IESA
India Energy Storage Alliance

10 YEARS
2010 2020
Customized Energy Solutions (India)

GLOBAL HIMALAYAN EXPEDITION

esa space solutions

Connected Rural Communities

Webinar

30/09/2020 15:00 CEST

Roberta Mugellesi Dow (ESA)

Rahul Walawalkar, Nitin Akhade, India Energy Storage Alliance & Customized Energy Solutions India

Paras Loomba (Global Himalayan Expedition)

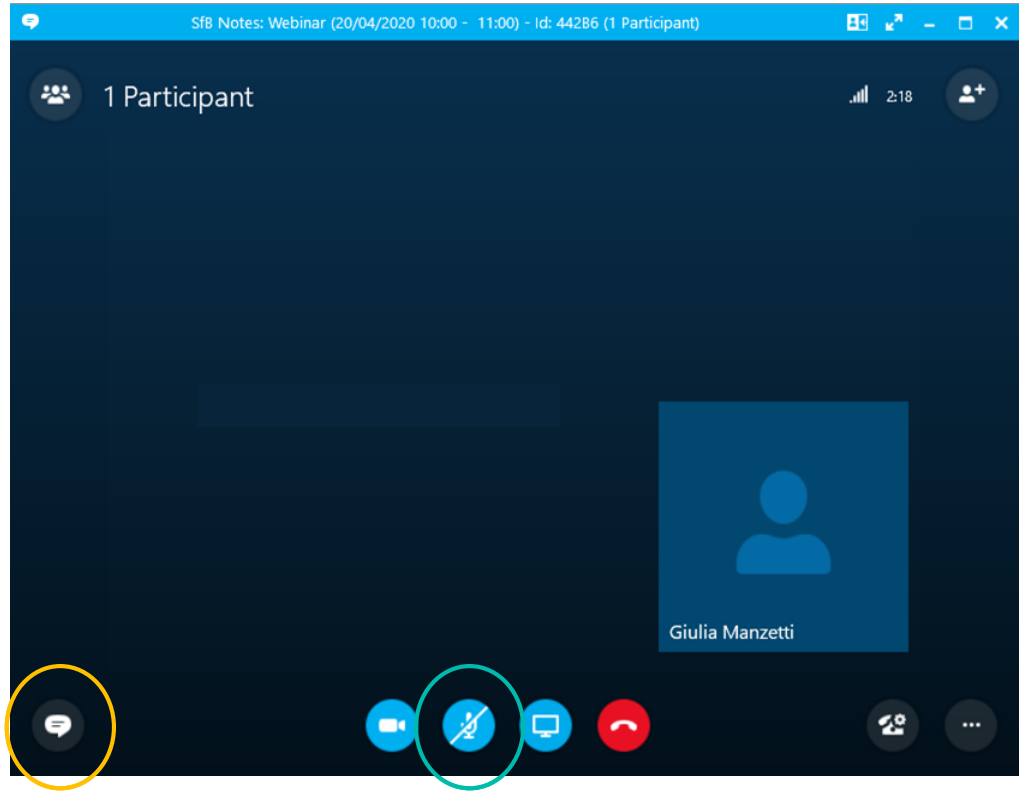
Roberta Mugellesi Dow

WELCOME TO THE WEBINAR!

Before we start...

- Due to the number of attendees, please **keep your microphones muted** at all times and switch off the webcam function

- You can use the **conversation function** anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar



AGENDA

- ESA introduction
- Introduction to Kick-Start Activity
- Space for Connected Rural Communities: Management of Resources
  - Background
  - Key topics
  - Enablers from space: SatNav, SatEO, SatCom
- Management of Resources
  - Rahul Walawalkar, Nitin Akhade, India Energy Storage Alliance & Customized Energy Solutions India
  - Paras Loomba- Global Himalayan Expedition
- How to apply
- Open Questions & Answers session

THE EUROPEAN SPACE AGENCY

Purpose of ESA

To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.

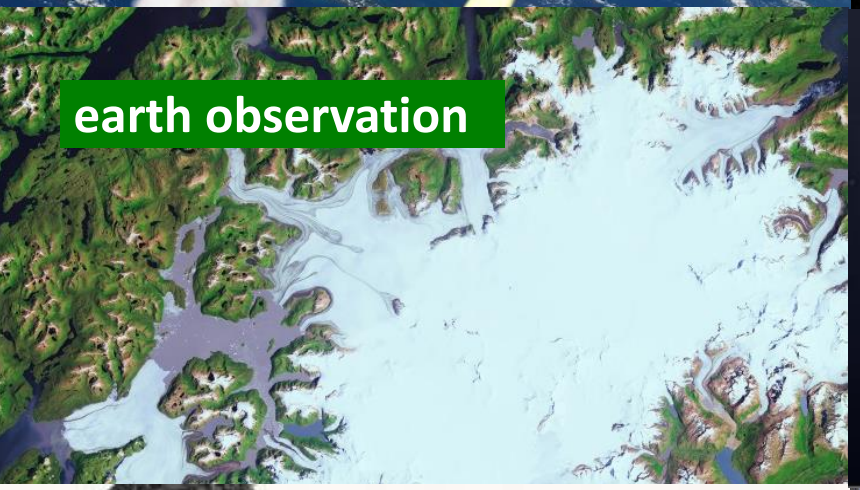
Facts and figures

- Over 50 years of experience
- 22 Member States
- 8 sites across Europe and a spaceport in French Guiana
- Over 80 satellites designed, tested and operated in flight


space transportation


science


human spaceflight


earth observation


telecommunications
and applications


navigation


exploration


operations


technology

→ Space Applications

Space technologies

- Space Weather
- Earth Observation
- Satellite Navigation
- Satellite Communication
- Human Spaceflight Technologies

- Big Data analytics
- VR/AR
- Artificial Intelligence
- Megaconstellations
- 5G
- Crowdsourcing
- IoT
- Cybersecurity
- Blockchain
- ....

Users and Markets

- Maritime
- Healthcare
- Transport
- Environment
- Agriculture
- Media
- Energy
- Education
- Aviation
- Financial

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WHAT ESA SPACE SOLUTIONS OFFERS

Zero-Equity Funding (€50K-€2M+)

Tailored Project Management Support

Access to our Network and Partners

Use of ESA Brand for Credibility

Connected Rural Communities
Subthematic Call: Management of Resources

Planned ESA's Kickstart Call

→ Introduction to Kick-Start

- Kick- Starts are ESA's funding scheme enabling companies to undertake short Feasibility Studies, up to 6 months, that explore new service and application concepts making use of space capabilities.
- Kick-Starts offer an instrument to assess the technical feasibility and commercial viability of an idea with limited initial investment by companies. As such, this scheme is considered particularly attractive for SMEs and start-ups, granting them an easy entry into ESA Business Applications.
- Successful Kick-Starts can be further developed into commercially-viable businesses with follow-up support from ESA Business Applications in the form of Demonstration Projects(*)

(*) https://business.esa.int/funding/direct-negotiation-call-for-proposals/demonstration-projects

→ Objectives

Get Customer Engagement
incl. needs and value proposition validation.

Technical Feasibility Assessment
incl. Service and System Architecture, Space data/technology integration.

Commercial Viability Assessment
incl. Business Model and Plan
follow-up ESA co-funded demonstration project

→ Connected Rural Communities - Background

To explore new business models and space-based solutions for commercially viable services to contribute to the economic development and improve coverage in **rural** areas by performing different pilots addressing the technical challenges that will help in improving the rural communities ecosystems.

Kick-Start call organized in the sub-thematic calls :

- **Life of Communities: Education & Health,**

  19 March – 4 May

- **Business Opportunities: Mobility & Tourism,**

  4 May – 14 August

- **Safety & Security,**

  14 August 2020 – 09 October 2020

- **Management of Resources: Utilities & Natural Resources,**

  09 October 2020 – 4 December 2020

→ Management of Resources: Utilities

- Rural areas face several challenges for the management of resources, including utilities as energy and water use.
- Energy covers direct light, heating, cooling, which are needed for a huge number of different tasks and a wide variety of end-users, as domestic, businesses, basic social services, transportation, etc.
- The majority of rural “energy programmes” focus on rural electrification, such as main grid extension into rural areas or decentralised electricity supply with mini-grids with stand-alone renewable energy systems.
- Potential applications include: assess the suitability of off-grid energy systems; remote operations of off-grid energy systems; rural utilities services planning and maintenance, monitoring and management of water resources including provision of clean water, green energy services, enhance the service delivery and infrastructure for water supply and disposal of sewage and surface water, support the utilities installation planning and deployment while ensuring environment protection

→ Management of Resources: Natural Resources

- Another aspect concerns the “land resources utilization”, including not only agricultural uses but also encompasses natural areas, sustainable management of forests, watercourses and other natural resources.
- Farming is the predominant form of agriculture in the rural communities. It is a mean of organising agricultural, forestry, fisheries, pastoral and aquaculture production, which is usually managed and operated by a family and predominantly reliant on family labour.
- Forests are an important part of the landscape of rural areas as they fulfil multiple roles in terms of timber production, recreation, hunting and as an important reservoir for wildlife. Forests are under threat because of a number of factors, in particular air pollution, forest fires, pests, diseases, reduced species diversity and in some cases an over-emphasis on timber production.
- Potential applications include innovative farming techniques e.g. to differentiate between plants and weeds, improve the link of the rural farmers to large enterprises in the supply chains; livestock monitoring and management of diseases outbreak

→ The Power of Space

Satellite Navigation

GNSS are the main source of geo- referenced locations data. Satellite navigation is instrumental in order to track and trace users and geo-locate different objects and for any crowd sourcing applications to locate people and devices.

