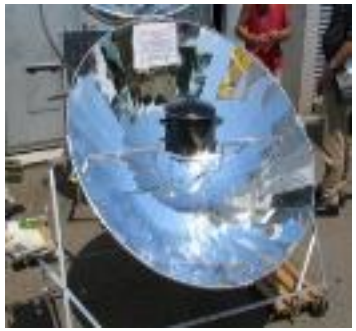
RENEWABLE ENERGY TECHNOLOGY (RET)	ESTIMATED UNIT COST	END-USE APPLICATIONS AND BENEFITS	INNOVATIVE ASPECT	VALIDATIONS FROM PILOT TESTING	LIMITING CONDITIONS
BIOGAS ENERGY					
FLEXI BIOGAS  Biogas International Limited (BIL), Kenya	USD 610 for domestic model ($3m^3$)	- Access to clean source of cooking fuel - Improved agricultural productivity from the use of organic fertilizer (bioslurry) - Women empowerment through time saved collecting firewood - GHG emission reduction potential from better livestock manure management	- A flexible above-ground PVC envelope housed in a greenhouse tunnel. - Pre-fabricated kit can be installed in half-day by trained technicians. - The system is portable (weighing 50 kg in total), simple to assemble and can be (re) moved.	- Installed over 3,000 units within projects in Rwanda co-financed by IFAD. - Piloted the technology within IFAD investment projects in Kenya, India, Sao Tome e Principe, Cambodia, Nepal and Mali. - Indian Institute of Technology (IIT) in Delhi conducted feasibility studies on the technology. - Designer of the technology awarded the Renewable Energy Innovator of the year (2012) in Washington D.C.	- Technology has intellectual proprietary rights (IPRs) therefore supplied by a sole company (Biogas International) which is a small-medium enterprise based in Kenya with limited human and financial capital. - Reliant on external temperatures hence suitable in dry, tropical areas where sunshine is plenty. - Several plastic recycling processes need to be considered.
BIOBOLSA  BioBolsa, Mexico	USD 600 for domestic model ($3m^3$)		- Pre-fabricated kit, modular, scalable and adaptable for a variety of biodegradable material and for human waste management. - Pre-fabricated kit can be installed in 1 day by trained technicians.' - Efficient zero-waste packaging and shipping for regional distribution.	- Technology has been institutionalized with the International Renewable Resources Institute (IRRI) in Mexico. - Installed over 3,000 systems in Mexico, Nicaragua, Costa Rica, Haití, Colombia, El Salvador and Panama. - Endorsed by SNV and currently implementing programs funded by Kellogg Foundation, USAID and the Mexican government.	- Technology has intellectual proprietary rights (IPRs) therefore supplied by a sole company (BioBolsa). - Currently production, training and after-sales services limited to Latin American countries. - Highly reliant on external temperatures. - There are several plastic recycling processes that need to be considered.

FLOATING DRUM  Appropriate Rural Technology Institute (ARTI), India	USD 200 for domestic model ($1m^3$)		- Adaptable to run purely on kitchen/vegetable waste. - Do-it-yourself (DIY) manual provided for installation, operation and management of the unit.	- Established by the Appropriate Rural Technology Institute (ARTI) in Maharashtra, India. - Designer of the technology, Dr Anand Karve, is winner of the Ashden Award for Sustainable Energy 2006 in the Food Security category.	- Designed primarily for rooftops in urban poor areas.
FIBRE GLASS  Puxin, China	USD 570 for $6m^3$ model		- Simple to build and operate relative to fixed dome biogas digesters. - The mould and the gas-holder can be built easily within 2 days. - Efficient 'water trap' method for managing gas pressure and optimal operation.	- Puxin Biogas won the "Blue Sky Award" given by United Nations Industrial Development Organization (UNIDO) and Shenzhen International Technology. - In China, Puxin biogas system has been extended to over ten provinces and exported to over twenty countries including UNDP and SNV projects.	- Reliant on the mould frame of the digester from one sole company (Puxin) based in Shenzhen. - The external guiding frame needs welding which is often not feasible at local level.
