenges that have arisen over time
- ✓ Adapts to needs in a timely way
- ✓ Integrates environment and social risks



Harmonized

- ✓ Brings environmental and social protections into closer harmony with other institutions
- ✓ Applies Good International Industry Practice

Ten Environmental and Social Standards cover a broad range of topics



What are the Environmental and Social Standards?

- Designed to help Governments **manage project risks and impacts, and improve environmental and social performance**, consistent with good international practice and national and international obligations

Include **objectives** that define the environmental outcomes to be



Include **requirements** that help Governments achieve the Environmental and Social Standard objectives through means appropriate to the nature, scale and risks of a project

Promoting Public Support for Projects

The ESF emphasizes more systematic stakeholder engagement and participation in all projects.

This enables Governments to maintain a constructive relationship with stakeholders and take their views into account in project design, which promotes a better public understanding and support for projects.

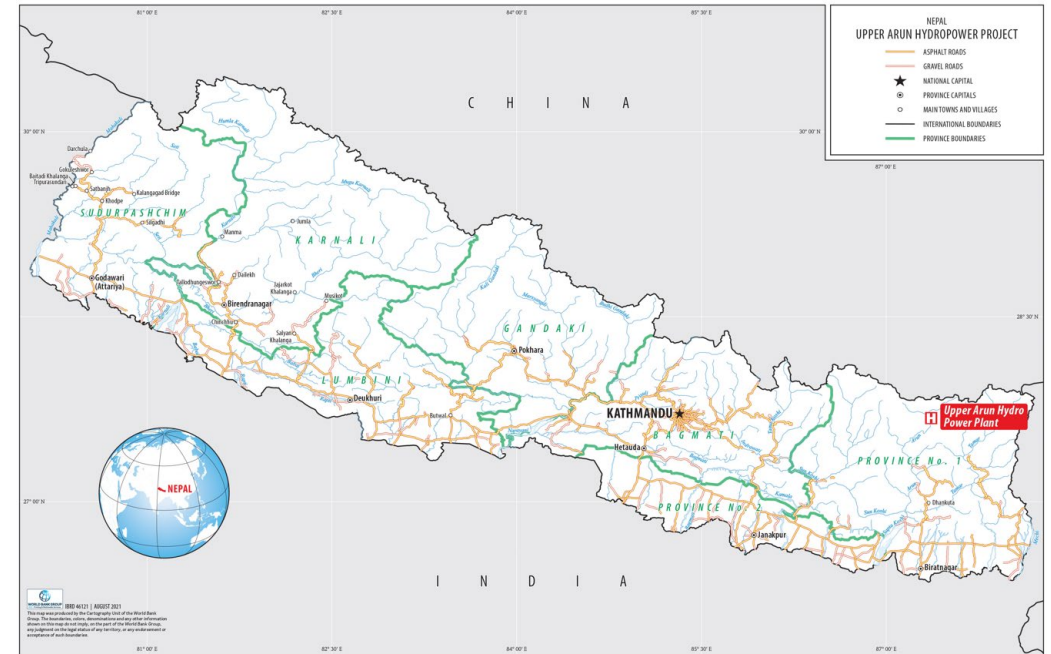


PROJECT DESCRIPTION

Upper Arun Hydro Electric Project (UAHEP)

- ❖ UAHEP is in eastern Nepal at about 10 km south of Nepal's border with China on the Arun River. The financing cost are estimated at USD 1.8 – 2.0 billion.
- ❖ The project is proposed to be developed by Upper Arun Hydroelectric Company Limited (UAHECL), a subsidiary of the Nepal Electricity Authority (NEA), the Nepal's power utility.
- ❖ Aside from domestic power, the project is expected to contribute surplus power that will be marketed for export.
- ❖ UAHEP provides an opportunity for the World Bank to support the Government of Nepal: a) to develop Nepal's capacity to implement large scale hydropower projects and b) to develop adequate, reliable and secure power, doubling current installed capacity and increasing the current government revenues