Earth Observation

EO imagery are used to provide maps showing the remote locations and to evaluate the conditions on the ground; recreate the remote environment; provide meteorological information and for monitoring and forecasting emissions; to support the land use analysis and planning of infrastructures and management of forestall/agricultural areas.

Satellite Communication

SatCom provide a means to communicate with the coordinating centre to and from remote locations where there is no terrestrial network or to cope with large demand of bandwidth, increase the communication network robustness and communication resilience, including M2M, voice and data

5G networks including terrestrial and satellite components will have a key role for delivering the high amount of data required with low latency.

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India Energy Storage Alliance

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Customized Energy Solutions (India)

Rahul Walawalkar, President of India Energy Storage Alliance &
President of Customized Energy Solutions India

Nitin Akhade, Customized Energy Solutions India

Presented by

Dr. Rahul Walawalkar

President, India Energy Storage Alliance &
President & MD, Customized Energy Solutions India Pvt. Ltd

IESA: THE ALLIANCE

VISION

To make Indian energy grid & transportation sector more competitive by providing a knowledge sharing platform for creating awareness about advanced energy storage and e-mobility solutions.

MISSION

Enabling India to become a global leader in research, manufacturing and adoption of advanced energy storage, microgrid and e-mobility technologies by 2022.

STRATEGIC PARTNERS

Founding Partners of:

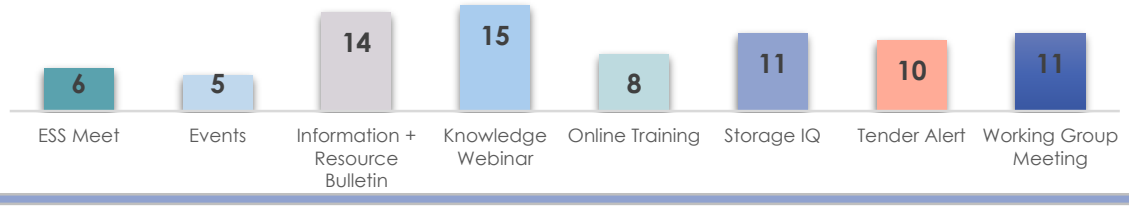
OUR MEMBERS

WHY JOIN IESA?

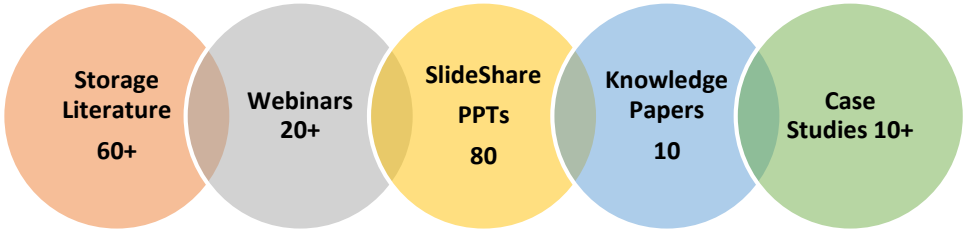
IESA
India Energy Storage Alliance

- Drive energy storage, microgrids and EV policy in India through active engagement with policymakers
- Stay informed on tenders & policy update through exclusive newsletters
- IESA Academy: Online platform for skill development
- Network with partners & customers at IESA events
- Access member exclusive reports & webinars
- Showcase products at events, online product catalogue and publications

Activities – 2019-20



Member Exclusive Resources



National and International Events

All year round, IESA organizes various regional and international events catering to every stakeholder of the energy storage and EV ecosystem. These conferences and workshops are a great place for learning, business networking and showcasing your company capabilities.

- India Energy Storage Week
- IESA Industry Excellence Awards
- E$$ Meets for C&I Customers
- India E-mobility Conclave
- Manufacturing Masterclass for CXOs
- Li Ion Cell Making Hands-on Workshop
- ESS & EV Investment Summit
- IESA Startup Competition

E$$ Meets & EV Roundtables

E$$ meet & EV Roundtables provide an exclusive platform for members to reach out to commercial and industrial consumers and early adopters. Till date, IESA has successfully organized 10+ regional meets, held in the cities of Coimbatore, Pune, Bangalore, Delhi, Ranchi and Kanpur.

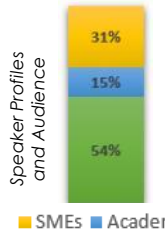
Storage IQ and Resource Bulletins

Storage IQ and Resource Bulletins give a detailed monthly update on activities and developments in the stationary energy storage and EV space in India. They covers tender updates, policy updates, draft policy recommendations, various meeting updates and information about upcoming meetings. Resource Bulletins serve are a one-stop-guide to all the important activities in the market over the month.

Annual Reports and White Papers

IESA releases two annual market overview reports covering stationary energy storage and e-mobility market. This year, IESA IS releasing four Emerging Tech Reports. IESA also releases knowledge papers on a regular basis to help members stay on top of the latest industry trends.

IESA Knowledge Webinars



IESA Academy conducts 'knowledge series' webinars which cater to global audience. The motto of the webinar is *by the members, for the members*. The webinars cover areas from technology, business models, to operations and recycling . IESA invites top thought leaders from the industry and attracts 100s of participants for these webinars.

- Utilities
- Battery Manufacturers
- ESS Technology Providers
- EV Manufacturers
- EV Fleet Operators
- Utilities and C&I Customers
- Financial Institutes
- RE Developers / IPPs

Drivers for Microgrids for Energy Access

Enhancing Data and Knowledge for Driving Policies

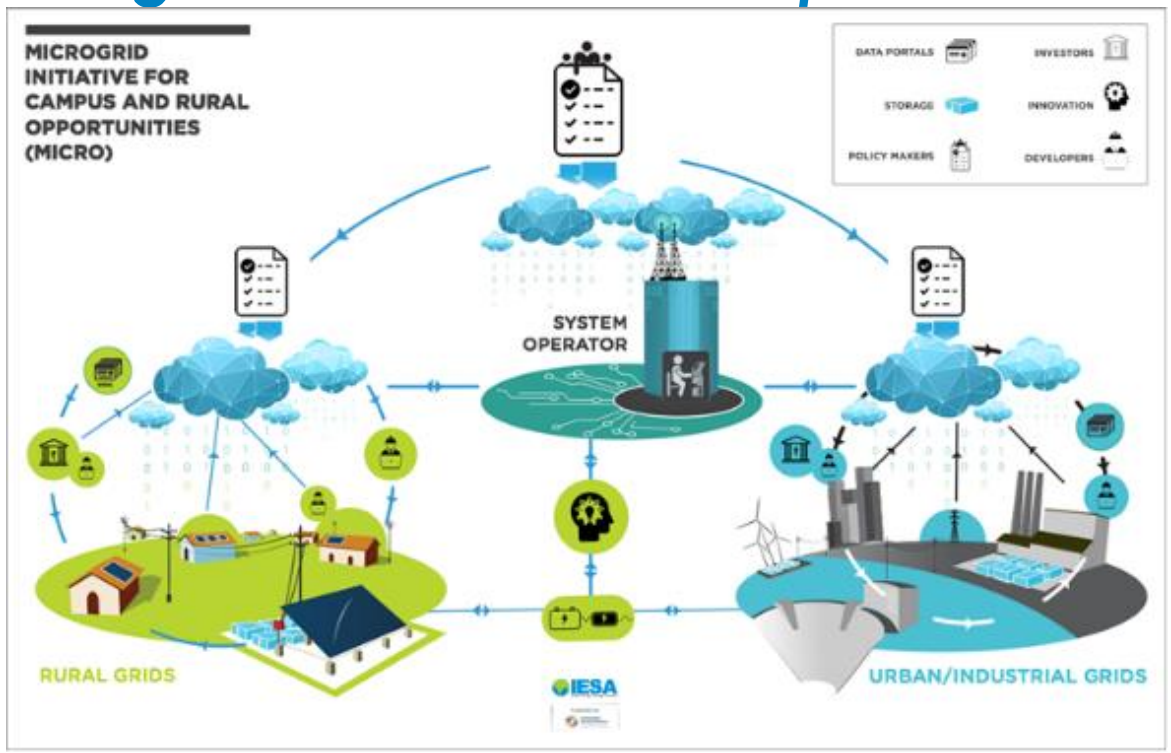
Bottom of Pyramid Innovation for Achieving Right Business Models