GESI SHAMBA  SimGas, Tanzania	USD 790 for $6m^3$		- Off-the shelf domestic biogas digesters that are mass produced with recycled plastic. - The digester consists of multiple removable parts, creating a modular system that is adaptable and scalable.	- Finalist at the U.S. International Design Excellence Awards (IDEA®) and Ashden Awards 2014. - Pilot testing in Tanzania and within an IFAD funded GEF Project (LUSIP) in Swaziland in 2014.	- Reliant on the mould frame of the digester from one sole company (SimGas) with factory based in Tanzania.

IMPROVED BIOMASS COOKING STOVES					
INSTITUTIONAL ROCKET STOVE  InStove, US	USD $850 (60 litre model) USD $995 (100 litre model)	- Cooking fuel for institutions (schools, hospitals) - Sterilize medical equipment or bio-hazardous waste.	- Uses advanced 'rocket' stove design principles which entail high temperature alloy allowing the combustion chamber to reach 1300 degrees Celsius.	- Autoclave endorsed by the World Health Organization. - In 2015, recognized as one of the 100 most sustainable solutions in the world by Danish Think Tank, Sustainia. - InStove technologies are in service in 28 countries, including 17 countries in sub-Saharan Africa with pasteurizer option for potable drinking water. - Additional applications: poultry processing, shea butter, high-capacity canning (with pressure cooker).	- Dependent on imported components (boxed shipping dimension 101 x 61 x 98 cm). - In case of wear and tear, limited availability of spare parts in rural areas.
KHMER ROCKET STOVE (KHROS)  GERES, Cambodia	USD 22	- Access to clean source of cooking fuel at household level. - Replacement of kerosene stoves and traditional biomass resources (firewood and charcoal).	- The improved cookstove (ICS) is made of an insulated ceramic for the combustion chamber, and an additional insulation made of high-temperature wool. - It features a cast iron grate and an air-inlet adjustable door to allow the user to control the heat easily.	- Stove is designed by the Technical Research and Development & Biomass Energy Laboratory units at the Groupe Energies Renouvelables, Environnement et Solidarités (GERES) in Cambodia. - According to field tests, this stove is 25% more efficient than the earlier ICS models developed in Cambodia. - To date, GERES Cambodia has distributed over 1 million stoves.	- A slight operation and maintenance issue is the kindling which requires attention. - Wood moisture must be low to operate the stove well which may pose concerns in the rainy season (this issue applies to all cookstove models).
BIOLITE  BioLite, USA	USD 50		- Converts waste heat into usable electricity, powering an internal fan and sending surplus electricity to a USB port to charge devices such as mobile phones and LED lights. - Designed to be easily adaptable to local cooking practices.	- Household Air Pollution (HAP) studies conducted on health benefits from reduced exposure to harmful gases such as carbon monoxide. - To date, SNV in Laos has completed field testing for over 2 years. - BioLite is active and has conducted large-scale pilot testing in India, Ghana, and Uganda.	- Wood moisture must be low to operate the stove well which may pose concerns in the rainy season (this issue applies to all cookstove models).

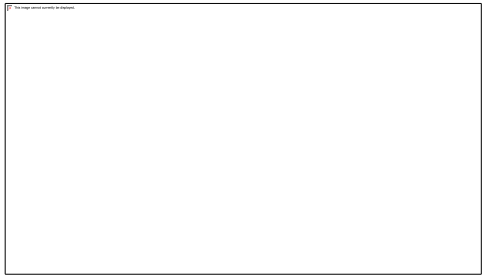
LANSTOVE  Nimbkar Agricultural Research Institute (NARI), INDIA	USD 120		- Efficient pressurized mantle that combines lighting and cooking fuels. - Advantage of storing fuel in a 9 litre pressurized kerosene cylinder. - Pressurization of cylinder is done by a hand-operated bicycle pump.	- Assessments carried out in 4 villages around Phaltan, in the state of Maharashtra, India on specific fuel consumption, end-use activities with 4 hours, potential for running devices (cooking, water boiling and lighting), pollution parameters and operation and maintenance issues. - NARI developed a method of water sterilization that passes water through 4-layered cotton sari cloth heating up to 60®C.	- For distribution in India only.