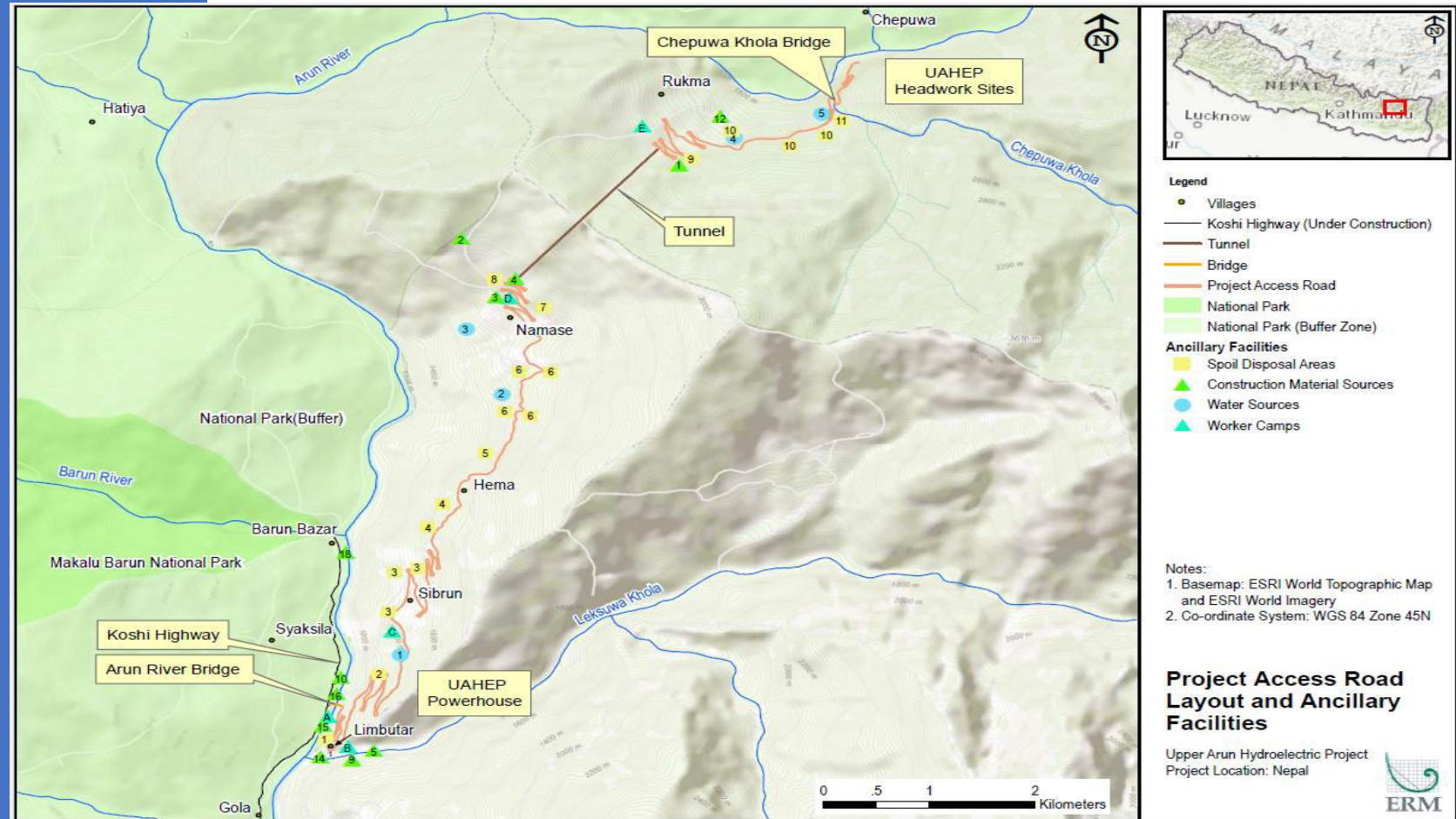
Note: since last Upper Arun RVP briefing in September 2021, the design features of Upper Arun have remained the same.



Item	Value
Project type	PROR
Catchment area above dam site	25,700km ²
Annual average flow	217m ³ /s (6.85 billion m ³)
Installed capacity	1060MW (6 units)
Annual average energy output	4,500 GWh
Maximum dam height	91m (Gravity dam)
Total construction period	About 7 years.