Skill Development of People Working in Highly Un-organized Sector

Funding needs to be co-related with Economic Development of Community

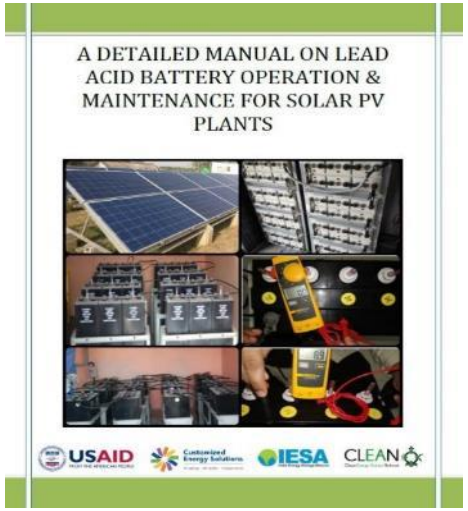
MICRO

(Microgrid Initiative for Campus & Rural Opportunities)



PACE Setter I, II funding Award (2019)

IESA bagged ISGF award 2019 for Household Electrification

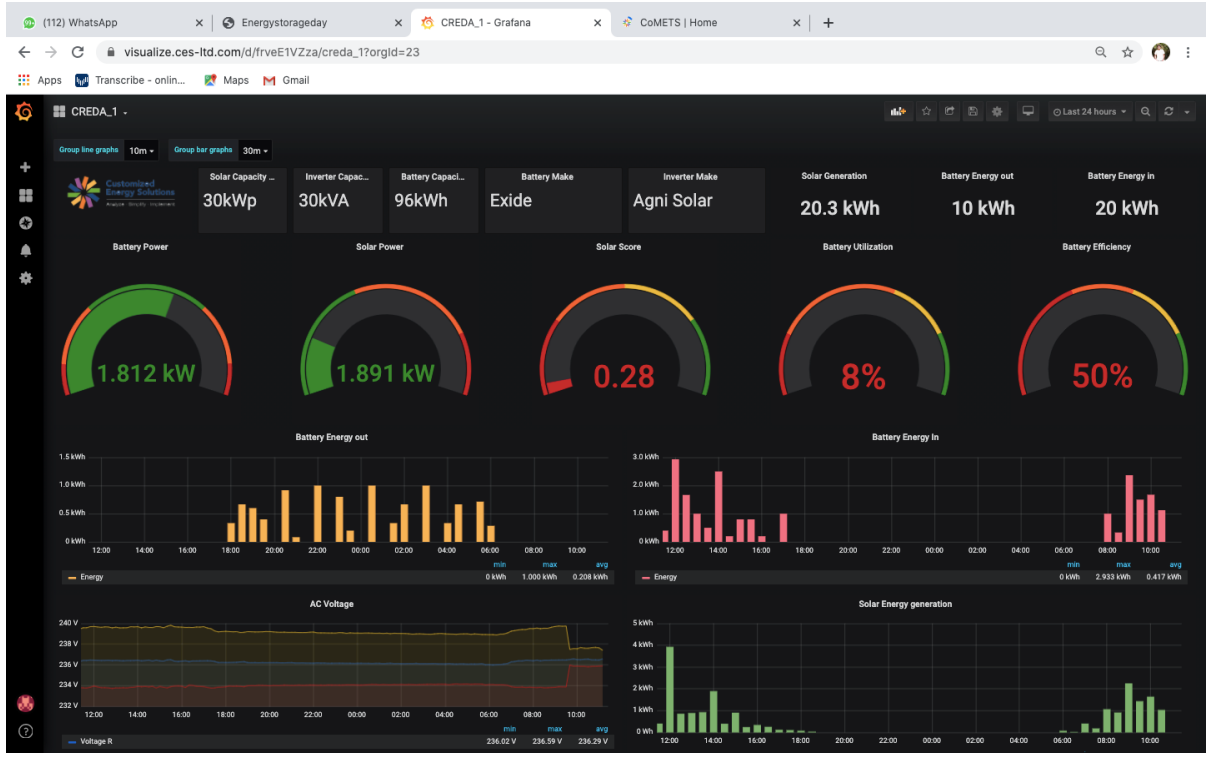


IESA Manual on Lead Acid batteries O&M for Solar PV plants

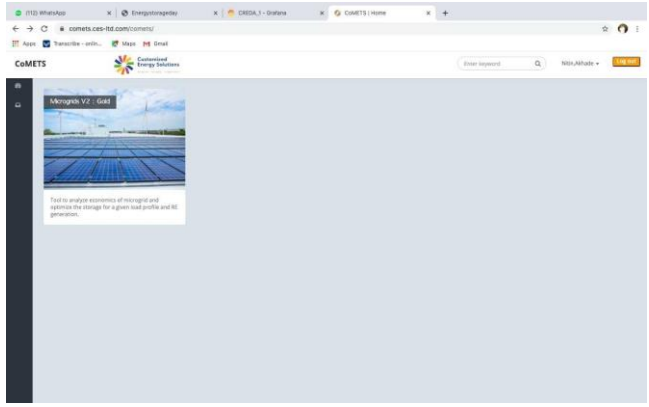
How MICRO can help here?

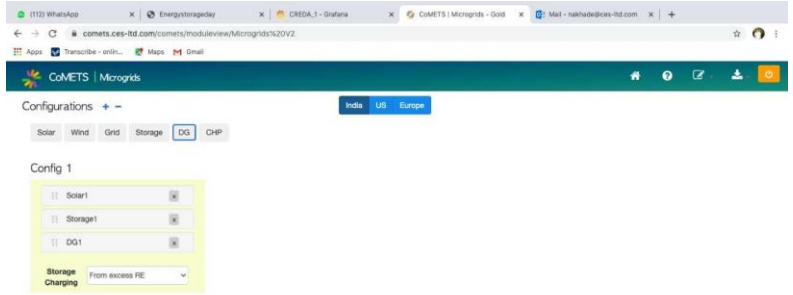
- Better returns on assets
- Transparency of data between funding agency and project developer
- Periodic Reporting
- Bringing equipment supplier in the frame for any quality or performance concerns
- Aggregation of funding and new sites opportunities
- Integrating economic development with microgrids

MICRO Platform



CoMETS – Microgrid Module

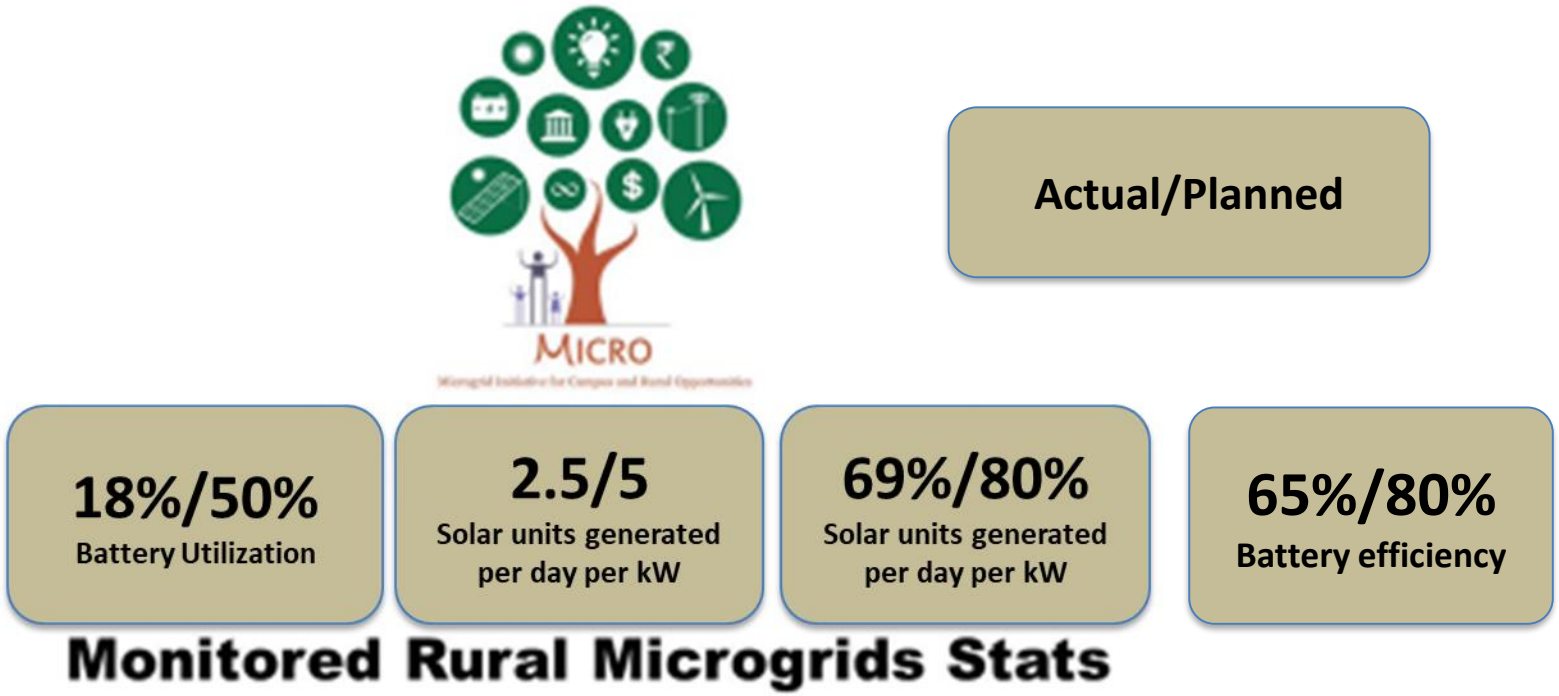




Lesson Learnt : - Utilization of batteries

- 18 out of 20 Microgrids monitored in CES MICRO are utilized less than 30% of rated capacity. However, it was anticipated that they will be used for 50% of the rated capacity
- Load did not pick up, batteries oversized for government funded projects

