Energy Access in Remote Areas & Decentralised Renewable Energy

Deepak Mohapatra

Senior Officer – Business and Market Development Alliance for Rural Electrification

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Alliance for Rural Electrification

GLOBAL ELECTRIFICATION STATS

685 million

people without access to electricity **1.5** billion

people suffering from unreliable electricity services of new connections

55%

to be powered by DRE solutions **billion** annual investment needed

ÚSD

35

Energy access gap

Off-track to achieve SDG7







Energy access gap

Off-track to achieve SDG7

At current rates of electrification, a gap of over 550m people is still estimated to remain by 2030

Projected Electrification Gap to 2030





Source: ENGIE Energy Access - GOGLA, Off-Grid Solar Market Trends Report 2022: State of the Sector (2022); IEA, Population With And Without Electricity Access By Technology In Sub-Saharan Africa (2022); IEA report Defining Energy Access: 2020 Methodology (2020); World Bank – Access to Electricity (% of population) (2023)

WHO WE ARE

The Alliance for Rural Electrification (ARE) is the global business association representing 200 members along the distributed renewable energy value chain.

ARE is working to expand sustainable electricity access, create jobs and respond to climate change in Africa, Asia-Pacific, and Latin America.

#1 Global DRE association

Members

55+ Countries

Continents



ARE Members Regional Focus & Expertise





MARKET SEGMENTS

Electricity access for households

Affordable, reliable and sustainable electricity for all

Powering productive uses of energy

Reliable and sustainable power for improved local livelihoods

Greening / Powering industries

Renewables to power green and net zero industries (agriculture, e-mobility, mining, telecom, etc.)

Electrifying public/ social infrastructure

Sustainable electricity for underserved health care, local government and education facilities, streetlights

Weak grid reinforcement

Renewables for weak grid improvement, energy efficiency and emission reductions

Who ARE the Members?

ARE represents the entire DRE value chain from manufacturing, technology provision and investment to project development, installation, operations, maintenance and recycling.

ARE Members at a glance

Company Types

Investors Manufacturers Technology Providers EPC/Installers Developers Academia NGOs and Think tanks

Technology Types

Solar PV Hydro Wind Bioenergy Green Hydrogen Energy storage Power components

Sizes

Stand-alone Systems Mini-grids Grid-connected

Regions

Sub-Saharan Africa Asia-Pacific LAC

ARE MEMBERS





A snapshot of 2024



Member Satisfaction:







Connections at ARE events:

10,000



Practitioners Trained:



Subscribers to ARE's Communication Network:



ARE SECRETARIAT

Global HQ



David Lecoque CFO



Jens Jaeger

Director - PBD

Deepak Mohapatra Senior Officer - BMD



Julia von Franz Officer – P&A



Ling Ng

Director - CM

Carlos Ferre

Assistant - BMD

Inès van Oldeneel Officer - BMD



Estrella Fernandez

Manager – FHR

Okan Özkan Officer - CM



Olha Skrypa Associate - FHR



Otto Neidhardt Assistant – P&A



Eleni Nikolantou Assistant - BMD





Regional Programme Expert - Southeast Asia

Shaukat Ali Regional Programme Expert - South Asia

Catherine Mukobo Regional Programme Expert - West & Central Africa

Topical & Regional Experts

Eugenia Masvikeni Regional Programme Expert - East & Southern Africa



Roberta Alonzo CORE Training Expert



Sandra Boko PURE Expert



Dwipen Boruah CORE Training Expert



Silver Navarro CORE Training Expert





Mary Susan Abbo CORE Training Expert



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Natasha Allen







ARE MEMBER SERVICES



Success stories from Asia & Pacific

ADB

Energy for All Program



India's Saubhagya Scheme



Myanmar National Electrification Project (NEP)



IDCOL SHS Program (Bangladesh)



Household Electrification Plan (Philippines)

Challenges and solutions in ensuring affordable, reliable, sustainable and modern energy for all

Challenges	Solutions
Unelectrified communities are more last-mile, making project sizes smaller and harder to finance	Portfolio approaches with ticket sizes of EUR 5-60 million, enabling investors such as DFIs and even commercial investors to also finance DRE projects
Little integration of DREs/DERs into electrification planning, still very grid-extension heavy	Establish "grid-compatible mini-grids" with technical standards and uptime to allow for immediate or future interconnection
Regulatory frameworks and policies often don't present clear/viable path for DREs	Create clear regulatory and streamlined licensing procedures for DRE as well as cost-reflective tariff structures (or, if universal tariff, subsidies to compensate developers) for DREs in unserved areas
Less political buy-in for improving energy access and therefore less engagement	Align energy access goals with National Political Agendas (digital transformation, climate adaptation, enabler of jobs, education, health, industrialisation)
Limited understanding of demand-side risk management opportunities for last-mile communities	Productive Use of Energy: Scaling up energy access for income-generation activities can improve livelihoods and energy system sustainability
Legacy of donor-driven projects	Use of different business models, capacity reinforcement and awareness raising

Examples of Innovative DRE solutions applications by ARE Members

Airborne Wind (SkySails) to provide clean energy to local communities in Taiwan, 2025