PROJECT LOCATION

- Adjacent to Makalu Barun National Park – some facilities, dam and reservoir site and 16-km dewatered section within the park's buffer zone.
- Most of Project area is currently accessed only by a walking trail.



Upper Arun Hydropower Project (UAHEP)

Benefit Sharing to Prioritize
Development for Local Communities



Benefit Sharing of Hydropower Development in Nepal

- **Royalties**

NRs. 100 for each installed kilowatt of electricity per year plus 2 percent of the average tariff per unit (per kilowatt hour) for a term of up to fifteen years from the date of generation of electricity for commercial purpose. After the term of first 15 years, NRs.1000 for each installed kilowatt of electricity per year plus 10 percent of the average tariff per unit (per kilowatt hour).

- **Community Support Program (Investment in community development and local infrastructure including rural electrification, water supply and irrigation)**

0.75% of total investment in the project with capacity up to 100 MW and 0.5% of total investment in the project with capacity larger than 100 MW for Community Support Program in IEE/EIA.

- **Corporate Social Responsibility**

allocate at least one percent (1%) of the net annual profit for each year to be utilized for CSR.

- **Equity investment: Local share offers in hydropower projects**

10% shares to local impacted people

- **Support for local livelihoods: Employment and training**

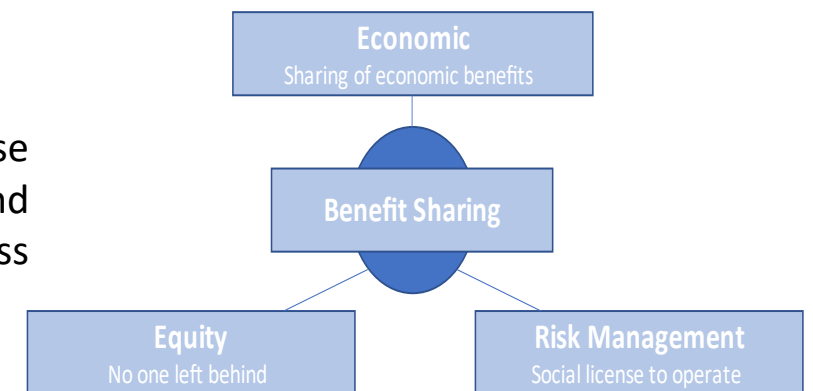
- **Environmental enhancement activities**

Background

- **The UAHEP is going to increase reliability and access to modern electricity services by tapping Nepal's large hydropower potential.**
 - At national (macro) level, the benefits are expected to be significant.
 - Meanwhile, the negative impacts will be felt locally.
- **During consultations, the local communities currently residing in the direct impact area (DIA) have voiced their expectation to share in some of the Project benefits**
 - Jobs, local infrastructure, local shares, etc.
- **The World Bank - Nepal office sought consulting support service to prepare a report on benefit sharing for the UAHEP with two objectives:**
 - 1) to benchmark Nepal's legislation on benefit sharing in hydropower projects against that of other countries in the region
 - 2) to develop a benefit sharing framework that reflects international good practices.