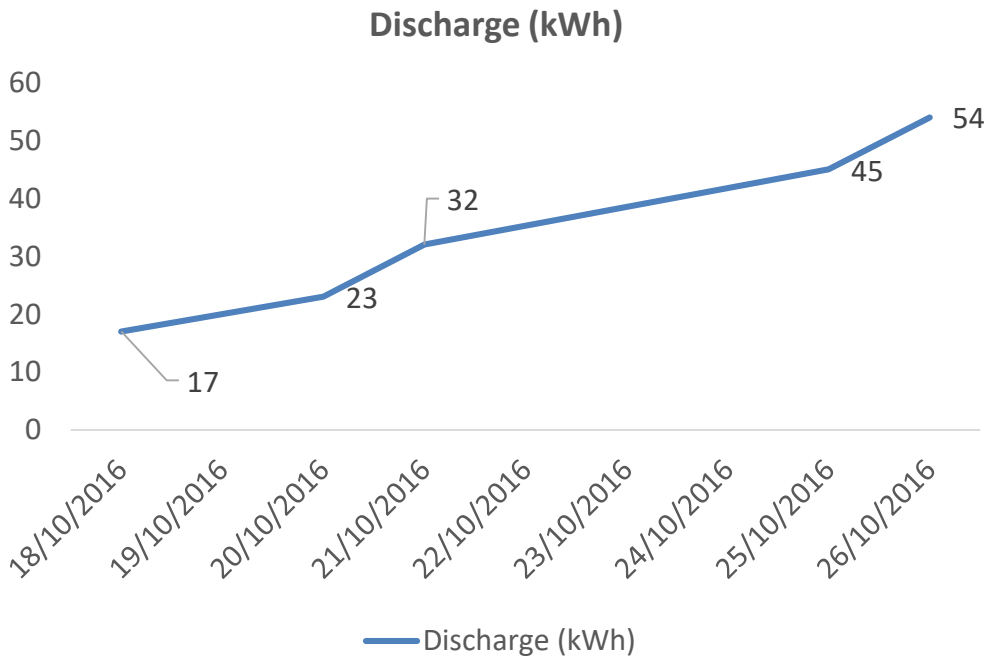
- **Is battery oversizing to be blamed always?**
- **Not always……**



Battery Utilization Case Study

Plant Details:
35 kWp Solar PV, 86.4 kWh Lead Acid Battery
Age of microgrid: 1.5 years
Location: Balrampur, UP, India
Funding Type: Soft Loan

- 18 months old battery was found accepting a charge of close to 23 kWh which is only 27% of a 86.4 kVAh system.
- The battery's charge acceptance and discharging capabilities were improved over a period of a week as shown in the graph after monitoring and analysis.
- The battery at the site required equalizing every 30 days which was not done efficiently as seen from the data.
- Savings of over 30 kWh of units from diesel generator almost every day which was equivalent to 1/4th of consumption everyday.
- $ 900 saved every month, which is over 1% of plant capital expenditure.



Performance Improvement Case Study

Performance Evaluation Done for month before and after battery O&M

Plant Details:

- 6 kWp Solar PV, 38.4 kWh Lead Acid Battery
- Age of microgrid: 3 years
- Location: Jawhar Village, Maharashtra India
- Funding Type: CSR Fund

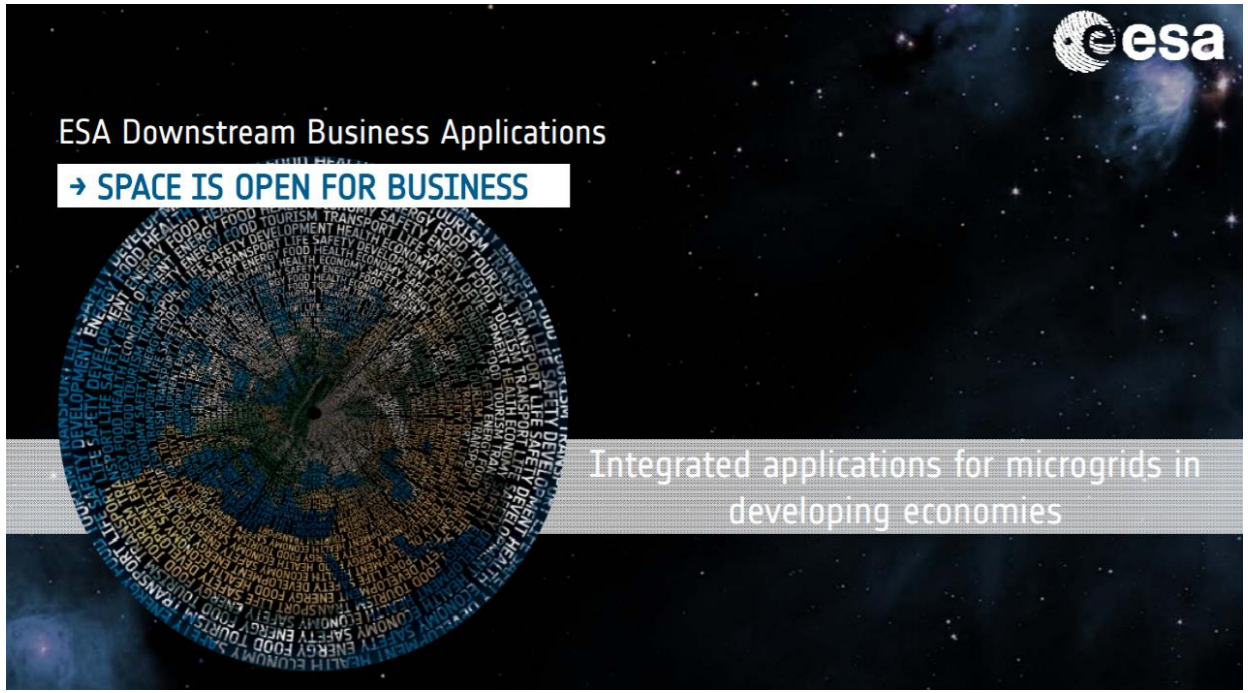
Solar PV Generation
Before: 21 kWh
After: 25.4 kWh
Increase: 21%

Battery Efficiency
Before: 69 %
After: 70 %
Increase: 1%

Load Served
Before: 9.5 kWh
After: 13.7 kWh
Increase: 44%

Overall O/p increased by 44% and efficiency loss reduced by 9% for the plant. For this particular case, the electricity tariff is linked to replacement of battery, hence there is a scope of 30% lowering of tariff with 44% increase in output.

MICRO team has worked with European Space Agency for feasibility of use of satellite around energy access



- Identification of clusters / habitats with potential need for microgrids using satellite data.
- Providing resource assessment to help in optimal sizing of microgrids
- Facilitate socio-economic growth of the local communities through
  - Telemedicine
  - Tele-education
  - Ensuring communication between different local communities
  - Creating better economic development opportunities through access to better data and tools
- Support the assessment of the socio economic impact of microgrid projects
- Support disaster recovery and damage assessment

Need for linking Microgrids with rural economic development

Drivers for Microgrids for Energy Access

Enhancing Data and Knowledge for Driving Policies

Bottom of Pyramid Innovation for Achieving Right Business Models

Skill Development of People Working in Highly Un-organized Sector

Funding needs to be co-related with Economic Development of Community

Geography Selected – Jharkhand , India

- State Capital – Ranchi
- Largest City – Jamshedpur
- Districts – 24
- Area - 79,714 km^2 (30,778 sq mi)
- Population - 32,988,134
- Density - 414/km^2 (1,070/sq mi)
- GDP - ₹2.55 lakh crore (US$36 billion)
- Per Capita - ₹63,754 (US$890)
- HDI (2018)- 0.599
- Literacy (2011) – 67.6%
- Sex Ration (2011)- 948/1000

- Major source of economic activities
- Agriculture (Paddy, Maize, Pulses and vegetables)
- Semi-skilled and unskilled activities in mining belt
- Transmigration to industrial state for employment opportunities

Promotion and accelerated deployment of RE & EE technologies and bringing private Investment in the RE sector in Jharkhand

Removal of barriers such as Creating Awareness , Capacity Building, Technical Support , Financial Support etc.