BRIQUETTING MACHINE  Birsa Agricultural University (BAU), India	N/A	- Access to less-polluting and less damaging energy source for cooking needs	- Consists of a driving motor, screw and power transmission system. Total briquetting capacity 240-250kg/hr. Prime mover requires 0.75kW.	- Designed by Central Institute of Agricultural Engineer (CIAE), Bhopal, India and piloted 4 model by the Birsa Agricultural University (BAU) in Ranchi, Jharkhand State, India.	- Briquetting machine is expensive and requires local expertise. - Requires set-up at community level for proper operation and maintenance to achieve economies of scale. - Technical challenges in terms of opportunity cost to collect biomass resources and process at a specific site.
SOLAR COOKING TECHNOLOGY					
PRINCE-40 SOLAR COOKER  Watershed Organisation Trust (WOTR), India	USD 645	- Access to clean source of cooking fuel for larger scale volumes (schools, community centres etc.) can effectively cook for	- The unit is a square dish concentrator of 4m^2 aperture area that can be manually assembled - Open source design and available in a Do It Yourself (DIY) kit form.	- The design by the Watershed Organisation Trust (WTOR) has won the Innovation 2009 award by the Alumni of the Indian Institute of Technology (IIT) in Mumbai, India. - Successful piloting since 2011 in Ahmednagar district, Maharashtra state in western India. - Approved technology by Indian Ministry of New and Renewable Energy (MNRE).	- Cultural acceptance of the technology (because cooking methods and habits in rural areas require open flame). - Issues with galvanized nut bolts, washers and better painting practice. - Need access to direct sunlight so difficulties in cooking evening meals.

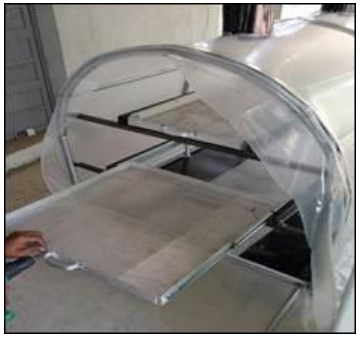
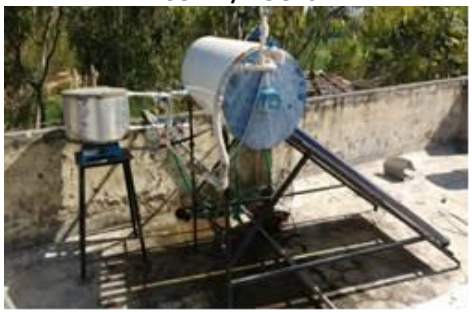
SPORT SOLAR OVEN  Solavore, US	USD 170 (includes shipping costs and pair of 3 litre cooking pots)	about 50 students.	- It is specially designed to maintain steady cooking temperatures (100 -160 degrees Celsius). - Bakes, slow-cooks, and de-hydrates. - Easy to transport and store, weighing 4.5kg (30cm high x 70cm long x 43cm deep).	- Distributed 450 solar ovens in Afghanistan as a pilot project. In total, 20,000 units deployed in over 60 countries (including Haití, Guatemala and Zambia) - Conducted water pasteurization assessments under the WAPI Indicator guaranteeing optimal temperatures. - Completed pilot in Cambodia with NGO Picosol under IFAD's Project for Agriculture Development and Economic Empowerment (PADEE).	- Requires access to direct sunlight therefore must be used as part of an integrated solution including heat retention accessories and open flame. - Dependent on imported parts although local sourcing and assembly of parts may be possible. - Cultural acceptance of the technology (because cooking methods and habits in rural areas require open flame
SUNFIRE DISH  SunFire Solutions, South Africa	USD 125		- Open source design - The cooker can get up to 300 degrees Celsius and provide a clean way to cook food.	- From field testing, the SunFire (a 1.2m Parabolic solar cooker) boils a litre of water in 15 minutes and power output of 600 watts. - There are three different size units available with outputs of 1200W and 2000W.	- Sun Fire is distributing in Africa only. - Cultural acceptance of the technology (because cooking methods and habits in rural areas require open flame). - Need access to direct sunlight. - At present, the technology has not reached market commercialization.