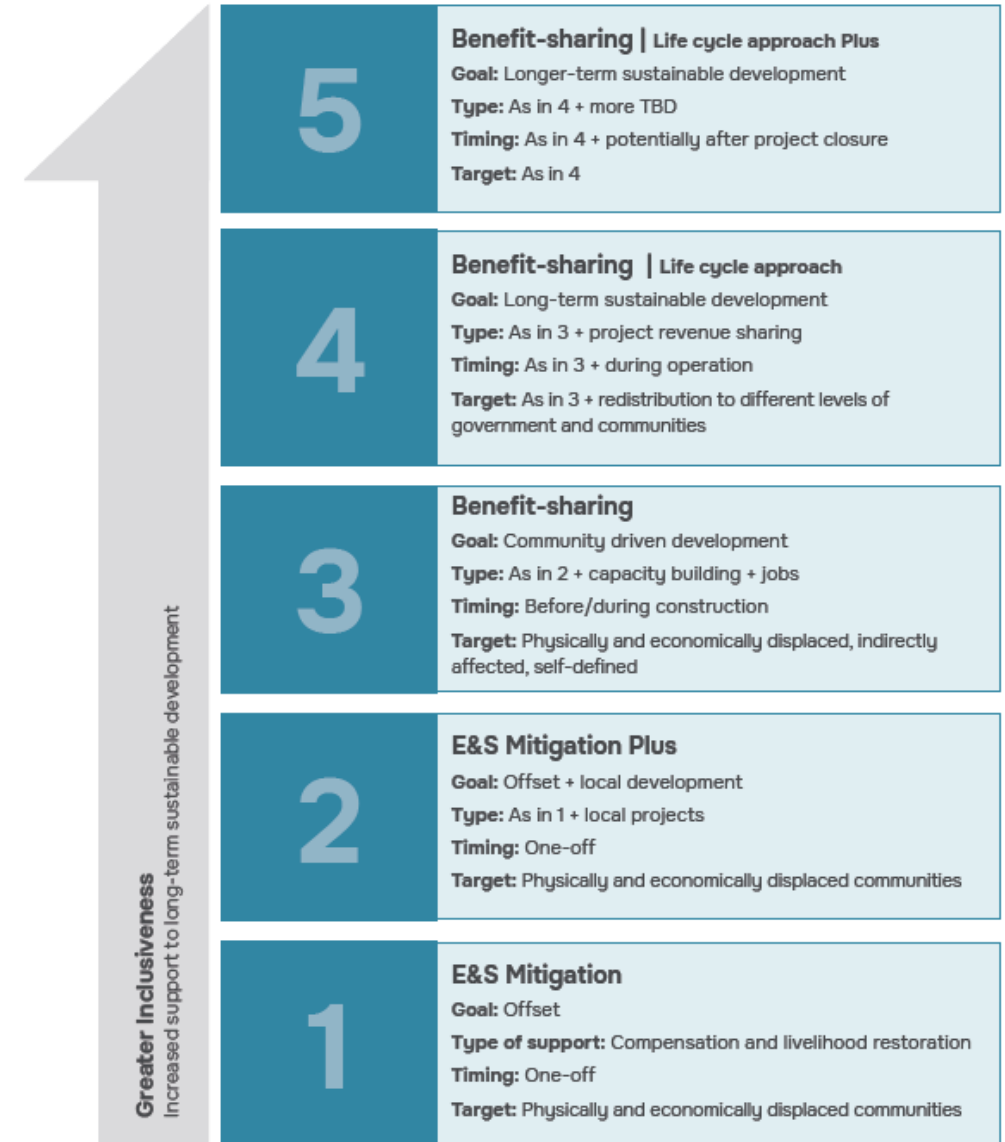
Understanding Benefit Sharing

- *“A framework for governments and project proponents to maximize and distribute benefits among stakeholders, trying to achieve equity across spatial and temporal scales, and in keeping with sustainability principles”* (Lillehammer, San Martin, and Dhillion, 2011)
- **It is different from impact mitigation**, which focuses on “doing no harm”—instead, *“benefit sharing focuses on opportunities to deliver value to the project’s host communities”* (IFC, 2019)
- **Three key rationales:**
 - **Economic**—to provide economic benefits to a broad range of stakeholders;
 - **Equity**—to ensure “no one is left behind,” with particular support for those who might be adversely affected by a project, as well as poor and marginalized households who might otherwise find it difficult to access benefits; and
 - **Risk management**—to obtain local buy-in and thus gain a social license to operate



Understanding Benefit Sharing, *cont.*

- **Social risk management is a continuum** - from impact mitigation (level 1) to sharing benefits in different phases of the project and with long-term sustainability in mind (level 5)
- **Difficulty to draw a line** as benefit sharing programs are sometimes designed as extensions of mitigation measures
- **Projects decide** where to locate themselves along the spectrum – only level 1 is compulsory
- **National legislations** should harmonise approaches across projects