Pain points

Average availability of national grid in most of the State is around 8-10 hrs
Main issue is the quality of the supply. The voltage level is around 160-180 Volts
In the areas with grid connectivity the economic growth rate is 4% year
But with DRE powered livelihood and enhanced backward and forward linkages it goes to 20% a year
People are entrepreneurial in sprit
Small Cluster helps in democratization of energy as well as income so more ownership and lesser changes of money in single person hand.

DRE powered Rural micro enterprise model

What is the technology ?

- Mini Pulse processing unit, co-powered by hybrid Solar micro grid.
- Mini ragi processing unit, co-powered by hybrid Solar micro grid.

Potential sites for implementation ?

- **Pulse Processing :** Village: Barkha Chumma; Block: Dadi; Dist-Hajirabagh (Jharkhand)
- **Paddy Processing :** Village: Barkha Chumma; Block: Dadi; Dist-Hajirabagh (Jharkhand)

Why it was required (What issues will be addresses)?

- Generating rural employment and livelihood opportunities.
- Increasing farmers income through value addition at source.
- Reliable and quality power supply will lead to increase in production.

Brief on Technology

Pulse Processing

Production rate – 600 kg/day

Motor Capacity - 3kW+1.5kW+1.5kW

Solar System – 12 kW

Lithium ion battery pack – 2 days Autonomy

Semi Automatic Packaging machine

Weighing and Band Sealer machine

Capacity building of local women communities

Back and Forward Market linkages

Knowledge dissemination with block and district level

Team Composition

Kiran Devi

Manju Devi

Sunita Devi

Mayo Devi

Sarla Devi

Technical and BD team

Loknath Mahato

Nitin Akhade

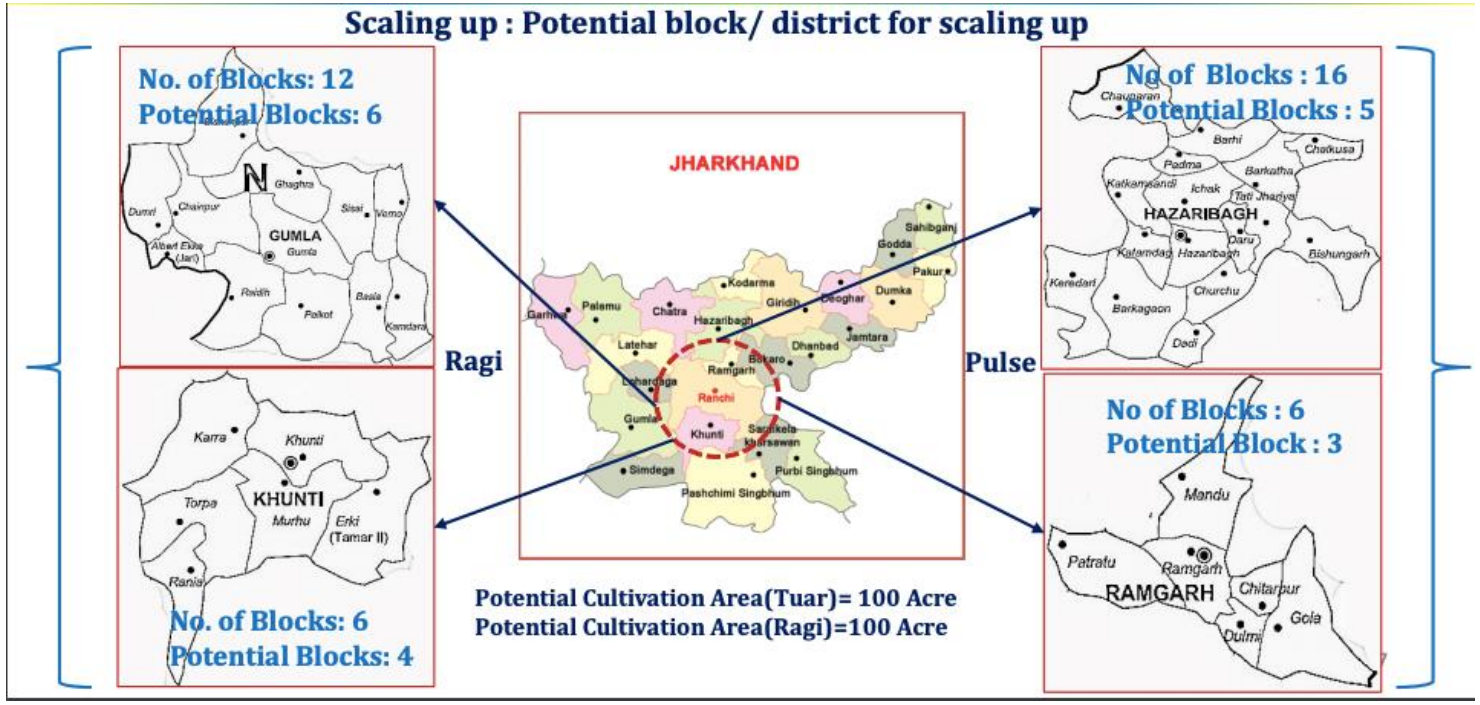
Anil Mahatao

Impact

Year	Milling Production (kg)	Revenue (INR)	OPEX (INR)	Net Profit (INR)	Command/Cultivation Area	Employment Generation
2021	25000	25000*85 = 21.25 Lakhs	25000*68 = 17.00 Lakhs	4.25 lakhs	50 Acre	7
2022	30000	30000*90 = 27.00 lakhs	30000*72= 21.60 Lakhs	5.4 lakhs	60 Acre	10
2023	35000	35000*95 =33.25 lakhs	35000*76= 26.60 lakhs	6.65 lakhs	70 Acre	14
2024	42500	42500*100 = 42.5 lakhs	42500*80= 34.00 lakhs	8.5 Lakhs	85 Acre	18
2025	50000	50000*105= 52.50 lakhs	50000*85 42.50 lakhs	10 Lakhs	100 Acre	22

SGD Linkage

Scaling potential



- Potential blocks for scaling – 18
- Employment generation over five years – 400+ direct
- Net profit over five years – 6.26 Cr

Scaling up

Identification of district specific product/produce – Focus should be on high value crops.

Help in value addition at source like processing, grading, quality control, packaging etc.

Market assessment and linkage to larger market.

Hand holding in supply chain/logistic, expansion and replication.

Financial support through convergence of different kind of fund such as State & Central Govt. Fund /Multilateral Fund /Debt from FI/MFI and CSR fund.

RE based powering should be considered at the conceptualization stage.

Opportunities for fixing the gap

Enhancing the productivity of the machine

Facilitation of quality control of agri processed products

Enhancing backward and forward linkages

Identifying areas and capacity for scaling the interventions


SURUCHI
NATURAL
Arhar
Dal

Customized Energy Solutions

THANK YOU

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Analyze · Simplify · Implement

Global Himalayan Expedition

Paras Loomba

Founder of the
Global Himalayan Expedition

GLOBAL HIMALAYAN EXPEDITION


789 million people – STILL in DARKNESS

Current Rural Scenario

Lack of Basic Facilities

Lack of Education & Livelihood

Results in

"Migration of Tribes & Lost Culture"

Global Himalayan Expedition

Empowering Himalayan Villages

WHO ARE WE?

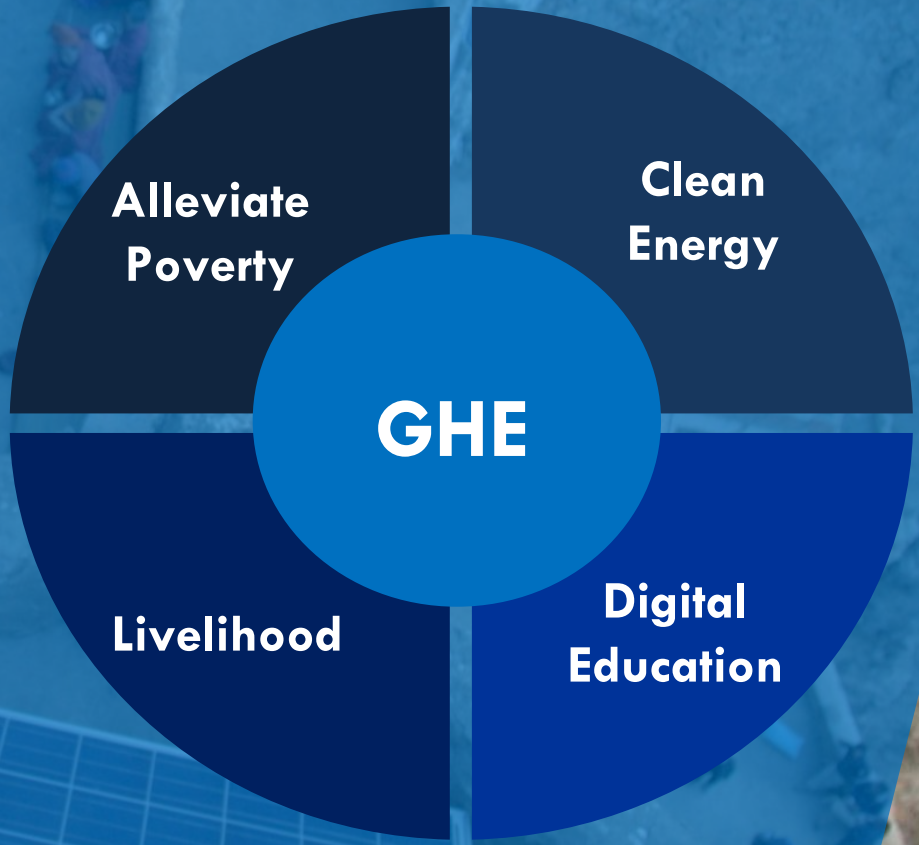
A Social Impact Enterprise that leverages tourism to provide clean energy and livelihood access for remote Himalayan communities

