HPNET
HYDRO EMPOWERMENT NETWORK

RESILIENT HYDRO MINI-GRIDS

BEST PRACTICES FOR INCREASED SOCIO-ECONOMIC AND ENVIRONMENTAL BENEFITS

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Network Faciliator and Manager

UN DESA Regional Capacity Development Event - Asia
Sustainable Water and Energy Solutions for Resilient Recovery from COVID-19

November 2020

OUR WORK

KNOWLEDGE EXCHANGE

Evidence building tools for multi-actors
Capacity building events (online and in-person)
South-South and peer-to-peer exchange

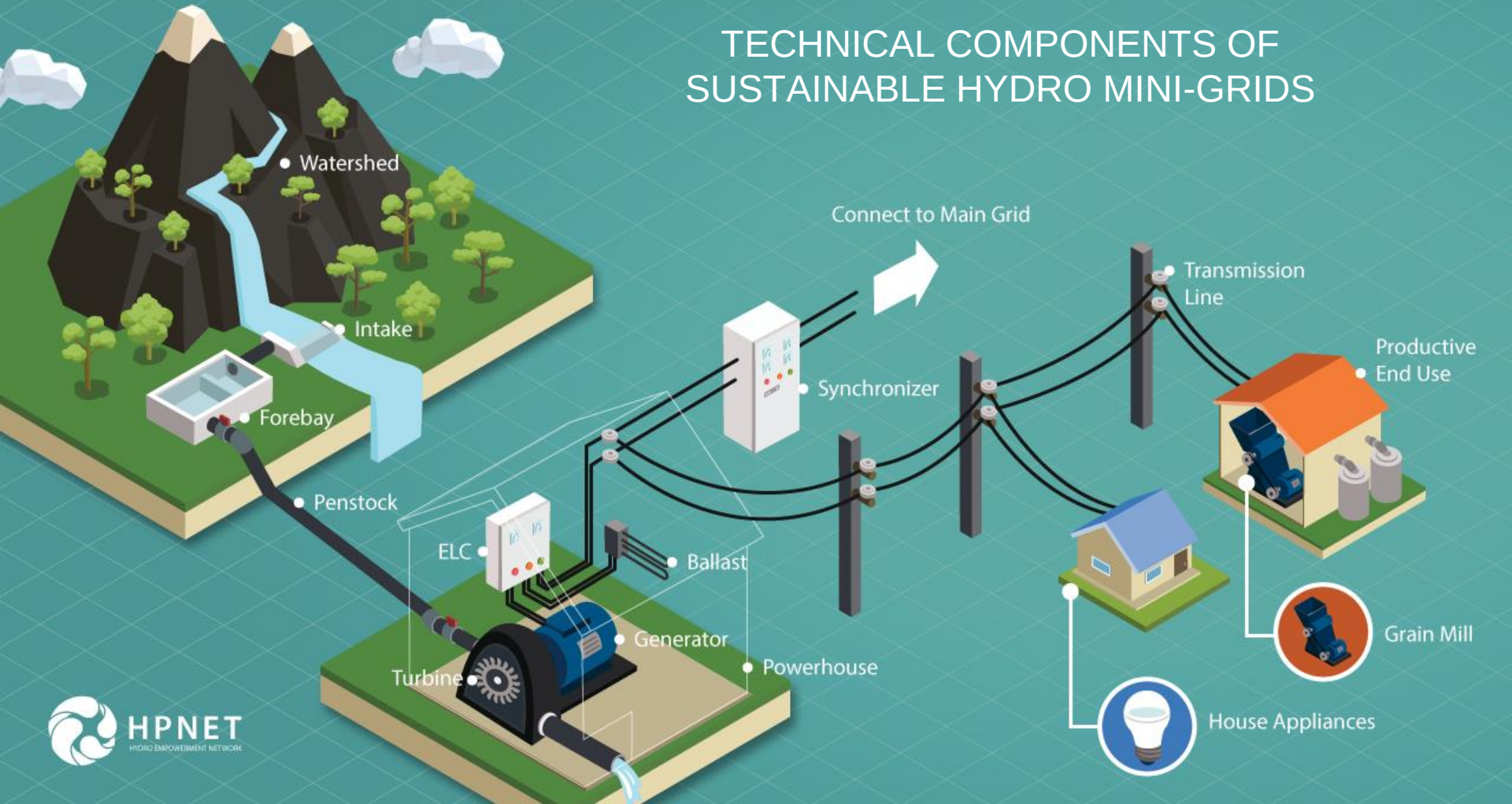
STRATEGY ADVOCACY

Platform for local practitioner voices
Coalition-building for advocacy to impact
Advocacy products for thematic solutions

THEMATIC FOCUS AREAS

Technology and skills advancement
Socio-environmental sustainability
Enabling financing and policy for scalability