The legislative framework on benefit sharing

- **Community Support Program (CSP) (before/during construction)**
 - Budgetary allocation in EIA to be submitted to MoFE (through DoED)
 - Compliance to be monitored by DoED
- **Local shares, and the *Nepal ko Pani, Janata ko Lagani* (“Nepal’s Water, People’s Investment” Program)**
 - The Nepali Constitution establishes the right of the local people to be shareholders (up to 10%)
 - Program launched in 2017
 - Announced 21 government projects with large public shareholding participation
 - 49% public (of which 3% for TL-affected people)
 - 41% Government, 5% Province, 5% LG
 - UAHEP is one of the projects in the Program
- **Royalties – capacity and energy (during operation)**
 - Rates as per Electricity Act 1992
 - 50% to federal govt, 25% to provincial govt, 25% to local govt
- **Corporate Social Responsibility (during operation)**
 - 1% company profit to be spent for local affected communities, annually
 - DoI approves plans, based on LGs recommendations
 - Implementation guidelines yet to be approved

The consultations revealed that:

- Each instrument has its own implementation challenges
- Low enforcement capacity of govt institutions
- Low LG capacity to invest funds for local development (CSP, royalties)
- Local politics and power dynamics dominate decision-making at local level
- Local shares perceived as “personal benefit”
- People have little understanding of projects’ performance and financial risks; no e-trading skills
 - Projects that run losses have no profits to share (e.g. currently NEA is not buying electricity from 23 projects due to energy surplus)
- Important omissions in legislation: e.g., the value of local shares after concession

Some elements could be considered for Nepal, e.g. guidelines for CSP, CSR, and royalties (incl. negative list), national program for pre-construction training.

Literature on impacts and lessons is scant. Very difficult to do cross-country comparison.

Cross-country comparison of benefit sharing frameworks

- **India has the most comprehensive regulatory framework, which supports communities before and during construction, and during operation.**
 - Since 2008, local funds (LADFs) are created for each hydro plants to fund community projects in the district where they are located.
 - In addition, the people affected by hydro-projects receive funds transferred directly to their personal bank accounts.
 - Pre-construction training program, on a national scale.
- **The Bhutan framework provides a range of benefits to communities during operation**
 - Free electricity, and royalties paid to the central government.
 - Jobs must be offered to at least one member of each affected household.
- **In the Philippines, funds are transferred during operation**
 - Directly from developers to local funds.
 - 80 percent of taxes paid to the central government are used for energy subsidies for the local people.
- **In Pakistan, a revenue sharing mechanism is provisioned by the Constitution.**
 - A new resettlement policy which contains provisions on benefit sharing has been drafted in 2002, but never enacted.

