



Market Analysis of RE and Low Carbon Technologies in the Philippines for EmPower

2025 MCPI Annual Conference

Microfinance and Sustainable Finance for the Poor

July 30-31, 2025 | Century Park Hotel, Manila



EmPower Outcomes

KEY ENABLERS



Policy development and implementation



Raise awareness and strengthen capacities



Mobilize investments in low-carbon technology



Foster regional and national partnerships

PRINCIPLES

Human rights-based approach

Gender equality and women's empowerment

Leave No One Behind

Climate resilience

1

INCREASE GENDER-RESPONSIVE CLIMATE ACTION



2

WOMEN'S LEADERSHIP



3

CLIMATE-RESILIENT LIVELIHOODS



Study References

The primary data and information for the market study were derived largely from the following donor-funded technical assistance projects and feasibility studies and key informant interviews (which are ongoing):

- **IFC DE Study** (Distributed Energy Market in the Philippines: Challenges and Barriers 2015)*
- **ADB/DOE E-trike Project*** (Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project, 2018-2019)
- **UNIDO E-mobility GEF** CEO Endorsement Document* (Accelerating the adoption and scale-up of electric mobility for low-carbon city development in the Philippines, 2020-2022)
- **NEDA TIDP*** (Tourism Sustainable Infrastructure Development Master Plan, 2021-2022)
- **UNIDO RETS*** (Renewable Energy Technology to Increase the Value Added of Seaweeds in Tawi-Tawi, 2019-2022)
- **UNIDO Water-Energy-Food Nexus** AF proposal* (Water-Energy-Food Nexus to address and adapt to climate change impacts in Tawi-Tawi, 2021-2022)
- **EU-ASEP I-PURE** (Integration of Productive Uses of Renewable Energy for Sustainable and Inclusive Energization in Mindanao, 2019-2023)
- **UNDP DREAMS** (Development for RE Applications Mainstreaming and Market Sustainability, 2018-2023)
 - UNDP DREAMS SF4RE (Support Facility for RE)
 - UNDP DREAMS I-PREP* (Iloilo Provincial Renewable Energy Plan)
- **UNIDO Cold Chain** (Global Partnership for improving the food cold chain in the Philippines, 2018-2024)
- **USAID ESP** (Energy Secure Philippines, 2020-2025)

Secondary data and information were from official government publications and documents, published research articles, policy papers and reports, and online feature and news articles.

*Projects with which the UNEP EmPower Philippine Focal Point had participated as Consultant.

RE and Low-carbon Technologies Surveyed for EMPOWER

- Agriculture and Fisheries
 - PURE
 - Pineapple Fiber and Pulp Production
 - Solar seaweed dryers
 - Cold Chain
 - Cold Storage
 - Solar powered Chest Freezers
- Clean and Modern Energy Access
 - Off-grid SHS
 - Smart Solar Network
 - Rooftop Solar PV
 - Clean Cookstoves
- Water Resources
 - Solar PV Water Pumps for Irrigation
 - Solar PV Water Pump for Water Supply and Sanitation
- Sustainable Transport
 - E-trikes
 - E-boats
- Green Building
 - Efficient Electrical Appliances
- Waste Management and Circular Economy
 - Biogas Digesters

