

The Green Energy Corridor Project

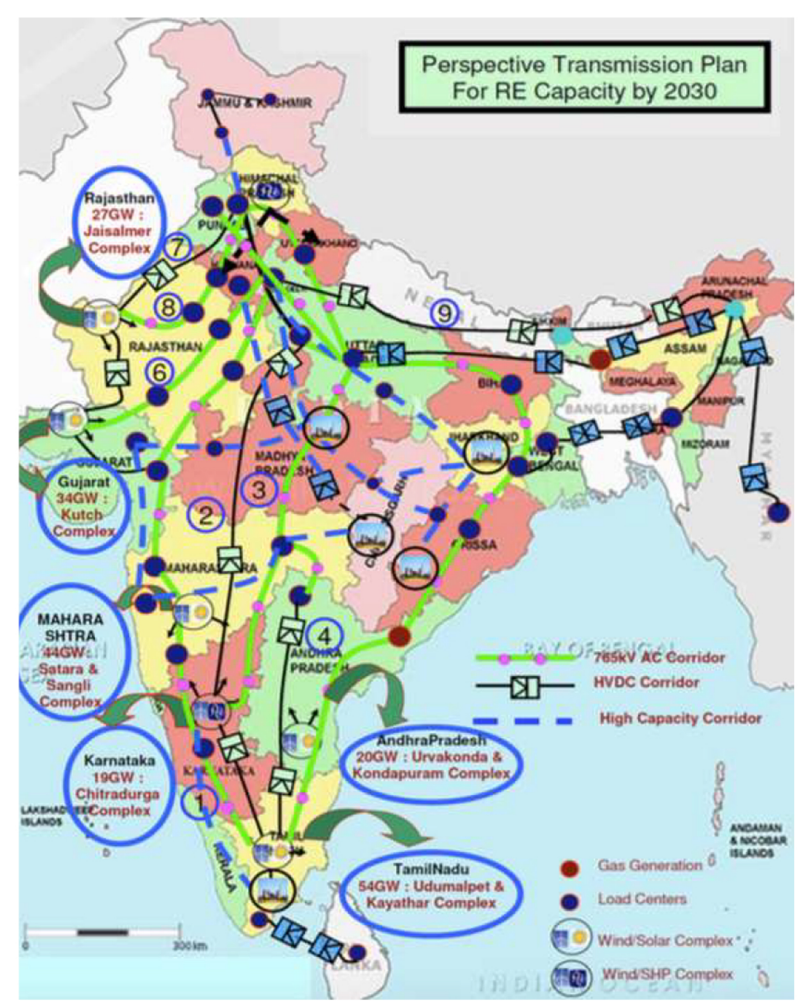
The green energy corridor (GEC) project was announced by the Power Grid Corporation of India Ltd. (PGCIL) in the year 2013. It is aimed at adding and synchronizing all major renewable energy projects in different parts of the country to the national grid by 2030. The project only focuses on integrating green energy sources available in India like solar, wind, small hydro, tidal etc. It does not consider power coming from low carbon or fossil fuels like nuclear, coal and gas based thermal power plants or any other non-renewable capacity within and hence, the name “Green Energy Corridor”.

After the largest power blackout in India on 30 July 2012, this is seen as one of the major requirements in grid transformation by the government. The common problem with renewable energy sources (like solar and wind) is the dynamic behaviour of voltage and frequency fluctuation. These fluctuations occur due to unpredictable changes in solar irradiance and wind intensity at all geographical locations with time.

GEC will be developed in two parts. First at inter-state level, which will be developed by respective state governments; and second intra-state, which will be developed by PGCIL. The task is to renew transmission infrastructure and services to introduce large scale renewable capacity. Initially eight renewable-energy rich states were selected including Rajasthan, Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Himachal Pradesh and Jammu & Kashmir. Respective state nodal agencies of these sates are responsible to provide information regarding current capacity.

Madhya Pradesh government also prepared the blue print for GEC projects in September 2016. It involves 6000 MW of renewable-energy projects worth ₹4000 crore, which are scheduled for completion in the next five years.