TECHNICAL COMPONENTS OF SUSTAINABLE HYDRO MINI-GRIDS



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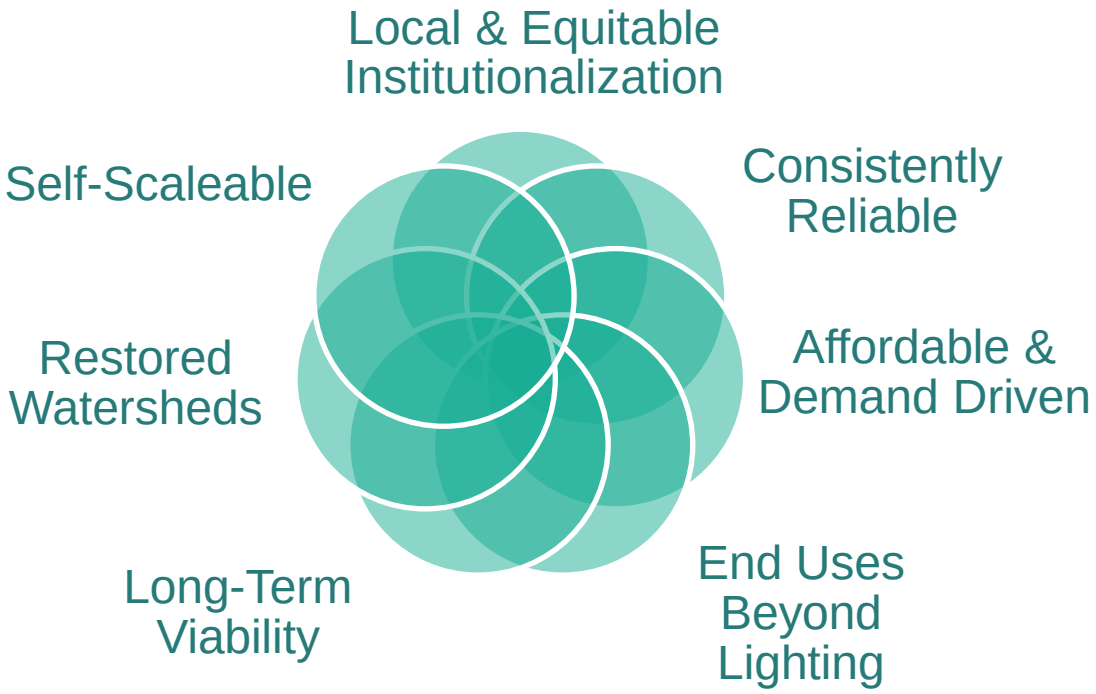
FACTORS FOR SUSTAINABILITY
ENABLE LOCAL PRACTITIONERS



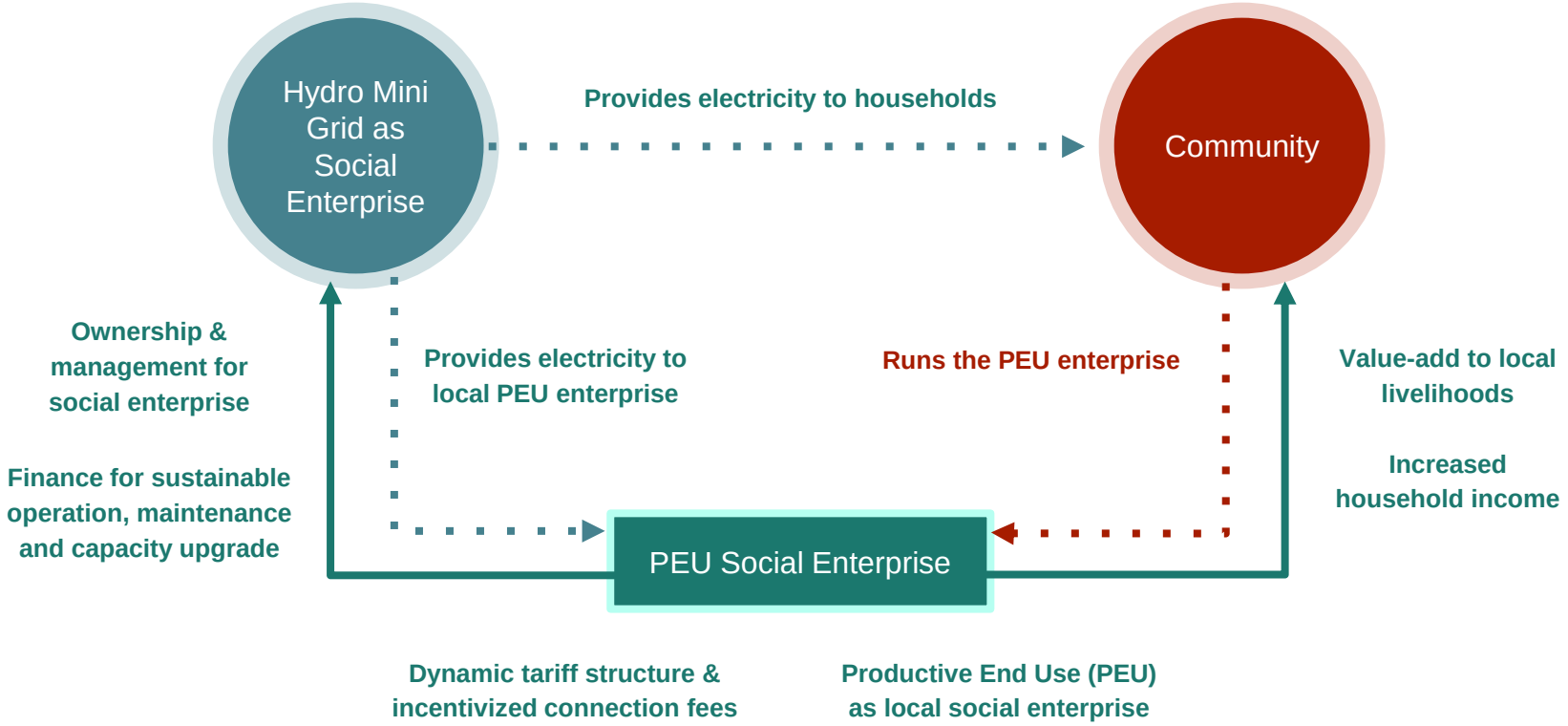
Htan Hla Pin Community Micro Hydro, Shan State, Myanmar
Photo Credit: Loïs Sevestre