SOLAR HOUSEHOLD LIGHTING KITS					
PORTABLE SOLAR LANTERN - JS 30 MOB  SunLite, India	USD 26 (including transport costs)	- Access to basic lighting needs. - Reduction in use of kerosene lamps	- Mobile phone charging with auto cut-off to ensure minimal light of 3-4 hours. - Lamp auto-shuts off in case of adequate external light. - Minimal repair is required as these lamps have an in-built solar panel. There are no moving parts.	- Winner for best product at the Global South-South Development Expo in Vienna, Austria. - Total of more than 250,000 units over the last 3 years across more than 20 countries distributed in partnership with UNHCR in Japan, Thailand, Philippines & in ongoing Syrian Refugee Crisis in Jordan. - 8 country pilot initiative led by United Nations Office for South-South Cooperation (UNOSSC) to distribute over 350,000 lamps by 2015.	- Troubleshooting required in terms of re-soldering broken wires in case of damage or wear and tear. - Replacement of solar battery (500 cycles which is about 2 years) and need to consider overcharging causing a shorter battery life.

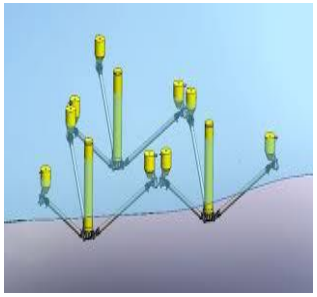
SUNKING ECO  Pollinate Energy, India	USD 50		- Micro-distribution network targeting urban poor communities in India. - Financed exclusively through mobile phone sales. - 3W solar PV panel, LiFePo4 battery, LED light.	- Received the Innovation Award of the Trust Law awards ceremony in London. - Impact assessment report: 2014	- Replacement of solar battery and need to consider overcharging causing a shorter battery life.
MOONLIGHT  Kamworks, Cambodia	USD 15		- Developed smart electronics to optimize the link between the solar panel and the battery. - Sealed battery safety box, 2 year warrantee, GSM connection for remote monitoring (service) and switch-off in case of loan default.	- Successful pilots in Cambodia with expected average sales of 4,000 products to over 15,000 people living in off-grid areas. - The product takes the optimum power from the solar panel depending on the weather conditions (this makes the battery last longer).	- Manufactured in Cambodia and mainly distributed in-country. - Need access to direct sunlight. - Replacement of solar battery and need to consider overcharging causing a shorter battery life.
GRAVITYLIGHT  Gravity Light Foundation™, UK	USD 5		- Innovative device that generates light from gravity. - Instantly available anytime and no need for sunshine or batteries. - One year warranty available from supplier.	- Currently being field tested and feedback on GravityLight from over 27 different countries expected by end 2016. - From field testing, it shows the light takes only takes 3 seconds to lift the weight that powers GravityLight creating 25 minutes of light on its descent. - GravityLights demonstrated to the international aid and development community at Aidex in Brussels in October 2016.	- Dependent on imported parts.