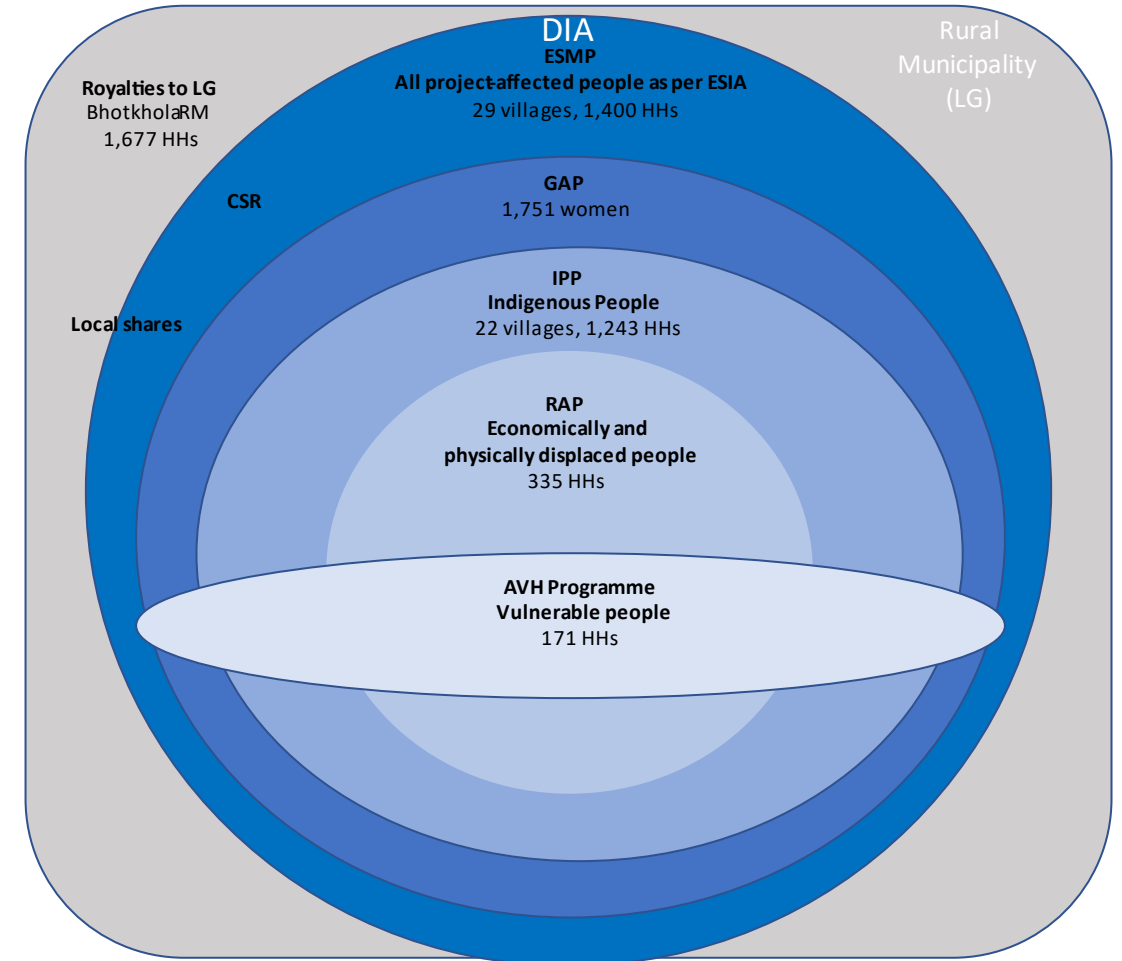
	Before construction	During construction	During operation	After concession
India	Training	Employment	Funds to local funds (for community projects) Funds to individuals' bank accounts	
Bhutan		Jobs and contracts	Free electricity or cash in lieu to central government Free electricity or cash in lieu to landowners (for 2 years) Jobs	
Philippines			Royalties to central government to subsidize electricity in host communities Royalties to local funds CSR	
Pakistan			Royalties (from federal to provincial governments)	
Nepal	Training (PPPs) Training (non-PPPs)	CSP	Royalties paid to the federal, provincial and local government CSR Local shares (dividends/capital gains)	

Mandatory
 Not mandatory

None of the countries' regulatory framework is clear about benefits in the post-concession phase.

The UAHEP mitigation, restoration, and benefit sharing plans were reviewed

- **ESMP and other plans**
 - Targets the whole population in the DIA
 - Some elements beyond mitigation (Assistance to Vulnerable Households - AVH program, Labor Management Plan, Gender Action Plan - GAP)
- **RAP**
 - Targets people to be economically and/or physically displaced
 - Some measures support gender equity and livelihood enhancement
- **IPP**
 - Targets only IPs in the DIA
 - First time FPIC process for a NEA project
 - Consent documents signed in December 2022
 - Budget for 5 years (NPR 55 crore plus 1 crore/yr for adm costs) to finance 4 development programs (investments to be selected by IPs committees)
- **Local Shares**
 - *Nepal ko Pani, Janata ko Lagani* – shareholding structure to be changed
- **CSR**
 - To benefit project-affected people in the DIA
- **Royalties to LG**
 - In 2020/2021, the RM of Bhokthola received intergovernmental-fiscal transfers worth NPR 18,561,000 (US\$ 142,000)
 - The Project will increase funding to LG significantly



The UAHEP's activities and plans were compared against international good practice on benefit sharing

- **Nine good practice criteria drawn from literature.**

Grouped around the three objectives of benefit sharing:

1. **Risk Management (Social License)**

1. Having culturally sensitive communication and engagement
2. Sharing benefits early on
3. Defining the target area for benefit sharing in a culturally appropriate manner

2. **Economic Development**

1. Benefit sharing promotes the long-term socio-economic development of the affected communities
2. Benefit sharing invests in meaningful activities that reflect the communities' needs and priorities
3. Benefit sharing contributes to building local institutional capacity
4. The governance structure of the benefit sharing mechanism promotes transparency, accountability, and inclusiveness

3. **Equity (Leave No One Behind)**

1. Women's and vulnerable people's voice is heard, and their needs responded to
2. Women and vulnerable people participate in the benefits provided

- **Qualitative assessment.**

Color coding: when the Project's performance reflects best practice (green), when more work needs to be done (amber), and areas of major criticality (red).