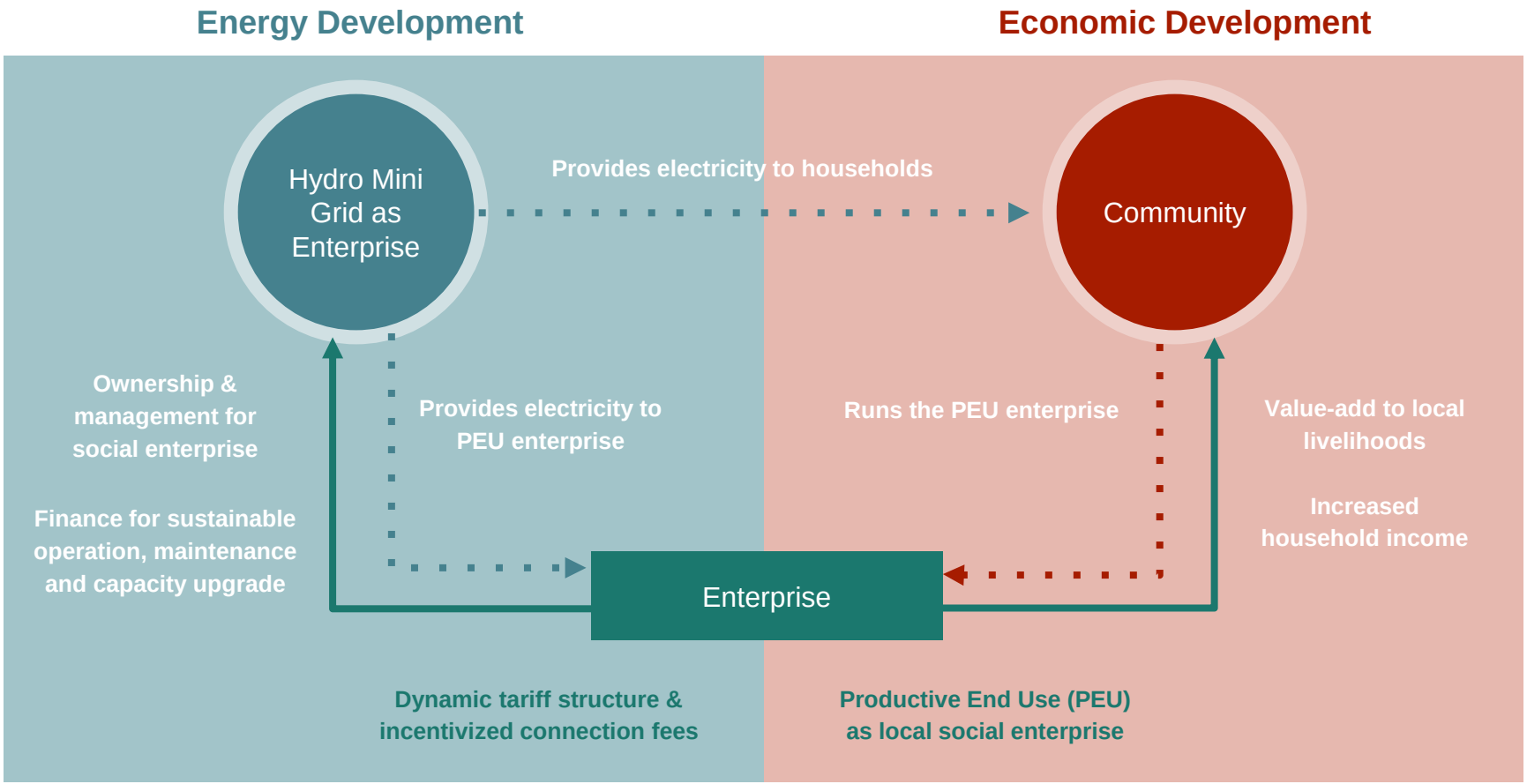
KEY CHALLENGE: SOCIAL ASSET ONLY

***Social Asset Only* Model – Not Sustainable**

- Operates only few hours per day (i.e. evening only)
- Low power factors / no productive end use loads
- Irregular tariff collection / No energy meters
- Minimum cash flow
- Not enough funds for maintenance and repair
- Weak management
- High risk of abandonment when main grid arrives

