

## CLIMATE CHANGE – WHAT WE CAN DO ABOUT IT!

*By Dwarkadas “Solar Suresh” (PGP 1970)*

**“Dwarkadas “Solar Suresh” from the land of Milk and Management, takes himself very seriously. So do the brinjals in his terrace garden. By applying modern technology to traditional ecological concepts, Suresh’s house in Chennai is a shining example of what individuals can do about the environment.” - Chik Krishna Chidambi (PGP 1970)**



The most debated topic during the last two decades is Climate Change or Global Warming or Carbon footprint. In Dec 2017, 190 countries of the UN signed an Agreement in Paris for country-specific targets that would lead to a global reduction in the carbon footprint. Protection of the environment as a concept is now coming to occupy centre-stage by socially conscious individuals and groups through talks, videos, demonstrations and the like.

My emphasis is on individual households, smaller establishments, and what they can do to mitigate the challenges to our environment. To demonstrate this, I have initiated seven activities in my own house in Chennai where I live.

I have taken my ideas from villages. Nothing original. Very simple. No rocket science. I am neither a consultant nor a theoretician. Anyone looking at these installations in my house will realise that they can do it too.

**1. Rain Water Harvesting (RWH)** Installed 25 years ago. The objective is to save a precious natural resource, water. Water gets drained away during rainy days. Collect rain water which gathers impurities in the terrace. Filter it through a sedimentation system of pebbles, charcoal and sand in layers. The output water is potable. I collect filtered water in an open well.

There is another type of RWH – I observed rain water stagnating in two locations in my compound, breeding mosquitoes and germs. I have taken such stagnant water below the ground using a 20-foot slotted pipe to recharge ground water substantially. Only one-time cost of pipes and installation of about Rs.5,000 to 20,000 depending on the terrace size and pipes length. No daily maintenance required for both the types.



**2. Rooftop solar panels for power** Installed a 3 kw system in January 2012, 2 kw on-grid and 1 kw off-grid with battery back-up. First in India to have automated the system. Derive revenue from on-grid power by feeding excess to the grid. Use the off-grid battery supply to power residential needs during outages. My rooftop solar plant has ensured that I have had electricity 24 x 7 for the last 8 years, without any outages.

There are advantages to solar power - like no daily maintenance, protection against future tariff increases by government, no separate wiring, no pollution, no consumption of fossil fuels and saving foreign exchange for the country .

- 1 kw produces 4 units of electricity per day and requires 80 sq ft of shadow-free area
- 1 kw on the grid costs Rs. 60,000 in Tamil Nadu and off-grid Rs. 100,000 with 4 batteries of 150 Ah
- The investment in my solar panels was Rs. 350,000 in 2012 and it covers 240 sq ft



**3. Domestic Bio-Gas plant** Earlier, cooking in India used home-dried cow dung for fuel, also gobar gas plants. This practice is now impractical, especially in urban India. So, I started using kitchen waste, namely cooked/uncooked food waste and fruit, vegetable peels. Starting point is cow dung. I installed 1 cubic meter capacity plant in February 2013, and use 3 to 4 kg kitchen waste per day and obtain 10 to 15 kg gas per month. It is possible to feed more and get more gas. I collect waste from neighbours and nearby vegetable stores to increase the input feed. Resultant methane gas is stored in a floating drum, from where it is piped to the kitchen for cooking purposes. While the gas is being produced, the unusable waste (slurry) is pushed out automatically. The slurry is excellent organic manure.

The main objective of bio-gas is not generating cooking gas and manure. Waste management is a big problem in cities. First, the waste has to be properly segregated. Even so, the disposal of wet kitchen waste, unless carefully done, can become a health hazard (breeds mosquitoes and germs, spreads disease and more). Use of wet kitchen waste in the areas where it is produced minimises health hazards and reduces the costs of waste disposal and fossil fuel use. So my objective is 'health'.

There is no pressure generated in bio-gas production. Hence, domestic bio-gas plants are very safe. No possibilities of explosion. No daily maintenance. No odour, no mosquitoes, good bio-fertiliser. Cooking is slow compared with LPG. 1 cubic meter capacity costs Rs 40,000 to set up.

Note: Science is as follows - Cow dung generates bacteria. This reacts with waste and generates methane gas. The process is anaerobic methanisation.



**4. Terrace Kitchen Garden** We utilise the organic manure of our bio-gas plant to organically grow vegetables in pots on our terrace. We grow some seasonal and some perennial vegetables - tomato, lady's finger, brinjal, green chilli, capsicum, cucumber, bottle gourd, ridge gourd, spinach, radish and many more in over 150 pots. We use only organic pesticides like Panchgavya and 3G oil made from neem leaves.

