A Compendium

Easy (not so easy) Solutions to Address Climate Change

Compiled by Centre for Environment Education

2014

CEE

Centre for Environment Education

Empowered lives.
Resilient nations.

For United Nations Development Programme (UNDP) India

INTRODUCTION

Climate change is the most serious challenge human society has ever faced and all stakeholders across the globe have already realized the gravity of the situation which is threatening for only LIVABLE planet i.e., Earth. Reduction of carbon footprint not only helps to improve the overall health of environment but also in tackling the adverse impacts of climate change. With the 'save environment' actions gaining momentum amongst the masses, it is now high time to explore novel technologies and share knowledge on them amongst the large number of stakeholders. There are a number of solutions that can be considered with plenty of live examples in country. Some are very simple, while some are more challenging. However, they all necessitate action with a firm commitment to succeed.

This compendium of **Easy (not so easy) Solutions to Address Climate Change** has been prepared by the **Centre for Environment Education (CEE) in collaboration with the United Nations Development Programme (UNDP) India** and is a compilation of Simple Solutions to address climate change for India which could be utilized by people from all walks of life. It will help every concerned citizen in the country to understand these simple solutions and implement them in their daily lives. The project to develop the compendium was coordinated by **CEE** as the Convener of the Action Group of the **Climate Change Community of Practice, Solution Exchange** under the leadership and guidance of **Mr. Prabhjot Sodhi** from **CEE** supported by **Dr Ramesh Jalan** from **UNDP, New Delhi** and **Mr. Kartikeya V Sarabhai, Director – CEE, Ahmedabad. Mr. Bibhu Prasad Tripathy** from **CEE, Bhubaneswar** was involved in the ground work of the project under the guidance of the core group members of the Action Group.

The process of development started with various stakeholders contacted through informal, issue based meetings; through emails so as to include the existing data and simple solutions and their respective experiences that could address the challenges of climate change.

The technologies which help reducing energy consumption have been given a priority and technologies that address the adverse impacts of climate change have been highlighted. Already available materials from websites, personal

contacts, and networks have been collated. Simple, low cost and easy to manage solutions at the local level for mass utilization have been given emphasis in the compendium.

Since this has been mainly a discussion and communication-based activity the following steps have been followed to bring-out the Compendium:

1. The format for documenting the details of successful technologies was developed after continuous brainstorming sessions & meetings and communication with stakeholders, experts, entrepreneurs, industries, community members etc. and internal meetings with CEE and UNDP.
2. Emails were sent to scientists, engineers attached to Research Institutes, Educational Institutes, Government Departments, Industries, and Farmer's Clubs etc. stating the intention and urging them to share their knowledge / expertise and spread the message to those people who could contribute to this endeavor.
3. Documents prepared in a formatted way on Adaptable and Transferable Technologies, wherein the following relevant information have been included:
    1. Details of technologies/ methods.
    2. Location of successful implementation.
    3. Results obtained from this implementation and the contribution it has made to mitigate climate change/ reduction of greenhouse gas emissions.
    4. Contact address of the relevant institute/ person who can provide further assistance for transfer of technologies

4. The Action Group focused first at the macro level and divided the technologies based on their usage into various categories based on the following identified key sectors, viz., **Energy Efficiency & Alternate Energy based Technologies, Waste to Energy Technologies, Climate Resilient Technologies, Cook Stoves Technologies, Solar Energy based Technologies, Water Management Technologies, and Miscellaneous Technologies.**
5. A Stakeholders' Workshop was organized on 16th December 2014 and the draft was shared and discussed threadbare at the meeting. After incorporating the comments / suggestions of the members present in the

meeting the compendium has been finalized and would be updated on a regular basis based on further inputs from the community at large.

This compendium is the first step to a document with a range of technologies which are **simple, low cost, easy to manage locally by community; easy to modify and manage for utilization by the masses** to address the adverse impacts of climate change, link communities with the youth in particular to adopt these technologies in their day to day living in both urban and rural areas. It's an ongoing process and stakeholders are requested to add to it based on their experiences and knowledge by writing to us in the days to come.

It is envisaged that this compendium will provide very useful and handy information to all stakeholders. Even common people will be able understand their responsibility and scope to mitigate the adverse impacts of climate change. They will be able to contact the experts using the contact details provided in the compendium.

Minutes of the Stakeholders' Workshop
Held at UN Conference Hall, UN House, 55 Lodi Estate, New Delhi-110003
At 10 AM on Tuesday, 16 December 2014.

The workshop commenced with a brief address by Ramesh Jalan, UNDP India thanking the participants for joining the workshop and highlighting the agenda ahead.

Anil Arora, CEE formally welcomed the participants and set the tone for the stakeholders' discussion.

- He requested the participants of the workshop to actively discuss and provide their views on the Climate Change (CC) Compendium.
- He also said that inputs will be sought from 2 different working groups to be created among the participants and it will welcome any changes, additions and introduction of any new technologies emerging out of the discussion.

Ramesh Jalan then addressed the participants introducing them to the Action Group concept of solution exchange.

- Explaining the concept of Action Groups, he mentioned that currently 2 Action groups are engaged in preparing the CC Compendium and the guidelines / toolkit on CNSEC respectively.
- Every Action Group is led by a Champion which in the present instance is Mr. Prabhjot Sodhi, CEE for the CC Compendium and Prof. Suresh Jain representing TERI for the CNSEC.
- These champions submitted their proposal and the Action Group were constituted last year.
- He also informed that none of these Action Group members are paid for the time and expertise they render in developing the documents that we are intending to finalize today.
- Then he explained the concept of Solution Exchange in detail with its results and contributions to various programs.

    - Solution Exchange is a **Knowledge Management Initiative** and it was launched in 2005 by the UN agencies in India. It provides knowledge based services, products and currently 6 Solution Exchange Communities are active. They are the resource hub/facilitators/catalyst to share knowledge on various thematic areas.
    - Solution Exchanges has been facilitating knowledge for solving various implementation problems, providing job vacancies, strengthening of research work/study outputs, designing new project/model, capacity building, influencing policies/programs, developing tools/systems, getting right human resource.

Mr. Arora then explained the genesis behind the title of the CC compendium **Easy (not so easy) Solutions** as the same technologies mentioned in the compendium are differently implemented on the ground that's why they are easy for some people and not so easy for other groups of communities.

It was followed by a presentation by Bibhu Prasad Tripathy from CEE on the CC Compendium.

- He mentioned that it's a compilation of Simple Solutions to address CC where priority has been given to technologies/solutions for mass utilization and which help reducing energy consumption.
- It's a tool for common people to find solutions and get into touch with the experts.

- He said that this is an ongoing process and will evolve over time and requested all members present to help strengthen the compendium.
- He explained the process of preparing the compendium that included literature review, website searches, and meetings with experts, stakeholders, entrepreneurs, industries, community etc.
- The draft compendium will be discussed and 2 separate working groups will finalize it.
- The technologies have mainly been divided into the following categories : Energy Efficiency & Alternate Energy Technologies, Climate Resilient Technologies, Cook Stoves Technologies, Solar Energy Technologies, Waste to Energy Technologies, Water Management Technologies, and Miscellaneous Technologies.
- He briefly mentioned the various types of technologies that have been included under these categories and their need to tackle CC.
- He mentioned that some of the technologies will be taken up for pilot testing, dissemination and implemention with GEF/UNDP Small Grant Programme projects through NGOs/CBO partners. Linkages with more institutions/CSR partners/Donors will be made for testing the pilot projects.
- He informed the participants that the Final Compendium will be uploaded in the webpage of UN CC Solution Exchange and also on the website: www.sgpindia.org by the end of 1st week of January.

Ramesh Jalan then made a presentation on some of the key technologies under each of the categories including Biomass Dryers, Bioamass Gasifiers, Fly Ash technologies, Agricultural Technologies, Solar PV and CSP technologies, Marble Slurry Bricks, Rain Water Harvesting Technologies.

Then 2 working groups were created to discuss the technologies in the compendium. The working groups were formed based on the following technologies:

Group 1: Technologies discussed by the working Group:

1. Energy Efficiency & Alternate Energy
2. Climate Resilient
3. Cook Stove

Group 2: Technologies discussed by the working Group:

1. Solar Energy
2. Waste to Energy
3. Water Management
4. Miscellaneous

The followings are the outcomes from the working group presentation and suggestions.

- It was discussed that parameters like Usefulness & Cost Effectiveness should be evaluated to finalize the technologies. Both these parameters will provide feasibility of its application in the area.
- Based on the above consideration, it was seen that the Lighting & Water Heating are best suited for Solar Energy and then the decentralized generation of energy.

- It was also highlighted that compendium should have examples with respect to execution and best practices.
- Cook Stoves that have been distributed by concerned Ministry / Agencies in India, but different usage pattern in different parts of country makes it non-feasible option for all regions with the same design. In the same way, other technologies and strategies should be looked at keeping in view the requirements of the specific locations and community.
- For techniques like Rain Water Harvesting, cost should also be made a part of compendium.
- There is a requirement to showcase in the Compendium by including the Specification of the product and explanation of its working.
- Compendium should also guide users about working and adaptability of technologies /products keeping in view their specific working conditions.

The workshop then formally closed with a vote of thanks from Anil Arora, CEE.

List of Participants:

Sl. No	Name of the Participant	Organization Name	Contact No. & Email ID
1.	Mr. Archit Agarwal	IIIT Delhi	8860198398 archit11038@iiitd.ac.in
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10.	Ms. Deepika Gupta	Practical Action	deepika.gupta@practicalaction.org.np

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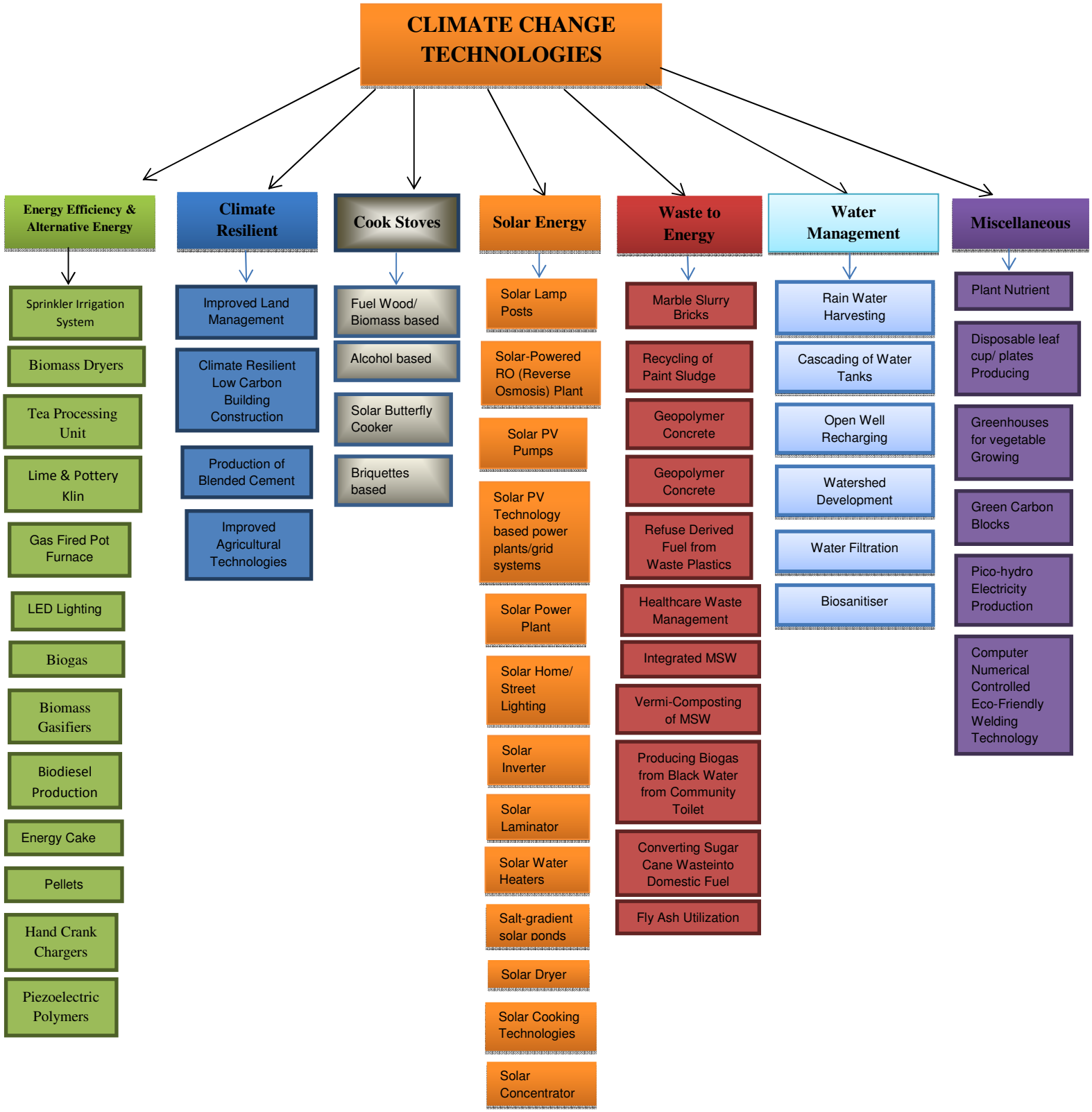
47.	Mr. Pritom De	CEE	pritom.de@ceeindia.org
48.	Mr. Hardeep Singh	CEE	9899650340 hardeep.singh@ceeindia.org

Agenda of the Workshop:

S. No.	Time (Hours)	Particulars
1.	09.30-10.00	Registration and **Tea/Coffee**
2.	10.00-11.00	-Welcome of the Participants – **Mr. Anil Arora** -Introduction to the Program Workshop (Compendium, Sustainable Campus and Solution Exchange)- **Dr. Ramesh Jalan** -Introduction to the Compendium program by **Mr Prabhjot Sodhi and Mr. Bibhu Prasad Tripathy** -Introduction of Participants: coordinated By **Mr Anil Arora**
3.	11.00-11.30	**Tea/Coffee**
4.	11.30-12.10	Presentation on key technologies, role, importance in the Compendium- **Dr Ramesh Jalan**
5.	12.10-13.10	Open discussions on possible options, choices on Technologies to have the Compendium Strengthened Break-out in two Groups – **Mr Anil Arora, Dr Jalan and Bibhu**
6.	13.10-13.30	Presentation by Groups for 7-10 mins. on the Ideas and Way Forward on the Compendium
7.	13.30-1340	Wrap up and Way Forward by **Dr Jalan, UNDP and Anil Arora, CEE**
8.	13.30-14.30	**Lunch**

Details of The Technologies


CLIMATE CHANGE TECHNOLOGIES
Energy Efficiency & Alternative Energy
Sprinkler Irrigation System
Biomass Dryers
Tea Processing Unit
Lime & Pottery Klin
Gas Fired Pot Furnace
LED Lighting
Biogas
Biomass Gasifiers
Biodiesel Production
Energy Cake
Pellets
Hand Crank Chargers
Piezoelectric Polymers
Climate Resilient
Improved Land Management
Climate Resilient Low Carbon Building Construction
Production of Blended Cement
Improved Agricultural Technologies
Cook Stoves
Fuel Wood/ Biomass based
Alcohol based
Solar Butterfly Cooker
Briquettes based
Solar Energy
Solar Lamp Posts
Solar-Powered RO (Reverse Osmosis) Plant
Solar PV Pumps
Solar PV Technology based power plants/grid systems
Solar Power Plant
Solar Home/ Street Lighting
Solar Inverter
Solar Laminator
Solar Water Heaters
Salt-gradient solar ponds
Solar Dryer
Solar Cooking Technologies
Solar Concentrator
Waste to Energy
Marble Slurry Bricks
Recycling of Paint Sludge
Geopolymer Concrete
Geopolymer Concrete
Refuse Derived Fuel from Waste Plastics
Healthcare Waste Management
Integrated MSW
Vermi-Composting of MSW
Producing Biogas from Black Water from Community Toilet
Converting Sugar Cane Wasteinto Domestic Fuel
Fly Ash Utilization
Water Management
Rain Water Harvesting
Cascading of Water Tanks
Open Well Recharging
Watershed Development
Water Filtration
Biosanitiser
Miscellaneous
Plant Nutrient
Disposable leaf cup/ plates Producing
Greenhouses for vegetable Growing
Green Carbon Blocks
Pico-hydro Electricity Production
Computer Numerical Controlled Eco-Friendly Welding Technology

Alternate Energy & Energy Efficiency:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
	Energy Efficiency Technologies				
1.	**Sprinkler Irrigation for Horticulture**	- Estimations showed that each sprinkler unit can save 13.44 m3 water per day (15% - 25% less than before) - In terms of energy, one sprinkler unit saves 5 kWh energy per day	- This measure has been helpful in stabilizing the horticulture productivity, community income and opens up new land to cultivation. It decreased the use of energy and water while improving productivity of the land. - The sprinkler system is also able to irrigate 60 acres of sandy land improving employment and food security for marginalized social groups. - The sprinkler systems free up human labour as well as water resources.	PoovulaDoruvu, Nellore, Andhra Pradesh	Academy of Gandhian Studies (AGS) 18-3-60, SDRSI Complex K.T. Bye pass Road Tirupati – 517507, Andhra Pradesh, India E-mail: ags.adaptcap@gmail.com
2.	**Energy Efficient Irrigation System**	The cut down on the cost of refrigeration by installing poly-houses with semi-automated cooling fans that also resulted in reduction of energy consumption. Installation of a Vapor Absorption Machine to utilize the waste heat out of thermal jacket of biogas engines contributed to heavy energy saving in the long run	Reduction in industrial energy consumption by use of energy efficient equipment & other low cost innovative strategies by Jain Irrigation Systems.	India	**Jain Irrigation System Ltd.** Jain Plastic Park, N.H. No.6,,Bambhori Jalgaon, Maharashtra - 425001 **Tel:** 0257-2258011 **Fax:** 0257-2258111 **Email:** jisl@jains.com **Website:** http://www.jains.com
3.	**Watermill Upgradation**	This technology provides clean energy through mill cut carbon emission. A rough estimate	-Reviving 200 thousands villages with improved services. -Decentralized clean energy	Uttarakhand, Jammu & Kashmir, and	**Dr. Anil Joshi, Himalayan Environmental Studies and Conservation**

		reveals that each mill cut 1 kg of carbon per hour, thus helping climate change mittigation.	availability. -Respect to tradition.	Himachal Pradesh.	**Organisation (HESCO)** Village : Shuklapur, P.O. : Ambiwala, Via: Prem Nagar, Dehradun, Uttrakhand, Phone: 09411109073, 09412932511, 09411112402 E-mail : dranilpjoshi@gmail.com dranilpjoshi@yahoo.com wise.wtp@yahoo.com
4.	**Bath Water Stoves**	This technology has the potential to conserve 40 percent of biofuels as compared to conventional water heating stoves.	Application These stoves can be used in Houses, Lodges, Hotels, Kalyanamantapas (Community halls) and in other establishments where hot water is required. Features Rapid heating of water	North Karnataka	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com, info@tide-india.org
5.	**Biomass Drying Technologies**				
i.	**Biomass Cabinet Dryers**	It provides improved energy efficiency and also managing biomass waste available in the area.	Features • Requires less time to dry the product (as compared to natural drying) • Requires less amount of fuel to dry the product (as compared to open smoking of produce) • Wide range of fuels like coconut husk, wood, arecanut husk and other wastes can be used • Lower space requirement and minimal installation time • Durable with minimal maintenance • Available in varied capacities depending on the effective tray area and user requirement	Coastal areas of Thrissur, Ernakulam and Kozhikode districts of Kerala.	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-india.org

			• Smoke does not come in contact with the produce thereby ensuring good quality of dried produce		
ii.	**Biomass Drying Machine**	The drying process ensures the reduction of emissions during combustion of the biomass and also reduces the amount of biomass consumed during burning.	Drying of biomass serves as a preliminary stage of pelleting, briquetting and gasification. Reducing the moisture of biomass to 10-15%, its calorific value is increased from 2kWh/kg to approximately 4.5kWh/kg. This process reduces the costs of transport, storage and creates ideal conditions for direct combustion or biomass briquettes for high quality.		**HarithAvani Technologies** No. C-80, Peenya 3rd Stage , Bengaluru – 560058, Karnataka, India Mobile: 08447551928
iii.	**Wood Dryer**	The drying process ensures the reduction of emissions during combustion of the biomass and also reduces the amount of biomass consumed during burning.	Wood dryer for Biomass power plant which is used for drying any type of biomass material Capacity 500 to 5000 Kg /per hour, such as, wood, wood-waste, corn wastes, coconut shell etc.		**LaxmiEn - Fab Pvt. Ltd** No. 25, Nilsin Plot, Near Patel Alloy Steel, Phase - 1, G. I. D. C., VatvaTollfree No:-18002001171, Ahmedabad 382445, Gujarat 08376806608
iv.	**Industrial Biomass Dryer**	The drying process ensures the reduction of emissions during combustion of the biomass and also reduces the amount of biomass consumed during burning.	Industrial Biomass Dryer is a product which is used for drying any type of biomass material, such as, wood, wood-waste, corn wastes, coconut shell, rice husks, agriculture residue, etc.		**E. B. Mechanism Pvt. Ltd** No. 154, Road No. 5, Industrial Area, Jhotwara, Jaipur - 302012, Rajasthan, India 08588873049
v.	**Biomass Briquettes Dryer**	The drying process ensures the reduction of emissions during combustion of the biomass and also reduces the amount of biomass consumed during burning.	It is batch type and used for drying straw, husk, rice husk and matarhusk(bhusa).		**K. B. Engineering Company** Adhartal Industrial Estate , **Jabalpur** - 482002, Madhya Pradesh, India 09584406418
vi.	**Biomass Dryer**	The drying process ensures the reduction of emissions during combustion of the biomass and also reduces the amount of biomass consumed during burning.	The range of saw dust dryer/ agro waste dryer/ biomass dryer that are offered are used for removing water and moisture from saw dust/ agro waste/ bio mass		**Industrial Thermal Engineers** Plot No. 66/13, Phase No. 1, G. I. D. C., Vatva , Ahmedabad - 382445, Gujarat, India 08447572176
vii.					**Infinite Energy Private Limited**