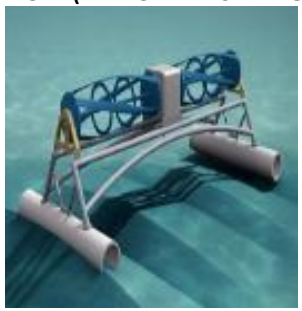
SALt LAMP  Sustainable Alternative Lighting (SALt), Philippines	USD 10		- The SALt lamp runs for eight hours on a glass of saltwater (1 glass of water and 2 tablespoons of salt). - The lamp relies on a galvanic cell battery with two electrodes placed in the salt and water electrolyte solution.	- From field tests in Philippines, changing electrolytes to a saline solution makes the lighting non-toxic. Sustainable Alternative Living (SALt) have received several awards from Ideaspace Foundation 2014, Philippines. - Kotra Innovation for Impact Award - Startup Nations Summit 2014, South Korea. - Also received Asia Entrepreneurship Award 2015 by ADB Philippines and Japan.	- Dependent on imported parts or chemical solutions that are not readily available in rural areas. - Lifespan of 6-12 months.
HYDROPOWER AND WIND ENERGY					
VORTEX HYDRO POWER  Zotlotler, Austria	USD 3,800 per 1kW	- Community based technology producing electricity - Basic Lighting (for streets, common rooms) - Charging of mobile and other small electronics, appliances and agricultural machinery (rice huller, grinding mill, leaf plate machine etc.)	- Customized design for specific applications relating to head and flow rates. - Fishes and microbe can pass the system upstream and down-stream (no conventional fish ladder required). - Scalable (1kW up to 160kW).	- Operating successfully in Green School in Bali. Studies show that the gravitation water vortex power plants (GWVPP) is suitable for very low head between 0,7 and up to 2m at a flow rate up to 20m³/s. - Studies show that GWVPP uses a minimum of moving parts requiring low service and maintenance costs. - After generation of electricity, water can be used for drinking and irrigation purposes. - Can also be integrated in a back flow canal of a water treatment station for self-supply.	- Suitable at community level where issues of operation, maintenance and financial sustainability may be encountered. - Cost dependent on site-specific parameters with available data on flow rates of the river during the entire season. - Suitable locations are areas where the river is deep in the land.
SOLAR-WIND HYBRID SYSTEM  Practical Action, India	USD 4,000 per kW		- Hybrid combination of the solar/wind system produces 1.3kw per day and can typically supply 3-5 kWh per day of 220 V/AC, 50 Hz power. - Such a model would cost about USD 16,000 for a community of 35-40 members.	- Odisha is the first pilot project running since July 2014. Field visit to this hybrid system conducted during IFAD funded project Orissa Tribal Empowerment and Livelihoods Programme (OTELP) supervision mission. - The assembling and manufacturing can be done locally by trained villagers. - Performance evaluation by Practical Action India show high availability of electrical supply without frequent need for a backup generator.	- Technology only in its initial phases of pilot testing in Odisha, India. - Average wind speed must exceed 3m/s and maximum 25m/s. Data must be available on wind flow rates. - Community based technology where technical guidance from skilled experts is required. - Easy to ship and install; no concrete is required.

LIAM F1 WIND TURBINE  The Archimedes, The Netherlands	USD 4,520	- Running television for recreation centres, radios, fans etc.	- The windmill has an organic shape (nautilus shell) and the conical shape increases the blade-surface which results in an average yield that is higher compared to a normal three-bladed wind turbine.	- Technical University Delft and Peutz/DNLR studies show that the design's unconventional shape delivers more energy than traditional windmills. - The University of Korea have conducted 55 wind tunnel tests and 1.5 years of field-testing. - Easy to assemble, with maintenance skills transferred to local people. - Process of scaling up to more than 10,000 units.	- A location is suitable for a small wind turbine when the average wind speed exceeds 3m/s and maximum speed being 25m/s. - Dependent on imported parts (inverter / controllers / wires etc.) - Require a minimum wind speed of 2.5 m/s, with optimum performance requiring a wind speed of at least 4 m/s.