RE and Low-carbon Technologies for EMPOWER



Huge market potential, huge impacts

	Market Potential (Size)	Typical Cost of Technology or Projects	Economic Viability	Women Enterprises	Marginalized Groups	Suppliers
Efficient electrical Appliances	On-grid and off-grid HH and MSMEs	Various depending on appliances	CURRENT	Use	Poor HH and MEMEs with electricity access	Many
Rooftop solar PV	On-grid, off-grid, various sectors, decreasing costs, friendly policies, increasing consumer awareness, attractive financing schemes, competitive supply	PHP52,000-67,000 per kW (DREAMS)	CURRENT	Use	Poor Urban and Rural HH and MSMEs	Many (more than 300, 74 registered with DOE)
E-trikes	<ul style="list-style-type: none"> 6,783 units (56.76% of EV market in 2019); 8-12% p.a.(EVAP) 100,000 units by 2024 (based on EVAP); 100,000 units annually (PUVMP) 	PHP150,000-250,000 (own estimate based on ADB)	CURRENT	Use	Women, children, elderly in marginalized and climate vulnerable communities	Some, c/o EVAP (Electric Vehicle Association of the Philippines)
Biogas digesters -Floating drum type	Alternative cooking fuel among urban villages	PHP9,000-25,000	CURRENT	Use/ Livelihood	<ul style="list-style-type: none"> Poor Urban HH Livelihood involves cooking 	DOST
Clean cookstoves	<ul style="list-style-type: none"> More than 11 million HH (based on HECS 2023) Top markets: Northern Mindanao, BARMM, CARAGA (Region XIII), Zamboanga Peninsula (Region IX), Western Visayas (Region VI), Cagayan Valley (Region II), SOCCSKSARGEN (Region XII) (more than 60% of HH dependent on fuelwood) (HECS 2023) 	PHP300-3000 (own est based on ADB)	MT	Use/ Livelihood	<ul style="list-style-type: none"> Poor Urban and Rural HH HH using fuelwood as alternative cooking fuels Livelihood involves cooking 	<ul style="list-style-type: none"> Know of only one c/o of ADB

Huge market potential, huge impacts

	Market Prospects Potential (Size)	Typical Cost of Projects/Products	Economic Viability	Women Enterprises	Marginalized Groups	Suppliers
PURE -Pineapple Fiber Decorticating Machine	<ul style="list-style-type: none"> Nationwide (Northern Mindanao, 57%; SOCCSKSARGEN, 30%); 4,300 communities (550,400 HH) 	PHP300,000	CURRENT	Livelihood	Pineapple farmers	Contractor of the EU-funded project in Negros Occidental
Solar PV water pumps for Irrigation	Farming communities/villages without access to irrigation or using diesel powered irrigation	PHP10,000 PH50-55,000 PHP89,000 PHP140-170,000 (news features)	CURRENT	Livelihood	Poor Farmers	Seems many, c/o DA, NIA
Floating Seaweeds Solar Dryer	<ul style="list-style-type: none"> More than 500,000 people and over 100,000 families living along coastlines and many islands, employing more than 200,000 fisherfolks and 30,000 traders The main producers of seaweeds in the Philippines are Region IV-B (MIMAROPA), Region IX (Zamboanga Peninsula), and BARMM 	PHP539,000 per unit (I-PURE)	CURRENT	Livelihood	Seaweeds farmers in BARMM, Regions IV-B and IX	Designed by two universities; contractor of the I-PURE project
Solar powered chest freezers	Off-grid and on-grid areas, public market, MSMEs,	n.a.	CURRENT	Use/ Livelihood	Farmers and fisherfolks	c/o UNIDO

Efficient Electrical Appliances



- Prospect: Current
- Marginalized groups: Poor HH, MSMEs
- Current market size and growth rate: Large, high growth rate
- Costs/Economics: payback period of less than one year
- Market potential: HH and enterprises switching to or replacing old and less efficient lighting and electrical appliances
- Market factors:
 - Electricity prices
 - Decreasing poverty incidence
 - Population growth rate
 - GDP growth rate
 - Climate awareness
- Supply chain
 - Local and imported
 - Registered at DOE

Rooftop Solar PV



- Other sectors

- Schools
- Tourism
- Agriculture
- LGUs
- Solar charging stations
- Sports

- Prospect: Current and increasing market potential
- Marginalized groups: Poor urban and rural households, MSMEs
- Markets: Nationwide, on-grid/off-grid, multi-sectoral
- Current market size and growth rate:
 - 11,707 QEs equivalent to 101,251 MW (up to 100 kWp per installation, net metering), 13.4% (2020-2025)
- Market potential (based on IFC, 2015)
 - Commercial (shopping malls, hospitals, high-rise buildings): at least 120 MW
 - Residential (high-income HH): at least 600 MW
- Costs: PHP52,000-67,000 per kW (UNDP DREAMS)
- Market factors
 - Decreasing costs of technology
 - High electricity prices
 - Favorable policies (net metering, GEOP, DERs)
 - Increasing consumer awareness
 - Competitive supply industry
- Supply chain
 - 74 DOE registered installers
 - At least 300