					Flat No.1107 11th Floor, Arunachal Buliding, **New Delhi** - 110001, Delhi, India 09212084933
viii.					**Phoenix Products** D- 87, Industrial Estate, Near Kptcl, Sub Station Udyambag , **Belgaum** -590008, Karnataka, India 09448863775
ix.					**Radhe Exim Private Limited** Plot No. 2621/22, Road- D/2, Lodhika, GIDC, Kalawad Road , **Rajkot** - 360021, Gujarat, India 0281-2287888
x.	**The use of biomass dryers for drying fishes.**	Biomass drying technologies replace use of fuel wood or fossil fuels. The effective use of biomass which otherwise was left to decay checked the release of methane. 1.6 tonnes of fish has been dried in three years, preventing the release of 1620 kg of CO and conserving 1400 kg of coal.	Biomass fired dryers replaced the open fish drying, electric dryers. The project initiative to shift towards the use of renewable source of energy was attained.	Coastal areas of Thrissur, Ernakulam and kozikhode district of Kerala.	Ms. SvatiBhogle, Director Technology Informatics Design Endeavour (TIDE) 19, 9th Cross, 6th Main, Malleswaram, Bangalore-03 ,Tel: 080-23315656, 23462032 Fax: 080-23344555, Email : tide@vsnl.com; svati.bhogle@gmail.com
6.	Tobacco Curing Barn	Fuel saving potential of up to 50 percent (as compared to conventional barns).	Features • Ducting design compatible with existing barn dimensions. • Ducting uses different materials of construction and diameter if the ducting is also varied • Provides uniform temperature horizontally across the barn resulting in good quality curing of the leaves • Good quality of dried tobacco and less than 5 percent rejection due	Karnataka	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-

			to poor drying		india.org
7.	**Room Dryers** for food produces	• Fuel saving potential of about 25 – 30 percent (as compared to open smoking of produce)	• Large quantities of products can be dried • Uniform temperature profile resulting in simultaneous drying of produce • Ducting can be laid in any room of the desired dimensions • Smoke does not come in contact with the produce thereby ensuring good quality of dried produce • Quality of produce better than that obtained by other conventional drying techniques.	KARNATAKA	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-india.org
8.	**Energy Efficient Lime Kiln**	Fuel saving potential of about 30 percent	**Features** • Complete conversion of limestone into lime with minimum of rejects (unburnt lime stone). • Generation of high temperatures by optimization of the air fuel ratio. • Easy to operate with low drudgery. • Can also be operated in the continuous mode. • Reduction of smoke in working environment through use of chimney. • Kiln design provides for thermal stresses due to expansion. • TIDE kilns have been developed for a batch size of 500 kg of to improve the productivity and profitability of the small lime burners.	KARNATAKA	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-india.org
9.	**Energy Efficient Pottery Kiln** For baking pots	Fuel saving potential 25 percent over conventional kilns.	Features • Easy to load and unload • Uniformly fired wares of good color • Temperature can be controlled by	KARNATAKA	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003

			controlling the burning rate of fuel fed into the lower chamber. • Fuel saving potential 25 percent over conventional kilns. • Very low breakages/cracks compared to conventional kilns.		India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com,info@tide-india.org
10.	**Low Capacity Brick Kiln**	Potential to conserve 15 percent-20 percent of fuel compared to conventional clamps.	Features • Compact with low space requirement • Capacity 12,000 bricks / batch • Rejects less than 5 percent • Fuel type – firewood, coal, rice husk • Batch time 5-7 days • Good quality of bricks, can fetch a higher price • Potential to conserve 15 percent-20 percent of fuel compared to conventional clamps.	**Bangalore**	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com, info@tide-india.org
11.	Energy efficient products like – Cooking stove, CFLs, energy efficient fans, roof ventilations etc.	Reduced carbon emission – Approximately 108 t CO2 in 1 year.	• Electricity bills have reduced by 35 -50% • Reduced expenses on fuel (wood & kerosene) • The reduced expenses have led to increased savings • Reduced smoke leads to reduction in health problems • Reduced smoke has led to clean houses requiring less maintenance	Ahmedabad & Bhopal	Ms. BhavnaMaheriya Mahila Housing Trust Gujarat Email: bhavya@mahilahsg.org
12.	**Energy Efficiency in Tea Processing Units**	Reduction in the emissions of carbon in producing a cup of tea from 17 to 12 grams per cup of tea. Three hot water generators,	Tea processing units have been able to **save** between 15-20 percent in **energy costs.** The initiative has enabled savings of US$ 10.4 million through savings of 19.5 million kwh in electricity	Nilgiris, Tamil Nadu; Vandiperiyar and Wayanad, Kerala	UNDP and Tea Board, Coonoor. UNDP India Country Office United Nations Development Programme (UNDP) Post Box No. 3059, 55 Lodhi

		with a capacity of 10 lakh kcal per hour, have been purchased, which will, based on studies, help in reducing firewood consumption by 350–400 tons per year and carbon dioxide emissions by 600 tons per year in a mediumsized factory	consumed and reduced firewood required for heating by 142,000 tons. While energy cost savings are INR 2.78 per kg of made tea, investments in energy efficient measures are INR 2.4 per kg of made tea, allowing for a comfortable payback period of nine months on these investments.		Estate New Delhi, India. Pin Code - 110 003 Tel: 91 11 46532333. Fax: 91 11 24627612 Email: info.in@undp.org Executive Director, Tea Board, ShelwoodCoonoor Club Road, Post Box No. 6, Coonoor - 643 101, Nilgiri, South India Tel. : 0423-2231638/2230316*[D] Fax: 0423-2232332, 2231484-Res. E-mail : teaboardcoonoor@rediffmail.com
13.	**GAS FIRED POT FURNACE FOR GLASS INDUSTRY** The TERI-design system incorporates a highly efficient heat recovery device called 'modular recuperator', which yields fuel savings of around 30% compared to the conventional gas-fired pot furnace.	The refurbished natural-gas-based furnaces are excellent environment performers in that there was a substantial reduction in energy consumption as well as emissions of pollutants.	The glass units could benefit immensely as the gas-fired furnaces demonstrate energy savings up to 50% and 30% in the case of pot and muffle furnaces, respectively.	FIROZABAD , INDIA	TERI (THE ENERGY AND RESOUCE INSTITUTE) Project Coordinator - CoSMiLE Darbari Seth Block IHC Complex, Lodhi Road New Delhi - 110003 India +91 Delhi (0) 11 Tel. 2468 2100 or 41504900 Fax 2468 2144 or 2468 2145 E-mail cosmile@teri.res.in
14.	**Coke Based Brass Melting Furnace for Rural Artisans**	Energy efficiency with 20-40% less consumption of coke helps in reduction of Carbon emission.	It reduces pollution in the atmosphere as compared to traditional brass melting furnace. The melting time is reduced by 10 to 40 % as compared to that needed in	Moradabad , Uttar Pradesh	FOSET KOLKATA D. Mandal*, K.L. Sahoo, P. Poddar and K.K. Paul CSIR-National Metallurgical Laboratory, Jamshedpur-831007,

			traditional furnace. The users are not directly exposed to flue gas heat. The part of suspended particles and zinc fume are arrested in the chamber through which flue gasses passes. The oxidation loss of materials is less as the melt does not come in direct contact of fresh air from outside		India Corresponding author: durbadal@nmlindia.org (D Mandal) 15N, NelliSenguptaSarani New CMC Building (5th floor) Kolkata - 700 087 Phone : 03322529675, Fax : 03322520521
15.	**Energy efficiency in textile industries** through use of energy efficient stoves and solar water heaters	It is arresting 2007 MTs of carbon emission per day and saving 510 MT of firewood per day. Energy efficient stoves reduces the consumption of fuel wood and also reduces harmful emissions that is produced out of burning fuel wood. Solar water heaters uses the renewable source of energy which is the sun .it also reduces the emissions of various toxic gases which adds to global warming.	The benefits of wood saving, less fumes-smoke in the areas and also the loss of heat are resulting in improved relations between the workers and the management in the units. The emerging potential in terms of scale and areas of operation is tremendous, conservatively estimated within 5 years at 10,000 MTs of CO emissions reduction with nearly 250 installations.	TamiLNADU , INDIA 69 energy efficient stoves and 7 solar water heating systems installed in the textile units.	Ms. SvatiBhogle, Director Technology Informatics Design Endeavour (TIDE) 19, 9th Cross, 6th Main, Malleswaram, Bangalore-03 Tel: 080-23315656, 23462032 Fax: 080-23344555, Email : tide@vsnl.com;svati.bhogle@gmail.com
16.	Energy Efficiency in Rubber injection moulding machine with **electronically controlled hydraulic pump**	-The rated power of energy saving is 20KW. -With an average loading of 70%, the actual power consumption is 14kw. -Reduction in co2 emission is 203.75tonnes.	-Improved efficiency and reduced specific energy consumption -Increased production due to faster operation. -User friendly operation and less dependence on humans.	INDIA	**MSME** Deputy Secretary Ministry of Micro, Small and Medium Enterprises Room No 321, UdyogBhawan, Rafi Marg, New Delhi - 110011 Email: ds.sme@nic.in
17.	HCFC-free, Energy-efficient Air Conditioners	One production line produces around 180,000 units per year. The direct emissions saved by these units, compared to earlier models using fluorinated gas refrigerants, as well as the	The new air conditioners have been designed based on European safety regulations and represent value of money for Indian customers, as they have the highest energy efficiency in their class, which saves electricity	GODREJ & BOYCE factory in Shirwal, Maharashtra	Markus Wypior markus.wypior@giz.de Godrej & Boyce Manufacturing Company Limited Pirojshanagar, Vikhroli,

		savings in indirect emissions related to energy consumption, amount to about 1 million tonnes CO_2 (based on a product lifetime of ten years). Reduction in India's consumption of ozone- and climate-damaging HCFCs.	costs and reduces indirect emissions.		Mumbai - 400079, INDIA. Tel: +91-22-6796 5656 / 5959 Fax: +91-22-6796 1518 Email: info@godrej.com
18.	**LED Lighting Technologies**				
i.	LED Street Lighting (i)	Reduce emission of 40.22 Tons/year of CO2 into the atmosphere. It saved a power of 46800units per year and 130 watts per fixture was saved.	It eliminated the lead elements in lighting. The lights have working life of Quite Long (>50,000 hours)	100 LED lights were installed at Mata Road, AtulKatariaChowk, Sector-14, Gurgaon.	**Instapower Ltd.** Plot No. - 457 Phase - V, UdyogVihar, Gurgaon - 122016 Telephone: +91-124-4124000 Fax: +91-124-4124034
ii.	LED Street Lighting (ii)	Replacement of sodium vapour and mercury vapour high wattage lamps which produces more greenhouse gases. Carbon dioxide emission is 4.4 kg/yr which means lower energy consumption and decreases CO2 emissions	Used for street lighting, campus lighting and garden lighting purposes. SYSKA LED Street Lights are more energy-efficient, more environment-friendly and more illuminating as compared to regular lights. Their optic lenses give a wider dispersion of light, covering maximum areas and increasing the pole spacing.	India	Syska LED lighting Office Locations Shree SantKripa Appliances Pvt. Ltd. 7 Akshay Complex, Off. Dhole Patil Road, Pune - 411 001. Maharashtra, India. Tel: +91 20 40131000 Fax: +91 20 26164837 Email: info@syskaled.com
	Alternate Energy Technologies				
19.	**Biogas Technologies**				
i.	Anaerobic Digester Biogas	ARTI estimate that for a typical urban household, biogas saves 100 kg of LPG or 250 litres of kerosene per year, which is equivalent to 300 to 600 kg CO_2 per year. A rural family could save about 3 tonnes of	From the point of view of conversion of feedstock into methane, the compact biogas plant system developed is 20 times as efficient as the conventional system, and from the point of view of reaction time, it is 40 times as efficient	About 2000 households using – both in urban and rural households in Maharashtra.	Appropriate Rural Technology Institute's Rural Entrepreneurship Development Center (ARTI - REDC) Ganesh Nagar, Phaltan-Baramati Road,

		wood per year, which would generate about 5 tonnes CO_2 if burnt.			Phaltan : 415523. Maharashtra, INDIA Phone: 091-02166-249874 Email: contact@arti-india.org
ii.	Anaerobic Digester Biogas	It is helping in conservation of burning of fossil fuel, i.e., LPG gas to the tune of 14KG per month per family.	As the heating value of biogas is almost half that of cooking LPG, specially designed biogas burners are provided to improve cooking speed. Depending on the demand by the customer, a blower to increase gas pressure may be employed.	Maharashtra	KIRLOSKAR INTEGRATED TECHNOLOGIES LIMITED Registered Office: 13/a, Karve Road, Kothrud, Pune - 411038, India Phone no:- +91 20 25457940 + 91 20 25457939 (225) GTC.KITL@kirloskar.com
iii.	Anaerobic Digester Biogas **(Mailhem Portable Renewable Energy Device (Biogas Plant) based on Food Waste)**	This project helps in reduction of Green House Gases (GHG) emissions. 80% depreciation is available in the year of **installation of biogas plant**.	Sludge is taken out from bottom of Anaerobic Digester once in 3/4 month and can be used as semi solid manure directly or bagged after drying. Neat and hygienic disposal of **organic waste** at its source of generation & hence, no nuisance of waste transport on public roads. No foul smell and flies / mosquito nuisance, since gas tight top covers are provided. Semi automatic operation hence easy maintenance and less wear & tear of equipment.		**Mailhem Engineers Pvt. Ltd.** 14 Vishrambaug Society, 2nd Floor, Opp. International Convention Centre, SenapatiBapat Road, Pune 411016 Maharashtra, India **Tele. No.** +9120 25650057 **Fax No.** +91 20 25650047 **Mobile:** +919373597455 **Email:** info@mailhem.com
iv.	Anaerobic Digester Biogas • Prefabricated Bio Gas Plant • Fixed Dome Biogas Plant • Floating	An alternate to the fossil fuel that causes major emission of Green House Gases. Biogas, being a clean technology, can minimize the amount of carbon emission. Thus, it mitigates climate change.	Can be used for both domestic and commercial purpose. Applications: • As natural gas after purification • Electricity generation using biogas engine / generator • As vehicle fuel after purification.	India	Urja Bio Systems Mr. VikasBhise (Head- Green Energy Projects) B-4, Sneh Complex, Behind Ankur Electronics, Deep BanglowChowk, Model Colony, Shivaji Nagar Pune - 411016, Maharashtra, India

	Dome Biogas Plant				Call at: 08373904471 Mobile: +(91)-8408923557 +(91)-9403264303 +(91)-9657065801 +(91)-7774043040 Telephone: +(91)-(20)-41222986
v.	Anaerobic Digester Biogas **Spherical type Fixed dome biogas plant**	While combustion of biogas, like natural gas, produces carbon dioxide (CO2), a greenhouse gas, the carbon in biogas comes from plant matter that fixed this carbon from atmospheric CO2. Thus, biogas production is carbon-neutral and does not add to greenhouse gas emissions.	The spherical-type fixed-dome biogas plant easily meets the cooking, lighting, and power generation needs of a rural family in India. Even the waste from the biogas plant could be utilized as rich, nutritious manure—an added bonus or most rural families in India as they have agriculture as their mainstay. The success rate of the plant is 100%. The upgraded design of TERI's biogas plant has demonstrated how apt and ideal this technology is for rural India—it is based on renewable energy , has low running cost, is cost-effective, and energy-efficient.	India , 6 plants were installed in the village of Dhanawas, in the state of Haryana. 173 TERI-modelled biogas plants have been installed in 46 villages across seven states in North and central India. .	TERI (The energy and resource institute) General Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900 Fax (+91 11) 2468 2144 and 2468 2145 For general inquires contact mailbox@teri.res.in
vi.	Anaerobic Digester Biogas **Biogas bottling plants**	The biogas bottling plants are one of the most potent tools for mitigating climatic change by preventing black carbon emission from biomass chullah since biogas is used as a cooking fuel and methane emissions from untreated cattle dung and biomass wastes are also avoided.	The purified biogas (more than 90% Methane here) is filled in CNG cylinder and supplied to mid-day meal scheme, mess, Hotel, industries etc. for various purposes such as cooking & heating etc. The slurry which comes out of the biogas plant is directly or after drying used as bio/organic manure for improving soil-fertility and reducing	MAHARASHTRA , INDIA	**MNRE** Mr. N.C. Mujumdar, Director Ashok BiogreenPvt. Ltd., Vill. Talwade, TahasilTrimbak, Dist.-Nasik Email: cmd@ncm.co.in Dr. A. V. Mohan Rao, Director , M/s Spectrum Renewable Energy Pvt. Ltd., Vill. – Kodoli, Block –Panhala, Warananagar, Dist.–Kolhapur

			use of chemical fertilizers. It is also non-pollutant because it is free from weed-seeds, foul smell and pathogens. The slurry is rich in main nutrients such as Nitrogen, Potassium and Sodium (NPK) alongwith micronutrients - Iron & Zinc etc. The slurry/manure of biogas plant is being sold to the farmers and used in liquid/solid form by them in agricultural crops		Email. – info@srel.in
vii.	Anaerobic Digester Biogas **Biogas to Elecricity**	Conservation of traditional electricity, thus saving burning of coal and resulting in reduction of CO2 emission.	It comprises the biogas digester system of the desired capacity, gas storage, biogas cleaning system to get rid of H_2S from the gas, and the biogas genset. In the digester system, one may have a pre-digester or a feed mixing chamber or both. On the post-digester side, liquid from the slurry is separated and is recycled for feed preparation. It reduces the overall fresh water demand of the scheme.		KIRLOSKAR INTEGRATED TECHNOLOGIES LIMITED Registered Office: 13/a, Karve Road, Kothrud, Pune - 411038, India Phone no:- +91 20 25457940 + 91 20 25457939 (225) GTC.KITL@kirloskar.com
viii.	Anaerobic Digester Biogas	Total methane captured and used so far is approx 32,000 cubic meters and it has generated over 9000 units of electricity which helps in climate change mitigation. Slurry, which is produced from the digester as a by product provides additional nutrients for bed technique for vermicomposting. The model has enhanced the use of treated slurry as organic manure thereby resulting in gradual reduction in the use of	The power generated from the biogas plant is used to provide energy services to supply drinking water, irrigation and running of micro-enterprises like milk chilling plant, flour mill, oil expeller and spice grinding which were otherwise operated by diesel/coal. Several other potential areas of livelihood generation, like organic farming, green energy based irrigation services, construction and operation of domestic biogas plant, repairing and maintenance of gas engine etc. are also introduced	Sri Ram Raja Gaushala, Block Niwari, Madhya Pradesh	Development Alternatives ,B-32, TARA Crescent, Qutub Institutional Area,New Delhi - 110 016, INDIA,Tel: (+91) - 11 - 2613 4103 ,Fax: (+91) - 11 - 2613 0817 Web: www.devalt.org

		chemical fertilisers.	through this Gaushala model.		
ix.	Anaerobic Digester Biogas Deenbandhu model	Each plant saves about 4 tonnes/year of CO2 by replacing the use of largely unsustainable wood, so total saving is about 170,000 tonnes/year of CO2.	— Cooking with biogas instead of wood eliminates smoke and soot, reducing incidence of respiratory complaints, eye problems and headaches. — Biogas brings villagers more time. Two to three hours per day previously used to collect wood and to cook are released for income generation and other purposes. — Producing and selling vermicompost from biogas residue is a significant income generation activity, usually for women.	Karnataka 43,000 plants installed by 2007, benefitting over 210,000 people	SKG sangha Contact:- D Vidya Sanghainfo@skgsangha.org skgsangha@gmail.com www.skgsangha.org
x.	Anaerobic Digester Biogas Making **Nightsoil-based Biogas Plants**	Biogas plant not only reduces the wastes but also helps in the reduction of greenhouse gas emissions and decomposes the wastes which in turn are used for cooking and for agriculture purposes also.	The gas generated from five persons using the toilet is sufficient to cook food (breakfast, lunch and dinner) for the family • It reduces cooking time drastically, saves fuel cost • The biogas plant also provides rich manure for improving the fertility • The fully digested organic manure which comes out after 45-50 days is excellent for promotion of soil fertility and restore the land which has lost its productivity due to continuous application of chemical fertilizers.	Dehu village, Pune District , Maharshtra	**UNICEF** Sonia Sarkar Communication Officer- Media, unicefindia Tel: 91 11 2469-0401, 2469-1410 contact, Dr. S.V. Mapuskar, AppaPatwardhan Society, Pune Maharashtra, Ph: 020-27697204
xi.	Anaerobic Digester Biogas Balaji model. This biogas plant is completely submerged in the ground	Biogas uses renewable source of energy which reduces green house gases into the atmosphere and prevents global warming	• An alternate renewable source of energy at low capital and maintenance costs and provide employment generation • Durable, safe, produces odourless gas and easy to repair technology. • Solid organic materials like grass, and straw can be used as feeding material, while the slurry from the plant is perfectly digested as it consists of 90% of water	Kanpur	**UNICEF** Sonia Sarkar Communication Officer- Media, unicefindia Tel: 91 11 2469-0401, 2469-1410

			• Suitable to address Solid Waste Management in rural areas in the country.		
xii.	Anaerobic Digester Biogas VK-NARDEP has developed a smaller plant and the cheaper, bamboo-framed 'VINCAP' plant.	The potential saving in greenhouse gas emissions is around 4 tonnes CO2/year per plant, or 8,000 tonnes CO2/year in total. The solid residue from biogas plants replaces chemical fertilisers, reducing the run-off of nitrates into ground water and the release of nitrous oxide (a greenhouse gas)	It also researched and developed methods to improve quality of residue as fertiliser and add value to it. It includes growing Azolla (a nitrogen-fixing plant) on the residue and using vermi-composting techniques.	By 2009, 100 of the VINCAP design installed in Tamil Nadu, benefitting some 15,600 people.	Vivekananda Kendra - Natural Resources Development Project (VK–NARDEP) Contact details Sri G Vasudeo, Secretary Vivekananda Kendra –NARDEP, Vivekanandapuram Kanyakumari Tamil Nadu 629702 India Tel: +91-4652 246296 ngc_vknardep@sancharnet.in
xiii.	**Anaerobic Digester Biogas from Canteen Waste (i)** BARC (Bhabha Atomic Research Centre) developed Nisargaruna technology' which offers a "Zero effluent" method for management of solid waste.	The plant can generate around 3 cylinders (14.3 kg/cylinder) of biogas. Produces Manure of 80 - 100 kg/day with about 3% nitrogen and 1.5% phosphate content which can be used as an excellent soil conditioner/ fertilizer. •GHG reduction of about 50 - 65 tonnes / annum	The gas can cook 1000 - 1500 meals per day or alternatively can generate electricity of 32 MWh per annum. Waste disposal is done in a scientific manner • Reduces Energy cost for treatment. The gas produced is used by 4 burners to cook food continuously for 5 hours in the canteen that helps in saving 3 LPG cylinders per day.	Wipro, Sarjapura campus, Bangalore	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Ms Sasikala Wipro Technologies, Doddakannelli, Sarjapur Road, Bangalore - 560 035 sasikala.r44@wipro.com 080 39916447
xiv.	**Bio Reactor for Canteen waste to generate biogas (ii)**	It is an alternative for cooking gas and hence saving consumption of fossil fuel while helping in waste management. This reduces the emission of CO2 into the atmosphere.	The typical volume of the plant set up at Transport House, KSRTC is designed to handle 25 kg of canteen rejects along with the leaf litter. About 1.5 cubic meters of biogas is produced every day. A floating dome gasholder has been provided at the top for the collection of the biogas.	This Bio Reactor for Canteen waste was installed at Transport House, KSRTC, Bangalore.	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-