SOLAR PUMPING SYSTEMS					
SUNSALUTER  Rosiecollis Technologies Inc., Canada	USD 25	- Water harvesting for small-scale irrigation. - Access to clean drinking water and electricity for charging mobile cell phones, or a 12-volt battery.	- Gravity powered device through water displacement, it can filter 4 litres per day. - Device that rotates solar panels (30W to 1.2kW arrays) to follow the sun using mechanical water flow.	- Won the Westly Prize, the Mashable-UN Foundation Startups for Social Good Challenge and the prize at the Staples-Ashoka Youth Social Entrepreneurship Challenge. - Pilot tested in Kenya, Ghana, Uganda, Tanzania, Malawi, Morocco, Mexico, Indonesia, India and Philippines reaching 5,000 individuals resulting in efficiency increases of 30% and total system cost reduction up to 15-20%.	- Need access to direct sunlight. - Can be made from common materials like bamboo or scrap metal, making it local and inexpensive.
SUNTROLLEY  Atom Solar, India	USD 1,200		- The equipment includes a 1HP (or 750 watts) solar pump with 12 solar (each 100 W panel). - Versatile, lightweight submersible pump mounted on a trolley/bicycle adaptable for power up to 5HP pumps. - Maintenance free and weather proof cased electronic unit.	- Green Peace Challenge: Award Winning Design. - Solar pump installation carried out at ICIMOD's Koshi Basin Programme in Kathmandu, Nepal. - Rice is being grown with drip irrigation where about 50m^3 per day required are provide with a 1hp pump. - Studies show that 1.2kW solar panels mounted on a mobile trolley. Water output 15,000 litres/hr max (at 5m head) is ideal for farming in shallow ground water area.	- Most suitable in areas where access to water year-round and in tropical areas where sunshine is greatest. Max Head 90m (at 500 litres per hr). - Manufactured in Pune, India which owns patent rights over the trolley frame. - Need access to direct sunlight unless additional costs factored in for inverter, battery and charge controller.

POST HARVEST TECHNOLOGIES					
THE SOLAR BUBBLE DRYER  GrainPro, Philippines	USD 2,200	- Post-harvest handling (drying of grains, seeds and horticulture products).	- Modern drying innovation that minimizes the effects of unpredictable weather. - The current design has two ventilators, placed at the air inlet at one end of the dryer to inflate and hold up the polyethylene plastic sheet, thus providing the dome shape.	- GrainPro, in close collaboration with the International Rice Research Institute (IRRI) and the University of Hohenheim (UOH) Germany, introduced the 1-toncapacity Solar Bubble Dryer™ (SBD). - Field testing supported by GIZ show that the ventilators move the air inside the dryer, ensuring a homogenous distribution of heat and reducing the moisture content. - Can dry grains and seeds at an average drying rate of 1% MC per 2 hours for paddy and corn.	- Need access to direct sunlight (although there are 2 models: solar models rely on purely solar power to run ventilators. It comes with a charge controller to re-charge the battery (sold separately). - Alternatively, an electric-powered model can be powered by electricity from the grid.
SOLAR BIOMASS DRYER  Royal University of Agriculture (RUA), Cambodia	USD 700		- Solar dryer with integrated collector-storage and biomass-backup heater can work well also during unfavorable weather conditions.	- Tested only through the Cambodian Technology Institute (ITC). SNV is bringing all necessary actors together to stimulate dialogue and cooperation. - Previous research by ITC indicated that the dryer developed to run on solar energy only was economically not justifiable hence their continued research into other options. - The research of the hybrid dryer fuelled with solar and clean charcoal is promising in terms of quality, taste, color and texture of dried fish.	- One of the most important characteristics of any kind of dried fish is its level of dryness. Locally produced dried fish is sometimes still damp, which damages taste and makes it more perishable. - For a 50kg load capacity, 5kg of charcoal is used daily.