E-trikes



- Motivations: Comfort and convenience, energy efficiency, climate mitigation and adaptation, increased income
- Prospect: Current
- Marginalized groups: Women, children, elderly in marginalized and climate vulnerable communities
- Current market size and growth rate:
 - 6,783 units (56.76% of EV market in 2019); 8-12% (EVAP)
- Costs:
 - E-trikes: PHP150,000-250,000 per unit
 - CS: PHP20,000 per E-trike (PHP50,000 per charging point)
- Market potential:
 - Nationwide: on-grid/off-grid
 - 100,000 units by 2024 (based on EVAP); 100,000 units annually (PUVMP)

- Market factors
 - Increased consumer awareness on passenger benefits, environment and climate benefits
 - High fuel prices
 - Decreasing costs (due to increasing demand—economies of scale, technology improvements)
 - Availability of charging stations
 - PUVMP (2017):
 - 21% EV share by 2030, 50% by 2040
 - 2.45 million EVs and 65,000 EV CS (2023-2028)
 - 1.85 million EVs and 42,000 CS (2029-2034)
 - >2 million EVs and 40,000 CS (2034-2040)
 - 70% local manufacturers
- Supply chain: EVAP
 - 54 EV manufacturers (e-trikes and e-jeepneys)
 - 11 parts and components; 18 dealers and traders

Biogas Digesters

- Motivations: Waste management, clean cooking, air pollution, climate, circular economy
- Prospect: Current
 - Poor Urban HH
- Current market size and growth rate:
 - Silang, Cavite
 - Gapan, Nueva Ecija
 - Las Pinas City, MM
 - Marilao, Meycauyan, Obando, Bulacan
 - Fairview, QC
 - Pasig City
 - Barangay Tunasan, Muntinlupa City
- Market potential: Poor urban households, villages
- Costs: PHP9,000-25,000 (DOST)
- Market factors
 - Solid Waste Management Act, Renewable Energy Act
- Supply chain
 - DOST-ITDI (3 accredited suppliers)



Improved/Clean Cookstoves



- Market barriers:
 - Up-front cost of cookstoves and cost of modern fuels
 - Exclusive use of traditional cookstoves or in combination with modern cookstoves is advantageous
 - Traditional cookstoves are safer to use than modern cookstoves
 - Lack of enabling policy
- Motivations: Health impacts and deaths due to indoor air pollution, climate, energy efficiency
 - 2nd largest number of death due to indoor air pollution (8.4 deaths per 10,000 population)
- Prospect: Medium Term
- Marginalized groups: Poor rural and urban HH
- Market potential:
 - More than 11 million HH (based on HECS 2023)
 - Top markets: Northern Mindanao, BARMM, CARAGA (Region XIII), Zamboanga Peninsula (Region IX), Western Visayas (Region VI), Cagayan Valley (Region II), SOCCSKSARGEN (Region XII) (more than 60% of HH dependent on fuelwood) (HECS 2023)
 - GR of access to clean cooking=1.4% p.a.(slowest in achieving SDG7 target in 2000-2018)
- Current market size and growth rate: ???
- Costs:PHP300-3,000 (ADB, Nayon)
- Market factors
 - income (poverty incidence)
 - Access to electricity
 - High logistics cost (access to clean fuels)
- Supply chain
 - Local and imported

Solar-powered Pineapple Fiber Decorticator

- Prospect: Current
- Marginalized groups: Pineapple farmers
- Markets: Nationwide (Northern Mindanao, 57%; SOCCSKSARGEN, 30%)
- Current market size and growth rate: 90 communities (11,520 HH)
- Market potential: 4,300 communities (550,400 HH)
- Costs: PHP300,000 (EU-ASEP)
- Market factors
 - Demand for Pinatex, price of leather, environment consciousness
- Supply chain
 - Local