			Pipelines have been provided to the canteen and stove connected. At present, the gas is being used to keep the cooked food warm.	The plant is a masonry structure, which was built and commissioned in the month of February 2005.	23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-india.org
xv.	Anaerobic Digester Biogas to generate **power from Biogas**	The amount of carbon emission reduction achieved is 21 Tonnes per annum	▪Around 450 people have been benefitted directly and indirectly through this initiative. ▪Skill up-gradation & Employment generation for 36 people in the village. ▪Savings through kerosene INR 0.1 million / annum. ▪Income from power generation INR 0.09 million / annum.	Thalingi village, Tamilnadu	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Dr Kamaraj Founder NERD Society (Non-Conventional Energy and Rural Development Society) 249, ChitthiVinayagar Colony Vembu Avenue, Vadavalli Coimbatore - 641041 kamarajs@hotmail.com +91 94439 34139
xvi.	Anaerobic Digester Biogas These units are of fixed dome type and structured by the Ferro-Cement model.	With a rough estimate, so far they have saved 3000 kg firewood per family means 3000000 kg of fire wood per year means3000 MT of fire wood is saved. In other language saved 4500 trees per year.	- Apart from being a very Low cost unit, the waste generated through this unit in the form of slurry is used for making Vermi compost manure. -Bio-gas not helps evading deforestation, but also providing a smoke free kitchen to the home maker.	1500 Bio-gas Units has been set up in 10 villages in Maharashtra	**Dr Prasad Deodhar** Bhagirath Gram VikasPratishthan Post - Zarap, Taluka – Kudal, District - Sindhudurg Pin – 416520, Maharashtra, India Mobile no: +91 9422596500 Email: bhagirathgram@gmail.com
xvii.	Anaerobic Digester Biogas **Bambu Biogas Plant model**	Biogas uses renewable source of energy which reduces green house gases into the atmosphere and prevents global warming	Those Bambu Biogas are in use since last three years. It has significantly reduced the cost of Biogas. In addition to that, use of local variety of Bambu (called Burud)	It has successfully built two prototypes biogas by using	**Dr Prasad Deodhar** Bhagirath Gram VikasPratishthan Post - Zarap, Taluka – Kudal, District - Sindhudurg Pin – 416520,

			could become a good earning source for many families.	bamboo in Maharashtra.	Maharashtra, India Mobile no: +91 9422596500 Email: bhagirathgram@gmail.com
xviii.	Anaerobic Digester Biogas Integrated Solid Waste Management	It is used to produce Biogas as alternative energy while helping in waste management.	The project has established that it is possible to convert the organic fraction of the waste into biogas and compost and stream lined all operational and maintenance issues at the processing site.	**Chikmagalur and Raichur, Karnataka**	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone:** 91-80-23315656 / 91-80-23462032 **Fax:** 91-80-23344555 **email:** tide@vsnl.com / info@tide-india.org
xix	Biomethanation Digester to produce Biogas	Biogas plants help in the reduction of CO_2 emissions in the air which is a greenhouse gases Additionally, all these plants produce clean biogas which partially replaces LPG or firewood as cooking fuel and in turn cut down CO_2 emission..	The main benefit of Biotech plants is that they provide a clean disposal route for food waste from households and institutions, and huge amount of organic wastes from markets and councils. Therefore, they prevent the release of methane from uncontrolled decomposition of waste. Plants connected to lavatories help in avoiding contamination of ground water through human sewage.	KERALA	**MNRE ,** Contact address V K Jain Director & National Project Coordinator UNDP-MNRE Access to Clean Energy Project Ministry of New and Renewable Energy ,Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in **BIOTECH INDIA** **HEAD OFFICE.** **THIRUVANANTHAPURAM** **PB No. 520,** **MP Appan Road** **Vazhuthacaud, Thycaud P.O,** **Thiruvananthapuram (Dist).** **PIN - 695014, Kerala, India.** **Phone : +91-471-2331909** **2321909, 2332179** **Fax :-91-471-2332179 Email : biotechindia@eth.net**

xx	**SHAKTI SURABHI ENERGY PLANT**	It is an alternate fuel for cooking gas. Waste disposal - very good for bio degradable waste management system. Arrests greenhouse gas. Digested outlet slurry is good as an organic manure.	1cum of Shakti Surabhi gas is equal to 0.43 kgs. of L.P.G. The Diesel generator (D.G) sets can be easily modified to run on the methane gas. If a D.G..set is of 10 KW capacity, then Biogas Engine will give assured 50% power, (which comes to 5 KW.). The gas consumption is about 1 cum. for 1 KWH power.	India	Natural resource development project **Vivekananda Kendra** Vivekanandapuram, Kanyakumari - 629702, Tamil Nadu, India. Mobile : 9442646296 Phone : 04652 - 246296, 04652 - 247126 e-mail : gc_vknardep@sancharnet.in, vknardep@gmail.com Web site : www.vknardep.org
20	**Biomass Gasifier Technologies**				
i.	Biomass Gasifier **For Guar Gum Extraction**	Biomass energy is considered environmentally friendly as it often produces heat or electricity with less harmful environmental impacts than energy from traditional fossil fuels such as coal which emits carbon on burning.	It was estimated that by switching over from fossil fuel based heating to a biomass gasifier system , the operating costs reduced as well as there was an improvement in the earnings of the people.	JOHDPUR	TERI (THE ENERGY AND RESOUCE INSTITUTE) Project Coordinator – CoSMiLE Darbari Seth Block IHC Complex, Lodhi Road New Delhi - 110003 India +91 Delhi (0) 11 Tel. 2468 2100, 41504900 Fax 2468 2144 or 2468 2145 E-mail cosmile@teri.res.in
ii.	Biomass Gasifier for agri-residues	Reducing the percentage of emission of carbon in the atmosphere by replacing the use of traditional fuels.	-About 600tonnesof biomass was harvested and local farmers earned approximately Rs1200 per tonne. -The forestry activity has generated employment, and given impetus to participation of women in biomass development. -40 biogas units are serving 175 households as clean fuel option and are currently maintained by the local community.	Tumkur district , Karnataka	**MNRE** Ministry of New and Renewable Energy Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in Biomass energy for rural india (beri) Email:- www.bioenergyindia.com
iii.	Biomass Gasifier for agri-reisdues	The gasifiers produce electricity using biomass. So, installation of this kind in large scale would	-The **biomass gasifier** meets the daily requirement of domestic lighting in 85 households, street	**Kakadpana Test Project in Nasik District**	MNRE Ministry of New and Renewable Energy

		certainly reduce the use of coal in the thermal power plants. Unlike thermal, it does not emit greenhouse gases. Use of biogas has been contributing for mitigating climate change by reducing greenhouse gases emission and sequestrating carbon in the form of conserving natural forest.	lighting and other entertainment activities and indirectly helping in Increased income. -The villagers have decided to use the power generated for many other applications, such as, flour mill, chafe/fodder cutter machines and water pumps. -2 Nos. of biogas plants are also installed in the village for meeting out their cooking requirements.	**of Maharashtra** Kakadpana hamlet consists of 85 hoseholds and has Warli ST Population, which is known for warli painting.	Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in Gomukh, Environmental Trust for Sustainable Development, Pune Maharashtra Energy Development Agency (MEDA)
iv.	Biomass Gasifier	The gasifiers produce electricity using biomass. So, installation of this kind in large scale would certainly reduce the use of coal in the thermal power plants. Unlike thermal, it does not emit greenhouse gases.	-The **biomass gasifier** meets the daily requirement of domestic lighting in 123 households, street lighting and other entertainment activities and indirectly helping in Increased income. -The fear of wild animals has reduced, as 15 street lights have been installed in the village, which provide adequate illumination during night.	**Boritakheda Test Project in Amravati District of Maharashtra** Boritakheda has Korku ST Population with 123 housholds.	**MNRE** Ministry of New and Renewable Energy Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in DREAM BahuddheshiyaSanstha, Amravati Maharashtra Energy Development Agency (MEDA)
v.	Biomass Gasifier **Pine-Needle Gasifier**	As a renewable energy project, the pine-needle gasifier contributes towards reducing GHG (greenhouse gas) emissions. It is also an alternative to LPG as a cooking source.	AVANI's pine-needle gasifier project proposes to address cooking effectively utilizing charcoal, a by-product of the gasifier. –It will indirectly contribute to enhancing ground water recharge, regeneration of biodiversity, and reduction in fire-fighting efforts.	CENTRAL HIMLAYAS	**MNRE** Ministry of New and Renewable Energy Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in **AVANI** PO Tripuradevi, via Berinag Dist. Pithoragarh, Kumaon 262531 Uttarakhand, India Telefax: (+91) 5964 244943 E-mail: info@avani-kumaon.org
vi.	Biomass Gasifier	Reducing the percentage of emission of carbon in the	•In Radhapur, about 18 households have paid connections for electricity	Village Radhapur,	**Development Alternatives**, B-32, TARA Crescent, Qutub

	Down Drift	atmosphere by replacing the use of traditional fuels.	that is being generated through the biomass gasifier. •Apart from meeting the domestic energy needs, the power plant also fulfils the energy demand for irrigation (6 pumps) and enterprises (1 flour mill of 5 horsepower). •Subsequently, 1 motor driven biomass cutter of 3 horsepower has also been installed.	Panchayat Badarkha, Pichore block District Shivpuri, Madhya Pradesh, India	Institutional Area,New Delhi – 110 016, INDIA,Tel: (+91) – 11 – 2613 4103 ,Fax: (+91) – 11 – 2613 0817 Web: www.devalt.org
vii.	Biomass Gasifier	Conventional energy equivalent of around 314 million kWh for a period of 10 years in Andhra Pradesh would be replaced by exporting clean power (excluding around 15% power generation using coal) from this power plant thereby resulting in CO_2 emission reduction of around 208,056 tons.	-The project has created employment opportunities for the villagers and also for creating an additional means of revenue for local farmers/biomass waste suppliers which will positively help to improve living standard and the socio-economic condition of the village.	Andhra Pradesh	SreeRayalseema Green Energy Limited (SRGEL) Station Road, Srinilayam Gooty IN-515 402 Andhra Pradesh INDIA **Tel:** +91 8552 252731 / 252231 **Fax:** +91 8552 252131 **Main Contact** K MADHUSUDAN, Chairman & Managing Director
viii.	Biomass Gasifier	The 32 kW down draft Gasifier produces 100-120 kWh of energy per day that replaces the use of fossil fuel.	- Savings through Kerosene INR 0.55 million / annum. -Major part of the power generated goes for energizing the village micro-enterprises such as chura mill, oil expeller, rice huller and irrigation pump sets. -The plant is also supplying power to a few telecom towers. -The plant is creating new jobs in the village. -Better irrigation facilities are resulting in higher farm income and better quality of life.	Bara, Bihar	Mr ShrashtantPatara, CEO Technology and Action for Rural Advancement Development Alternatives New Delhi – 110016 Tel: 011 26544252 speed@devalt.org Mr AklavyaSharan Executive Director DESI Power Ground Floor, No. 44, 3rd Main, 6th Cross,K.H.M. Block, R.T.Nagar Main Road,Bangalore - 560 032 Mob: +91 9844011724 aklavya@desipower.com
ix.	Biomass Gasifier	Each Megawatt of power generated from rice husk plant	• Residual waste from the plant is used in making incense sticks,	Patna, Bihar	Development Alternatives ,B-32, TARA Crescent, Qutub

	Husk Power Systems(HPS)	has resulted in reduction of carbon dioxide (CO) emissions by about 5800 every year. These reductions in emissions can be attained with the implementation of 32-33 rice husk plants.	rubber and manure. • About 1200 women have been employed in incense sticks manufacturing. •Processed waste water and tar tank water is collected in a settling tank and recycled, which ensures that there is no water pollution.		Institutional Area,New Delhi - 110 016, INDIA,Tel: (+91) - 11 - 2613 4103 ,Fax: (+91) - 11 - 2613 0817 Web: www.devalt.org Husk Power Systems Private Limited Opposite SheoMandir, Shastri Nagar Market,Sheikhpura, Patna - 800 014, Bihar, India. Tel: +91-612-2283333 Email: info@huskpowersystems.com, Web: www.huskpowersystems.com akumar3@devalt.org, nrana@devalt.org
x.	Biomass Gasifier	**Recycling of** the bio-waste. **Reduces diesel consumption** by more than 70%.	A gasifier is a reactor that converts biomass into clean gaseous fuel called producer gas (having calorific value of the order of 1000–1200 kilocalories per normalized cubic metre)	Different parts of India.	The Energy and Research Institute, New Delhi. (TERI) Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900 Fax (+91 11) 2468 2144 and 2468 2145 Email: mailbox@teri.res.in
xi.	Biomass Gasifier	High conversion efficiency of 70 - 80% from solid biomass to gaseous fuel can reduce emission of Green House Gases. A Litre of liquid fuels (diesel / gasoline) can be saved with only 3 to 4 kilograms of biomass.	Each Kilogram of Biomass produces around 2.5 to 3.0 cubic meters of gas having a calorific value of 1000 - 1100 kilocalories per cubic meter. Extremely clean and complete combustion of gas due to high hydrogen content. Wide turn down ratio. Systems have been installed of 3	Worldwide including India (Sundarban)	BIO-GLO KW Gasifier Factory Rico Industrial Estate Jaipur – 303301, India email: indiaunit@globalenergycollaborations.com

		Positive environmental impact through saving of biomass in most cases. Positive impact on global climate i.e. reduced threat of global warming.	HP, 5 HP,10 HP etc. **in rural areas for irrigational purposes.**		
xii.	Biomass Gasifier	Biogas can be converted into cooking gas which helps in the reduction of emission of carbon and reduces the green house effect	The village is receiving electricity for about 4 hours, daily since February 2005. 2 light bulb connections of 40w and 1 socket have been provided for indoor lighting to each household. 5 streetlights are lit up at the vital entry and exit points within the village.	JAMERA, CHATTISGARH.	TERI General Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900 Fax (+91 11) 2468 2144 and 2468 2145 For general inquires contact mailbox@teri.res.in
21	**Biodiesel production** through Batch Processing plant	The emissions from these biodiesel engines are 20% to 50% lower as compared to those running on high-speed diesel. Engines running on biodiesel do not emit any sulfur.	Biodiesel engines run smoother, have better combustion efficiencies due to extra oxygen in the fuel and can take any blend of biodiesel and high speed diesel. Biodiesel has physical characteristics and combustion properties closer to that of conventional “high speed diesel” (HSD) derived from crude oil; hence it could be used to directly replace HSD in engines.		KIRLOSKAR INTEGRATED TECHNOLOGIES LIMITED Registered Office: 13/a, Karve Road, Kothrud, Pune - 411038, India Phone no:- +91 20 25457940 + 91 20 25457939 (225) GTC.KITL@kirloskar.com
22.	**Piezeolectic Polymers to Energy.** Scientists from the A*STAR Institute of Materials Research and Engineering have fabricated a vibration	Energy Conservation	This is a technology, which harnesses energy from vibrations. piezoelectric polymer multilayers may enable harvested energy to **replace** batteries.	Institute of Material Research and Engineering.	**Institute of Materials Research and Engineering (IMRE)** 3, Research Link Singapore 117602 Tel: (65) 6874-8111 Fax: (65) 6872-0785 Email: enquiry@imre.a-star.edusg

	gathering apparatus using polymers with minimal weight				
23	**Energy Cake Technology** converts bio-mass (including powdery agro-wastes and excluding cattle dung) into smokeless high temperature (max > 500℃) energy source for cooking, heating etc.	This urja biomass cakes helps in climate change as it is made out of agro waste materials which are used in cooking, heating etc. It reduces the emission of harmful greenhouse gases that are caused due to the burning of waste materials.	This technology produces fuel at less cost, less cooking time, less drudgery and fewer infrastructures. Production of these fuels synchronizes the local resources (all types of agricultural wastes / biomass); need of local low cost renewable smokeless fuel and local opportunity of employment with additional income.	Himachal Pradesh, Uttarakhand, Madhya Pradesh, Chattisgarh, Odisha, Rajasthan, Tamil Nadu, Andhra Pradesh., Kerala, Assam, Haryana, Jharkhand, West Bengal.	Energy Research Applications (ERA) Dr. A. K. Singh Project Co-ordinator Energy Research Applications Energy House, Plot No. 294, Sector 39, Gurgaon, Haryana Ph.: 0124-2380194, Fax 0124-4270735 Mob.: 09311380194 Email : energyresapp@sify.com
24	**Pellets** Production Technology to replace lignite and coal which are high carbon fuels.	A Clean Development Mechanism (CDM) assessment of greenhouse gas emissions found a net saving of 1.70 tonnes CO2 per tonne of pellets used.	They are used as a boiler fuel to replace lignite and sometimes black coal, or else used in combination with them. No boiler modification is required to burn pellets.	Plants in Changodar&Gandhidam in Gujarat. Use in Ahmedabad, Gujarat	Abellon clean energy Contact details Ridhdhi Parekh, Senior Executive - Marketing AbellonCleanEnergy Ltd, Sangeeta Complex, Near Parimal Crossing, Ellisbridge, Ahmedabad, 380006 India ridhdhi.parekh@abelloncleanenergy.com www.abelloncleanenergy.com
25	**Hand crank technology for charging Mobiles**	Replacing traditional energy sources.	The FreeCharge provides emergency power to a mobile phone or any other similar electronic devices. Wind its hand crank to generate electricity and put power straight into your device.		**Freeplay Energy** 28, Sardar Patel Road, New Delhi - 110021, India Tel : +91 11 4168 0395, 2687 3731 Fax: +91 11 2611 9423 Email : sales@freeplayenergyindia.com Url: www.freeplayenergy.com

26	**Zip Charge – Charging Portable Electronic Devices like mobiles**	Replacing traditional energy sources.	The definitive way to power all your portable devices when on the move. Charging this pocket-size stick of dynamite for just 10 minutes will store enough power for 10 hours talk time on your mobile or 20 hours play time on your iPod.		**Freeplay Energy** 28, Sardar Patel Road, New Delhi - 110021, India Tel : +91 11 4168 0395, 2687 3731 Fax: +91 11 2611 9423 Email : sales@freeplayenergyindia.com Url: www.freeplayenergy.com
27	**Foot Powered Generator – Weza** **For charging electronic devices**	Replacing traditional energy sources.	This solid, foot-powered energy source harge its own internal battery. To charge it, you simply step down on the pedal and the generator spins. Charging to full power takes modest dedication.		**Freeplay Energy** 28, Sardar Patel Road, New Delhi - 110021, India Tel : +91 11 4168 0395, 2687 3731 Fax: +91 11 2611 9423 Email : sales@freeplayenergyindia.com Url: www.freeplayenergy.com

N.B.: Please refer **Annexure – I** for more details on technologies.

Climate Resilient:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
1.	**Improved Land Management Technologies**				
i.	Improved Land Management Technology for constructing bunds for prevention of salt water intrusions	- The constructed bund and shutter keep the village agriculture safe from storm surges and backwater flooding which are projected to be worse due to climate change.	- Agricultural land protected from salt water intrusion: 200 acres of land protected from floods and salt water infiltration - Increase of harvest compared to the previous years: Harvests are expected to double from 10 to 20 bags per acre, worth a total amount of INR 2 million; an increase to 30 bags per acre is probable once salinity levels have further decreased. - The quality of the groundwater is restored, far lower salinity level. - The pond which was renovated complimentary to the bund and shutter help to improve the quality and quantity of fresh water supply for the villagers..	Kumarakurdi, Nagapattinam, Tamil Nadu	Rachna Arora Indo-German Environment Partnership (IGEP) Programme Deutsche Gesellschaftfür InternationaleZusammenarbeit (GIZ) GmbH New Delhi rachna.arora@giz.de **Avvai Village Welfare Society (AVVAI)** 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com
ii.	Improved Land Management Technology for constructing bunds further inland	- The bund allow for agricultural plots further inland in both villages and thus contribute to sustaining development efforts in Perumalpettai under a changing climate	- With the constructed bund, the village of Perumalpettai is well protected from future storm surges and flooding. In total, around 60 families and a school building are directly protected from floods. - The bund also protects Agricultural land from flooding, 25 acres of arable land protected	Perumalpettai, Nagapattinam, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com

			from floods and salt water		
iii.	Improved Land Management Technology for construction of canal bunds	- The project contributes to the adaptation process as it strengthens local capacities to cope with current and potential future climate-related impacts such as storm surges and flooding.	- The construction of the canal bund keeps the canal from flooding homes, fields, and fresh water supplies. - The bund also provides the people of Kaduvetti with more secure water sources, allowing the village to produce at least one good harvest per growing. - This has resulted in thorough protection of 60 families and 76 acres of agricultural land specifically for the agriculture production. - It is estimated that 37 tons more groundnut can be harvested annually. Furthermore, after harvesting the groundnuts the land can be used for paddy cultivation making it possible to harvest a second crop. - The bund can also be used as a road and prevents homes from being destroyed during floods.	Kaduvetti, Cuddalore, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com
iv.	Improved Land Management Technology for construction of bunds enabling saline free fresh water	- The bund protects the agricultural fields from saline floods which projected to increase due to climate change and contributes to the adaptation process as it strengthens local capacities to cope with current and potential future climate-related impacts such as storm surges and flooding.	- Villagers have now access to saline-free fresh water canals and groundwater. - The backwater river bund has helped gain new land for cultivation. - 370 acres are protected from salt water intrusion, making more cultivation possible. - Currently 7.6 tons are harvested (in comparison to 2.7 tons harvested on the saline land); higher increase expected due to crop rotation scheme followed in forthcoming years.	NaduPalayam, Cuddalore, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com

v.	Improved Land Management Technology for construction of channels to avoid flooding	- The channels constructed support in case of flooding; diminishing the negative effects of unpredictable precipitation patterns and thus reduces climate-related vulnerabilities.	- Over 80 families benefit from these measures, increasing agricultural productivity and allowing people to find employment, thus reducing migration to other towns. - Community is now able to take full advantage of the rain water catchment infrastructure. - Due to a better use of water crop pattern is improved, generating income and welfare.	ThangalPerumpulam, Thiruvallur, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com
vi.	Improved Land Management Technology for construction of sand dunes and concrete reinforced sheds	- The interventions will improve the climate-resilience of the community's livelihoods, safety, and income security of their fishermen and women	- Ensure year-round mobility by enabling villagers to cross the canal via the causeway and can work for an additional 75 days, hence secure annual income per family with an additional income of Rs.11,250 per year for each family (75 days x Rs.150). With an improved transport access to the shore, the costs of operation are also reduced. - A concrete reinforced shed behind the sand dunes along the road from the village to the beach will provide a climate-proof storage of motors, nets and other equipment required by fisher folk supporting approximately 1000 people. - The roof of the shed will be of a height and material appropriate for fish drying.	RamudupalliPalem, Nellore, Andhra Pradesh	Academy of Gandhian Studies (AGS) 18-3-60, SDRSI Complex K.T. Bye pass Road Tirupati – 517507, Andhra Pradesh, India E-mail: ags.adaptcap@gmail.com
vii.	Improved Land Management Technology for enhancing carbon sinks	These landscapes are managed to minimize greenhouse emissions and maximize the sequestration of carbon in soils and vegetation.	Abhipsa covers the livelihood security of 971 tribal households through Orchard development in 810.5acres in Thakurmunda and Karanjia blocks of Mayurbhanj district.	Thakurmunda and Karanjia blocks of Mayurbhanj district in Odisha	**Sambandh**(abhipsa) Head Office: Sambandh Plot No-472/756, At-Saradeipur, PO-Uttara, Bhubaneswar, Odisha, India Tel: 0674 - 24366600674 – 2435550 sambandhindia@gmail.com

					www.sambandh.org
2.	**Climate Resilient Low Carbon Building Construction using** Compressed Earth Block Interlocking and FLG (Fly ash, Lime, Gypsum) Interlocking technology	It helps in energy conservation as it doesn't use burnt bricks and also saves the CO2 emission out of burning of mud bricks. Also absence of cement and use of local raw materials means no transportation for materials that leads to reduction of Carbon emission. Structures are disaster resilient.	- Absence of mud bricks helps in conservation of the very useful top soil. - It is also a low cost and rapid construction process. - Easy to use by a layman. - Aesthetic look is also a feature of this construction. - It has more durability as compared to conventional buildings. - It also has helped in developing a social enterprise model called BMSB (Building Material Services Bank) that uses locally available raw materials to establish green technology. - It also produces different pre cast building elements and does capacity building in production of these materials and services.	Reconstruction of 1400 core homes in 100 villages of coastal **Odisha**. Astaranga block in **Puri**dist., Balikuda, Erasama blocks in **Jagatsinghpur** dist., Marshaghai block in **Kendrapada** dist.	Anjan Kumar Jena Ashraya Project **Cooperation for Rural Excellence (CORE)** Choudwar, ODISHA Email: ashrayaorissa@gmail.com Phone: 08763421156
3.	**Production of 100% Blended Cement**	Reduction in 2 million tonnes of carbon dioxide. Through introduction of innovative product concepts using very high proportion of industrial by-products such fly ash/slag leading to further reduction of CO2 by 10-15%.	Lafarge India plants are able to maximize use of industrial by-products such as flyash and slag. At Lafarge India 100% blended cement is produced.	India	**Lafarge India** 22, Block D, 4th Floor, Camac Street, Abanindranath Thakur Sarani, Kankaria Estates, Park Street area, Kolkata, West Bengal 700016 Phone:033 3983 2100
	Improved Agricultural Technologies				
4.	**Low Carbon Farming**	The contribution of this technology is through reduction in agricultural CH_4 and N_2O; and CO_2 emission. Exceptionally, it has methods to store or sequester carbon dioxide in soil and biomass	It implementation resulted in traditional understanding of Sustainable Agriculture as a healthy balance between crops, trees, animals and people.	Throughout India	**Agricultural Development and Training Societies (ADATS)** Registered Office: No: 10, 2nd Cross Shanthivana (in front of the twin tower Lakeview Habitat, Hebbal)

		through agricultural activities.			Sahakar Nagar Post Bangalore 560 092 Tel: +91 (80) 23438993
5.	**Green Seeker** (A crop vigour mapping system).	India's farmers adapting to climate change with this technology	Crop mapping helps in reducing the losses in agriculture. Better weather forecast.	Haryana	http://www.bbc.com/news/business-29257401 UNDP Solution Exchange Climate Change Community **Trimble Navigation India Pvt Ltd** (Agriculture, Construction Instruments, Survey, Marine Survey, 3D Scanning) MG Road 312, 318 Time Towers, Near IFFCO Chowk Gurgaon, Haryana, 122001 India Phone: 0124 425 6820 Fax: +91 124 4256822 URL: www.trimble.com
6.	**Laser Land Levelling technology**	This method of tilling helps them save 25-30% of water during cultivation.	Laser-controlled devices are mounted on tractors, and these help farmers level the land into a flat surface.	Haryana	http://www.bbc.com/news/business-29257401 UNDP Solution Exchange Climate Change Community **Trimble Navigation India Pvt Ltd** (Agriculture, Construction Instruments, Survey, Marine Survey, 3D Scanning) MG Road 312, 318 Time Towers, Near IFFCO Chowk Gurgaon, Haryana, 122001 India Phone: 0124 425 6820 Fax: +91 124 4256822 URL: www.trimble.com
7.	**Happy Seeders**(Improved Sowing Technology)	These are attachments mounted on tractors that help sow wheat even when the paddy residue is still standing on the fields thus avoiding the	Leaving the crop residue in the fields helps increase the organic matter, better controlling moisture and temperature levels.	Haryana	http://www.bbc.com/news/business-29257401 UNDP Solution Exchange Climate Change Community **Trimble Navigation India Pvt Ltd**

		burning of these wastes and getting rid of smogs.			(Agriculture, Construction Instruments, Survey, Marine Survey, 3D Scanning) MG Road 312, 318 Time Towers, Near IFFCO Chowk Gurgaon, Haryana, 122001 India Phone: 0124 425 6820 Fax: +91 124 4256822 URL: www.trimble.com
8.	**Hydroponics** (A method of growing plants without soil using mineral nutrients in water)	Home grown products would diminish the dependency on fertilisers based food. The manufacturing of chemical fertilizers require huge amount of water. So, usage of these home grown, fertilizer free foods, eventually check the % of grey water of global water footprint.	Growing own food would mitigate the cost of food prices.	Urban and high density housing areas.	Indoor Mini Farms AncelBhagawandeen Climate Himalaya Secretariat: O/o Prakriti group, P.O. Silli, Agastyamuni, Rudraprayag, Uttarakhand-246421 +91-989 766 3711 , +91-971 913 7208 Email: info@chimalaya.org
9.	**Swarna Sub-1** (SS-1)Paddy seed	Resilient to flood and climate change and can produce steady amounts of paddy.	It yields upto 3 to 3.5 tonnes per hectare when submerged, which can go upto 6 tonnes in normal conditions. This particular paddy can survive underwater for 15 days. In Assam, despite a harsh climate the state managed to produce 52.33 lakhs metric tonnes of rice in the last financial year and the production in the current financial year are estimated to increase to 61 metric tonnes.	India: Assam, and Odisha. Abroad: Bangladesh, Cambodia, Myanmar, and Nepal.	International Rice Research Institute (IRRI) Philippines. Indian Council of Agricultural Research (ICAR). Dr. Swapan Kumar Datta, Deputy Director General (Crop Science) Division of Crop Science, KrishiBhavan, New Delhi 110 001. Phone: (Off.) 91-11-23382545; Fax: 91-11-23097003 E-mail: ddgcs.icar@nic.in Titabor Regional Agricultural Research Station (TRAS), Assam.