The analysis shows that almost all the criteria are **amber** - that is, more could be done to implement good international practice on benefit sharing.

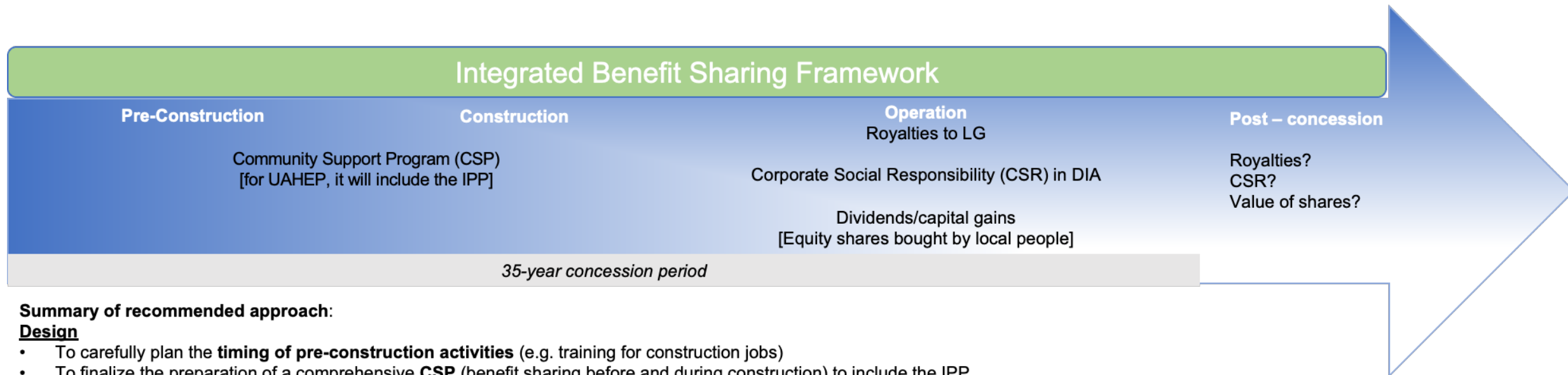
Presently, three areas of constraint – not unique to UAHEP:

1. Lack of long-term vision to support local development
2. Weak capacity, of both the Project company and LG, to implement benefit sharing
3. Low transparency, accountability and inclusiveness across the array of benefit sharing mechanisms

Limitation of the analysis:

- It can only look at what the Project has done so far (e.g., consultation and engagement activities) and what it has committed to do
- Importantly, success will depend on third parties also, e.g. the local government (RM).

Recommended approach to benefit sharing



Summary of recommended approach:

- Design**
- To carefully plan the **timing of pre-construction activities** (e.g. training for construction jobs)
 - To finalize the preparation of a comprehensive **CSP** (benefit sharing before and during construction) to include the IPP.
 - To prepare an integrated and comprehensive **Benefit Sharing Framework** which promotes a project life-cycle approach to benefit sharing
 - To confirm the **project shareholding structure**, and **raise awareness about local shares**

- Implementation**
- To improve understanding of and safeguard against **political economy/power dynamics** at local level
 - To prepare for the **implementation** of the integrated Benefit Sharing Framework
 - To consider creating a **Project benefit sharing stakeholder committee**, incl. IP, non-IPs, TL-affected people, LG, Project Company
 - To **gather evidence and share lessons by including monitoring and evaluation** of benefit sharing into the Project

- Regulatory and institutional issues**
- To **streamline the existing regulatory framework on benefit sharing**, and communicate clearly what happens to project benefits after the end of the concession period
 - To **build the capacity of the LG**, which is relevant also for effective benefit sharing in Nepal