Source: (GERMI)
The Gujarat Energy
Research & Management Institute



Source: PGCIL

Surya Raitha Scheme Karnataka| A solar pump set

Scheme for Farmers

Karnataka government is going to launch Surya Raitha Scheme to provide solar water pump sets to the farmers. Subsequently, the state govt. will replace the existing irrigation pump sets (IP Pumps) with these solar water pumps in order to produce excess energy. Accordingly, govt. will launch this scheme on the pilot basis in Kanakapura on 19 January 2018.



In the initial phase, Karnataka govt. will replace 310 IP sets with solar water pump sets. These solar pumps

have around 1.5 times the capacity to pump more water than the existing IP Pump Sets. Moreover, these pumps will supply 1/3rd of the total energy generated to the nearby electricity grid (assembly).

Surya Raitha Scheme

Surya Raitha Scheme helps farmers in irrigation purposes as the farmers need not switch on their IP Sets during night. Subsequently, the solar water pumps keep a check on the power and water wastage. Karnataka govt. will launch this scheme through funds collected from combination of

farmers investment, Central & State govt. subsidy and soft-loans from Bangalore Electricity Supply Company (BESCOM).

FEATURES OF THE SURYA RAITHA PILOT PROJECT (In Kanakapura taluk, Ramanagara district)			
Dedicated high voltage distribution system (HVDS) feeder	All IP set consumers on feeder will be part of projects.	 310 Number of pumpsets	
	Assured day time power supply.		
IP sets will be metered for accounting purposes.	 2.58 MWp Solar photo-voltaic capacity	11 Number of villages	

“Ere long intelligence—transmitted without wires—will throb through the earth like a pulse through a living organism”
-Nikola Tesla

Are electric vehicles better for the environment than gas powered ones?

Comparing electric and gas-powered versions of the same car show the environmental benefits of electric vehicles.

Are electric vehicles really better for the environment when you include the resources that go into making the battery and the impact of disposing it?

One massive benefit of electric cars in cities, is that the pollution isn't occurring at the point of use. So even if the power comes from coal, that's coal burning outside the city, thus improving the air quality within the city (over a diesel or petrol car).

Renault recently made a public report that provides a fair assessment by comparing an electric version of its Fluence sedan with gas and diesel-powered versions of the same car. And it makes clear that electric cars are, indeed, better for the environment. It looked not only at greenhouse-gas emissions, but impacts on acid rain, ozone pollution, algae blooms, consumption of water and materials such as steel and copper, and total energy demand.

Electric vehicles come out behind in two areas. They contribute slightly more to acid rain. And they're slightly worse in terms of causing algae blooms than gasoline cars.

Electric cars usually also show significantly reduced greenhouse gas emissions, depending on the method used for electricity generation to charge the batteries. For example, some battery electric vehicles do not produce CO₂ emissions at all, but only if their energy is obtained from sources such as solar, wind, nuclear, or hydropower. Even when the power is generated using fossil fuels, usually electric vehicles, show significant reductions in overall well-wheel global carbon emissions compared to gasoline vehicles, due to the highly carbon-intensive production in mining, pumping, refining, transportation and the efficiencies obtained with gasoline.