N.B.: Please refer **Annexure – II** for more details on technologies.

Cook Stoves:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
1.	**Fuel Wood/Biomass based Cook Stove Technologies**				
i.	**Ayurvedic Medicine Preparation Stove**	Fuel saving potential of about 50% as compared to conventional stoves	• Stoves for a wide range of vessel sizes and shapes (50cm to 150cm diameter) • Smoke-free and heat-free working environment • Vessel can be easily removed and placed on the stove • Meets Good Manufacturing Practices (GMP) standards as required by Statutory guidelines: Burning rate of the stove 8.19 Kg/hr.	Kallada (Karnataka) and Kerala	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone** 91-80-23315656 91-80-23462032 **Fax** 91-80-23344555 **Email:** tide@vsnl.com / info@tide-india.org
ii.	**Arecanut Cooking Stove**	These stoves show 40% of fuel saving compared to conventional stoves. It has potential to conserve upto 60% of biomass as compared to conventional stoves**.**	• Faster cooking of arecanuts with lesser fuel • Wide variety of biomass fuels such as areca husk, firewood, coconut shells, agro residues can be used • Shifting of stove from one place to another is possible in case of single pan stove • Smoke-free and heat-free working environment • Vessel can be changed without affecting the body of the stove • Durable with low maintenance cost.	Chikmagalore, Chitradurga, Davangere, Shivmoga, Tumkur, Uttar Kannada	Technology Informatics Design Endeavour (TIDE) #19, 9th cross, 6th main Malleswaram Bangalore 560003 India **Phone** 91-80-23315656 91-80-23462032 **Fax** 91-80-23344555 **Email:** tide@vsnl.com / info@tide-india.org

iii.	Greenway Smart Cook Stove **Forced Draft Cookstoves – Domestic Size**	Due to high efficiency the burden on the forests for fire-wood would be lessened. Thus, results of afforestation would directly mitigate climate change. Furthermore, the higher efficiency would help in better burning of the fuels. This would result in lesser emission of Green House Gases.	Thermal efficiency:24.1% CO : 3.0 g/MJ_d TPM : 320mg/MJ_d Power output : 0.8 kW		Ms. Neha Juneja, Co-founder, Greenway Grameen Infra Pvt Ltd, 301, Chawla Complex, Sector 15, CBD Belapur, Navi Mumbai 400614 Tel: 022-41239169, Phone: 09930751591 Email: info@grameeninfra.com www.grameeninfra.com
iv.	TERI SPT-0610 **Forced Draft Cookstoves – Domestic Size** . Fuel wood, agriculture residue and cattle dung cake can be used as fuel for this stove.	Reduced deforestation due to 50% less consumption of fuel wood Reduces global warming due to reduction of black carbon and other warming agents	Thermal efficiency :36.84% CO : 2.25 g/MJ_d TPM :147.40 mg/MJ_d Power output:1.08 kW The power charger has dual charging mode (both AC/grid power supply and solar power supply) to cater to households in non-electrified areas. Reduces drudgery of women collecting fuel wood 70% reduction in smoke (particulate matter) Beneficial in terms of reduced Indoor Air Pollution (IAP) and healthier environment for women and children Less blackening of cooking pots and kitchen walls Reduces the cooking time by approximately half		**The Energy and Resources Institute (TERI**), 6C, Darbari Seth Block India Habitat Place, Lodhi Road New Delhi - 110 003 Tel: 011-24682111/24682100 Manufacturer Address: Phoenix Udyog Pvt Ltd, Nahan Road, Moginand, Kala-Amb, District: Sirmour, Himachal Pradesh-173030 Tel:098161 03575 Email: phoenix.hp@rbsgroup.in
v.	Double chambered stove	Its combustion efficiency is 40 % means less use of fuel and lesser CO2 emissions.	It is a double chambered efficient portable stove. It can use coconut shell or wood as	Integrated Rural	**V Jayprakashan** Integrated Rural Technology

			a fuel. Innovator has improved the stove by incorporating a secondary combustion chamber for burning the un-burnt bio mass and hydrocarbons coming out with the smokes/exhaust.	Technology Centre, Mandur, Palakkad	Centre, Calicut,Kerala IRTC Campus Mundur(PO), Palakkad – 678592 Telephone: 0491-2832324 / 2832663 Fax: 0491-2832324 / 2832663 www.irtc.org.in email: irtcpalakkad@gmail.com
vi.	Ojas - M06(Fuel-Pellets) **Forced Draft - Community Size**	Due to high efficiency the burden on the forests for fire-wood would be lessened. Thus, results of afforestation would directly mitigate climate change. Furthermore, the higher efficiency would help in better burning of the fuels. This would result in lesser emission of Green House Gases.	Thermal Efficiency :35.11% CO :1.05 g/MJ_d TPM :69.01 mg/MJ_d Power output :5.43 kW		Shri Sashidhara B T, Proprietor Sacks Right Energy Innovations No.83/84, Kempegowda Circle 14th A Cross, Thigalarapalya Main Road, Peenya 2nd Stage, Bangalore-560058 (M): 09900241276,09886425879 Email: wedesignforyou2000@gmail.com
vii.	BIOMASS COOKSTOVES	In addition to the fuel reduction, the improved stoves result in an approximate 80% reduction in smoke.	Families have less exposure to health risks common with traditional stoves such as burns and indoor air pollution. Efficient cook stoves are an important product in tackling the resulting health issues. The stoves are designed with simple enhancements that make them approximately 60% more fuel efficient and significantly more durable than traditional chulha stoves.	SOUTH INDIA	http://www.carbonneutral.com/images/uploads/projects/South_India_Cookstoves_Project.pdf THE CARBON NEUTRAL COMPANY The CarbonNeutral Company - a world-leading provider of carbon reduction solutions London T: +44 20 7833 6000 E: info@carbonneutral.com New York T: 1-646-367-5800 E: salesna@carbonneutral.com
viii.	**"Forced Draft" Improved Biomass Cookstoves**	80% reduction in smoke reducing the indoor air pollution (IAP) and though it uses biomass for cooking purposes there is a less	Fuel saving up to 50% when compared to a traditional mud stove. This reduces the hardships faced by women in fetching fuelwood from long distance areas.	Eight villages in Jagdishpur Block of eastern Uttar Pradesh	Mr Vivek Jha, Area Convenor, Rural Extension Activity, The Energy and Resources Institute (TERI), Darbari Seth Block, IHC Complex,

		dependency on fuel woods which in turn reduces the co2 emissions.	Less soot formation on cooking vessels and kitchen walls reduces the efforts in cleaning vessels and makes the kitchen a better place from an aesthetic point of view. Around 50% reduction in cooking time		Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900 vivekjha@teri.res.in
ix.	**Portable stove fueled by paddy husk**	Usage of paddy husk as the fuel in this stove, certainly, indicates the alternates to firewood, cow dung cakes. Surely, it can reduce the dependency for the firewood on the forests of the villagers, forest dwellers. This would help in return to mitigate climate change.	The stove **has been tested** by TERI University, New Delhi and found having **thermal efficiency** 23 % in cold & hot start and 32 % during simmering. The higher efficiency of the stove would lead to proper combustion of the, thus, emits less smoke.		Shri Ashok Thakur, Bihar **National Innovation Foundation-India** Satellite Complex, Premchand Nagar, Jodhpur Tekra, Satellite Ahmedabad 380 015, Gujarat Telephone: +91-79-2673 2456,+91-79-2673 2095, +91-79-2675 3501 Fax: +91-79-2673 1903, +91-11-4385 1803 Email: info@nifindia.org
x.	**Energy Efficient Community Chulha**	The technology has been tested and validated by IIT Guwahati, ANERT and IRTC and observed a thermal efficiency of 29 to 35% as against 17% in ordinary smoke less community Chulha and recommended for wide scale adoption and replication. Hence, it would help in reduced CO2 emission which will help in climate change mitigation.	The specialty is the secondary burning system which will burn the un-burnt hydrocarbon coming out with the smoke/exhaust. Due to proper combustion of biomass; the Chulha results less smoke and consume less fuel. The community Chulha developed by Jayaprakash is ideally suited for schools, anganwadis, college hostels, panchayats (for waste disposal) and other community purposes. It has been observed that introduction of this low cost innovation will reduce the expenses of food preparation in school and anganwadies more than 30 %.	Idukki district , Kerala	**Peermade Development Society** PB No. 11, Peermade P.O., Idukki District, Kerala, India, 685 531. Phone: +91-4869-232197, 232725, 232496, 232497 Fax: +91-4869-232096, 233875 E-mail: ds@pdspeermade.com, pedes@satyam.net.in, mail@pdspeermade.com Web: www.pdspeermade.com
2.	**Alcohol cook**	1. Especially damaging **greenhouse gases** like	Ethanol and methanol burn very cleanly. Studies conducted in a	Almost worldwide.	Global Alliance For Clean

	stoves	carbon monoxide and **VOCs** (volatile organic compounds) **are not** produced or produced only at **extremely low levels.** 2. Black carbon aerosols, a potentially potent climate forcer, are essentially **not produced** by the combustion of ethanol and methanol.	number of countries, both in the laboratory and in household field tests, have shown the benefit of alcohol stoves in dramatically **reducing indoor air pollution** as compared to wood, charcoal and kerosene stoves. These stoves tend to produce significantly **less CO** (carbon monoxide) than stoves using kerosene or solid fuels. These stoves that incorporate adequate oxygen in the combustion process achieve extremely low levels of CO.		Cookstoves 1750 Pennsylvania Avenue NW, Suite 300 Washington, DC 20006 info@cleancookstoves.org Phone: (202) 650-5345 Fax: (202) 862-9800
3.	**Solar Butterfly Cooker For Domestic Cooking**	Clean and reliable energy supply for daily cooking Saves 70% consumption of coal, wood or charcoal	A-symmetric double paraboloid dish used to concentrate sun light Cooks faster than other types of solar cookers of same size User friendly, easy to use, move and clean Sturdy design, safe to operate and durable Effectively useful from sunrise to sunset Uses highly reflective surface to increase efficiency Useful for urban and rural areas for cooking for 6 to 8 heads Boils one liter of water in 15 minutes Cooks 1Kg rice in one hour Can be used for frying like gas stove Can be used to produce potable bacteria free water by boiling	West Bengal	**The Paulsons & Co** 6B, Bondel Road, Kolkata – 700019 Phone: +91 33 22807741; Mobile: +91 9830659495 email: thepaulsonsco@gmail.com

4.	**SANJA CHULHA (briquettes made from crop waste as fuel)**	This technology uses the renewable source of energy as well as it uses the waste materials from crops such as the crop residues. Each stove saves about 43 kg per day of LPG and thus avoids the emission of about 26 tonnes/year of CO2. The electricity used to make the briquettes and run the fans produces an estimated 1 tonne/year of CO2, so the net annual saving is about 25 tonnes/year of CO2 per stove.	Stoves cost about US$3,000 each. Users save about US$350/month because briquettes are cheaper than LPG. Nishant Bioenergy provides credit, so that users can pay for the stove in instalments from these savings. Briquetting plants typically earn 40% more from selling briquettes to schools than to industrial users. Farmers can increase their annual income by about 10% by selling crop residue to briquetting plants. Briquetting avoids the local pollution and fire risk of burning in this way. The design of the Sanja Chulha and the fact that the stove is used for extended times ensures efficient, clean combustion.	INDIA	**NISHANT BIOENERGY LIMITED** Ramesh Kumar Nibhoria BS PUMP Wali Gali, Near OBC, Ambala- Chandigarh Road, Zirakpur, Chandigarh,Punjab,India nibhoria@rediffmail.com; nibhoria@gmail.com www.nishantbioenergy.comwww.nishantbioenergy.org

N.B.: Please refer **Annexure – III** for more details on technologies.

Solar Energy:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
	Photo Voltaic (PV) based Solar Technologies				
1.	**Solar Lamp Posts**	Save energy (costs): One solar light generates 30 kWh/h and up to 360 kWh/d. In total, 8 solar lights generate 2,880kWh, saving 1,401 kWh electricity per year which leads to the reduction of CO2 emission at the thermal power plants.	- Ensure lighting and light posts withstand extreme weather events. - The new street lights enable children to study at night and community members to do their routine work without depending on electrical energy. - People are protected from frequent power cuts due to low voltage. - The measure also addresses the safety issues by installing lights in public areas and near the communities' latrines. Particularly the women also pertain that it makes moving around the village at nighttime possible and safer.	Thirumalai Nagar, Thiruvallur, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com
2. i	Solar-Powered RO (Reverse Osmosis) Plant	The solar panels also contribute to climate change mitigation and reduce greenhouse gas emissions as It saves energy as estimation shows that 7,200 kWh is saved by the community per year.	It helps to provide reliable water to those who can transport the water and pay the charge per pot It also ensures availability of clean drinking water: In total, this adaptation measure provides 11,169 m^3 of clean drinking water to the inhabitants of the community. Now, 8 litres of drinking water are available per head per day or 2,920 litres per head per year.	VengamukkaPalem, Prakasam, Andhra Pradesh	Academy of Gandhian Studies (AGS) 18-3-60, SDRSI Complex K.T. Bye pass Road Tirupati – 517507, Andhra Pradesh, India E-mail: ags.adaptcap@gmail.com

ii	Solar-Powered RO (Reverse Osmosis) Plant	The use of solar energy to purify the water for use is helping in climate change mitigation as otherwise it would have use traditional source of energy for the same.	•The RO units reduce the salt content of the water from 8000 ppm to 500 ppm and can process 400–800 litres of water per hour for eight hours a day. •Reduction in water-borne diseases and other ailments caused by fluoride contamination: joint pain, digestive disorders, skin ailments, and so on. •Reduction of drudgery amongst women and girls.	village Kotri, RAJASTHAN	MNRE Contact address V K Jain Director & National Project Coordinator UNDP-MNRE Access to Clean Energy Project Ministry of New and Renewable Energy Block No. 14, CGO Complex, New Delhi - 110 003 Telefax: 011-2436 9788 | jainvk@nic.in | www.mnre.gov.in
3.	**Solar PV Pumps (i)**	This particular pilot technology is resilient to climate change impacts on energy supply as the pumps gathering and distributing the water run on photovoltaic power. The project addresses both climate change adaptation and mitigation by providing clean, resilient water supply supported by solar pumps.	-This intervention ensures daily clean water in sufficient quantity to cover drinking and cooking needs of all villagers and mitigating water borne diseases. -Approximately 650 people are now supplied with safe water. -Additionally, the villagers have now an extra 1.5 hour per day at their disposal which they previously had to use to collect water.	DasarajuPalli, Prakasam, Andhra Pradesh	Academy of Gandhian Studies (AGS) 18-3-60, SDRSI Complex K.T. Bye pass Road Tirupati – 517507, Andhra Pradesh, India E-mail: ags.adaptcap@gmail.com
	Solar PV Pumps (ii)	Use of Solar energy ensure no GHG emission which is caused in case of traditional energy sources.	**Impacts** can be realised in the following areas: • Drip Irrigation in horticulture • Irrigation in agriculture. • Filling pond for pisciculture. • Community drinking water.	Bihar, Chhattisgarh, Orissa, Punjab, and Tamil Nadu.	**BarunMitra** **LIBERTY INSTITUTE** **259, J-Block, (2nd floor), Saket, New Delhi 110 017. India.** **Tel: (91)-(11) 652-8244 / 651-2441** **Fax: (91)-(11)-6856992 / 6527868** **Address for Correspondence:**

					96/10 PushpVihar-i, New Delhi - 110 017, India **Email:**webmaster@libertyindia.org
	Solar PV Pumps (iii) 2 Hp Solar DC Surface Water Pump	With this project WAAREE has enabled to save 2148 units of electricity per year and save 2.8 metric tons of CO2 emissions. By harnessing the energy of the sun they eliminate the need to use traditional fuel sources such as oil or coal to generate the electricity they need to operate.	Since these Solar pumps are being used extensively in landscaping, they do not require any type of wiring they allow landscapers tremendous freedom in where to place water features such as fountains, streams and waterfalls.	Goa Governor Residence, Panaji, Goa 2 Installations	WAAREE ENERGIES LTD. Phone 1800 2121 321 602, Western Edge- I Off. Western Express Highway, Borivali(East) Mumbai - 400066, Maharashtra, India Phone: 022 - 66444444 Email waaree@waaree.com
	Solar PV Pumps (iv) **Solar water pumping systems**	Replacement for conventional energy which causes CO2 emission.	Most effective way to ensure ground water supply is by using bountiful solar energy.	Gujarat, Uttar Pradesh, Rajasthan, Punjab	**Shashwat Cleantech Pvt. Ltd** 1st floor-A/7, SafalProfitaire, Prahaladnagar Corporate Road, Prahaladnagar, Ahmedabad – 380 015 Email : info@shashwatgreen.in Telefax : 79 4002 2224
	Solar PV Pumps (v)	Replacement for conventional energy which causes CO2 emission.	Useful for -For Drip irrigation in Horticulture sector. (Punjab) -For irrigation in agriculture. (Tamil Nadu & Bihar) -For filling pond for pisci-culture. (Bihar Fishery) -For Community Drinking Water. (Chattisgarh& Odisha)	100 NOS 2HP SUBMERSIBLE (DC) SPV WATER PUMPING SYSTEMS in **Punjab** 530 Nos. Solar PV Pumping Systems of 4800 Wp (5 HP) in **Tamil Nadu** 1560 Nos, 2HP in **Bihar** 216 Nos, 3 HP in **Bihar Fishery** Around 900 Nos 1 HP Solar Dual Pump **Chattisgarh**	**ChitraNarayanswamy** Email: narayanswamy.chitra@gmail.com

				413 pump in **Odisha**	
	Solar PV Pumps (vi) **SOLAR SUBMERSIBLE PUMP 1HP**	Replaces fossil fuels which cause CO2 emission.	• It comes with MPPT technology which enables it to track the maximum power available from the solar panel at various sun intensities throughout a day. • Operating frequency can be adjustable as per need. • Very easy to operate and very user friendly as it doesn't require traditional battery charger sign wave converter etc.	India	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248, 815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
	Solar PV technology based power plants/grid systems				
4.	**Solar Mini-Grid Project**	Harnessing of solar energy. Since, solar energy is a clean energy, this mini-grid contribute to mitigate climate change.	Electricity available for the community that helps in increasing the quality of life.	Bagha, Rajshahi (Bangladesh)	Infrastructure Development Company Limited **(IDCOL)** Mr. Md. Enamul Karim Pavel Head of Renewable Energy PABX: 220 e-mail: ekarim@idcol.org
5.	**MICRO GRID SOLAR**	Save 21,600 tonnes of GHG emissions from homes. Save 75 tonnes of GHG emissions from schools. Save 1,510 tonnes of GHG emissions from shops and markets.	Each mini-grid shared by 7 to 10 households. Provide 4.2 megawatts of solar energy to 147,000 households (736,000 people) by installing 17,300 community-owned solar 225W mini-grids.	**Villages in Sundarban**	Mlinda foundation, FRANCE contact@mlinda.org SUNCRAFT ENERGY ***Kolkata Head office address:*** GE-171 Rajdanga Main Road Kolkata- 700107 West Bengal, India **Phone:** +91-33-2442-4430