SOLAR DRYER  Punjab Agricultural University (PAU), India	USD 1,194 (Price dependent on available local market prices for solar modules and other raw materials)		- Solar dryer combined with one hour electric supply converted from AC to DC through 1.8kW solar panels - AC electric blower (1 hp) changed to run on DC power (1hp, 24 V)	- Performance evaluation of air circulation arrangement and technical reports showing solar dryer able to dry different products turmeric, lentil doughnut (wadian), ginger, garlic, chili and bitter gourd satisfactorily. - Fabrication and installation of the air circulation arrangement and forced circulation solar dryer runs satisfactorily on DC power hence no inverter required.	- Prohibitively expensive for individual smallholder farmer but high potential within a community based financing scheme or at cooperative level.

PORTABLE MINI-DOMESTIC DRYER  Akola Centre, India	USD 90		- A semi-cylindrical shaped tunnel with metallic frame structure covered with UV-stabilized polythene sheet of 200 micron. Cement concrete floor is painted black for better absorption of solar radiation	- In the field tests, the agricultural produce is dried using solar thermal energy. - It was concluded that ideal technical dimensions are: height of tunnel 0.9m, width 1.06m, length 1.6m and aperture area 3.9m^2. - -	- In these types of dryers, drying is dependent on availability of solar radiation and it is not continuous. - Operating capacity of 10 kg.
HYBRID SOLAR/BIOGAS DRYER  **Maharana Pratap University of Agriculture and Technology (MPUAT), India**	N/A – lab test		- Solar water heater and biogas integrated hybrid dryer for mushroom can dry 4 kg of button mushroom from 91 % moisture content to average 10.4 % in 11 hours at 50 °C using solar and biogas energy with average 650 W/m2 solar radiation and consumption of 1.10 m^3 of biogas daily.	- Hybrid solar/biogas dryer using 12.5 kg of button mushroom waste, 37.5 kg dung and 75 litres of water. - The biogas production was maximum in treatment when button mushroom substrate was mixed with cow dung in a ratio of 25:75. - The total biogas production in 80 days was 148m^3 and the average daily biogas production was observed as 1.9m^3/day. The designed system was found to be economically viable as it recovers total investment in 1 year and 6 months.	- Also developed Aloe Vera waste (daily 40-50 litre of juice is produced) generating 100-120kg of waste per day. The waste generated consists of leaf peel, tentacles, froth of gel, etc. The non-edible Aloe Vera waste cannot be used as cattle feed.
SOLAR POULTRY INCUBATOR  Lifeway Solar, India	USD 600	- Portable & less energy consuming (20/60 watt) solar poultry incubator	- Semi-Automatic unit capable of hatching 100 quail, 40 chicks or 25 goose eggs. - Supplied with fully automatic heat control - thermal properties of the fiber glass cabinet ensure the least possible conditions for egg incubation.	- Still testing phases but has been approved by IIT Madras, Chennai. - Similar projects are running in Jhabua under the stewardship of Grameen Vikas Trust in Jhabua and also in Ananthapur under KVK and Ranga Agricultural University in Ananthapur.	- Lifeway Solar Devices Pvt. Ltd at Cochin, Kerala is the manufacturer of Solar Poultry incubators. - Need access to direct sunlight although can work on three power options: solar, battery, grid power.

PROTOTYPE STAGE					
SUNFLOWER SOLAR CONCENTRATOR  AirLight, Switzerland	Pilot stage	- Integrated concentrator technology for electricity, heating, cooling, low-temperature desalination and water purification	- Low seasonal dependence of output (2-axis tracking). - After the production all components are containerized in a 40' (12m x 2.5m x 2.5m) container for easy shipping.	- Long lifetime (up to 60 years) - Currently in first pilot stage. - IFAD has expressed interest in prototyping one of the new High Concentration Photovoltaic Thermal (HCPVT) systems, also known as the sunflower. - Launch is foreseen in 2017 with early adopters in late 2016.	- Dependent on imported materials. - Requires skilled expertise for proper operation and maintenance. - Still in proof of concept stage but ideal for off-grid island communities, remote farms (dairy), public buildings (schools and hospitals).