- AJAY PANDA
6TH SEMESTER
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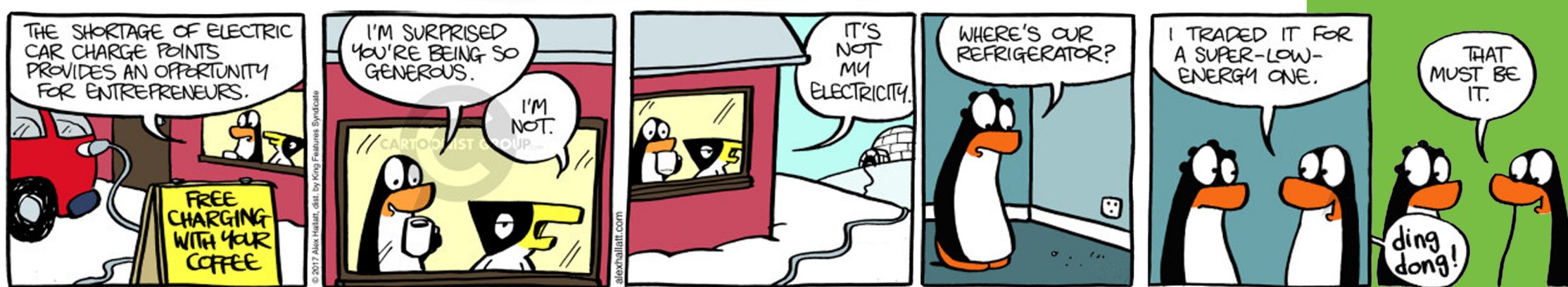
The kite wind generator

It's an expert estimation that the total energy stored in wind is 100 times higher than the actual need by of humans on this earth. The catch is that we have to learn and devise ways to trap this wind power blowing across the planet earth. Experts tell us one more thing that most of the wind energy is available at high altitude and we can't manufacture turbines of that height. So we have to think of new ways to trap that wind power blowing at a significant height.

Now researchers want to create something like a kite that can float at a higher altitude to trap the wind energy.

The Kite Wind Generator simply known as KiteGen is an Italian company. They are installing kites that sprout from funnel like structures. They are mounted on giant poles. When wind blows these kites come out of funnels. For short, use kites that spring from funnels on the end of giant poles when the wind blows. For each kite, winches release a pair of high-resistance cables to control direction and angle. These kites are light and ultra-resistant. These kites are similar to those used for kite surfing – light and ultra-resistant, capable of flying up to a height of 2,000 meters.

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“We step up, We Transform”

THE SOLAR SOLUTION- Harvesting Energy Forever

Today Over half our energy comes from fossil fuels extracted from deep within the Earth's crust. Since commercial oil drilling began in the 1850s, more than 135 billion tons of crude oil has been extracted from the Earth. Every day, human beings consume more than a million terajoules of energy. And this means ...roughly equivalent to what we would use if all 7.5 billion people on earth boiled 70 kettles of water an hour around the clock (See figure 2). It illustrates our thirst & hunger for Energy and dependence on it. This also leaves no doubt in our mind that business as usual means this craving to grow, and exponentially as the underdeveloped too climb the prosperity ladder (see Figure 1).

Vital to Cope with Energy Demand Sustainably – Need Energy Only if we Exist!

AS THIRST FOR POWER GROWS... Will supply of energy in the future be enough to satisfy the needs of all? What about the quality of energy generated? Will it be environment-friendly? As scientists ponder these and other questions, a

Source: (www.masterbuilder.co.in)
Sadagopan Seshadri
Chief – Content Development,
CE – Infrastructure – Environment

hard look at the big challenges facing mankind on the energy front as well as environment front simultaneously has become imperative to ensure man's very sustainability on planet !! We need Energy only if we continue to be alive and kicking. Therefore 'Need to Exist' is a precondition to 'Energy Need'. Therefore the need to look for means that satisfy both 'Existence' & 'Energy' in that order!!

The challenge is of supply which is critical with huge 'Demand spike' expected in Asia, Latin America and parts of Africa as these are still in developing phase. (see Figure 2).

Making Renewable Energy the Answer

The sector is expected to continue growing by 2.6% each year until 2040. Worldwide, Solar Energy production grew by 50% in 2016 (See Figure 3). Sun is an inexhaustible source and the pity is that man is just utilizing 10% of what it is offering. There is a huge ground to cover. Look to the sun and just focus on it and man needs not depend on anything else!