					TERI CORPORATE OFFICE Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900 Fax (+91 11) 2468 2144 and 2468 2145 contact: mailbox@teri.res.in
6.	**Off-grid solar PV systems**	Replaces burning of fossil fuel for producing traditional electricity.	Such systems nullify the need for transmission and distribution network. Off- Grid Solar PV solar power is much cheaper than diesel and many locations in India are now ready for off-grid solar power from the financial viability point of view.	Gujarat, Rajasthan	**Shashwat Cleantech Pvt. Ltd** 1st floor-A/7, SafalProfitaire, Prahaladnagar Corporate Road, Prahaladnagar, Ahmedabad – 380 015 Email : info@shashwatgreen.in Telefax : 79 4002 2224
7.	**Grid-Connected Systems**	Replaces burning of fossil fuel for producing traditional electricity. The 1 MWp solar power system will reduce CO2 emissions by 1700 tons annually.	The energy available from a 1MW Plant would vary from a minimum of 141 MWh during the month of December to a maximum of 161.2 MWh during the month of March.	Gujarat, Tamilnadu, Madhya Pradesh	**Shashwat Cleantech Pvt. Ltd** 1st floor-A/7, SafalProfitaire, Prahaladnagar Corporate Road, Prahaladnagar, Ahmedabad – 380 015 Email : info@shashwatgreen.in Telefax : 79 4002 2224
8.	**Grid-Interactive Systems**	Replaces burning of fossil fuel for producing traditional electricity.	A grid-interactive system is essentially a hybrid system which can produce solar power during the day and switch over to the grid whenever required, so as to ensure maximum use of solar power.	India	**Shashwat Cleantech Pvt. Ltd** 1st floor-A/7, SafalProfitaire, Prahaladnagar Corporate Road, Prahaladnagar, Ahmedabad – 380 015 Email : info@shashwatgreen.in Telefax : 79 4002 2224
9.	Solar Power Plant (i) 100 kWp solar photo-voltaic power generation	The solar plant generates an average 400 – 450 kWh per day, supplying green power for lighting and running the water pumps.	The total energy cost saved is INR 1.15 Million per annum. The system is directly connected to grid and has no battery backup. The total consumption of the	Prasad's Multiplex (I-Max) in Hyderabad has become India's first theatre to install a 100 kWp solar photo-voltaic power generation system	Mr Ragunandan Prasadz - I-Max NTR Gardens, LIC Division P.O. Hyderabad - 500 063 maintenance@prasadz.com

	system	• The amount of Carbon Emission Reduction is 108 Tons every year	building is around 16,000 – 17,000 units/day and the solar PV system caters to 4 % of the total energy demand.	on its rooftop to meet part of its energy requirements.	+9198497 89840 Mr Sriphani, CEO, Yes SV Solar, 2-2-647/147 CE Colony, BaghAmberpet, Hyderabad - 500013 sriphani@yessv.com +91 97010 10176
	Solar Power Plant (ii)	This 100KWp solar power plant will ensure a 105.57 ton/year CO2 reduction.	This power plant will generate 100KW of Electricity. This New Solar power Plant will generate 1.40 million of electricity units during entire year which is worth 17.5 lacs per year.	Science Center, Surat, Gujurat	WAAREE ENERGIES LTD. Phone 1800 2121 321 602, Western Edge- I Off. Western Express Highway, Borivali(East) Mumbai - 400066, Maharashtra, India Phone: 022 - 66444444 Email waaree@waaree.com Surat Municipal Corporation Muglisara, Main Road, Surat – 395003, Gujarat, India. Tel.: +91 - 261 - 2423751-6 Fax: +91-261-2451935
	Solar Power Plant (iii) **Community Solar Power Plant (CSPP)**	Prior to the inception of the solar power plant, the average household consumption of kerosene was 3 litres per month. At present, the average monthly consumption of kerosene has fallen to half of the initial consumption. With 44 households subscribing to electricity services, 110 litres of kerosene is saved per month. Hence, Rampura villagers are successful in keeping in	Solar power generated from CSPP is now supplied for household lighting, fans and entertainment/educational purposes. Along with these facilities various other developmental activities have been carried out in the village, which include basic computer education, formation of self-help groups, land development and health and cleanliness activities. These developmental activities have helped in establishing a successful revenue model in the village.	RAMPURA, Bundelkhand Region, Uttar Pradesh	**Development Alternatives** B-32, TARA Crescent, Qutub Institutional Area New Delhi - 110 016, INDIA Tel: (+91) - 11 - 2613 4103 Fax: (+91) - 11 - 2613 0817 Web: www.devalt.org

		check around 3900 kg of carbon dioxide (CO) emissions annually.			
	Solar Power Plant (iv) **3 MW Solar Photovoltaic (PV) Power Plant**	CO2 Capture: Sequestering 250 tonnes/annum CO2 by vegetation from environment as food energy Reducing 1 lakh tonnes of CO2 over 25 years' viz-a-viz fossil fuels by solar energy.	This optimizes key resources like land & water, converts biomass residues into compost/fodder/energy, and enhances productivity of agricultural produce and solar infrastructure. Rural community gets job opportunity for agricultural activities under solar panels thereby the project anchors socio-economic and environmental benefits to local community.	Modasa, Gujarat	WAAREE ENERGIES LTD. Phone 1800 2121 321 602, Western Edge- I Off. Western Express Highway, Borivali(East) Mumbai - 400066, Maharashtra, India Phone: 022 - 66444444 Email waaree@waaree.com Abellon Clean Energy Limited Contact Person:Khushboo Soni Address: Sangeeta Complex, Near Parimal Crossing, Ellisbridge, Ahmedabad, Gujarat - 380006 Phone: +91-79-66309332 Fax Number:+91-79-66309334 Email:abellon@abelloncleanenergy.com Website:http://www.abelloncleanenergy.com
	Solar Power Plant (v) **Solar PV power plants**	This has helped in avoiding emission of CO2 in terms of conservation of electricity and also fuel wood used for cooking purpose.	A 2kw size Solar PV plant was established at each of the project villages. The average number of home lights installed at each village was about 85, along with 7 to 9 lights for street illumination.	Komna Block, Odisha	Ministry of new and renewable energy (MNRE), UNDP **Orissa Renewable Energy Development Agency (OREDA)** S-59, Mancheswar Industrial Estate, Bhubaneswar – 751010 Odisha **Email** : ceoreda@oredaorissa.com **Ph. No - 0674-2588260**

	Solar Power Plant (vi) **Rooftop PV energy solution**	Use of Solar Energy to produce 400 units of electricity daily helps in saving of 341KG of CO2 emission daily.	400 units of electricity per day are generated by 288 numbers of 290 WP solar panels placed on the rooftop of the Annexe. They are combined with power supply from conventional sources with help of an interactive grid power conditioning unit. Being highly visible in the public eye, the rooftop PV plant will attract considerable attention and contribute to increasing awareness of conservation of power and environmental responsibility.	PARLIAMENT HOUSE, INDIA It serves as a showcase of how green energy can be generated and used for captive consumption in public and private buildings.	LANCO SOLAR ENERGY PVT.LTD Plot No. 229, Phase – I, UdyogVihar, Gurgaon - 122 016 Tel: +91 (124) 469 1000 www.lancogroup.com
	Solar Power Plant (vii) **Solar power solutions for petrol pump**	Unlike conventional energy fuel, solar power package solution doesn't emit any gases or leave any residues, thereby contributing to a greener environment and reducing one's carbon footprint	**Huge reduction in hefty electricity bills –** Adoption of solar system for energy usage shall help the petrol pump in reducing hefty electricity bills. It reduces its dependency on the Diesel Generator Set, thus increasing profits by reducing operational and fuel costs.	India	SU-KAM POWER SYSTEMS LTD. Corporate Office Plot No. 54, UdyogVihar, Phase VI, Sector-37, Gurgaon - 122001, Haryana, India Telephone: +91-124-4170500 Fax: +91-124-4038700/1 Su-Kam Website: www.su-kam.com
10.	**1100 KW Solar PV-Diesel Hybrid Power Plant**	A 1MW hybrid system not only delivers maximum reliability but also saves more than 450,000 Litres of diesel being burnt every year and cuts CO2 emission by 1,500 tonnes/year.	The Roof Top Solar Photovoltaic Power (SPV) Plant commissioned in December 2013 would generate approx. 1.55 million units of energy annually. If there are multiple generators and there is sufficient power from PV, it shuts off some of the generators completely to minimize fuel consumption. The fuel save controller houses an intelligent energy management system.	Tirupur , tamilnadu	WAAREE ENERGIES LTD. Phone 1800 2121 321 602, Western Edge- I Off. Western Express Highway, Borivali(East) Mumbai - 400066, Maharashtra, India Phone: 022 - 66444444 Email waaree@waaree.com Mr. Govin, Proprietor Contact Person:- Mr. Meganathan, General Manager Address :-10-B, Padmavathipuram,

					Gandhi Nagar Post Tirupur Coimbatore - 641603 Tamil Nadu, India Phone No.:- +91-421-4343100,+91-421-2474526 Mobile Number :- +91-421-2479295 WebSite:- www.primetex.org
11.	**Solar PV Technology based Lighting System**				
i.	**Solar Home Lighting**	Every Kerosene Lantern creates 1/3 Ton CO2; 220 Solar Lanterns saved 875 Tons CO2 from Environment. Kerosene lanterns use heavily subsidized kerosene, which is very polluting, causes indoor air pollution which is negated by this.	• Providing Livelihood to 88 Women in 44 Villages, who Manage Charging Stations. And also to 4 Maintenance Staff. • Using Solar Lanterns to Generate Extra Livelihoods Opportunities, During Night, thus helping Reduce Poverty.	Chitrakoot , Gurgaon , Haryana & Madhya Pradesh	India Development Coalition of America (IDCA) Mailing Address: 143 Chaucer Court Willowbrook, IL 60527 Phone: 630-303-9592 / 630-960-2425 Email: info@idc-america.org **India:** S.M.Sehgal Foundation Plot no: 34, Sector 44 Gurgaon, Haryana Email: poojamurada@irrad.org
ii.	Solar Home Lighting	CO2 emission was 0.3 tonnes/ year per person due to the use of kerosene that emits CO2 and harmful green house gases on burning. Now this is saved as solar energy replaced the same.	Shidhulai's work benefitted about 87,000 families through improved education and health services, a greater understanding of sustainable agriculture practices, clean solar-powered lighting and communication with the outside world.	Bangladesh and India	AbulHasanat Mohammed Rezwan Executive Director ShidhulaiSwanirvarSangstha GPO Box No. 876, Dhaka 100000 Bangladesh rezwan@shidhulai.org, info@shidhulai.org www.shidhulai.org Alternative contact: Tahmeema Hossain tahmeema.hossain@shidhulai.org

iii.	Solar Home Lighting	Each SHS (solar home systems) saves about 100 litres/year of kerosene, thus systems installed to date avoid emissions of about 1,900 tonnes / year CO2. The replacement of kerosene for PV reduces the emission of greenhouse gases.	Students can study longer with solar lighting and neighbours can socialize more. Rural families can work in the evenings and earn more, which is particularly useful to women.	Uttar Pradesh	ARYAVART GRAMIN BANK Contact details Mr. Charan Singh CEO, AryavartGramin Bank A-2/46 Vijay KhandGomti Nagar Lucknow Uttar Pradesh , India agb_ho@yahoo.co.in www.aryavart-rrb.com
iv.	Solar Home Lighting **Solar PV Inverter Home Lighting System**	Powered by the sun's renewable energy, the system is energy neutral and an absolutely clean source of illumination. 1kwp solar installation reduces 1⁄2 ton of CO2 (carbon dioxide) per annum.	One can enjoy 30% power savings on electricity bills and a longer back up lighting system at zero running cost. The system has few moveable parts – reducing the risk of breakage. Once installed, it lasts for long time and requires little attention. In absence of sunlight, one can charge the system through this external charger that can be directly connected to the main electricity supply. These LED lamps have a longer life of approximately upto 10,000 hrs.	India	SU-KAM POWER SYSTEMS LTD. Corporate Office Plot No. 54, UdyogVihar, Phase VI, Sector-37, Gurgaon - 122001, Haryana, India Telephone: +91-124-4170500 Fax: +91-124-4038700/1 Su-Kam Website: www.su-kam.com
v.	Solar Home Lighting **60W Home Lighting System**	It uses the renewable source of energy which prevents the use of kerosene as well as thermal power.	•The 4 bright LED tubes can light up four rooms or can be used together to light up a school room, dormitory, church, mosque, hall or other large room. •The Barefoot Connect also includes a security light.	India	Barefoot power products # 667, 8th Main, 7th Cross. Indiranagar. H.A.L 2nd Stage Bangalore 560008 Karnataka INDIA info-in@barefootpower.com tel:+91 80420 07668 / +91 90080 26393

vi.	Solar Home Lighting .	It is using the renewable source of energy and preventing the use of kerosene and fossil fuels which emits carbon dioxide on burning.	The solar-based devices have illuminated the villagers' houses like never before–kerosene lamps are a thing of the past now. Today, infotainment is beamed into their huts through solar-powered television sets while solar fans provide respite from the sweltering temperatures of the summer. The danger of animal attacks is reduced, as animals avoid well-lit places.	India	TERI TERI (The Energy and Resources Institute), Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA Tel. (+91 11) 2468 2100 and 41504900, Fax (+91 11) 2468 2144 and 2468 2145, E-mail mailbox@teri.res.in
vii.	Solar Home Lighting **Solar Lanterns**	D.light estimate that a typical kerosene lamp, used daily, burns about 80 litres of kerosene each year, thus emitting 0.2 tonnes/year of CO2. The 220,000 solar lanterns sold to date are therefore saving at least 17 million litres/year of kerosene, and reducing CO2emissions by at least 44,000 tonnes/year. The savings may be higher since many D.Light lanterns replace more than one kerosene lamp.	Solar lanterns are designed by D.light to be low cost, high quality and durable -PV lanterns allow children to study for longer hours and more effectively. – Other benefits include extended shop hours, more efficient agricultural activities, mobile phone charging facilities and craftwork in the evening.	India, Africa	D.light Design Contact details D.light Design Sam Goldman CEO Tel: +852 3106 6300 dlight-hq@dlightdesign.com www.dlightdesign.com
viii.	Solar Home Lighting **Solar Lamp and Panel**	Use of solar reduces the thermal consumption. It has successfully reduced the use of kerosene.	The bright lamp can be used to illuminate a home or shop and can be carried as a portable light source. The included 1.5W solar panel can be used to charge the lamp or a mobile phone. Mobile phone charging adaptors are included.	India	**Barefoot power products** # 667, 8th Main, 7th Cross. Indiranagar. H.A.L 2nd Stage Bangalore 560008 Karnataka INDIA info-in@barefootpower.com tel:+91 80420 07668 / +91 90080 26393

ix.	Solar Home Lighting **Solar Portable Lighting Products charged using solar panels**	Replacing traditional energy sources.	-Solar Panel included -LED lasts 50000 hrs -Discharge/over charge protection -Battery charge indicator -Battery Backup- Around 8 hrs Avg.	India	**Urja Unlimited** 30/5, Wearwel Cycle Complex, Nit Industrial Area, Faridabad- 121002, Haryana **Sales & Marketing Office:** **Tel.:** 0129 4008752 **Fax:** 0129 4008751 **E-mail:** contact@urjaunlimited.in **Web.:** www.urjaunlimited.in
x.	Multipurpose solar LED lighting **ECCODiva**	This technology uses the solar energy which is a renewable source of energy which will not deplete any natural resource unlike fossil fuels which produces various greenhouse gases on burning.	One of the key advantages of the ECCODIVA's electronics is the fact that it is much more energy-efficient than most other lamps in the world. Another unique feature of the ECCODIVA is that the Micro-Controller based Maximum Power Point Tracking algorithm based charger controller that allows Solar Charging from Dawn to Dusk.	30,000 EccoDiva have been deployed in Ladakh. Chhatishgarh	ECCO ideas for life ECCO Electronics Pvt. Ltd. C-108, Sector 2, NOIDA (UP), 201301.INDIA Tel +91.120.414.6100 Fax +91.120.412.6203 info@ecco.in REGISTERED OFFICE 307, Aggarwal Complex, S-524, Shakarpur, Main Vikas Marg, Delhi – 110092.
xi.	LED solar street lighting	Solar energy is a renewable source of energy which conserves the electricity and hence reduces the burning of fossil fuels which emits carbon dioxide into the atmosphere.	It has showcased Vijaywada as a sustainable city in use of solar lighting.	Vijayawada, Andhra Pradesh	PHILIPS Philips India Limited 9th Floor, DLF 9-B,DLF Cyber City,Sector 25, DLF Phase - 3 Gurgaon - 122002, India
xii.	**SOLAR CFL/LED STREET LIGHT**	Conserves electrical energy.	Solar street lighting system is an ideal lighting system for the illumination of streets, squares and cross roads located in areas that are not connected to the power grid. This fully integrated system combines the latest and most innovative technologies available providing years of convenient	All over India. Mainly in Punjab	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248,

			and trouble free lighting.		815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
12.	**Solar Mobile Phone Charger** The Firefly Fast Phone Charge contains a solar panel and phone charging kit.	Use of Clean Energy saving electricity	The Firefly Fast Phone Charge can charge a 700mAh phone battery in two hours of strong sunshine.	India	Barefoot power products # 667, 8th Main, 7th Cross. Indiranagar. H.A.L 2nd Stage Bangalore 560008 Karnataka INDIA info-in@barefootpower.com tel:+91 80420 07668 / +91 90080 26393
13.	**12v Solar Fan (i)**	Use of Clean Energy saving electricity	The fan plugs directly into the Barefoot Connect front 12v output and includes a two metre cable.	India	Barefoot power products # 667, 8th Main, 7th Cross. Indiranagar. H.A.L 2nd Stage Bangalore 560008 Karnataka INDIA info-in@barefootpower.com tel:+91 80420 07668 / +91 90080 26393
	Solar Fan (ii)	Replacing traditional energy sources.	-Solar panel included -15-18 W Dc Fan -Battery Backup- 5 hrs -Operation can be increased, as per requirements		**Urja Unlimited** 30/5, Wearwel Cycle Complex, Nit Industrial Area, Faridabad- 121002, Haryana **Sales & Marketing Office:** **Tel.:** 0129 4008752 **Fax:** 0129 4008751 **E-mail:** contact@urjaunlimited.in **Web.:** www.urjaunlimited.in
14.	**SOLAR INVERTER**	Conserves energy.	Ensures the same power quality as you get from the mains. Delivers unmatched noise free performance. Ensures longer battery life. Save Power when mains and Solar both are present.	All over India. Mainly in Punjab	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com

					Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248, 815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
15.	**Solar Laminator**	It can be **an alternate** to the conventional electricity run laminator. Hence, saving burning of fossil fuel needed to generate electricity.	On a sunny and clear day, it takes **15-20 min to laminate first document**. Once the laminator gets heated to the optimum, the time taken for one lamination is comparable to that taken by an electricity operated one.	Rajasthan	**Solar Laminator** By Amandeep Singh, Rajasthan **National Innovation Foundation-India** Satellite Complex, Premchand Nagar, Jodhpur Tekra, Satellite Ahmedabad 380 015, Gujarat Telephone: +91-79-2673 2456,+91-79-2673 2095, +91-79-2675 3501 Fax: +91-79-2673 1903, +91-11-4385 1803 Email: info@nifindia.org
	Flat Plates based Solar Technologies				
16.	**Solar air heating for drying requirement in food processing industry**	Savings in diesel about 60 to 90 litres/day GHG reduction is about 60 tonnes per annum.	Cost savings by replacing diesel is about INR 1.0 - 1.2 million per annum.	Theni, India To save on diesel, the solar flat plate collector was installed in 2012 at AMR Dal Mill covering an area of 230 m^2.	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in SunBest Dr C Palaniappan No.5, Power house, 3rd street, N.R.T nagar, Theni - 625531 info@sunbest.in +919994095500

17.	**Flat Plates powered Solar Water Heater Technologies**				
i.	**Solar Water Heaters**	Solar water heaters use the renewable source of energy as a result of which it does not emit any harmful gases while heating and reduces carbon emissions.	Installation of solar water heaters have resulted in decline in use of fuel wood for various household activities and even reduced pressure on forests. Smokeless tandoors distributed to 27 BPL families.	Shimla- Rakchham village, Himachal Pradesh	WWF-India, Field Office, Bishop Cotton School, Gate 2 Bye Pass Road, New Shimla, 171009 HP Ph.: +91-177-2670173, 2672173 Email: wwfhp@rediffmail.com
ii.	Solar water heater	It can reduce 1245 KG of CO2 emission per year per household by conserving electricity.	Uninterrupted Hot Water Supply • No Requirement of electricity • Life Span of 20 years • Near Zero Maintenance • No Need of Gas • Saves more than 1500 Units of electricity yearly per Household	India http://www.genret.com/waterHeater.pdf	Genret Energy Solutions Pvt. Ltd. 1-8-741, Skytel Towers, Prakashnagar, Begumpet, Hyderabad -500016 Ph:40-65891584
iii.	**25000 LPD Water Heater**	To generate 25,000 litres of hot water by using diesel oil, 58.85 kg/day carbon dioxide would be added to the environment per, and by wood 1.45 kg/day, with this installation WAAREE will help reduce carbon emissions sizably. WAAREE Is also going to support the environment by reducing 17,000Kg CO2 emission per day with its 25,000LPD solar thermal system.	This project will solve water problems of the residents of Leh and Ladakh to a great extent. Over 40 villages, which were either un-electrified or had extremely unreliable sources of power, have been provided with reliable solar energy and solar water heaters.	40 villages in LADAKH , INDIA	WAAREE ENERGIES LTD. Phone 1800 2121 321 Email waaree@waaree.com Ladakh Renewable Energy Development Agency (LREDA), 1st Floor, 2nd Block, Council Secretariat Complex Ladakh Autonomous Hill Development Council Leh, Ladakh 194101 Email: lredaleh@gmail.com Telephone: ++91 (0)19 82255733 Fax. No.: ++91 (0)19 82257410
iv.	**Solar Water Heaters for process cleaning**	The quantity of diesel savings is about 75 to 100 litres/day GHG reduction is about 65 tonnes per annum.	Savings in diesel costs is about INR 1.2 - 1.5 million per annum The hot water is used to de-grease the manufactured cooker vessels.	TTK Prestige, Coimbatore, India	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149

					E: info@cii.in * **W**: www.cii.in Dr C Palaniappan PEN (Planters Energy Network) No.5, Power house, 3rd street, N.R.T nagar, Theni - 625531 info@pen.net.in,09994095500
v.	**1000LPD Solar Water Heating system**	Saving of over 15000units of electricity and 1800ltrs of furnace oil. Prevents emission of 15tonnes of carbon dioxide.	Highly efficient than FPC flat plate collector systems. Requires less space for installation Less scaling problems Approximately 25% less cost The tubes if broken can be replaced easily by untrained persons.	India	**Solar House Bright Life Solutions** Lady of Fatima school road , 22 no.phatak , Patiala-147001 Phone :- +91-175-5007722, 08427055722,09878822280 bls@hotmail.co.in
	Solar Evacuated Tube Technology				
18.	**Solar Water Heater** Using **evacuated tube technology**	Replaces natural gas and oils which are traditionally burnt to get hot water.	Performance varies depending, in part, on how much solar energy is available at the site, but also on how cold the water coming into the system is. The colder the water, the more efficiently the system operates.	India	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248, 815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
	Concentrated Solar Power (CSP) Technologies				
19.	**Salt-gradient solar ponds**	This technology uses solar power which is a renewable source of energy.	-Process heat can produce hot air for industrial and space heating applications. -Solar pond-based desalination system offers cost effective solution	Bhuj , Gujurat	TERI TERI (The Energy and Resources Institute), Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA

			for production of potable water from brackish/sea water. -Using the vapour absorption refrigeration system, the heat contained in a solar pond can be used for cold storage of food products and also for air conditioning. -The hot brine can also generate electricity, using an organic Rankin cycle engine.		Tel. (+91 11) 2468 2100 and 41504900, Fax (+91 11) 2468 2144 and 2468 2145, E-mail mailbox@teri.res.in
20.	**SOLAR DRYER**	It helps in the reduction of global warming as it prohibits the burning of any fossil fuels or the use of thermal power for drying purposes which in turn emits harmful gases into the atmosphere.	Sufficient exposure to production and Marketing techniques are followed in case of solar dryers. Project provides sufficient space for the women to use the experiences for income generation. This will not only fetch income for the women but will also cultivate entrepreneurial ability and self-reliance among them.	ANDHRA PRADESH , KERALA , TAMILNADU AND DELHI	AIWC (All India Women's Conference) Sarojini House, 6 BhagwanDass Road, New Delhi-110001 Tel: 91-11- 23389680/1165, Fax: 91-11-23384092, 8567 E-mai : info@aiwc.org.in president@aiwc.org.in website : www.aiwc.org.in http://www.inforse.org/Case/Case-India-SolarDryer.php3
21.	**SOLAR TUNNEL DRYER for fruits and agro products**	Solar crop drying technologies can replace moderate amounts of fuel wood or fossil fuels currently used for the process of crop drying.	Solar dryers are more efficient, hygienic and keep the crops safe from damage and insects. The most advanced designs allow for controlling drying parameters such as moisture content, air temperature, humidity and airflow rate. Adequate drying helps to preserve the flavour, texture, and colour of the food which leads to a better quality product.	India	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248, 815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
22.	**ARUN®100 SOLAR BOILER /SOLAR**	1 ARUN®100 solar thermal concentrator with energy storage	Steam available round the clock though provision given for energy storage. Steam Storage has been	Ramakrishna Mission Students Home, Chennai	CLIQUE SOLAR 149, BCD, First Floor,Govt. Industrial Estate, Charkop Village