LOW-COST WIND MILL  Fairwind, Austria	USD 30	- Access to household lighting and basic energy appliances	- Small wind turbines made from plastic bottles which can be assembled with simple knife and scissors. - Eco-friendly by recycling / reuse. Drive: brushless AC-generator (life time 20.000h, outer runner); simple and durable gear.	- Easy exchange of worn-out blades. The near-surface windmill is simple to screw together (ease of use) and sustainable (ease of repair). - The units require only a breeze to charge a mobile phone and can complete the charge in about three to four hours, or overnight. - The unit can be scaled to include low cost wind turbines and small solar chargers, 5V DC, 3 Amp, max 15 watt. 3 plugs for connecting to mobile phones and batteries to power LED lanterns.	- Charging time: depends on available wind speeds: ~2h at 5,55 m/s or 20 km/h. Charging starts at 3m/s. - Currently piloting their systems in South Africa and targeting Sub Saharan Africa and South Asia (India and Nepal) for expansion
WAVENET Series 6  Albatern, UK	Estimate that energy cost is US$ 0.95 cents per kilowatt hour.	- Electricity production for remote and island communities - Power for offshore sites such as fish farming.	- Innovative solution allowing rapid reduction of device costs through volume manufacture of standard components and increased yield by coupling individual units together in the array.	- The units have been designed to be robust and have a 15 to 20 year lifetime and weigh 8.6 tons which can be lifted by smaller cranes. - Carried out a feasibility study for the UK showing feasibility to provide power for offshore fish farms from wave energy on site. - Adaptable to boats expected to be working in a local area and other lifting equipment. -	- Complex logistics and high investment costs due to engineering expertise to support longer term local maintenance of generator equipment, hydraulic systems and marine structures and seabed conditions. - Available wave resource in the correct scale for device survivability

RIVEGEN (HYDROKINETIC ENERGY)  Ocean Renewable Power Company (ORPC), US	Remote river communities with high energy costs (USD$0.40 per kWh) USD 500,000 with capacity of 25 kW	- Hydrokinetic / tidal energy -clean power for remote off-grid or micro-grid communities particularly those dependent on isolated power grids.	- Designed to be interconnected to isolated diesel micro grids. - Underwater power data cabling and a debris protection system. - System operates on river bottom with no visible structures or impoundments.	- Successful ocean and river deployments including operation in remote locations. - In 2012, ORPC delivered power to the grid from the first commercial, grid-connected hydrokinetic tidal energy project in North America. - In 2013, Fast Company named ORPC to its Top 10 List of the World's Most Innovative Energy Companies. - RivGen® demonstration project in Igiugig, Alaska.	- Need to plan adequately so that site is properly assessed - Need to determine if - Requires highly skilled expertise for O&M - Multitude of assessments required for river and marine site selection i.e. documentation regarding no adverse impact on marine or aquatic life.
SEAWATER GREENHOUSE  The Middle East Desalination Research Centre, Oman	USD 53,000 (Temperate and Tropical areas) USD 65,000 (Oasis)	- Solar desalination for drinking water or agriculture - The benefits of the development of the Seawater	- The Seawater Greenhouse combines horticulture with solar desalination. - The idea of combining it with the growth of crops in a controlled greenhouse environment is novel.	- Surface seawater trickles down a porous front wall evaporator through which air is drawn into the greenhouse. - Field testing in Oman show that the saturated air passes through a condenser, which is cooled using cold deep seawater or cool seawater from the evaporators. - Uses sunlight, seawater and the atmosphere to produce fresh water and cool air, creating more temperate conditions for the cultivation of crops.	- Labour and knowledge intensive – require highly skilled technical expertise for the pre-feasibility assessment – still at the applied research stage.