'Global Warming' makes 'Cooling' needs the Burning Issue



Figure 1

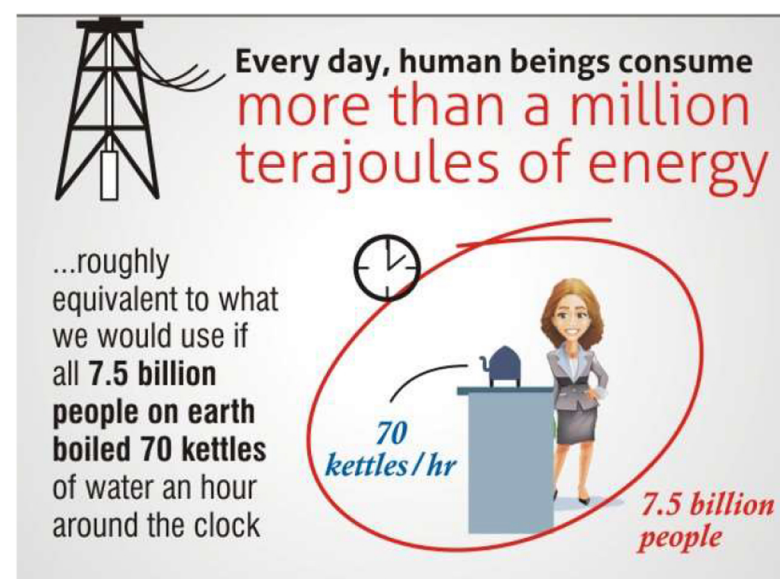


Figure 2

Figure showing the usage of resources

Therefore, Green house gas emissions (CO₂ especially) from fossil fuels as a whole needs containment.

Key Project variables affecting tariffs

A Bridge to India report identified the following variables and performed sensitivity analysis to show that tariffs can vary by as much as 20-25% or even more depending on tender structure, timing and specifications. See Table 1.

	Unit	Base case assumption	Variation	Change in tariff to maintain equity IRR
EPC cost (module cost)	₹ million/MW (C/W)	42 (34)	± 5%	± 4.1%
Land and transmission cost	₹ million/MW	3	± 20%	± 1.1%
Irradiance	DC:AC overloading	1.15x (21% CUF)	± 0.05x	± 2.7%
Cost of dept	% p.a.	10.5%	± 1% p.a.	± 3.4%
O&M cost	₹ Million/MW	0.4	± 5%	± 0.3%
Grid availability	-	99%	± 0.5%	± 0.2%

Table 1

Table showing key project variables affecting tariffs



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“No resistance can drop our potential”

(continued from page 2)

KiteGen people have thought of new ways to exploit the wind power existing at an altitude. They have discarded the usual heavy and static plants like current wind turbines, but opted for light, dynamic and intelligent ones. They have installed all the light devices in the air and heavy ones on the ground for generating power. The basics of the wind turbines and KiteGen are same. But they have moved the heaviest parts to the ground. They claim that the resulting structure, base

foundation included, is much lighter and cheaper. They have also provided flexibility regarding the height of kites. If the wind is strong at certain height, the height of the kite too can be adjusted accordingly. If today wind is blowing nicely at 1000m, say, kites can be adjusted at the same height. If tomorrow the strong wind is blowing at certain other height, wind kites can be flown at that height to gain maximum advantage of the wind power.

The swirling kites prompt KiteGen’s core in motion, and the rotation activates large alternators producing a current. They also have a control system on autopilot. This control system manipulates the flight pattern so that maximum power can be generated be it night or day. The KiteGen people are concerned with the environment too. They don’t want the lives of birds to be affected by their flying kites. So they have installed the advanced radar system that can redirect kites within seconds in case they detect flying of birds.