SOLUTION: TRANSITION TO SOCIAL ENTERPRISE




Energy Development
Economic Development
Hydro Mini Grid as Enterprise
Provides electricity to households
Community
Ownership & management for social enterprise
Finance for sustainable operation, maintenance and capacity upgrade
Provides electricity to PEU enterprise
Runs the PEU enterprise
Value-add to local livelihoods
Increased household income
Enterprise
Dynamic tariff structure & incentivized connection fees
Productive End Use (PEU) as local social enterprise

SEED

**Social Enterprise for Energy,
Ecological and Economic Development**

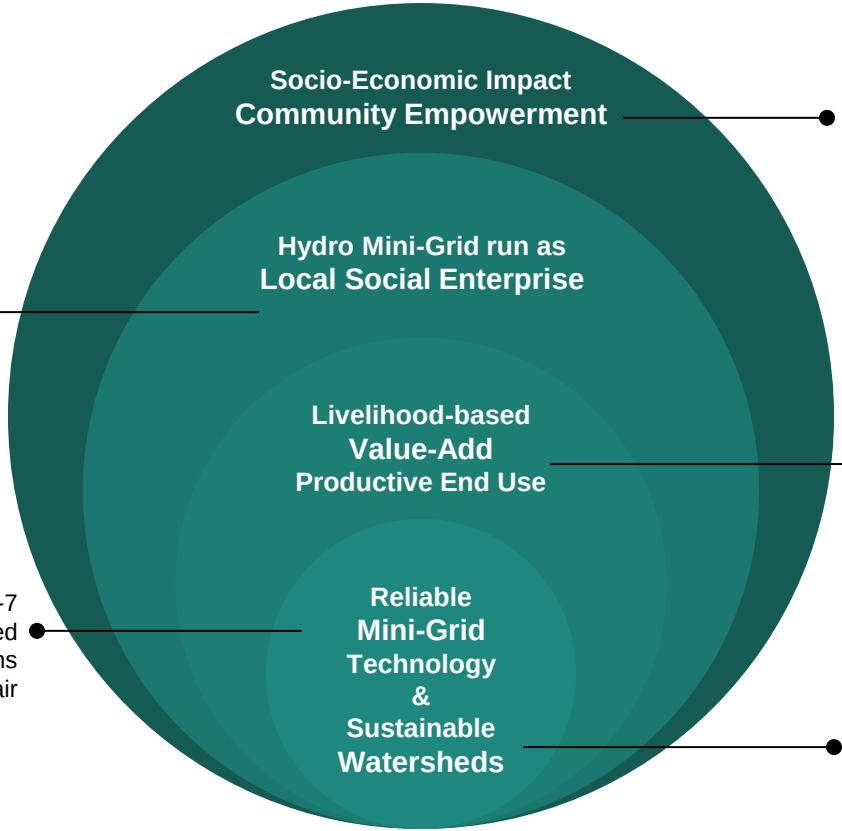
**Hydro Mini-Grid
Sustainability**

**Socio-Economic Impact
of Hydro Mini-Grid**

**Empowerment
Beyond Kilowatts**

HPNET INITIATIVE

CORE ELEMENTS OF **SEEED**



- Equitable local social enterprise models
- Alignment with indigenous values
- Strengthened local social capital
- Empowerment beyond mini-grid

- Access to appropriate finance
- Dynamic tariff & connection fee
- Financial & HR management
- Consumer service and grievance

- Value-add to agri-value chains
- Multi-village scale
- Women-centric productive end use
- Increased household income

- Operates 24-7
- Locally manufactured
- Reliable village technicians
- Prompt technical maintenance & repair

- Baseline of indigenous practices for watershed management
- Solutions for eco-restoration and climate resilience of micro hydro watersheds, e.g. re-forestation, check dams, and bio diversity.

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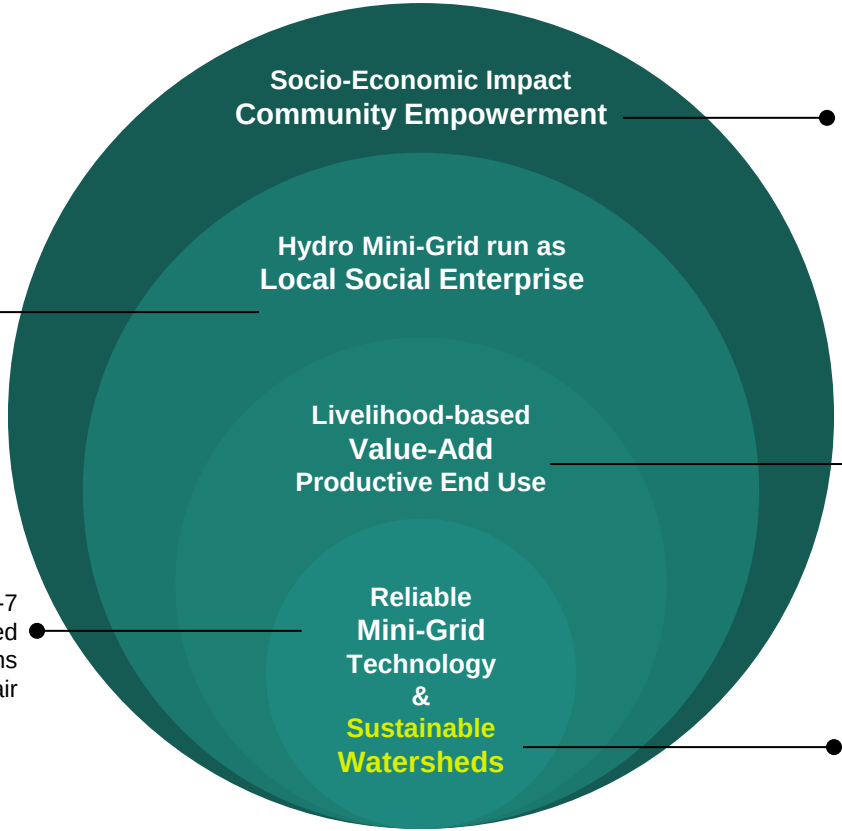