- Asia's first AWE system aligning with Taiwan's energy transition and sustainability goals
- AWE can provide stable and decentralised power for communities, especially in remote areas with limited grid access
- 24/7 continuous power generation, cost competitiveness: <2 cents/kWh
- Simple logistics for remote areas and complementary to standard wind





Green Hydrogen project for the Long Loyang Clinic in Sarawak, Malaysia (H2 Energy), 2020

- The Clinic serves Long Loyang village as well as 15 remote settlements along the Tinjar river. It relies on diesel for its electricity, the supply of which is extremely irregular and costly
- Solution: H2 has designed modular, compact and highly mobile systems that are easily transportable and highly scalable
- PV panels to generate electricity
- Electrolyser to produce hydrogen cells
- Stored in hydrogen storage tanks and depleted during times of solar inactivity



Hydroelectric turbines for the Green School Bali in Indonesia (Turbulent Hydro)

- The turbine supplies reliable energy to the Green
 School located next to the Ayung river in Bali, Indonesia
- The **13 kilowatts vortex** Turbine benefits more than seven hundred students, teachers and staff
- The installation does not produce noise pollution
- Replacement for the unreliable and unsustainable electricity of the national grid
- 60 tonnes of CO2e emissions avoided
- 60-80% reduction of electricity costs



Software & Digital Platforms (VIDA)

- Interactive map
- Satellite image and ground data sources
- Tailored map visualisations, analysis and reports
- **Energy demand**, accessibility, security, agricultural potential, social infrastructure and climate risks
- 100,000 remote locations across 30 countries
- USD 2 billion in investment catalysed









Innovation in demand-side management and community engagement in Malaysia (COMET)

- Interactive role-playing software that facilitates the planning and operation of community-sized mini-grid systems
- Simulates mini-grid systems and multiple energy scenarios
- Tests different tariffs and payment systems
- Control consumption with load management limits
- This tool is **designed to educate and engage communities**, making energy management both accessible and enjoyable





Biomass fuel (Green Charcoal Uganda)

- 90% of Ugandan energy comes from biomass fuel with only 1% from electricity
- GCU manufactures carbonized and non-carbonized briquettes from palm kernel husks, rice husks, coffee husks, and other agricultural wastes
- Sustainable products that replace both charcoal and firewood





Igiugig Hydrokinetic Project, 2023 Two RivGen® devices (ORPC) deployed to power an off-grid community in Alaska

- Marine renewable energy (MRE) system
- Multiple cross flow turbines drive a single generator
- Generates predictable, emission-free electricity from free-flowing river and tidal currents
- Connected directly into the grid using smart grid technology
- No impedance to navigation and coexists with marine life





Microgrid and energy storage system developed with Schneider Electric will relegate diesel generators to backup only.

Sunlight Pump for Agriculture (ennos, Innovex) at "Pyflor" farm in Honduras, 2017

- "Pyflor" farm in Honduras has been using a 0.5 HP sunlight pump instead of a gasoline pump to circulate water with fertilizer in a hydroponic irrigation system since 2017
- With a 375 Watts solar panel, a 0.5 HP sunlight pump saves 1.687 Kg of CO2 per year, and 730 litres of gasoline per year.
- The pumps now include "Remot", a cloud-based Internet of Things (IoT) platform for managing and maintaining solar equipment installations



E-Pirogue (Asantys Systems) River transport project in Senegal, 2024

- River transport for Off-grid communities
- 25 kW motor
- Lithium iron phosphate battery with a capacity of 36 kWh
- Charged by solar power from the roof. Additional recharging possibility at the port
- Emissions reduction, noise reduction, fuel savings







MFA Tricycle "Hamba" (Mobility for Africa)

- Robust off-road standard build
- Carries goods or people of 400kg
- 48V, 100AmpHr LFP battery pack. Rechargeable up to 10,000 cycles.
- Integrated charging and energy storage system (battery rack) designed to **be recharged with** Mini-Grid Solar Stations





Two Solar-powered cold rooms (Phaesun) at public markets in Kenya, 2024

- Both cold rooms are used to offer
 Cooling-as-a-Service to market traders in order to reduce post-harvest losses of valuable crops.
- PV system provides electrical energy
- Water chiller = Ice storage: SelfChill Cooling Units serve the water chiller. They convert electrical energy into thermal energy
- Ice is produced as energy storage with surplus solar energy. Cold water (~2°C) is pumped to the cooling appliance, e.g. Cold Room





Empowering women through household biogas systems for clean cooking in Kenya (nOa Climate)

- At Burani Village, nOa installed a 5m³ biogas digester at the local recreational training center and school to support sustainable energy solutions
- Off-grid micro biogas system designed to recycle organic waste into energy and organic fertilizer, perfect for clean cooking and water heating
- Capability to generate around 6kWh to 60kWh of heat energy per day
- It helps women to become more self-sufficient and improves local food security



the nOa one

Instead of throwing your organic waste into the bin, throw it into the nOa one. It's that simple.





Contact



Deepak Mohapatra

Senior Officer - Business & Market Development <u>d.mohapatra@ruralelec.org</u> Phone: +32 491 08 60 67