VISION - "Empowering rural mountain economies by creating livelihood and growth opportunities through tourism & technology"

MISSION - "" Create Sustainable Local Rural Enterprises and Impact 1 million mountain lives directly by 2025

TOURISM & TECHNOLOGY AS FORCE FOR DEVELOPMENT

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS 2030



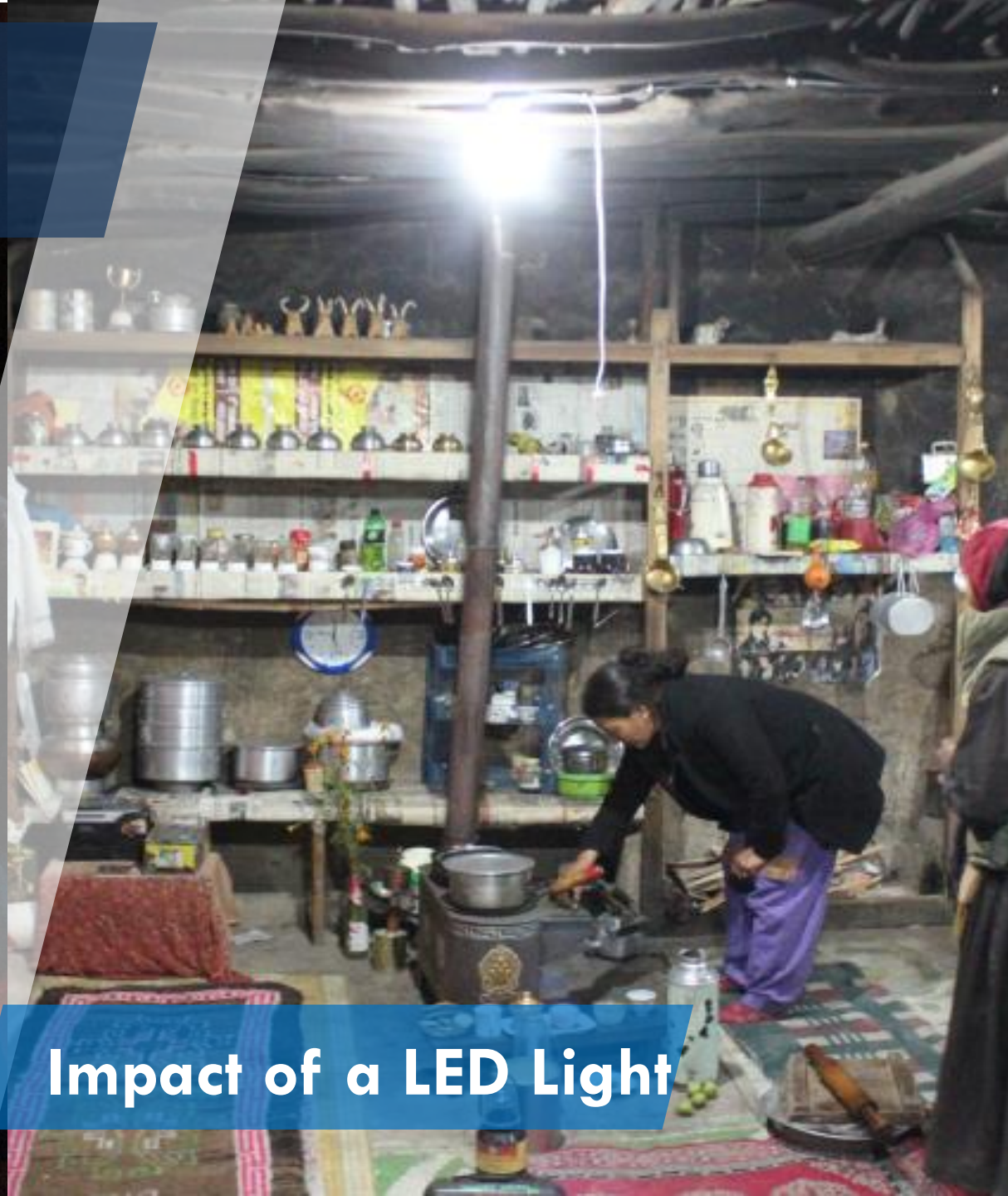
131
Villages
Electrified

60,000
Lives
Impacted

8700
Tons CO_2
Offset

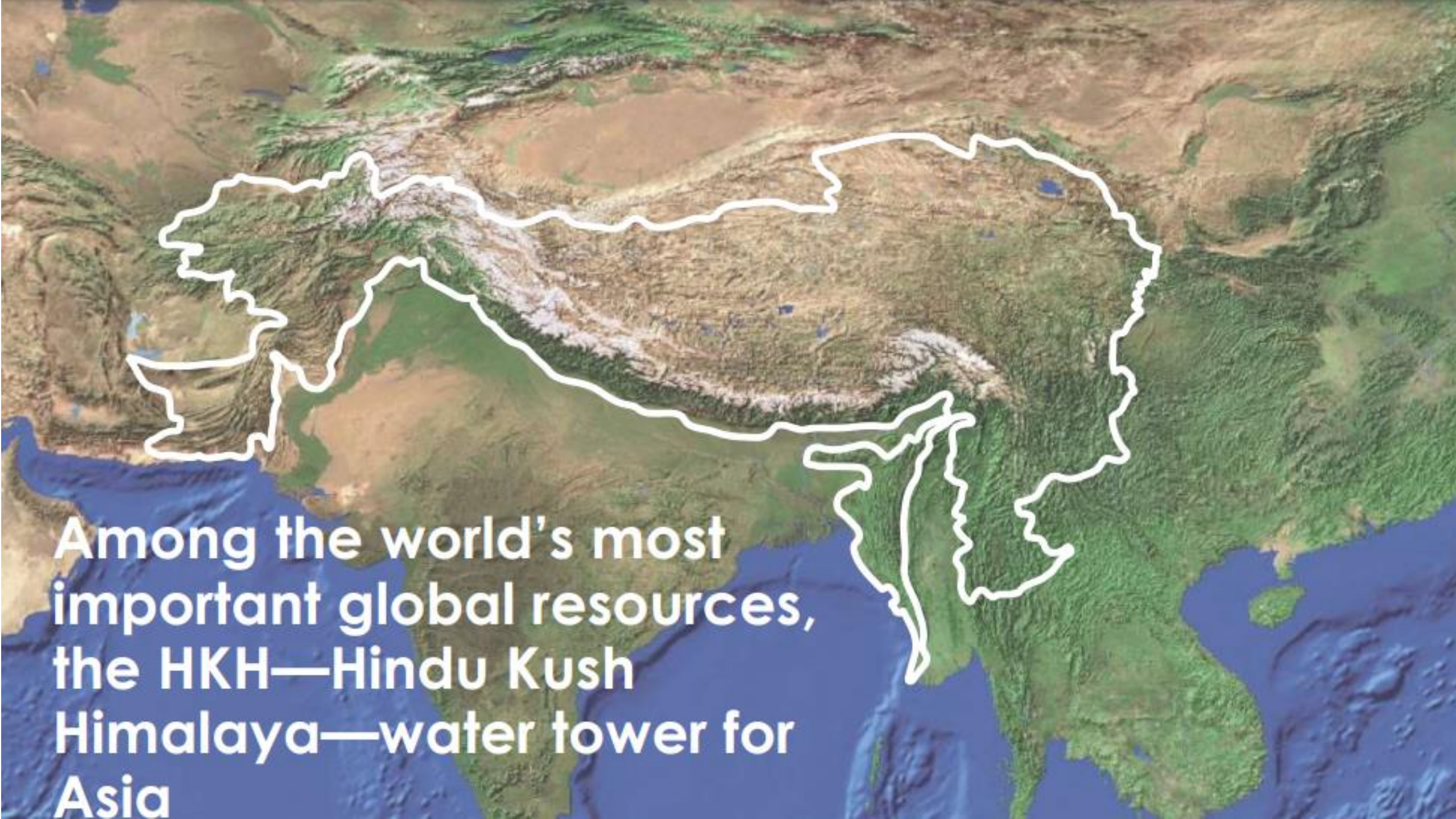
VISIBLE IMPACT

Harmful Kerosene Oil Lamp



Impact of a LED Light

VILLAGERS EXPERIENCING LIGHT FOR THE FIRST TIME


Among the world's most important global resources, the HKH—Hindu Kush Himalaya—water tower for Asia