	THERMAL CONCENTRATOR WITH THERMAL STORAGE	arrangement generating 540 kg of steam/day during solar hours on a clear sunny day, satisfying the complete energy requirement for cooking and hot water, resulting in 100% LPG fuel saving of 30 - 40 kg per day.	provided for cooking breakfast at 4 a.m. System is installed on roof top of existing building Cooks about 2000-3000 meals per day		Naka, Near Anand Mangal Hall, Kandivali (west) Mumbai - 400 066, Maharashtra, India. Phone:022-2860 9011/2/3/4 Fax:022-2860 9734 Email: info@cliquesolar.com sales@cliquesolar.com
23.	**Scheffler Parabolic dish and Solar Parabolic Concentrator**	SCHEFFLER PARABOLIC DISHES Annual electricity savings of 154 MWh and Carbon Emission reduction is about 150 tonnes per annum. SOLAR PARABOLIC CONCENTRATOR Electricity savings of around 300 - 350 MWh/yr and GHG reduction is around 130 tonnes per annum.	Solar parabolic concentrator is installed to cater to the increased load of air conditioning system covering around 24000 feet^2 areas.	Solar thermal energy for air-conditioning systems at Turbo Energy Ltd., (TEL), Chennai. There are 60 Scheffler Parabolic dishes installed in a total area of 960 m² to capture the heat energy in the sun.	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Mr. Ramakrishnan K &Krishnamoorthy Turbo Energy Pvt. Ltd., Old Mahabalipuram Road, Paiyanoor - 603104. Kanchipuram District. ramakrishnan.k@turboenergy.co.in / kramesh2525@rediffmail.com
24.	Solar Cooking Technology (i) **SOLAR KITCHEN**	Saving of 15000 liters of diesel / annum	▪The solar parabolic concentrator type steam cooking system is able to provide steam for preparing 1000 meals every day and the condensate is being utilized for keeping the cooked food warm and laundry service. ▪The Solar Parabolic Concentrator system meets 35 % of the kitchen's steam requirements and the rest is met by the diesel-fired boiler. The entire system is completely automated. ▪The total energy cost savings of	AUROVILLE PONDICHERRY, INDIA	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Mr. Gilles Gluigou Principal Project Investigator Auroville Community gillou@auroville.org.in +919486144065 http://www.auroville.org

			about INR 0.75 million per year		
	Solar Cooking Technology (ii) **Solar Parabolic Cooker**	Replaces fossil fuels which cause CO2 emission.	• Parabolic (Dish) shaped solar cooker cooks food within 15 to 60 minutes. • Food is cooked in Pressure Cooker, Metal Bowl or in any cooking vessel. • We can boil, roast, bake, fry and dry any food. • Dish Cooker prepares Lunch and Dinner for 5 to 15 persons. • Daily regular usage saves 8 to 10 LPG cylinders per year.	India	**Radha Energy Cell** 1 St Floor, Deol Mkt, Rajesh Nagar, BadiHaibowla, Ludhiana, Punjab, India. E-Mails: sales@radhasolar.com info@solarexporterindia.com radhasolar@gmail.com Purchase: pur@radhasolar.com Call Us :- (M) 91-9888897248, 815097248, 8558897248, 9888724277, 8054987248, 8054497248, 9915286672 Office:- +91-161-6572248 +91-161-2302179
25.	**Solar Concentrator for Milk Pasteurisation**	Furnace oil saved/ annum is 18000 - 20000 litres. • Carbon emission reduction of about 60 – 70 tonnes / year	• Mahanand dairy unit is producing 20,000 to 25,000 lts of milk per day. • Pressurized water was selected as the medium of heat transfer and storage as it has high specific heat, free from fire hazards, zero possibility of accelerated oxidization, compatibility with food products and low operational cost.	Mahanand Dairy Unit, Latur, INDIA	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India) **T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Mr Abhishek Bhatewara Director Clique Developments Limited 149/BCD, Charkop Village Naka Government Industrial Estate Charkop, Kandivli (West) Mumbai-400067 adb@cliquesolar.com +91 90961 80000
26.	Solar Thermal Energy for cleaning engine components	GHG reduction of about 60–70tonnes/year Amount of Energy/ Diesel	The innovative dish design and the automatic two-axis tracking system help to deliver the optimal thermal energy output per m² of collector	Mahindra Vehicle Manufacturers Ltd., Pune, Maharashtra has installed ARUN	**Confederation of Indian Industry** The MantoshSondhi Centre 23, Institutional Area, Lodi Road, New Delhi – 110 003 (India)

	Using Fresnel Paraboloid Solar Concentrator	Saved every year is 18,000-20,000 litres/year.	area.	160 dish in October 2010 to meet the hot water requirements for cleaning engine components.	**T**: 91 11 45771000 / 24629994-7 * **F**: 91 11 24626149 **E**: info@cii.in * **W**: www.cii.in Clique solar Mr Abhishek Bhatewara ,Director Clique Developments Limited, 149/BCD, Charkop Village Naka, Government Industrial Estate, Charkop, Kandivli (West), Mumbai-400067 adb@cliquesolar.com

N.B.: Please refer **Annexure – IV** for more details on technologies.

Waste to Energy:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
1.	**Marble Slurry Bricks**	The utilisation of marble slurry **enhances soil property** and **protect environment.**	IES claims to found potential in slurry bricks as an excellent construction material and offer a viable option to replace the traditional bricks.	Udaipur, Rajasthan	Dr. Desh Bandhu, Indian Environmental Society, U-112, Vidhata House, Vikas Marg, Shakarpur, Delhi-110 092. Mb: 09810180133 Email: iesindia@gmail.com
2.	Up-gradation of Common Effluents of Treatment Plant (CETP)	To convert the open anaerobic lagoons into **closed anaerobic system with biogas generation**. With a view to **control methane emission**, odour and minimize sludge generation. The use of biogas would also ensure the conservation of fossil fuels.	This would minimize the dangers of methane gas poisoning, **for the locals.**	Tannery cluster in Dingdul, Tamil Nadu.	**Dr. E. Ravindranath**, Chief Scientist & Head, Centre Leather Research Institute, Chennai Ph: 044-24916351 09840766668 Email: ethiravi@yahoo.com> & **Dr. S. Rajamani**, International Union of Environment (IUE) Commission, 18, First Street, South Beach Avenue, MRC Nagar, Chennai 600 028, Tamil Nadu" Ph: 044 -24615494 / 5497 09840063210 email: dr.s.rajamani@gmail.com
3.	Environmentally sound technology for recycling of paint sludge	Conversion of Industrial paint **Sludge** (Hazardous Waste) to a **usable product** thus leading to conserving resources apart from reduced paint sludge disposal cost and **environmental risk** due to conventional paint sludge disposal practices.	32 million litres of liquid paint by the leading manufacturers of India which is used in automobile sector mostly generate paint sludge in the range of 40 to 45 million litres per annum. These paint sludge will be recycled and added with extra material and will be made reusable by this technology.	M/s Maharani Paints Pvt. Ltd., Faridabad, Haryana	**Mr. D Sreenivasulu,** National Productivity Council Utpadakta Bhawan, 5-6 Institutional Area, Lodhi Road, New Delhi – 110 003 Ph: 011-24690331 **Mr. A.S. Vishnoi &** **Dr. Sunil Lal,** M/s Maharani Paints Pvt. Ltd., Plot No. 137, Sector – 24, Faridabad – 121005. (Haryana) Mb.: 9654666868 Email: mj100pervez@gmail.com
4.	Development of	Development of an alternative	Successful implementation of	India	Dr. C. Antony Jeyasehar, Professor and

	Fly Ash based Geopolymer Concrete	to cement will reduce the production of cement which is turn reduce the pumping of CO2 to the atmosphere	this project would result in use of large quantities of fly ash and development of an alternative concrete. Also, it would save natural resources and vast area of land for ash pond to store it.		Head Department of Civil and Structural Engg., Annamalai University Annamalainagar, Tamil Nadu-608 002. Ph: 04144 239732/09443128028 Email: rsd66@yahoo.com
5.	Refuse derived fuel from Waste plastics	Energy Efficiency and Alternatives to Fossil Fuels leading to reduction of CO2 emission.	As the waste plastic derived oil has low sulphur content when compared to that of the conventional fuels, it would help reduce environmental pollution (eg. acid rain).	India	Dr. C.G. Saravanan, Department of Mechanical Engineering Faculty of Engineering and Technology, Annamalai University, 48 – A 3rd Cross, Vageesa Nagar, Chidambaram – 608001. Tamil Nadu Ph: 04144-239733/09843064772 Email:rsdk66@yahoo.com
6.	**Gas Handling Systems for Waste Plastics and Waste Tyre Pyrolysis**	The contribution towards mitigation of climate of change through disposing huge amount of plastic waste into fuels which can be used as substitute to coal and wood, thus minimising carbon emission to the atmosphere.	Plastics like Polythene, polypropyline are not biodegradable and create ecological problems. Some of it can be recycled. But non recycled plastic is always a problem to dispose it off which is addressed here.	India	Urja Bio Systems Mr. Vikas Bhise (Head- Green Energy Projects) B-4, Sneh Complex, Behind Ankur Electronics, Deep Banglow Chowk, Model Colony, Shivaji Nagar, Pune - 411016, Maharashtra, India Call at:08373904471 Mobile: +(91)-8408923557 +(91)-9403264303 +(91)-9657065801 +(91)-7774043040 Telephone: +(91)-(20)-41222986
7.	Technology for proper segregation, transportation and treatment of bio-medical waste, resulting in Best practices in healthcare waste management.	It can help reduce carbon dioxide emissions by diverting energy use from fossil fuels, while also generating energy and using waste as fuel can reduce the methane emissions generated in landfills by averting waste from landfills.	• Infectious waste reduced by 80 percent at King George'sMedical University in Lucknow, Uttar Pradesh as a result of proper segregation, transportation and treatment of bio-medical waste. • The hospital earns INR 18,00,000 (US$ 32,700)	New Delhi , Tamilnadu, Uttar Pradesh	**UNDP India Country Office** United Nations Development Programme (UNDP) Post Box No. 3059, 55 Lodhi Estate New Delhi, India. Pin Code - 110 003 Tel: 91 11 46532333. Fax: 91 11 24627612 Email: info.in@undp.org

			annually through recycling of the waste.		
8.	Integrated Municipal Solid Waste (MSW) Management (Vellore)	It radically reduces greenhouse gas by reducing the need for extraction, processing, and the transport of raw materials, as well as avoiding emissions from disposal (incineration, land filling, open dumping and open burning).	Gandhi Nagar village Panchayat generated an income of Rs 10,646/- during the financial year 2005-06 by selling organic waste and Rs 1,62,289/- from inorganic waste.	Vellore, Tamil Nadu	UNICEF **India Country Office** 73 Lodi Estate, New Delhi 110003, India Tel: 91 11 2469-0401, 2469-1410 Fax: 011 2462-7521, 2469-1410 Email: newdelhi@unicef.org contact Mr. C. Srinivasan, Project Director, Exnora Green Cross, Vellore, Tamil Nadu
9.	Vermi-Composting of MSW	This composting process converts the wastes through decomposing which reduces the emission of toxic green house gases into the atmosphere.	Fast process: It takes only 40-45 days for the conversion of garbage as compared to the conventional methods which require about 4-6 months • Zero pollution • Freedom from foul odour • Organic Manure • Economic potential	Hari Mandir, Panchavati, Nashik	UNICEF **India Country Office** 73 Lodi Estate, New Delhi 110003, India Tel: 91 11 2469-0401, 2469-1410 Fax: 011 2462-7521, 2469-1410 Email: newdelhi@unicef.org contact Mr. Sriknat Navrekar , Nirmal Gram Nirman Kendra, Goverdhan (Gangapur) Nashik 422 222 Tel: (0253) 2231598 e-mail: nirmalgram@rediffmail.com
10.	Conversion of Waste Plastic into Liquid Hydrocarbons/Energy, not yet commercialized, commercialization possibility exists.	Recycling of plastics helps in the reduction of greenhouse gases as it is a non-biodegradable substance which in turn reduces various health hazards and prevents global warming.	From 1liter of this liquid hydrocarbon fuel 6-7 Units of electricity is generated. Pilot Plant at Butibori, Nagpur based on invented technology will generate direct/indirect employment to more than 100000 rag pickers and 10,000 others, within India.	INDIA	UNICEF **India Country Office** 73 Lodi Estate, New Delhi 110003, India Tel: 91 11 2469-0401, 2469-1410 Fax: 011 2462-7521, 2469-1410 Email: newdelhi@unicef.org Prof. Mrs. Alka Umesh Zadgaonkar, Head of Department of Applied Chemistry, G.H. Raisoni College of Engineering, Nagpur, Maharashtra
11.	**Producing Biogas from Black Water from Community Toilet**	It prevents the emission of greenhouse gases in the air through treatment of human wastes from the community toilets which is a renewable source of energy and can be	-Prevents contamination of air, water and soil by black water from community toilet, and septic tank in a most eco-friendly way -Use treated water for growing	Tamil Nadu	UNICEF **India Country Office** 73 Lodi Estate, New Delhi- 110 003, India Tel: 91 11 2469-0401, 2469-1410 Fax: 011 2462-7521, 2469-1410

		used for heating as well as cooking purposes.	vegetables, fruits -Reuse of treated water for farming -Resource efficiency and non-dependence on energy -Use biogas for lighting and heating purposes		Email: newdelhi@unicef.org
12.	**Technology for Converting sugar cane waste into domestic fuel**	Charring the sugar cane trash in kilns instead of burning it in the open is helping to keep the skies clear and is reducing unnecessary carbon emissions. The briquettes are expected to displace the use of about 30 times the weight in wood. This could mean saving about 15,000 hectares of dry deciduous forest a year. This reduces atmospheric pollution and helps in climate change mitigation.	ARTI estimates that a rural family could make 100Kg of char-briquettes a day and so earn 3,000 Rupees (approx £35) a week by selling them on. It has developed a special kiln that puts the leaves to good use by converting them to charcoal powder. The powder is then formed into briquettes that can be used as fuel for domestic stoves.	Maharshtra	ARTI (Appropriate Rural Technology Institute of India) Contact name: Dr A. D. Karve Address: 2nd Floor, Maninee Apartments, S. No 13, Dhayarigaon, Pune, Maharashtra 411041, INDIA Telephone: + 91 20 439 0348 / 4392284 / 5442217 Email: adkarve@pn2.vsnl.net.in
13.	**FLY ASH UTILIZATION TECHNOLOGIES**				
i.	**Fly Ash Brick (i)**	The climate-friendly fly ash brick technology produces bricks without using coal. It has the potential to eliminate carbon emissions from India's large brick-making industry, which burns huge amounts of coal and emits millions of tons of carbon dioxide each year.	Unlike clay bricks, which use valuable topsoil as raw material, the new method uses fly ash, an unwanted residue from coal-fired power plants. The water absorption capacity is 10-15% as compared to the normal bricks which consumes upto 20-25% of water.	India	**Neptune Pvt.Ltd** Contacts Mr. Sandeep Dave, Director Mob : +91 9879206979 297, G.I.D.C. Phase - II, Modhera Road Mehsana - 384 002, Gujarat, India. Phone : +91 2762 224551 +91 2762 224 331 Fax : +91 2762 252 070 Email : bmct@neptune- india.com
ii.	**Fly Ash Brick (ii)**	Every tonne of fly ash utilized for manufacture of cement, mortar and concrete would reduce the consumption of cement to that extent and the resultant release of CO2 of the	Replacement of cement by fly ash would save the corresponding amount of the natural mineral resources which already are in scarcity.	India	**Tara Machines & Tech Services Pvt. Ltd** **Contacts** **Registered Office:** B-32, TARA Crescent, Qutab Institutional Area,

		same magnitude. Even in manufacturing of clay fly ash bricks it has been found that there is a fuel savings of 15 to 20%, which would again result in similar savings in emission of carbon dioxide and other gases.			New Delhi - 110 016, India Tel. : +91-11-2654 4100, 2654 4200 Fax: +91-11-2685 1158 **Marketing Office:** 29, Ghittorni, Near Metro Station, Mehrauli - Gurgaon Road, New Delhi - 110 030 Tel. : +91-11-2680 1521, 2680 4482 Visit us : www.taramachines.com Write to us: info@taramachines.com
iii.	**Fly Ash Brick (iii)**	A brick's carbon footprint is 0.15 lb, compared to 1.3 lb for clay brick and 0.75 lb for concrete brick. This is helping in climate change mitigation.	-Conservation of precious top-soil. -High compressive strength -Environment friendly -Excellent thermal insulation -Excellent sound insulation -Fire résistance -Nil efflorescence -Cost effective -Structural cost saving	India	**Ash Brick Pvt.Ltd** Ash Brick Pvt. Ltd. 7 Swallow Lane Kolkata - 700001 Phone - 033-22103675 **info@ashbrick.com** **www.ashbrick.com**
iv.	**Fly Ash Brick (iv)**	Saving of upto 5tonnes CO2 emission per 1 lakh bricks. Around 30% of less fuel consumption	A fly ash unit has a daily production capacity of 6000-8000 bricks per shift of 8 hours. Annual saving of 35 million tonne lime and 15 million tonne coal per year that would have been used for manufacture of 22 million tonne clinker and about 1 billion bricks which are now fly ash based than from conventional inputs.	India	**Sri Vaari Bricks** Tamil Nadu, India Business Type: Brick Manufacturer Contact Person: Mr.k.Nanda Gopal Address: No.# 36/6, Peedampalli to Kallapalayam Road, Kallapalayam Village & Panchayath, Sulur Taluk, Coimbatore - 641 103 Tamil Nadu, India
v.	**Fly Ash Brick (v)**	A brick's carbon footprint is 0.15 lb, compared to 1.3 lb for clay brick and 0.75 lb for concrete brick Around 30% of less fuel consumption	Conservation of precious top-soil: brick use flyash as raw material and are more environment friendly than conventional clay bricks which consume soil as raw material.	India	**Sarala Abhiyantriki** Mr. Jitendra Sharma / Balkrishna Sharma (Director) No. 120-A/2, Pologround Industrial Area, Opposite MP Transformer Indore - 452015, Madhya Pradesh, India **Call Us:** 08447526238 **Mobile:** +(91)-9302123268

					+(91)-9302124965 **Telephone:** +(91)-(731)-2420880, 2422365 **Fax:** +(91)-(731)-2420395
vi.	**Fly Ash Brick (vi)**	A brick's carbon footprint is 0.15 lb, compared to 1.3 lb for clay brick and 0.75 lb for concrete brick Around 30% of less fuel consumption	Replacement of cement by fly ash would save the corresponding amount of the natural mineral resources which already are in scarcity	India	**Karmyog Hydraulics** Mr. Paresh H. Lohar (Proprietor) Mobile : +919824544862 Phone : +91-2832-651648 Fax : +91-2832-245534
vii.	**Fly Ash Brick (vii)**	A brick's carbon footprint is 0.15 lb, compared to 1.3 lb for clay brick and 0.75 lb for concrete brick Around 30% of less fuel consumption	Conservation of precious top-soil: brick use flyash as raw material and are more environment friendly than conventional clay bricks which consume soil as raw material.	India	**Paras Steel Center** Mr. Atul Jain (Chairman And Managing Director) 62/B, Sector - F, Sanwer Road, Industrial Area Indore - 452003, Madhya Pradesh, India **Call Us:**08447500586 **Mobile:** +(91)-9425073668 +(91)-9300073668 **Telephone:** +(91)-(731)-4047085, 6542085
viii.	**Fly Ash Brick (viii)**	A brick's carbon footprint is 0.15 lb, compared to 1.3 lb for clay brick and 0.75 lb for concrete brick Around 30% of less fuel consumption	•Conservation of precious top-soil •Precise dimension •Excellent performance •Corrosion resistance •User friendly interface •Capability to withstand extreme temperature conditions •Easy to operate and maintain.	India	**Paras Steel Center** Mr. Atul Jain (Chairman And Managing Director) 62/B, Sector - F, Sanwer Road, Industrial Area Indore - 452003, Madhya Pradesh, India **Call Us:** 08447500586 **Mobile:** +(91)-9425073668 +(91)-9300073668 **Telephone:** +(91)-(731)-4047085 +(91)-(731)-6542085
ix.	**Fly Ash Brick (ix)**	Every tonne of fly ash utilized for manufacture of cement, mortar and concrete would reduce the consumption of cement to that extent and the	Conservation of precious top-soil: brick use flyash as raw material and are more environment friendly than conventional clay bricks which	India	**Concept Tech-Know Equipments Pvt. Ltd** Concept Tech-Know Equipments Pvt. Ltd. Office : 1 / B Philips Soc., Shivarkar

		resultant release of CO2 of the same magnitude.	consume soil as raw material		Road, Wanawadi, Pune - 411 040., Maharashtra, India. Works : Sr. No. 155, Behind Gawali Children Park, Bhosari - Alandi Road, Bhosari, Pune - 411 039., Maharashtra, India. Tel No.: + 91 20 60604535, Mobile No.: + 91 7875556878
x.	**Fly Ash Brick (x)**	Every tonne of fly ash utilized for manufacture of cement, mortar and concrete would reduce the consumption of cement to that extent and the resultant release of CO2 of the same magnitude.	Fly ash brick plants use over 20 million tons of fly ash which would otherwise have been dumped into hazardous ash mounds and ponds.	India	**Concept Tech-Know Equipments Pvt. Ltd** Concept Tech-Know Equipments Pvt. Ltd. Office : 1 / B Philips Soc., Shivarkar Road, Wanawadi, Pune - 411 040., Maharashtra, India. Works : Sr. No. 155, Behind Gawali Children Park, Bhosari - Alandi Road, Bhosari, Pune - 411 039., Maharashtra, India. Tel No.: + 91 20 60604535, Mobile No.: + 91 7875556878
xi.	**Fly Ash Brick (xi)**	Every tonne of fly ash utilized for manufacture of cement, mortar and concrete would reduce the consumption of cement to that extent and the resultant release of CO2 of the same magnitude.	• High Performance • Longer service life • Low maintenance • Hydraulic Oil Cooling System • Capacity : 30,000 Brick Per Shift	India	**Saha Hydraulic Services** Mr. Ujjal Saha (Owner) Plot No. 205, Light Industrial Area, Industrial Estate Bhilai - 490026, Chhattisgarh, India
xii.	**Fly Ash Brick (xii)**	Every tonne of fly ash utilized for manufacture of cement, mortar and concrete would reduce the consumption of cement to that extent and the resultant release of CO2 of the same magnitude.	• Accurate Dimension • High Performance • Longer Service Life • Capacity : 10000 Brick Per Shift	India	**Saha Hydraulic Services** Mr. Ujjal Saha (Owner) Plot No. 205, Light Industrial Area, Industrial Estate Bhilai - 490026, Chhattisgarh, India

N.B.: Please refer **Annexure – V** for more details on technologies.