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Sustainable **Watersheds**
Gram Vikas, Odisha, India

All Photos this Section Credit: Gram Vikas

http://www.hpnet.org/blog/india-gram-vikas-initiative-to-strengthen-springs

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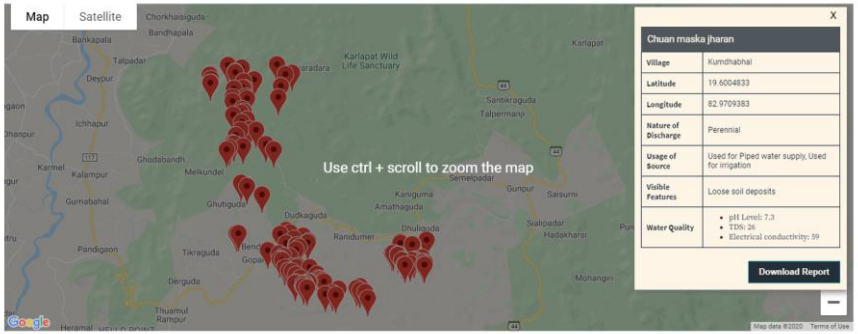

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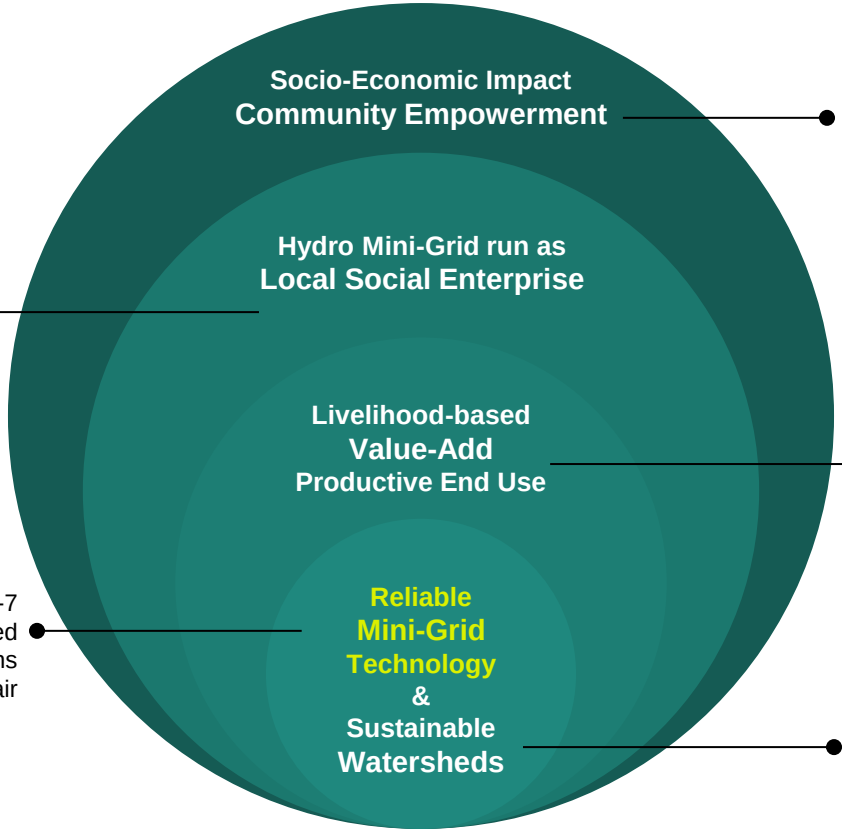

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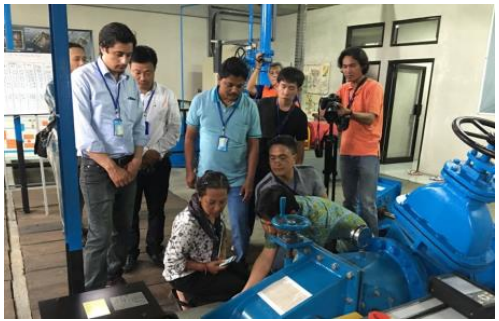
Reliable **Technology**