Life in Himalayas during winters

Changing energy needs & Covid-19 context

Rapid urbanization – aspirations of youths

Changing farming/business practices – towards mechanisation

Productive use to catalyse socio-economic development – green products

Agriculture and Food Security

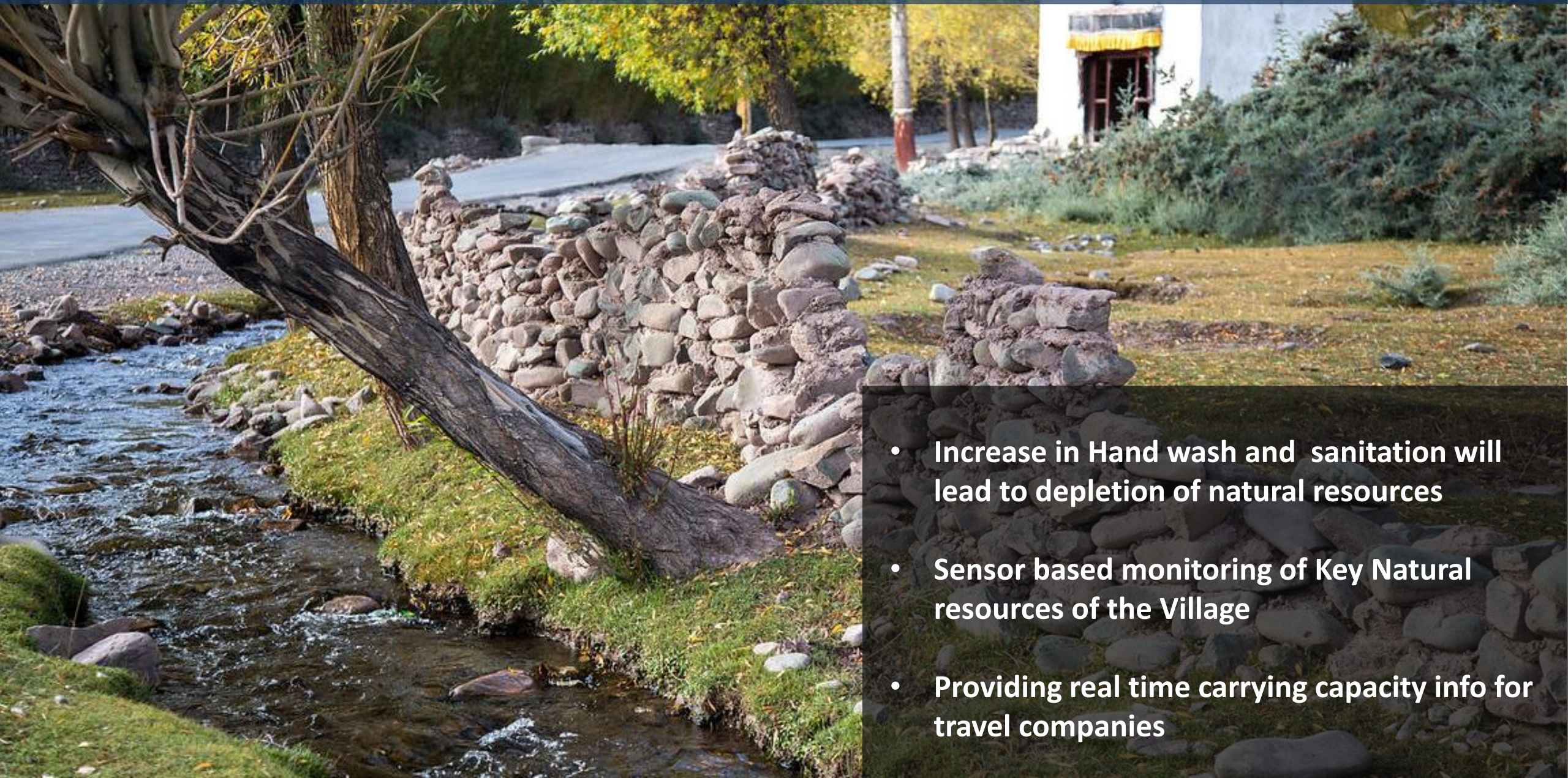
AGRICULTURE AND FOOD SECURITY

WATER RESOURCES AND HYDRO - CLIMATIC DISASTERS

LAND COVER AND LAND USE CHANGE AND ECOSYSTEMS

WEATHER AND CLIMATE SERVICES

Challenge 1 – Destination Natural Resource Monitoring

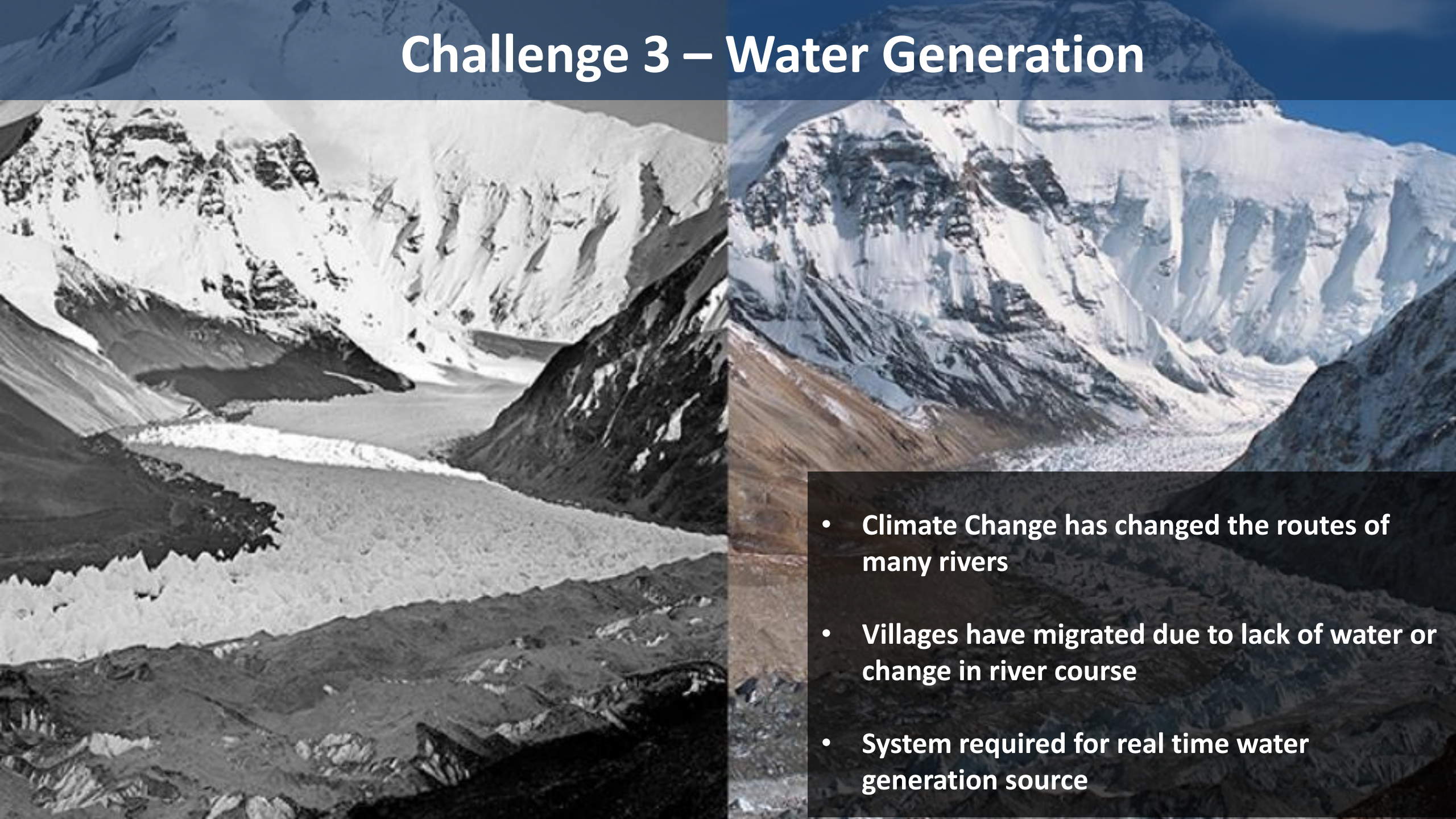


- Increase in Hand wash and sanitation will lead to depletion of natural resources
- Sensor based monitoring of Key Natural resources of the Village
- Providing real time carrying capacity info for travel companies

Challenge 2 – Energy Generation and Monitoring

- Most of the Energy Infrastructure fail due to continuous monitoring
- Local as well as Central monitoring system for areas without cellular activity
- Combining it with any Glacial or Cloud Burst Activity will help control damages

Challenge 3 – Water Generation



- Climate Change has changed the routes of many rivers
- Villages have migrated due to lack of water or change in river course
- System required for real time water generation source

Challenge 4 – Real time Livestock Monitoring

- Mountain Areas have a population that depends upon livestock
- Tracking Livestock and identifying grazing areas is a big concern for Nomads

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Roberta Mugellesi Dow

How to apply:
Funding and Tender Information

→ Thematic call

- The Thematic Calls for Kick-Start Activities are open to any company or organisation in participating Member States.
- Kick-Start Activities aim at exploring the viability of new service/application concepts and consolidating the user landscape including derivation of user requirements.
- Kick-Start activities resulting from Thematic Calls are funded at 75 % for a maximum amount of 60,000 Euro per activity and at 80% for a maximum of 64,000 Euro for SMEs.
- The Thematic Calls for Kick-Start Activities follow a competitive tendering procedure.