Water Management:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
1.	**Rain Water Harvesting Technologies**				
i.	Rain Water Harvesting	- In the face of additional climate-induced water stress this pilot help sustaining and climate-proofing the agricultural livelihoods. - It also strengthens the villagers' capacity to deal with uncertain water supply in a changing climate.	- With increased capacity of rainwater storage to 6,504 m^3, community can link the new pond with channels surrounding the field, hence extended growing season. - 72 acres previously left uncultivated can now again be used for cultivation - The community members are able to use the pond for bathing, washing, and irrigation. - The setup piped water supply can be used for its actual purpose providing drinking water. The villagers would thus have a reliable drinking water source in the village.	Chinnakaramedu, Cuddalore, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam -611 001 District: Nagapattinam Tamil Nadu, India E-mail: avvaikk@yahoo.com
ii.	Rain Water Harvesting	- The pond project strengthens the overall resilience against current water stresses such as salinization as well as potential future climate change.	- Overall 254 families benefit from being able to avail of a more reliable amount of water as well as better quality. - After the renovation of the pond, the ground water is better replenished. It will also recharge the four nearby dug wells and bore wells for domestic and irrigation purposes. - Deepened pond reaches sandy layer absorbing more water during rainy season and throughout the year. Therefore, 18 hand pumps pumping ground water are now providing saline free drinking water.	Kadapakkam, Thiruvallur, Tamil Nadu	Avvai Village Welfare Society (AVVAI) 260, Public Office Road, Velipalayam 611 001, Nagapattinam District, Tamil Nadu, India E-mail: avvaikk@yahoo.com
iii.	Rain Water	This technology contributes	-Constructed 200 Household Tanks and	Churu in	Bhoruka Charitable Trust

	Harvesting	towards mitigation of climate change through water management.	repaired 7 Community Tanks in 15 villages of Churu. -In the second phase (2009-10) 750 Household Tanks (300 for BPL families) were constructed and 33 Community Tanks were refurbished in 55 villages of Churu.	Rajasthan, India	Head Office 1, PrabhuDayal Marg, Near Sanganer Airport, Jaipur-302029, Rajasthan, India. Tel.: +91-141-3924700. Fax : +91-141-3924738 Email: bct@bctngo.org / bct@iihmr.org
iv.	Rain Water Harvesting	It helps sustaining and climate-proofing the agricultural livelihoods as the rainwater harvested can be used to irrigate 200 acres of land as well as watering an additional of 400 acres during times critical to paddy cultivation.	- This investment was able to provide the community with a constant availability of irrigation water through increased rain-water storage capacity by approx. 150,000 m3 annually and results in a higher crop yield of up to 140 tons per year. - This measure has also helped over 200 families in the area to safeguard their livelihoods.	Motumala, Prakasam, Andhra Pradesh	Academy of Gandhian Studies (AGS) 18-3-60, SDRSI Complex K.T. Bye pass Road Tirupati – 517507, Andhra Pradesh, India E-mail: ags.adaptcap@gmail.com
v.	Rainwater Harvesting	The supply of water is ensured without pumping ground water, hence reducing the carbon emission.	The school was constructed by RSSO in 2005 but the school remained non functional due to water scarcity. But after this project, the school started functioning in 2007. SPECIFICATIONS: Total Rooftop Area = 22.3 sq. m Rainwater Potential = 1527.8 x 22.3 x 0.8 = 27256 litres Volume of 3 Storage Tanks = 1300 litres each Cost = Rs 19000 in the year 2007	Naka Gate Slum, Khandagiri, Bhubaneshwar	Mrs. InderjitKhurana **Ruchika Social Service Organization (RSSO)** 3731/A Sriram Nagar, Samantarapur Bhubaneshwar-751002
vi.	Rainwater Harvesting	Minimized use of pumping hence, energy conservation ensured implying reduction of CO2 emission.	SPECIFICATIONS Total area harvested = 2,996 sq. m Rainwater Potential = 2,049.7 x 2,996 x 0.8 = 49,12,721 litres The volume of the two tanks = 70,98,000 litres	**Laipuitlang, Aizwal**	Dunglena Retired Civil Engineer, PHED Verdant Ridge Laipuitlang, Aizwal-796012
vii.	Rainwater Harvesting	The optimum utilization of rainwater saves a huge amount of groundwater which	SPECIFICATIONS Total Area = 222 sq. m Rainwater Potential = 877.8 x 222 x 0.8	Residence of A R Shivakumar, Bangalore	A R Shivakumar 44, Saurabha, 3 Main Bonaveshvara Layout

		consumes energy for pumping and hence reducing CO2 emission.	= 97,436 litres Volume of storage tanks: The overhead tank is 4,500 litres and the underground sumps are of 10,000 litres and 25,000 litres capacities. Cost = Rs.36,000 (in the year 1993)		Bangalore-560 040 Phone: 09845212314, 080-23398655
viii.	Rainwater Harvesting	The optimum utilization of rainwater saves a huge amount of groundwater which consumes energy for pumping and hence reducing CO2 emission.	Rainwater Potential = 1146.7 x 1485 x 0.8 = 13,62,280 litres Rainwater Harvesting for two rows of houses in two phases at a cost of Rs 6, 500 in the year 2005 and Rs 17,000 in the year 2007	Sterling Green View Phase-II, Bhopal	BrijeshNamdeo 134, Mandakini Society Kolar Road Bhopal Email: amberbhopal@yahoo.co.in
ix.	Rainwater Harvesting	The optimum utilization of rainwater saves a huge amount of groundwater which consumes energy for pumping and hence reducing CO2 emission.	SPECIFICATIONS Plot area = 23,000 sq.m Total Terrace area = 4,000 sq.m Terrace area from where rainwater is collected = 2,000 sq.m (for Phase I) Volume of water collected considering 1 inch of rainfall per hour 45 Cu. Mt = 45,000 Litres Volume of water annually harvested through roof top rainwater harvesting 4050 Cu. Mt (apprx) = 40,50,000 Litres	PRINCE OF WALES MUSEUM KALAGHODA-MUMBAI	M/S. N. S. & ASSOCIATES 9, MATRU CHAYA, NANDA PATKAR ROAD, VILE PARLE (EAST). MUMBAI 400 057, Tel. 022-26131122, Cell No. 9821204735, 9867344735 Email: ns.associates@yahoo.co.in, Website: waterharvestingindia.com
x.	Rainwater Harvesting	The optimum utilization of rainwater saves a huge amount of groundwater which consumes energy for pumping and hence reducing CO2 emission.	SPECIFICATIONS Total area of the plot = 6 acres Area of rooftops / terrace = 3800 sqm. Area of unpaved surfaces = 16476 sq m Area of paved surfaces = 4000 sq m The hospital has total number of 9 tanks with total capacity of 2,25,000litres. The project was completed in May 2006 with a total cost of 7 lacks.	Ayurveda College Hospital, Thiruvananthapuram	**DESIGNED BY** Kerala Rural Water Supply and Sanitation Agency PTC Towers, SS, Kovil Road, Thampanoor, Trivandrom-1 Phone-2337002-5 email: rwh@jalanidhi.com **CONTACT PERSON:** Socio Economic Unit Foundation Civil Station, Vanchiyoor, Trivandrum Ph-2325907, 2462361

xi.	Rainwater Harvesting	The optimum utilization of rainwater saves a huge amount of groundwater which consumes energy for pumping and hence reducing CO2 emission.	SPECIFICATIONS**:** Total area of the plot = 2.5 acres Area of rooftops / terrace = 3,065 sq m Area of unpaved surfaces = 500 sq m Area of paved surfaces = 6550 sq m The installation was complete by May, 2003. The project cost was 5 lakh.	Shivani Apartment, Chennai	40 ECR Road, Trivanyur, Chennai Mr. Shanmugam supervisor-9841269190 Prantap (incharge maintenance)– 9841435779
xii.	Rainwater Harvesting *(Jaldhar Model*)	This technology ensures management of rainwater instead of underground water. Massive drawing of ground water might hamper the stability of ecosystem. This instability, might lead to climate change. Eventually, this technology contributes to the climate change.	It harvests rainwater and saves paddy crops from frequent rain failures.	India	**PRADAN** E-1/A, Kailash Colony Ground Floor and Basement Kailash Colony New Delhi - 110 048 Tel: 4040 7700, 2924 8826 to 2924 8832 E-mail: headoffice@pradan.net
2.	**Cascading of Water Tanks**	-One of the aims is to develop small scale water bodies and other **wetland ecosystems.** Thus, latter`s development would contribute in tackling the climate change. The tanks are source of silt and sand for construction. Thus, locals have the options to the available silt and sand, thus reduces burden on rivers for sand mining. Eventually, it **undermines the changing climate.**	After close to 13 years since its inception, the ThalambeduVayalagam**now boasts of a savings** of close to Rs. 60,000 The judicious use of tank water and ground water reduce chances of degradation of groundwater table. Thus, stable groundwater level is expected. Tanks have been the most important **source of irrigation, for recharging ground water, offering sanctuary to birds,** for **domestic use** of people and a source of drinking water for both people and animals.	Kanchipuram, Tamil Nadu, India.	DHAN Foundation (Development of Humane Action) Kennet Cross Road Near Seventh Day School 1A, Vaidyanathapuram East Madurai 625 016, Tamil Nadu, INDIA Tel : +91-452-2610794, 2610805 Fax : +91-452-2602247 Email: dhanfoundation@dhan.org
3.	**Mazhapolima** – open well recharging	One of the contributions towards the mitigation of climate change through increase of groundwater. This increase promotes the increase the moisture holding	-Recharge groundwater by feeding rainwater into open wells, ponds, and bore wells. -Improve drinking water availability and service level. -Create an alternative sanitation model	Thrissur district, Kerala	**Arghyam** #599, 12th main, HAL 2nd Stage, Indira Nagar, Bangalore, Karnataka India 560008 Email: info@arghyam.org

		capacity of soil. Thus, makes the land fertile and improves the vegetation. The increase in greenery due to vegetation would directly reduce the atmospheric carbon dioxide and other Green House Gases.	for coastal other densely-populated areas of the district. -Reduce the impact of drought and consequent public spending on tanker water for water-stressed regions.		Phone: +91 (080) 41698941 / 42 Fax: +91 (080) 41698943
4.	**Watershed Development**	Adaptation to the climate variation: It results in enhancing the adaptive capacities of the people in a watershed as also their **resilience to climate risks.**	There has been **increase,** specifically, **in subsurface water level**. Substantial increase in % of irrigated areas, agricultural product, and livestock in the context of pre-WSD and post-WSD.	Maharashtra	WOTR; Pune (Head Office) "The Forum" 2nd Floor, Padmavati corner, Pune Satara Road, Pune – 411009, Maharashtra. Tele : +91-20-24226211 Fax: +91-20-24213530 Email: info@wotr.org, pune@wotr.org
5.	**Water Filtration**	These water filters work on gravity and do not consume any electricity, hence do not cause carbon emission due to electrical energy consumption.	-There is also no leaching of chemicals into the filtered water. -Further, there is also no wastage of water in the entire filtration process. -Moreover these filters are manufactured with durable materials and not easily breakable.	India	ShantanuSukul Livinguard Technologies Pvt. Ltd. Mumbai Email: shantanusukul@gmail.com
6.	**Biosanitiser/ Eco chip Biosanitiser**	No use of machinery, electricity and labour, hence conserves energy. No sludge or greenhouse gases as a by-product.	No electricity or chemicals required for its operation while ensuring waste water treatment.	Pune, Maharashtra	Bhawalkar Ecological Research Institute (BERI), A1, Padma Park, Behind Padmavati Temple City: Pune State: Maharashtra Pin: 411009 Phone: 020-4226916 Fax: 91-20-4225208 Email: bvpl@vsnl.com

N.B.: Please refer **Annexure – VI** for more details on technologies.

Miscellaneous:

S. No.	Name/Nature of Technology	Contribution the technology has made to mitigate climate change and/or the reduction of greenhouse gas emissions	Results obtained from this implementation	Where the technology has been successfully implemented	Contact information of relevant institutes/person who can render assistance in the transfer of technologies
1.	**Plant Nutrient Technologies**				
i.	Preparation of Plant Extracts	It is a combination of agronomic, mechanical and biological package. An alternate to chemical pesticides which are responsible for climate change.	The farmers have been able to find an **alternate to chemical pest repellents**. Importantly, this has **economic benefits**, since the plant extract is locally available and barely bear any costs.	India	Secretary, Vivekananda Kendra-NARDEP Vivekanandapuram Kanyakumari,Pin-629702 Phone:04652-246296 email: vknardep@gmail.com
ii.	Preparation of Amino Fish	The formulations provide essential nutrients to the plants. It can be substitute to the chemical fertilizers which are responsible for climate change.	It results in beginning of trends of organic agriculture. It is, also, suitable as foliar spray and basal application.	India	Secretary, Vivekananda Kendra-NARDEP Vivekanandapuram Kanyakumari,Pin-629702,India Phone:04652-246296 email: vknardep@gmail.com
2.	**Technologies for producing Disposable leaf cup/plates**				
i.	Leaf cup/plate making	The leaf made plates and cups can be the alternates of plastic disposal plates production of which require substantial amount of grey water, and contributes in the carbon imprint. Thus, these leaf plates and cup making machines contributes positively to **mitigate climate change**	Production Capacity per 8 Hours Thalies Plain: 1200 Nos ThaliesCharkahna: 1200 Nos Katories: 2500 Nos Nashta Plates 5 : 2500 Nos Nashta Plates 7: 1900 Nos	India	A. M. I. ENGINEERING Station Road, Opp. VeenaCinema,Patna - 800001, Bihar, India Mr. Ashwani /Manmohan (Partner(s)) http://www.amienggfarmer.com /Exporters_Suppliers/ Exporters/hp/scripts/contact_ us.html?catalog_id=26873
ii.	Leaf cup/plate making Hydaulic AY Series. Flywheel – MX Series.	The leaf made plates and cups can be the alternates of plastic disposal plates production of which require substantial amount of grey water, and contributes in the carbon imprint. Thus, these leaf plates and cup making machines contributes positively to	The results obtained, apart from mitigation of climate change, are in the conservation of forests and livelihoods of marginalized tribal. This technology is **chemical free**.	India	C Nandha Kumar Registered office: No.7, Periyathottam Colony, 2 Cross Street, Veerakeralam Road, Coimbatore - 641007 Tamil nadu, India Mobile:+91 9944422522

		mitigate climate change			+91 9585559504 General enquiries: themagnus.nandha@gmail.com Product enquiries: info@ecoleafplates
iii.	Leaf cup/plate making **Areca Plate Making Machine**	These areca leaf plates & bowls can be excellent alternatives to plastic disposal plates. Unlike these, the areca plates & bowls are easily decomposable, not polluting. Moreover, it does not boost carbon imprinting and grey water while manufacturing. Thus, it contributes to mitigate to the climate change.	If it can be installed at community level, it can result in livelihood benefits, apart from the environmental.	India	S. S. Engineering Works, Coimbatore Mr. R. Sampath Kumar (Managing Director) No. 5/ 229 – B, Kovai To Sathy Main Road, Karayampalayam, Annur Coimbatore – 641653, Tamil Nadu, India Phone: 08447510167
3.	**Growing of vegetables locally using Greenhouses**	GERES estimates that the planes and trucks which bring fresh vegetables to the Ladakh, J & K area emit about 1.6 tonnes of CO2 per tonne of vegetables. Local production of 300 tonnes/ year of vegetables in the improved greenhouses therefore prevent the emission of about 470 tonnes/year CO2 (or 0.84 tonnes/year CO2 per greenhouse).	– Cheap and relatively simple to build using mainly local materials and labour. – Greenhouse provides good growing conditions throughout the winter months, despite outside air temperatures of -25°C and below. – Over 400 family members benefit directly, and an estimated 50,000 (about 25% of the population) through sale and barter of produce.	Jammu and Kashmir , Ladakh By 2008, 586 improved greenhouses installed, growing about 300 tonnes/year of fresh produce.	GERES ((Groupe energies renouvables, environnement et solidarities) Contact details Vincent Stauffer GERES India c/o Danzom-NangsoLeh 194101 Leh District Ladakh Jammu and Kashmir, India v.stauffer@geres.eu www.india.geres.eu
4.	**GREEN CARBON BLOCKS**	Every standard 10inch block produced by ECOCARB saves the environment by 2kg of co2. All Green Blocks are manufactured by using ECOCARB with no GHG emission.	The wide range of product offering of GREEN CARBON is used in a varied of applications if broad range of Industries like: **Water Treatment**-purification of drinking and ground water, treatment of industrial and waste water. **Food Processing**-purification and decolonization of edible oils and sweeteners. **Beverages**-removal of colloidal	India http://www.eco-carb.com/products.htm#greenblocks2	Global Ecocarb Pvt Ltd 4th Main Road HRBR LAYOUT Bangalore 560043, India Phone: (91) 80 25442331 Fax: (91) 80 25448514 Email: info@eco-carb.com

			matter before bottling and improving feed water quality in soft drink plants **Gold Recovery**		
5.	**Pico-hydro electricity production (3 kW)**	The 3kW system generates 24 units of AC power which helps in reduction of Carbon emission which was earlier caused due to use of Kerosene.	-Savings through Kerosene INR 0.1 million / annum -Access to modern amenities such as TV s, Grinders and Mixers. - Improvement in indoor air quality and consequent health benefits. -Creation on employment opportunities. - Improvement in educational opportunities for children	Jodpal Hamlet, Karnataka	Mr Sampathkumar Director **Prakruti Renewable Power Pvt. Ltd.**, 768, 14th cross, 33rd Main, J.P. Nagar Phase I, Bangalore. sampath@prakrutihydro.com +91 9845543783
6.	**Hybrid Technology of Solar and Biomass**	Linear Fresnel technology converts water directly into steam without the use of heat transfer fluid or heat exchanger. Steam produced can power a steam generator that can produce electricity using a solar thermal generator during the day and biomass—fired generator rest of the time. This saves the fossil fuels otherwise used for producing electricity.	Hybridisation increases the overall efficiency and avoids daily start ups & shut downs which in turn increase the overall efficiency of machine.	Spain	**Arun Kumar V** Sr. Engineer, Steag Energy Systems India Ltd **Address:** A-29 & A30, Red FM Rd, Sector 16, Noida, Uttar Pradesh **Phone:**0120 462 5301
7.	**Computer Numerical Controlled Eco-Friendly Welding Technology**	The newly developed friction stir welding (FSW) process didn't produce gaseous emission, particulate emission and radiation during welding.		Annamalai University, Annamalai Nagar, Tamil Nadu.	Dr. V. Balasubramania, Department of Manufacturing Engineering, Annamalai University, Annamalai Nagar - 608 002, Tamil Nadu Ph: 04144-239734, 09443412249 email: visvabalu@yahoo.com

N.B.: Please refer **Annexure – VII** for more details on technologies.

Annexure – I Energy Efficiency & Alternate Energy Technologies

1. **Sprinkler Irrigation for Horticulture** at PoovulaDoruvu, Nellore, Andhra Pradesh

In addressing the water-availability related challenge and adapting to the projected impact of changing climate, sprinkler irrigation scheme was introduced. The selected measure was expected to save water and energy whilst increasing agricultural productivity in 60 acres of village lands. During the pilot implementation, 35 sprinkler kits were distributed. Each sprinkler will be jointly used by 2 families. The sprinkler kits consist of an electric pump, sprinkler sets including pipes of 6m length pipes, quick action couplings, six sets of sprinkler couplers with batten assembly, sprinkler nozzles and riser pipes, as well as enough hose for about an acre of land.

2. **Biomass Cabinet Dryers** by TIDE

These dryers can be used to dry small quantities of the produce like vegetables, fishes, fruits (Post harvest technologies of preservation). The available standard tray capacities of these dryers are 22 sq. mts, 11 sq. mts and 6 sq. mts of tray area. It is possible to construct dryers of a wide range of capacity based on user requirements. The cabinet dryers can be constructed with bricks or by using metallic components.

3. **Tobacco Curing Barn** by TIDE

Harvested tobacco leaves are cured in tobacco barns. Tobacco leaves are tied to rods and suspended inside the barn as bunches at different levels. Firewood is burnt in a furnace at the bottom of the barn and the heat generated is led into the barn through the ducting laid at the bottom of the room. Tobacco barns are similar in design to the room dryers. Curing of tobacco is a four stage process that has to be carried out at different temperatures and for a fixed duration. A single tobacco curing batch requires 4-5 days. Tobacco barn performance has been monitored by the Central Tobacco Research Institute.

4. **Room Dryers** for food produces by TIDE

Drying of vegetables, fishes, fruits (Post harvest technologies of preservation). When the quantity of products to be dried in a batch is large, the use of room dryers is recommended. The combustion chamber and the ducting assembly are conveniently laid at the base of the room. Heat is generated by the combustion of biomass on a grate in the combustion chamber and facilitating the movement of hot gases through the duct pipes. The material of construction of the ducting is varied depending on the expected temperature of the flue gas to get a uniform hot air temperature inside the dryer.

5. **Energy Efficient Lime Kiln** by TIDE

The lime kiln is a device that converts mined limestone [CaCo3] to lime [CaO]. Limestone is broken into small pieces and fed into the lime kiln in alternating layers of limestone and fuel. Coal or firewood is usually the fuel used. Lime burning is either carried out in large continuous kilns (capacity about 10 tons / batch) or in very small capacities (250 kg per batch) by small lime makers. Energy efficiency has been obtained by

optimizing the L/D (length to diameter ratio) of the kiln, restricting the air inlet into the kiln and by the provision of a chimney to have a good draft. The kiln can also be operate in the continuous mode.

6. **Energy Efficient Pottery Kiln** for baking pots by TIDE

Pottery kiln is a device that can efficiently fire green pottery wares at the high temperature required for vitrification. The green sun dried pottery wares are loaded in the pottery kiln and fired for about 8 hours. Traditionally green pottery wares are fired in conventional pottery kilns that are just dug out spaces in the ground.

The fuel efficient pottery kiln consists of two chambers. The insulated lower chamber which is the combustion chamber is about a third of the volume of the upper chamber where the wares are stacked. Arched brick structures that allow hot gases to pass through them separate the two chambers. The top of the kiln is open and plastered with mud plaster after the wares are loaded. Depending on the size and the shape of the wares the firing time is between 8-10 hours.

7. **Low Capacity Brick Kiln** by TIDE

Energy efficiency is difficult to achieve when working at low batch sizes. The low capacity brick kiln is a fixed kiln unlike the clamps where brick making can be carried out in the vicinity of tank beds.

This low-capacity brick kiln is designed for a batch size of about 12000 bricks as against a batch size of about 40,000 to 50,000 in conventional clamps. The specific fuel consumption is 0.27 kg of firewood per brick which is lower than the specific fuel consumption in clamps (around 0.35 kg fuel per brick).

8. **Anaerobic Digester Biogas** by ARTI

ARTI has developed a compact biogas plant which uses waste food rather than dung/manure as feedstock, to supply biogas for cooking. **Dr. Anand Karve** (President of ARTI) developed a compact biogas system that uses starchy or sugary feedstock (waste grain flour, spoilt grain, overripe or misshapen fruit, non edible seeds, fruits and rhizomes, green leaves, kitchen waste, leftover food, etc). Just 2 kg of such feedstock produces about 500 g of methane, and the reaction is completed with 24 hours.

9. **Anaerobic Digester Biogas** by KIRLOSKAR

For standard 2 m^3/day capacity they offer “Sanjeevani” and “Sanjeevani-S”. Both these plants take animal dung or crushed food waste as inputs and produce about 2,000 liters of biogas every day. The capacity is equivalent to about 1 domestic LPG cylinder (typically 14 to 15 kg) every month.

10. **Spherical type Fixed dome biogas plant** by TERI

The team from TERI fine-tuned biogas-plant technology and introduced a spherical type fixed-dome biogas plant to ensure that not an iota of energy is wasted when working with waste. The spherical shape of the plant merges the digestion and gas storage spaces to a single dimension, making their construction far easier. It also minimizes the surface area for a given volume, thereby reducing cost while increasing the gas production rate.

11. **Anaerobic Digester Biogas -** Balaji model

The Balaji model for generating biogas from cow/cattle dung and agro wastes is a unique technology that has been promoted by the Kanpur Gaushala Society (KGS) at Kanpur. This biogas plant is completely submerged in the ground, so it is very attractive than other plants. Plant does not require daily water addition because it is completely submerged below water. The feeding material takes the required amount of water.

12. **Anaerobic Digester Biogas from Canteen Waste** at Wipro, Sarjapura campus, Bangalore

A 50 m^3 Biogas digester was installed in the Sarjapura campus in 2010 with technical support from the Nuclear Agriculture and Bio-technology Division (NA & BD) of BARC (Bhabha Atomic Research Centre). BARC developed Nisargaruna technology’ which offers a “Zero effluent” method for management of solid waste. This system not only helped in safe disposal of waste and minimized transportation cost but also partly replaced the LPG gas used for cooking in the canteen.

13. **Bio Reactor for Canteen waste to generate biogas** by TIDE

Immobilized cell bioreactor is a high rate bio-methanation plant using spent biomass as the bacterial support. Methane producing bacteria (methanogens) are trapped on partially digested leafy biomass. Biomass wastes can be fed to these biogas plants in a totally dry state (such as rice straw, bagasse, paper shreds, etc.) or in green state (garden cuttings, lawn mowings, vegetables peels and wastes having on an average 85% moisture and 15% dry matter) or in a slushy state (food wastes such as uneaten rice, plate and dish washings, fruit and vegetable rejects, etc. having 90% moisture and 10% dry matter). These feedstocks need not be powdered or mashed before feeding. On the basis of dry matter fed to the bioreactors, every kilo fed produces between 50 and 80 litres of biogas.

14. **Bambu Biogas Plant model** by Bhagirath Gram Vikas Pratishthan

In the Deenbandhu" biogas model, the 'ferrocement technique' is used to build a Bio Gas. It requires 40 Kgs 6mm steel and wire-mesh. This costs to Rs. 3500. As an innovation, it has tried Bambu instead of Steel.