Training Centers for Local Manufacturing & Capacity Building

India, Indonesia, Malaysia, Nepal, Sri Lanka, Philippines






http://www.hpnet.org/blog/join-us-launch-of-hpnets-2019-webinar-series

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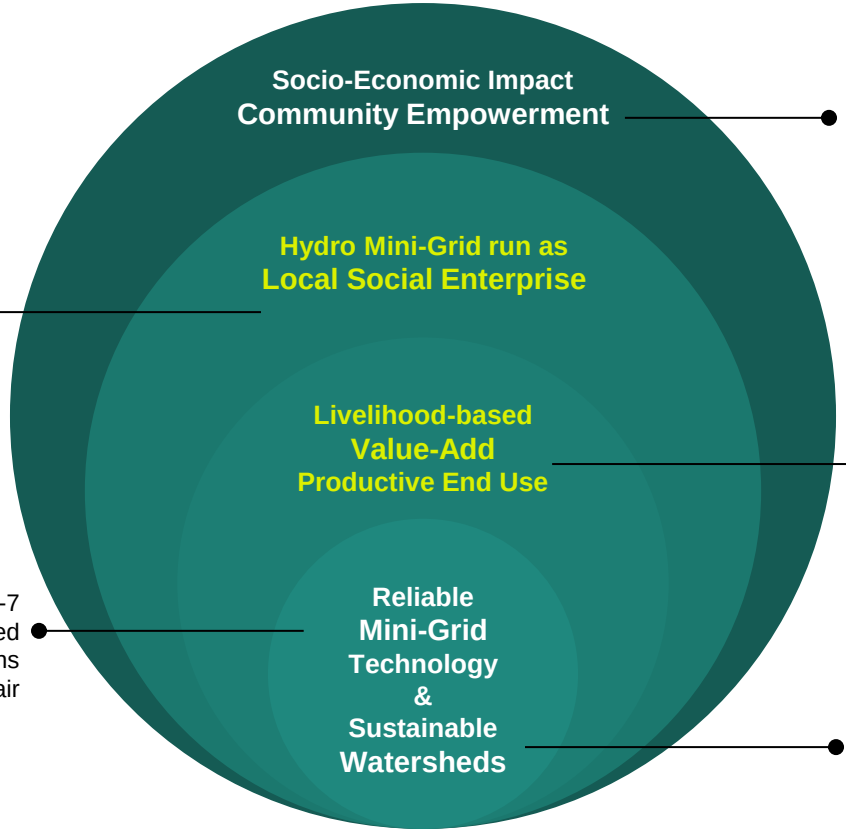

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MYANMAR: COOPERATIVE-OWNED HYDRO MINI-GRIDS

High Load Factor

Northern Shan State

80 kW system providing electricity to 600+ households & enterprises in 11 villages (40 miles T/D)

External Enterprises

- Coffee plantations, 2
- Fuel pump, 1
- Poultry farm, 1
- Rice mill, 1
- Telecom tower, 2

Village-own Enterprises

- Brick making
- Cash crop farming
- Daily goods shops
- Damson fruit processing
- Fabrication shop
- Lime baking
- Scaled lettuce crop
- Silkworm breeding
- Tailoring
- Truck rental
- Vehicle repair shop
- Wood working

Social Services

- Health clinics, 2
- Monasteries, 10
- Public centres
- Schools, 8
- Streetlights

Household Use

- Carpentry tool, 1
- Corn thrasher, 1
- Electric rice cookers, ~250
- Electric frying pans, ~200
- Fans, many
- Grinders, several
- Mobile phone charging, many
- Rice mills, several
- Refrigerators, several
- Televisions, many
- Water heaters, several
- Washing machines, several
- Water pumps, many

Lin Yuang Chi Micro Hydro Cooperative-Owned Utility in Myanmar
Photo Credit: D. Vaghela

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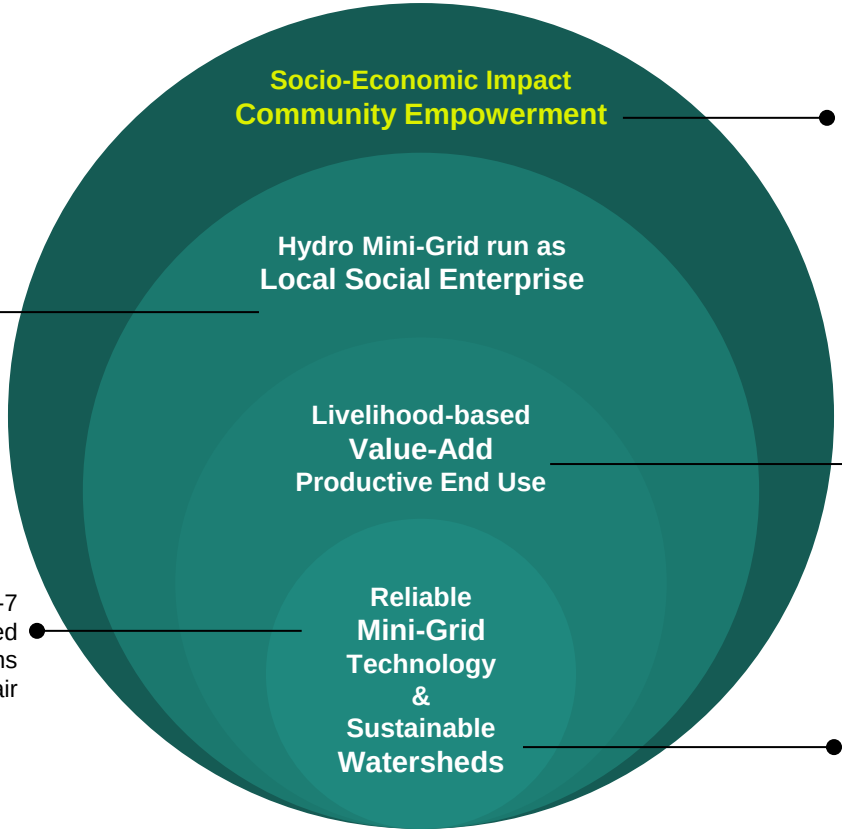