FPIC: The Process

- Representative Selection Process Inclusive
- AJAC (85 reps from 10 villages with social quotas)
- WG (20 reps, even gender split)
- Capacity-Building Assessment: Objective assessment of partner capacity for IPP/FPIC planning process and response
- Supplementary Needs Assessment & Priorities/Planning (if SIA insufficient)
- Consent Process Agreement
- Three Rounds of Village Consultations:
 - i. introduce project/FPIC/IPP process; gather community priorities,
 - ii. submit first IPP draft, other document drafts,
 - iii. revised IPP draft and related documents
- Three Rounds of Meetings (after each Round of Consultations)
- Spirituality & Culturally Embedded

CHANGING NEPAL AND GREENING SOUTH ASIA

Changing Nepal

- ❖ By GoN called a *“Game Changer Project”* and expected to contribute to at least 0.5 percent of GDP (annual average) within five years of its completion and significant employment creation [NPC 15th 5-year plan]
- ❖ *Meeting people’s needs for electricity*: Energy production from UAHEP could meet 25% of the peak energy deficit in the dry season of around 3,269 GWh in FY31 as indicated by the energy balance results of the power market potential analysis [CSPDR FS].
- ❖ *Generating revenue*: The project may generate about US\$350 million annually (equivalent to 1% of Nepal’s GDP in 2021), and more than US\$ 400 million in royalties over 30 years to be distributed among federal, provincial and local governments as per the Intergovernmental Fiscal Arrangement Act, 2074 (2017) enacted by the federal parliament.
- ❖ *Significant benefit sharing with local communities* mostly mandated by Nepali law, including Royalties, Community Support Program, and equity investment.

Land Area Flooded and People Displaced in Large Hydropower Projects *					
Project (country)	Installed Capacity (MW)	Reservoir area (hectares)	People displaced	Hectares flooded/MW	People displaced/MW
<i>Pebuenche (Chile)</i>	500	400	0	<1	2
Upper Arun (Nepal)	1,060	20	109	0.02	0.10
<i>Pangue (Chile)</i>	450	500	50	1	<1
<i>Guavio (Colombia)</i>	1,000	1,530	4,959	2	5
<i>Tehri (India)</i>	2,400	4,200	100,000	2	42

* Good Dams and Bad Dams: Environmental Criteria for Site Selection of Hydroelectric Projects (World Bank 2003)

- ❖ *Comparatively small environmental footprint*: GHG emissions from UA reservoir very low at only 0.2g CO₂; land flooded by reservoir is extremely low (see table for comparison)

Greening South Asia

- ❖ *Reducing greenhouse gas emissions directly* in India and Bangladesh from fossil fuel generated power through electricity exports from Nepal.
- ❖ *Supporting scaling up renewable energy generation* in India and Bangladesh by providing important system balancing services: each MW of cross-border hydro can support 4-6 MW of variable renewable electricity (solar/wind) in India.

LEVERAGING BANK ENGAGEMENT FOR TRANSFORMATION

The WBG Country Partnership Framework (CPF) for Nepal stresses the importance of hydropower generation **to increase domestic supplies, regional energy trade, and climate change co-benefits.**

- **DEVELOPMENT FOR NEPAL** - electricity from Upper Arun will (i) increase grid-based electricity to support economic activity, including jobs; and (ii) electricity exports to India and Bangladesh will provide revenues that can be re-invested in education, health, etc.
- **REGIONAL GREEN GROWTH & CLIMATE MITIGATION** - hydropower from Nepal can enable (i) displacement of more expensive thermal generation; and (ii) provide absorption capacity for 3-4 MW of solar/ wind per MW of hydro installed in neighboring countries like India and Bangladesh.
- **CROWDING IN FINANCING** - the Bank's participation in the project, with both best practice/expertise and financing will enable crowding in public and private financial resources for this high risk – high reward project.
- **BUILDING BACK A BETTER ENERGY SECTOR** - the Project is an anchor, which provides the necessary pull to lift the energy sector up to higher levels of performance alongside Nepal's IPF and DPC program.
- **SUPPORTING THE BANK'S IDA-20 COMMITMENT ON RENEWABLES** - the Project would contribute to meeting 10 percent of the Bank's target.



Thank You



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