The cost may work out to Rs. 300 to 500 per pot including soil, manure, cocopeat and sand. They can be managed by daily labour or self-attended; latter is preferred.

We are yet to fine-tune the economics which may show that buying from the market may be cheaper. However, home-grown vegetables are fresh and assuredly organic. The experience of seeing vegetables grow in front of your eyes is priceless.

It is worthy to note that since March 25, 2020, we managed mostly with vegetables grown in my terrace kitchen garden.



**5. Air-to-water generator** This produces drinking water from atmospheric air. The moisture is condensed and drinking water results. We use Israeli technology developed over 60 years ago which is being adopted here only now.

I have installed a 30 litres-per-day equipment, at a cost of Rs 50,000 (one-time installation cost). This is an appliance like an air conditioner. Works on electricity. Consumes 0.25 units

of electricity per litre of water. In my house, it runs on solar power. No daily maintenance. Quality of water is very good. (Tested independently in laboratory).



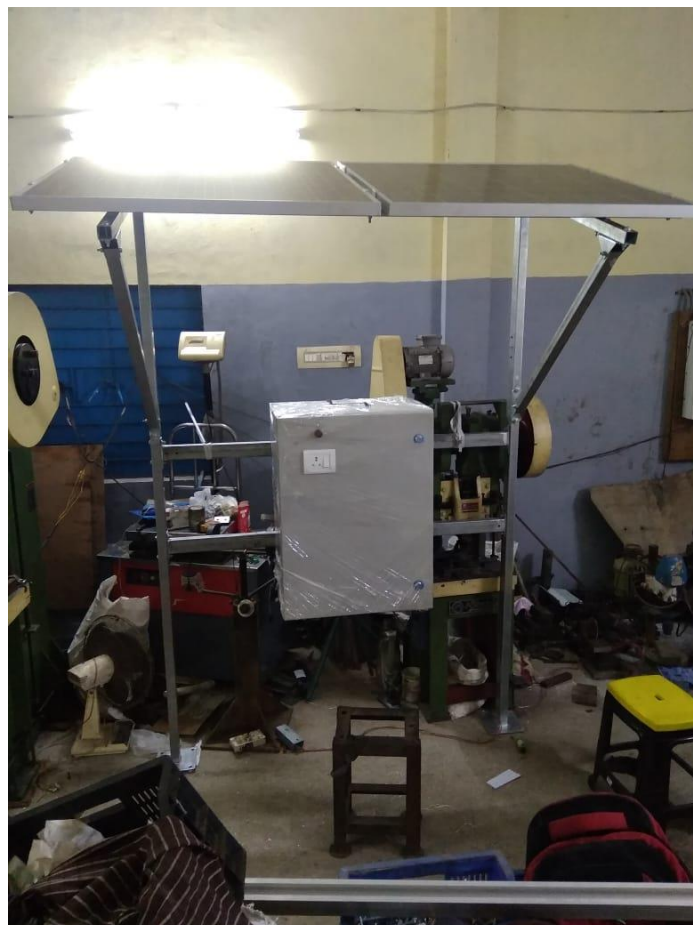
**6. Afforestation - Greening of residential areas** We live in a thickly populated urban residential locality in Chennai. By growing neem, bamboo, and almond tree widely over 30 years we have altered the landscape in our locality and created a verdant atmosphere.

**7. Solar-Powered Car** We have recently developed the prototype of a solar-powered car and have been testing its performance on Chennai roads. All electric vehicles run on a battery which has to be charged by conventional power, consuming fossil fuels and generating carbon footprint. Foreign exchange is expended in procuring fossil fuels. Therefore, EV is not the ideal solution for intercity transport. Countries like Korea (Hyundai), Japan (Toyota), and Norway have developed trial cars powered by solar power.

The car has been developed for me by a team of cross-functional fresh engineers. Presently we have tested the concept. It is fun to see people staring in awe at the car running on Chennai streets.



I have now developed a **Solar Charging Station for EV - electric vehicles** - two and three wheelers. These EVs are now plying in large numbers in many states. These EVs require charging through conventional power source, meaning consumption of fossil fuels and generating pollution. Solar charging will be the answer.



**8. Waste Water Recycling** This project is pending in my house. Sewage Treatment Plants (STPs) are common in industries and in large apartment complexes. Now, this affordable technology is available for using in a single residence or smaller establishments to get usable water.

**To conclude:** Do not expect the government to find solutions for you. Find your own solutions!