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PAKISTAN: **COMMUNITY-OWNED MINI-HYDRO UTILITY**

- CHITRAL – VIBRANT COMMUNITIES LIVING IN **REMOTE & HARSH ENVIRONMENT**
- **LOCAL KNOWLEDGE** OF TERRAIN & FLOW IS **CRITICAL** TO PROJECT DESIGN & LIFE
- **SUSTAINABILITY BUILT-IN** FROM THE START – DURING IMPLEMENTATION
- **MODERN ENERGY** ACCESS ACHIEVED THRU **LOCAL AND INCLUSIVE** SOLUTIONS

Aga Khan Rural Support Programme (AKRSP) works with indigenous communities in Chitral, using **local technology**, **innovative ownership** models, and **women-centric** approaches to **electrify valleys**: http://www.hpnet.org/blog/a-women-centric-enterprise-based-approach-lessons-from-pakistan (w/video)

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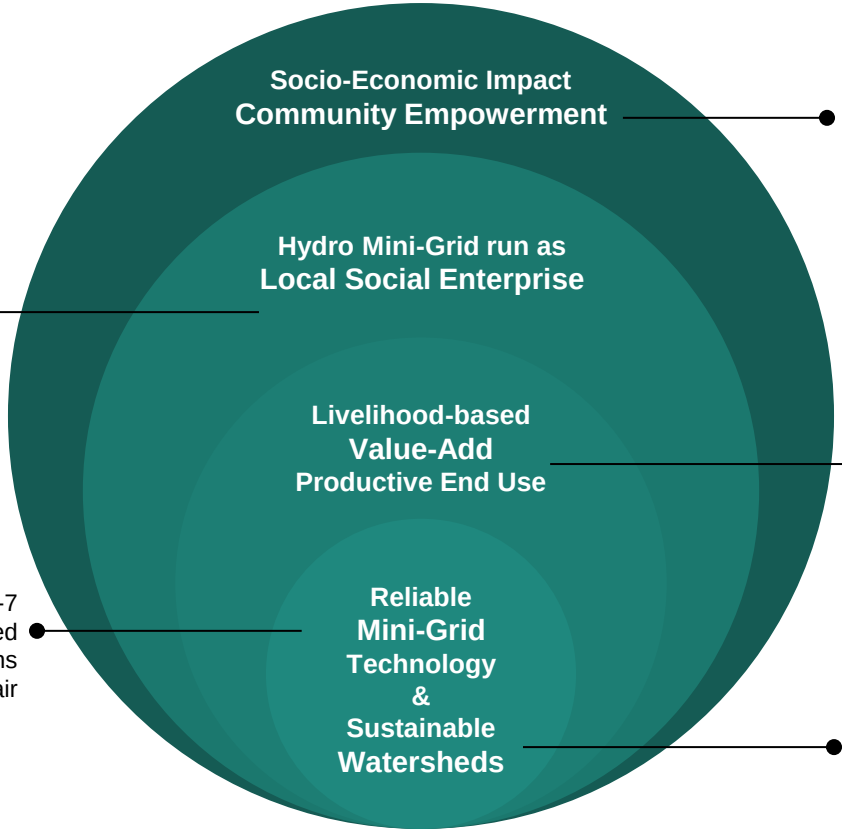

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HINDSIGHT LESSON

CAPEX Subsidy vs Interest Subsidy

GRANTS AND SUBSIDY

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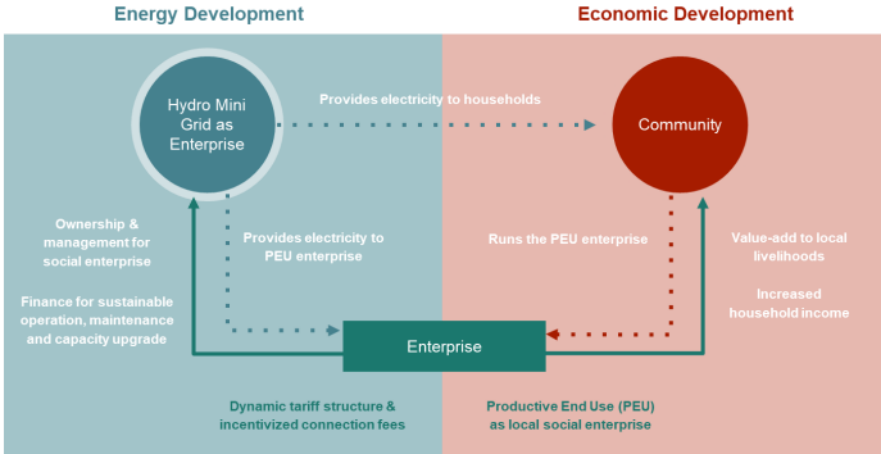
AFFORDABLE CREDIT