15. **Biomethanation Digester to produce Biogas** by Biotech India

Biotech, an NGO based in Kerala, has developed biogas digesters that capture food and other organic waste and waste water at the source and produce biogas through a technology called **biomethanation**. The organic materials are taken into air-tight vessels where bacteria break them to release biogas. This resultant gas, which is a mixture of methane and carbon dioxide (with the percentage of the latter being less), can either be burned directly as a cooking fuel or can be used to generate electricity after purification. The solid residue can be used as organic compost.

16. **SHAKTI SURABHI ENERGY PLANT** by Vivekananda Kendra

Shakti Surabhi is a Biomethanation plant developed by Vivekananda Kendra – Natural Resources Development Project (nardep) for producing biogas from kitchen and vegetable waste. It is an improvement over the general floating drum type biogas plant.

17. **Pine-Needle Gasifier** by AVANI

The pine chir tree that grows in abundance in this area is a source of fuel wood for the nearby villagers. The combustible pine needles that carpet the forest are one of the several causes of forest fires. A study has estimated a total production of about 14.65 MW of electricity from biomass in the state. With its rich forest resources, Uttarakhand has a huge potential for generation of electricity through gasification, which is a comparatively cheaper, easily accessible, and durable technology for the state. The gasifier system pyrolizes sized pine needles to volatize them into producer gas, which is a mixture of combustible gas. The producer gas is then passed through. a series of filters consisting of saw dust and fine cloth to remove tar and other impurities. A modified diesel engine thus runs on the resultant 100% producer gas.

18. **Biodiesel production through** Batch Processing plant by KIRLOSKAR

KIRLOSKAR have developed a batch processing plant for biodiesel production. The plant is capable of taking multiple feedstocks. It provides specific feedstock based process optimization to customers. The typical capacity of the plant is based on 10 tonnes per day of feedstock which translates to about 11,000 liters of biodiesel per day on a two shift basis.

19. **Pellets** Production Technology by Abellon clean energy

Abellon currently has two pellet plants that convert loose biomass into small, dense pellets. The plant in Changodar started operation in 2009 and uses mainly crop waste. The plant in Gandhidam started in 2010 and uses 80% sawmill waste from a nearby sawmill, and 20% crop waste.

Annexure - II Climate Resilient Technologies

1. **Improved Land Management Technology for constructing bunds for prevention of salt water intrusions (**Kumarakurdi, Nagapattinam, Tamil Nadu)

To protect the agriculture fields from salinization and improve the availability of clean water, 2 km bund was built around the agricultural fields. To ensure a high stability the bund was made of stiff clay, hard red earth and gravely soil. There is vegetation on the bund walls prevents erosion. In addition, a shutter was placed where the fields' irrigation canal and the Manjal River join to allow field drainage during the monsoon season.

In addition, a pond renovation project which was proposed in early 2011 was accepted for funding by the Kumarakurdi's Panchayat president to complement the bund and shutter project. The pond was intended to provide the village with water for domestic use.

2. **Improved Land Management Technology for constructing bunds further inland (**Perumalpettai, Nagapattinam, Tamil Nadu)

With AdaptCap Project, a coastal bund was constructed to shelter the villagers, their homes, properties and infrastructure from storms and sea water flooding. The coastal bund is located just behind the dunes in a length of 700 m until it is connected with the existing bund as part of the dune structure on the north side of the village. For particularly high stability, it was constructed with a height of 4 m and deposit on the sides to a width of 6 m – planted with undergrowth on the slopes to prevent erosion. The bund was built using hard stiff clay, hard red earth and gravely soil for foundation construction.

3. **Improved Land Management Technology for construction of canal bunds (**Kaduvetti, Cuddalore, Tamil Nadu)

Village leaders called a bund ca. 1 km long on the backwater shore to protect their fields from floods and salt water intrusion. The height of the existing bund was elevated to 1.3 m and width to 3 m. New soil has been deposited for foundation construction. Overall, 5,200 m3 of soil, gravel and sand were used to construct the bund guaranteeing a high stability of the construction. Moreover, planting works have been carried out to prevent erosion of the bund. The road gradient has also been re-established.

4. **Improved Land Management Technology for construction of bunds enabling saline free fresh water (**NaduPalayam, Cuddalore, Tamil Nadu)

To protect the irrigation channels as well as proofing the livelihood against the changing climate, the community together with the Adaptcap project constructed a bund separating the backwater from the main channel. The contractor excavated and increased the height of the bund to 1.5 meters and the width to 3 meters, planting on the slopes to prevent erosion. This backwater bund was strengthened with clay and soil. It now runs between the backwaters and agricultural fields over a distance of 1.5 km and protects the fields from becoming saline.

5. **Improved Land Management Technology for construction of channels to avoid flooding (**ThangalPerumpulam, Thiruvallur, Tamil Nadu)

To overcome the water challenge in Thangal Perumpulem village, a drainage channel was addressed. The proposed measure was expected to make the use of water more efficient while at the same time preventing severe impacts from flooding during monsoon season. With the support of the EU-financed AdaptCap project, the local community built and/or renovated two 700 meters long irrigation channels to distribute water. The channels were constructed using hard stiff clay, hard red earth and gravelly soil as revetment. These channels help to distribute the water to the agriculture fields, enable water drainage and prevent water from stagnating during monsoon season and cyclones. Soil was removed from the government cement revetments, allowing water to pass under the bund and road. Shutters were added to each of these cement structures to prevent flooding of the fields, sea water backing up in canals and keeping the channels clear of debris and dirt.

6. **Improved Land Management Technology for construction of sand dunes and concrete reinforced sheds (**Ramudupalli Palem, Nellore, Andhra Pradesh)

In order to improve the living condition, community together with the AdaptCap project built a sturdy and safe causeway over the canal to facilitate a year-round access to the seafront. Large pipes allow the canal water to flow freely underneath. The road is surfaced with gravel and dirt to match level with the rest of the road to the sea. Sand is deposited to provide a foundation under the large pipes, fixed by a 0.3 metres gravel layer. A metal layer on top provides the foundation for the road. Additionally, a concrete reinforced shed was built behind the sand dunes along the road from the village to the beach to provide a climate-proof storage of motors, nets and other equipment required by the fishers. The shed is constructed in height and dimensions so that it can be used to dry fish.

7. **Improved Land Management Technology for enhancing carbon sinks (**Thakurmunda and Karanjia blocks of Mayurbhanj district in Odisha)

Abhipsa Program creates an unique opportunity to achieve “climate-friendly” landscapes which include, for example, conversion of non-agricultural degraded land into orchards, interconnected with natural habitats.

8. **Low Carbon Farming**

•Use reduced or no-tillage farming •Alter crop mixes and rotations •Change the timing, amounts, and frequency of the use of fertilizers and other inputs that use energy •Change the mix of irrigated versus dry land •Increase irrigation efficiency •Change the management of livestock manure •Change the types of livestock and their diets to reduce the release of methane from their digestive tracts •Change approaches to managing water and straw in rice production

Annexure – III Cook Stoves Technologies

1. Ayurvedic Medicine Preparation Stove at

Preparation of Ayurvedic medicines involves a process wherein barks, twigs, Leaves, herbs etc are immersed in water or oil, the mixture heated and the herbal extract obtained. In conventional stoves, due to absence of chimneys, smoke is emitted to the immediate environment, which results in the smoke coming in contact with the medicinal preparation. In the new improved stove (with chimney), the emitted smoke is released outside the working environment.

2. Arecanut Cooking Stove

These stoves are designed for simultaneous cooking of arecanut in three/two or one vessel with a single fuel feeding port. The stoves are made from prefabricated ferro-concrete components that are transported to the user site and then assembled on site. Consistency in design and performance is obtained by use of production centre assembled prefabricated components.
Three pan stove dimenstions are 425cmX111cmX116cm. Burning rate of the stove is 30 Kg/ hr.
Two pan stove dimenstions are 300cmx111cmx116cm. Burning rate of the stove is 25.8 Kg/ hr.
Single pan stove dimensions are 96 cm diameter and 103 cm height. Fuel Burning rate of the stove is 19.23 kg/hr. Single pan stove dimensions are 96 cm diameter and 103 cm height. Fuel Burning rate of the stove is 19.23 kg/hr.

3. Solar Butterfly Cooker for Domestic Cooking

Technical Specifications
Collection Area: 1.8 m2 (0.9 m2 per wing)
Tracking: Bi-directional, manual
Focus: 0.6m
Output: Equivalent to 800 Watt
Support structure: MS with tracking and rolling arrangements
Reflector shell: Light concrete
Reflectivity: Greater than 85%
Net Weight: 32Kg

Annexure – IV Solar Energy Technologies

1. **Solar Lamp Posts** at Thirumalai Nagar, Thiruvallur, Tamil Nadu

8 solar lamp posts were installed. They were erected in areas critical to village life, such as the fishing equipment storage area, the village water desalination plant, public bathrooms, schools and temple courtyard. The lights turn on automatically from 6 pm to 6 am and can run for 18-20 hours without sunshine, greatly reducing greenhouse emissions. Posts are 10 feet high and battery boxes for LED lighting are installed at the top of the light pole, ensuring that these are not affected, for example, by flooding.

2. **Solar-Powered RO (Reverse Osmosis) Plan** at VengamukkaPalem, Prakasam, Andhra Pradesh

The community of Vengamukka Palem together with the AdaptCap project installed **solar panels** on the local reverse osmosis plant. Solar power substitutes the unstable power supply from the grid. The reverse osmosis system needs 3 kWh power that are supplied by the 4kWh solar system. The solar panels system is split into 2 which one 2.4 KW panel was installed on the roof of the plant while the other one, 1.6 KW, was mounted on the ground near the reverse plant. The both solar panels have a length of 1.66 m, a height of 0.99 m and a WP per hour of 200W. The system has a 20 kWh backup system, which enables the plant to run for at least six hours every day independent of the power grid supply. This way, the community can be supplied with drinking water without any interruptions.

3. **Solar-Powered RO (Reverse Osmosis) Plan** at village Kotri, RAJASTHAN

These plants are driven by 5 kW of solar power generated by 96 panels mounted on the roof of the building. Tubular batteries are used to store this electricity. These batteries do not have to be serviced for five years and are not water-based, making them easier to maintain.

Tilonia, installed the first solar-powered RO (reverse osmosis) plant in their campus in village Kotri in 2006. The RO unit had been developed by the CSMCRI (Central Salt and Marine Chemicals Research Institute), a body of the CSIR (Council for Scientific and Industrial Research).

4. **Solar PV Pumps** at DasarajuPalli, Prakasam, Andhra Pradesh

The water from the infiltration well is treated for turbidity and bacteria by a combination of roughing filter and slow sand filters. The water is tested locally by a water quality testing kit to control the final quality of water. Depending on the initial water quality and the performance of the system, the water is disinfected at the end. The water is pumped from the pond to the filtration unit by a solar pump and the filtered water is stored in an elevated tank from where it is directly distributed. In addition, water from canals is piped to local ponds right before the dry season, recharging the infiltration well.

5. **2 Hp Solar DC Surface Water Pump** at Goa Governor Residence, Panaji, Goa

The desired output level was 85 litres per watt, for the same WAAREE installed 10 panels of 225 Wp WAAREE WS series a 2.5 kW system for the 2 Hp two surface water pumps along with a variety of protection features and systems.

6. **Off-Grid Solar PV Systems** at Gujarat, Rajasthan

An off-grid solar project is a standalone power plant meant to produce power at the point of use. PV modules use sunlight to produce DC electrical energy with power density ranging from 5-18 watt per square foot, which in turn passes through mppt charge controllers to ensure safety of batteries and inverter. The inverter then converts this to standard AC electrical energy for consumption in household appliances.

7. **Grid-Connected Systems** at Gujarat, Tamilnadu, Madhya Pradesh

A grid connected project, is essentially a solar Photovoltaic plant meant to feed power into the grid without any captive consumption. PV modules use sunlight to produce DC electrical energy with power density ranging from 5-18 watt per square foot, which is in turn converted to standard AC electrical energy and fed into the grid.

8. **Grid-Interactive Systems**

A grid-interactive system is essentially a hybrid system which can produce solar power during the day and switch over to the grid whenever required, so as to ensure maximum use of solar power. PV modules use sunlight to produce DC electrical energy with power density ranging from 5-18 watt per square foot, which is in turn converted to standard AC electrical energy for consumption. The same can also be stored in a battery bank before conversion to AC. In case the solar power system is unable to support the load due to overcast weather or unexpected increase in need for power, the grid power would be turned ON and fed through the solar power system to operate the load(s). This will continue until the batteries are recharged by the solar power system. This ensures a continuous source of power to operate the load(s).

9. **1100 KW Solar PV-Diesel Hybrid Power Plant** at Tirupur , tamilnadu

This Hybrid Power Plant is for SRG Apparels, Tirupur. 3870 PV modules of WAAREE Make WS-290WP capacity were installed on the rooftop of the solar project developer's existing textile plant. A Solar PV-Diesel Hybrid System combines the power output of PV arrays and the diesel generators. The control system draws power in such a way that it maximizes the load on PV and minimizes on Diesel Generators.

10. **SOLAR CFL/LED STREET LIGHT** by Radha Energy Cell

The standalone solar photovoltaic street lighting system comprises of a Compact Fluorescent Lamp (CF Lamp) or LED Lamp as light source, re-chargeable lead acid battery for storage, PV modules for charging the battery, suitable electronics for the operation safe charging and discharging of the battery and mechanical hardware for fixing these sub systems.

11. **Solar Laminator**

It consists of metallic plates and rollers. The paper to be laminated is kept between the lamination sheets and then passed between the rollers for lamination. Low cost solution for lamination for places where electricity is not available/ available/ is erratic. No bubbling or wrinkling is observed during the process.

12. **Solar air heating for drying requirement in food processing industry** at Theni, India

A flat plate collector is installed as solar technology. A 5 HP power blower is installed to deliver the hot air from the solar flat plate collector. The life of the flat plate solar collector is 15 years and has been installed by SunBest systems.

13. **Solar Water Heaters for process cleaning** at TTK Prestige, Coimbatore, India

The total installed capacity of the system is 16,000 litres per day. Each Solar hot water tank of 2,000 litre capacity is connected to a 24 flat plate solar water heater.

14. **Solar Water Heater** Using **evacuated tube technology**

Using evacuated tube technology, SOLAR WATER Heaters designed with specially coated glass tubes to deliver superior performance that ensures availability of hot water even on partially cloudy days.

15. **Salt-gradient solar ponds** at Bhuj , Gujurat

The pond is a large saline water body in which solar energy is trapped in the salt. The salt solution gets denser with depth, making it possible to maintain a concentrated layer of hot brine at the bottom.

16. **Scheffler Parabolic dish and Solar Parabolic Concentrator** at Turbo Energy Ltd., (TEL), Chennai

The system is generating hot water through Scheffler Parabolic dish and Solar Parabolic Concentrator to operate VAM (VAPOUR ABSORPTION MACHINE) of capacity 90 TR and of 40 TR respectively.

17. **Solar Concentrator for Milk Pasteurisation** at Mahanand Dairy Unit, Latur, INDIA

The solar parabolic concentrator has a collector area of 169 m^2 and is equipped with a double axis tracking system for hot water generation at a temperature of 80-90 ℃. An insulated pressurized water storage tank has been provided for storage of thermal energy.

Annexure - V Waste to Energy Technologies

1. Marble Slurry Bricks

The damage due to huge quantum of slurry, which contains a number of chemical constituents, directly or indirectly propels climate change. Thus, utilization of marble slurry, in some way, can mitigate climate change. This technology negates upto some extent, the damaging effects on environment, land and water. Also, prevents health hazard of the laborers. It has the potential to check the pollution due to Marble Slurry Dust (MSD).

2. Integrated Municipal Solid Waste (MSW) Management (Vellore)

Zero waste management (ZWM) is a system of managing solid wastes that strives for maximum waste recovery through recycling and reuse, aiming at zero waste generation. The Vellore solid waste management project is now managed by village Panchayats supported by Residential Welfare Associations and SHGs. Each family pays Rs 20/- and each shop pays Rs 50/- as waste collection charge. The funds collected from monthly subscriptions and sale of inorganic waste and organic manure are used for paying the street beautifiers and supervisors. The pilots in Vellore district are successful because informed communities are willing to pay for a clean environment managed by local youth who take pride in beautifying their street and get paid for it too.

3. Vermi-Composting of MSW (Hari Mandir, Panchavati, Nashik)

A vermitank was constructed for the Harimandir temple under the technical guidance of Nirmal Gram Nirman Kendra which is working satisfactorily till date. This has not only solved the problem of garbage but has added to the beauty & income of the temple.

4. Conversion of Waste Plastic into Liquid Hydrocarbons/Energy

The invented process involves degradation of waste plastic using `catalytic-additive' and is different from the generally existing pyrolytic processes. The products obtained in the process are Liquid hydrocarbons, Gas and residual Coke.

Annexure – VI Water Management Technologies

1. **Rain Water Harvesting** at Chinnakaramedu, Cuddalore, Tamil Nadu

To address the water scarcity and salinity, the community, supported by the Adaptcap project, constructed a freshwater pond to harvest rain water. The pond has 2 m in depth as the groundwater below is saline. The excavated ground was deposited on all sides with clay, hard red earth and gravel soil. A bund surrounds the pond to protect it from sea water flooding it and a fence protects against other contamination. The pond helps to recharge groundwater and thus reduce its salinity.

2. **Rain Water Harvesting** at Kadapakkam, Thiruvallur, Tamil Nadu

The people of Kadapakkam addressed the problem of water stress by excavating, renovating and deepening the existing pond by 1.5 m (depth prior intervention: 3 m). Thus, the pond now cuts through a layer of sand, which absorbs more water during the rainy season. It also acts as a filter and improves the quality of the ground water, reducing the salinity level, hence improving well water quality. The pond length: 70m – 100m, width: 50m – 80m. Additionally, a bund around the pond as well as shutters was constructed to prevent sea water from flooding land and canals, decreasing further salination of soil, surface and ground water. Plants will be lined around the bund to prevent erosion.

3. **Rain Water Harvesting** at Motumala, Prakasam, Andhra Pradesh

To address the increasing challenge of water scarcity, farmers proposed to capture the runoff water during the intense short rains. In order to harvest the rainwater that runs through the drainage canal in Motumala's agriculture fields during the monsoon period, farming leaders dug a pond in the irrigation canal, which is 150-200 meters away from the large irrigation tank. From the pond, the water can be pumped to the agricultural tank. The pond will fill during heavy rain, at which time pumps will lift the water into the agricultural bund area. The tank digging and check dam in the canal will create 150 m3 of water storage area from which many thousands of cubic meters of water pumped into the irrigation tank during the rainy season.

4. **Rain Water Harvesting** at Naka Gate Slum, Khandagiri, Bhubaneshwar, Odisha

The rainwater from the sloping roof of GI sheet is collected in gutter and transmitted to the first storage tank. Once this tank is full, the overflow passes to the next tank and so on. At the collection point there is an iron bucket to strain away large impurities as mentioned above. From the storage tanks the water passes to the taps of the toilets through a filtration tank.

5. **Rain Water Harvesting** at Laipuitlang, Aizwal, Mizoram

The Government of Mizoram opted to harvest rain from the surface and rooftops of two reservoirs in Laipuitlang. The rainwater collected passes through the slow sand filter and ultimately stored in the two reservoirs.

6. **Rain Water Harvesting** at Residence of A R Shivakumar, Bangalore

The residence of A R Shivakumar is located on a ridge in the city of Bangalore and there is no municipality water connection in the site. The only source of water is rainwater supplemented by groundwater which is extracted through one bore well in the premises.

-About 70 % of the rainwater is diverted to the northern side of the house and gets stored in an overhead tank of 4,500 litres capacity placed on the ground floor roof. This water is generally used for non potable purposes like cleaning, washing etc.

-The overflow of the tank flows to an underground sump of 25,000 litres capacity. This is a L shaped tank and is used for drinking and cooking only.

-The water from the overhead tank is used during rainy season and that from the underground sumps are used during the non rainy seasons.

-The rainfall falling on the backside of the building percolates to the ground through four recycled plastic drums with their bottom cut and buried underground. The interconnected drums recharge the groundwater. Care has been taken that not a single drop of water passes out of the premises.

-The groundwater recharge has improved the groundwater level. Before the implementation of the system, the groundwater level in the surrounding area was 61 m bgl but recently groundwater is available at the depth of 9 m bgl.

7. Rain Water Harvesting at **Sterling Green View Phase-II, Bhopal, Madhya Pradesh**

There are two rows of houses. In one row there are ten houses and in the other row there are five houses. The water from the rooftop comes down the pipes at the backside of both the rows. A main pipe on each row, which is connected to the Amber Filter, joins these pipes. First flushing system is seen there. This filter contains charcoal, lime and sand. The filtered water then recharges two service tube wells in the area. The row that contains ten houses recharges the service tube well which is 51 m deep and the row, which contains five houses, recharges another service tube well which is 75 m deep.

8. Rain Water Harvesting at **Prince Of Wales Museum, Kalaghoda-Mumbai**

The Museum has a yearly requirement of 36,50,000 Litres i.e. 10,000 Liters / Day for gardening. To meet this requirement they designed a recharge pit of 5 m x 5 m x 4 m depth. “V” wire rainwater filter Screen (SS304) from Johnson’s is installed on the mouth of borewell casing pipe. A valve chamber to divert first rainfall water into storm water drain is installed (Size: 0.9 m x 0.9 m x 1.5 m depth). All rainwater downtake pipes in the front side of Museum building are connected to the recharging pit.

9. Rain Water Harvesting at **Ayurveda College Hospital, Thiruvananthapuram**

On the roof, a 1000 litres tank is placed for each rainwater storage tank on the ground. The water is pumped into these tanks and used for gardening and other non potable purposes.

10. **Rain Water Harvesting** at **Shivani Apartment, Chennai**

Around 40 pits were dug around the premises of the apartment. Size of each pit is 4 feet dia and 1.5 feet depth 1' dia and 10' deep auger. 6 recharge wells were dug, each with a dimension of 10' dia and 10'depth with 1' dia and 10' deep auger.

11. **Cascading of Water Tanks** at Kanchipuram, Tamil Nadu, India

Engineers devised a simple solution- a series of cascading tanks. The outflow from one tank would serve as the inflow for the next one in the series since the tanks were designed to allow the excess water to flow out after it has reached its capacity. The thought and effort put into designing these massive chains of receptacles and over-flow channels hundreds of years back is awe-inspiring.

12. **Water Filtration**

Livinguard provides a unique three stage water filtration process. The first stage of filtration involves removal of dirt, soil and mud which happens when water passes through a 5 micron filter. The second stage of filtration involves removing of heavy metals, foul smells and organic matter which happens when water passes through activated charcoal. The third stage of filtration involves removal of microbiological contamination which happens when water passes through anti-microbial treated fabric. The filter effectively eliminates all water borne diseases including E-coli. Particles of 1 micron diameter too get filtered out at this stage.

13. **Biosanitiser/ Eco chip Biosanitiser**

Biosanitiser/ Eco Chip Biosanitiser/ Eco Chip is a compact water and wastewater treatment bio-catalyst which contains various plant enzymes in its purified forms. The enzymes present in the eco chip degrade the organic component and produces active oxygen. It neutralizes the pH of the medium. One chip contains 100 mg of Biosanitiser.

Annexure – VII Miscellaneous Technologies

1. GREEN CARBON BLOCKS

All standard grades of Granular Activated Carbon (GAC) and Powder Activated Carbon (PAC) are certified as GREEN CARBON. GREEN BLOCKS are manufactured by a unique multi stage compression process that offers superior performance in contaminates reduction with lower pressure drop compared to the conventional extruded blocks.

2. **Pico-hydro electricity production (3 kW)** at Jodpal Hamlet, Karnataka

A 3KW pico hydro project has been installed by prakruti renewable power pvt ltd in 2011. The site receives water from Thala-Cauvery which is a perennial stream originating from the Kodagu hills. Continuous water availability has ensured the success of this Pico-hydro project. The power generated is enough to meet the lighting and small commercial activities of the village.

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