The cost of the technology is US\$750,000 and it won’t takes acres and acres of space like a wind farm. You can install the whole machinery within a diameter of just 100 meters. KiteGen claim that they can produce half a GW of energy, and produce it at a cost of US\$2.5 per GW. Its creators, Sequoia Automation, say a 2,000 meter-version would generate 5GW of power

- MEGHANA BHUSHAN
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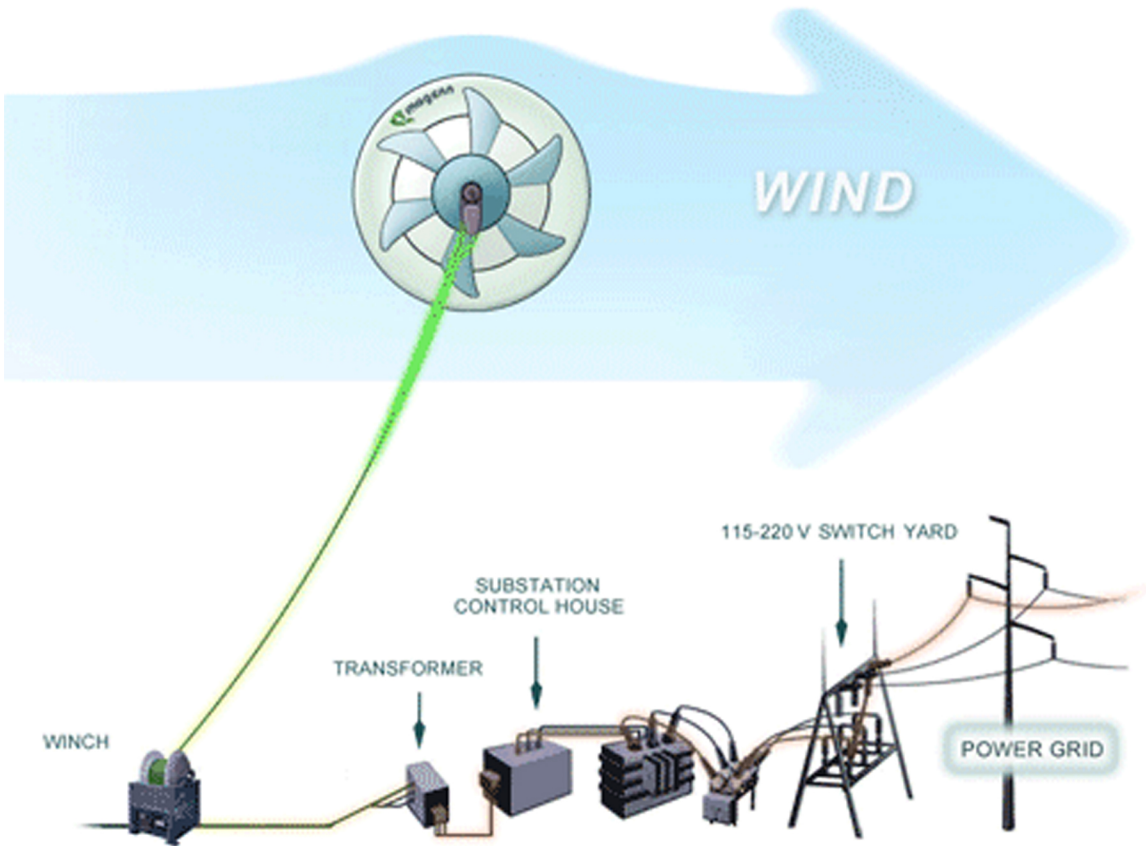


fig: The Kite Wind Generator

I am delighted to know that ‘TESLA’ is bringing out a monthly buletien entitled ‘FYEI’ that covers wide spectrum of information related to Electrical Engineering. Such information bulletien serve as a knowledge source to update and keep abreast with most recent happenings in the field. I wish that the editorial team bring in highly focused coverage in the Electrical Engineers field for the bnifit of student community. I congratulate the ream and wish sucess in all forthcoming issues.

- Dr T N NAGABHUSHAN
(Principal)



I am happy that the students of our department are bringing out the newsletter FYEI with an idea to highlight and promote the latest technological innovations in electrical and electronics engineering. This forum provides an opportunity to the student community to express and bring out their hidden talents.I wish their venture a great success with continuous improvement in the newsleter.

- Dr. K T VEERAMANJU
(Professor and HOD)

“Peace be amplified, world be rectified”