NEPAL: Prior to **decades of international development** funds, mini-grids developed with loans from Agriculture Bank. Developers became **too dependent on CAPEX subsidies**. Many **did not survive** donor exit. **Only 1/3** government-funded projects are functioning; now in **transition to enterprise-based.**

MYANMAR: NEP CAPEX **subsidy** (60%) awarded to **projects that are over-sized** (20% load factor). Same developers submitting many proposals. Pre-NEP developers **prefer loans** & phase-wise growth.

ACCESS TO FINANCE ASPECTS

Viable Enterprise Model

Multi-Donor Coordination and Collaboration

Affordable Collateral

Viable Interest Rates

Risk: Main Grid Arrival

Risk: Currency Exchange Loss

Loan Tenure

Availability of Capital to Lend

Developer Needs

Local Bank Needs

REGIONAL HINDSIGHT

National+Local Level Energy Planning

- National government promotes **local level decision-making**, using **mapping tools for coordination** with local officials
- **Integrated planning** between central grid and mini-grids, including **grid interconnection,** benefits both.
- **Citizen participation** leads to strong voice for RE and **less conflict** over natural resource extraction

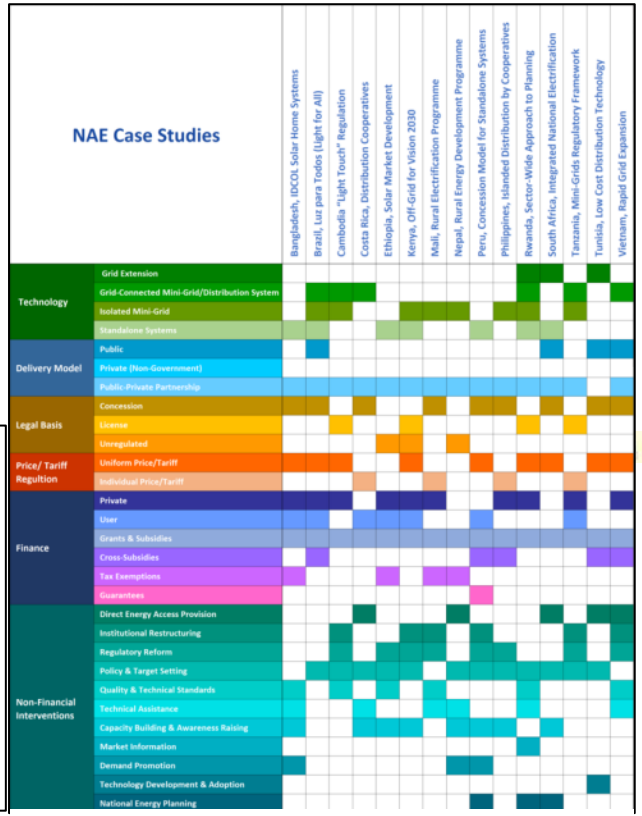
→ **Low cost, timely, and more reliable energy access**

NEPAL

- **Constitutional mandate** for local level energy planning.
- National government& UNDP are building **energy planning skills of Municipalities**.
- New policy **promotes grid interconnection** of mini-grids.

SARAWAK, MALAYSIA

- **Inclusive energy planning** with local stakeholders.
- **Multiple RE sources** assessed for each village.
- Investment in **processes to facilitate community-based** decision-making.

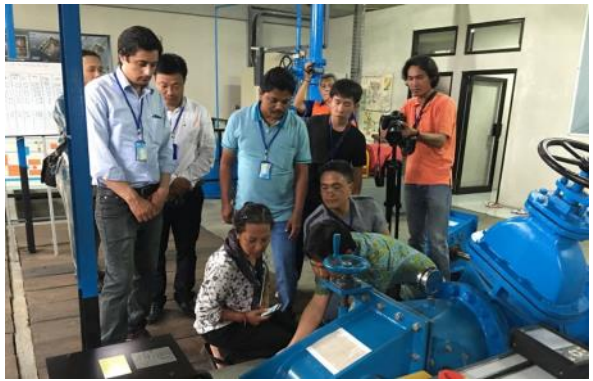


https://energypedia.info/wiki/NAE_Case_Study:_Mali,_Rural_Electrification_Programme

KEY TAKEAWAY

Socio-Economic Benefits Hydro Mini-Grids

JOB & SKILLS CREATION



- Technical **Skills Building**
- Appropriate **Innovation**
- **Local** Social **Enterprise** (Local Profit)
- **Jobs** Creation (Regenerative)

ECO-RESTORATION

- Year-round **consistent flow**
- **Value-add** of end use
- **Income** Generation
- **Food Security**
- **Climate Resilience**

BEYOND KILOWATTS

- **Inclusive & Equitable** Services
- Local Economic **Stability**
- Indigenous **Land Rights**
- More RE → **Less Dams & Coal**
- Energy Democracy → **Peace**

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