Solar PV Water Pumps

- Prospect: Current
- Marginalized groups: farmers
- Current market size and growth rates not known
- Costs: PHP10,000/50-55,000/89,000/140-170,000 (per project)
- Market potential: Farming communities/villages without access to irrigation or using diesel powered irrigation
- Market factors
 - Decreasing costs of solar panels
- Supply chain: Imported
- Advantages
 - Low maintenance
 - No fuel costs or spills
 - Easy to install
 - Simple and reliable
 - Unattended operation
 - System can be made to be mobile
 - Longer life-span
 - Low average usage cost



Cash flow analysis of water pump over 1 ha of crop land

Gasoline-fueled water pump

Description	Expense Cost	
	Year 1	Year 2-20 (annual)
Gasoline pump	15,000	
Water tank		
Manpower	9,400	9,400
Accessories	2,000	
Maintenance cost	500	500
Fuel cost	57,612	57,612
Total annual costs	84,512	67,512
Total cost for 20 years		1,367,240
Total water pumped for 20 years		251,160
Cost per m2 pumped, PHP		5.44

Solar PV water pump

Description	Expense Cost	
	Year 1	Year 2-20 (annual)
PV pump wiring	40,000	
PV solar modules, 315 Wp x 5	40,000	
PV racking system	10,000	
Water tank 30 L	50,000	
Manpower	9,400	9,400
Accessories	2,000	
Maintenance cost	500	500
Fuel cost		
Total annual costs	151,900	9,900
Total cost for 20 years		340,000
Total water pumped for 20 years		251,160
Cost per m2 pumped, PHP		1.35

UNDP DREAMS SF4RE Solar PV Water Pumps for Potable Water Supply

Facility	Location	Installed Capacity	Number of HH served	Cost	Cost per HH
4 potable water systems	Tapaz, Capiz	4 x 1.27 kW	128	PHP3.7 m	PHP28,906.30
10 Potable water systems	Goa, Camarines Sur	10 x 2.2 kW	820	PHP6.2 m	PHP7,560.98



Floating Seaweeds Solar Dryer



- Market potential: more than 500,000 people and over 100,000 families living along coastlines and many islands, employing more than 200,000 fisherfolks and 30,000 traders
- Market factors
 - High prices of raw dried seaweeds (RDS)
- Supply chain
 - UPLB
 - MSU Tawi-Tawi (MCOT)

- Prospect: Current
- Marginalized groups: Seaweeds farmers in BARMM, Regions IV-B and IX
- Markets: Seaweeds farmers, main producers in BARMM, Regions IV-B and IX
- Current market size and growth rate: EU-ASEP/I-PURE beneficiaries
- Costs: PHP539,000 per unit (I-PURE)



Solar Powered Chest Freezers



- Prospect: Current
- Marginalized groups: farmers and fisherfolks, MSMEs
- Current market size and growth rate; not known
- Market potential (UNIDO):
 - Farmers
 - Fisherfolks
 - Market vendors
 - MSMEs
 - Tourism facilities
- Costs: ???
- Market factors
 - Lack of electricity access
 - High electricity prices
- Supply chain
 - Imported

Next Steps

- Capacity building of MFIs on clean tech
- Increasing awareness of women enterprises (through caravans)
- Clean tech talks for MFIs and women enterprises
- Partnerships with other initiatives (e.g. Clean Air Asia, DTI, DOST, DOE, DA)

Thank you!

About EmPower



Federal Ministry
for Economic Cooperation
and Development



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FOREIGN AFFAIRS & TRADE
Manatū Aorere



Sweden
Sverige



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC



EmPower: Women for Climate-Resilient Societies (Phase II)

Duration:

5 Years (January 2023 – December 2027)

Geographical Coverage:

Asia-Pacific region with a focus on Bangladesh, Cambodia, Indonesia, Philippines and Viet Nam

Donors:

Governments of Germany, New Zealand, Sweden and Switzerland

Implementing Agencies:

UN Women and UNEP

SDGs:





EmPower. Increasing women enterprises access to clean technology and finance



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EmPower. Increasing capacity of MFIs on ESG, climate finance, and clean tech



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