→ How to apply, 1/2

1. **Register** by completing online questionnaire on ESA-STAR Registration (minimum 'light registration') (https://esastar-emr.sso.esa.int)
2. **Download** the official tender **documentation** (Invitation to Tender) via EMITS 'AO 8872' from 19th March 2020
3. **Create** 'Bidder Restricted Area' in ESA-STAR
4. **Write your proposal** and obtain **Letter of Authorization** from National Delegation, if needed (see below)
5. **Submit** your proposal via 'Bidder Restricted Area' in ESA-STAR Tendering by 4th December 2020 13:00 CET (Don't wait until the last minute!)

More info can be found here:
esa.int/About_Us/Business_with_ESA/How_to_do/esa-star_Registration_Process

→ Authorization from National Delegations

The authorization from National Delegation for the specific Thematic Call against which you submit your Proposal is an admissibility criteria. Proposals not authorized at the closing date of the Thematic Call will not be admitted for evaluation.

For each individual Thematic Call, dedicated clarifications will be posted in EMITS to provide information on the list of Member States that have already provided their pre-authorization to the Thematic Call. In case your company/organisation resides in a country which has not provided a pre-authorization to the Thematic Call you are interested in, you need to contact your National Delegation. The contact information of the National Delegations can be found at https://business.esa.int/national-delegations.

→ How to Apply, 2/2

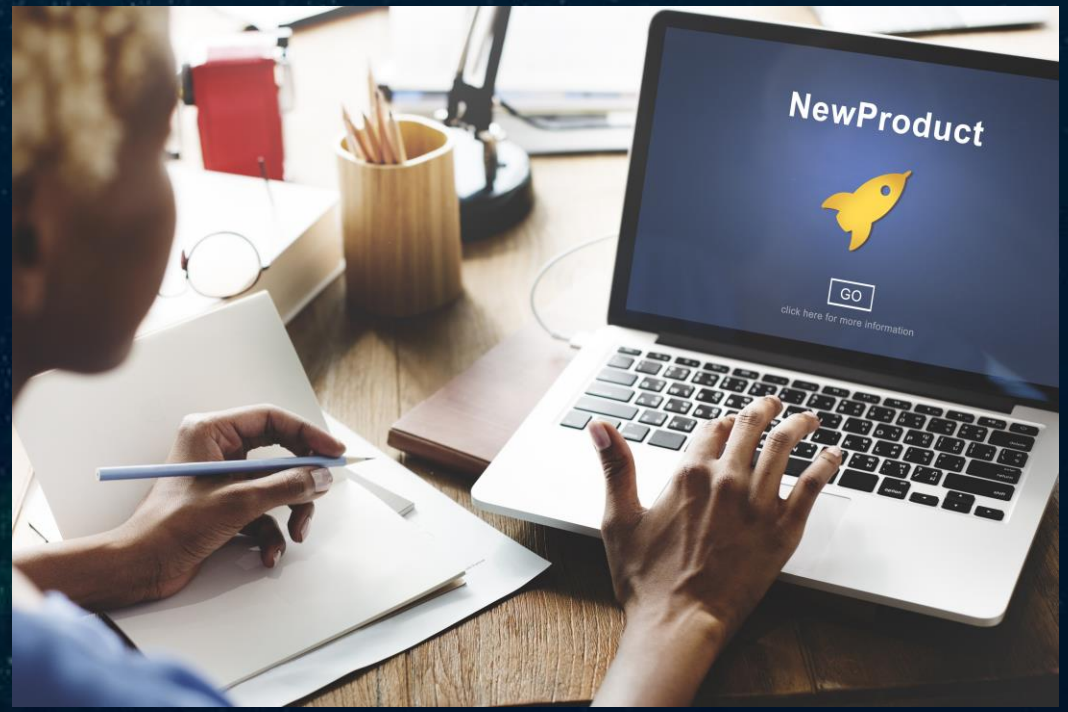
The Letter of Invitation to Call for Proposals is issued on EMITS (http://emits.sso.esa.int/emits/owa/emits.main) under 'AO/1-10273' and includes:

- **Cover letter**
- **Appendix 1:**
  List of Thematic Calls for Ideas (including the calendar of the Thematic Call for Ideas and specific information on the themes)
- **Appendix 2:**
  Draft Contract
- **Appendix 3:**
  Tendering Conditions for Express Procurement Procedure - EXPRO/TC
- **Appendix 4:**
  Proposal Template

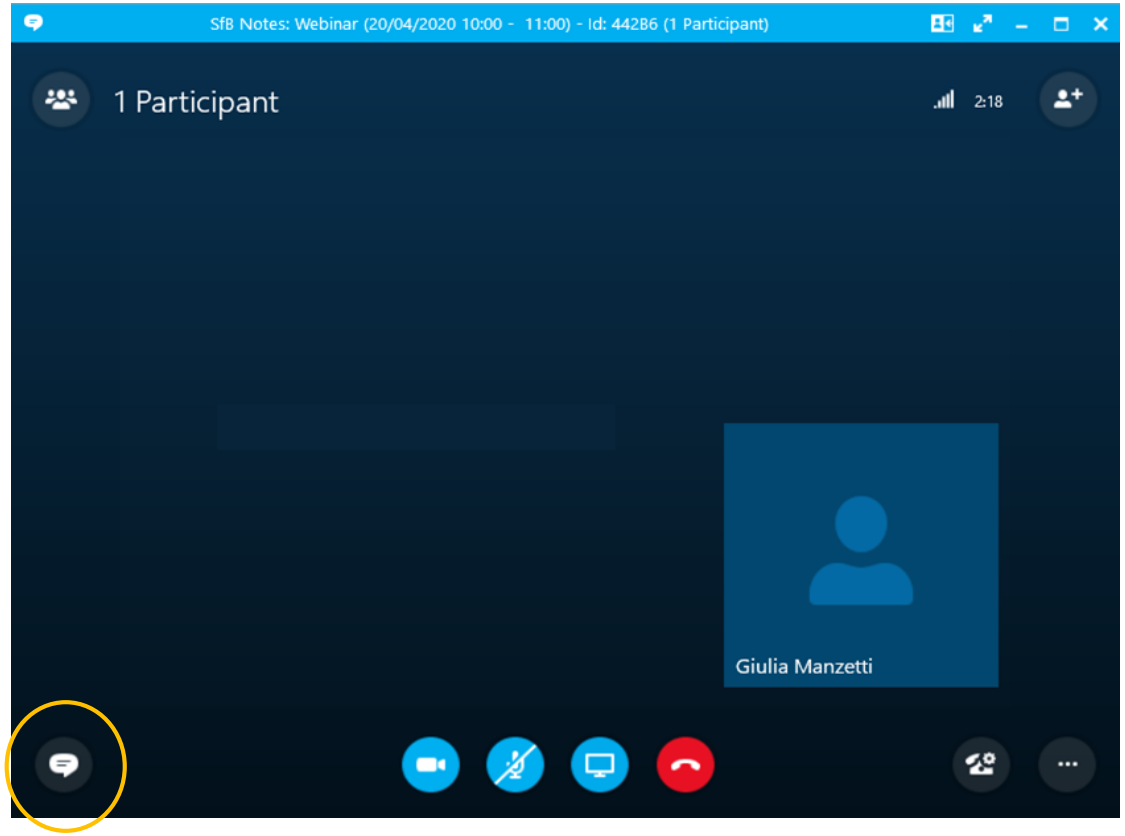
→ Proposal Template

Your Proposal shall include the following information:

1) Executive Summary (max 1 page)
2) Business Potential (max 5 pages)
3) Technical Concept (max 5 pages)
4) Team and Resources (max 3 pages)
5) Management (max 4 pages)
6) Financials (max 2 pages)



OPEN QUESTION & ANSWER SESSION



business.esa.int

THANK YOU FOR PARTICIPATING

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