

Chamalapura Thermal Power Station: A Partial Estimate of Health Effects based on Radiation Release through Stack and Flyash Utilisation.

Table CEC succinctly brings the prognosis for a cancer epidemic in Mysore area and other regions in a 88.5 km radius surrounding the proposed Chamalapura Thermal Station, totally unnecessary to meet Bangalore's needs. The present risk of 72 fatal cancers per annum per 100000 of the population will increase by 4 to 5 times when all utilitarian measures for the flyash are put in place in the area.

Chamalapura is not an end in itself. With some 100000 MW of thermal capacity in place, all India will similarly face this risk. It is not only this risk, but the risk of fatal doses to all ages resulting in enhanced infant mortalities and still births of unspeakable magnitudes that is the prognosis on an all India basis. By implication, this will result shortly in a further population explosion by means of the survival instinct penetrating the general public. On the basis of the ECRR recommendations it is easy to estimate such mortalities. But the prognosis placed above should deter any policy from being implemented which continues with coal firing without energy conservation life styles and methodologies being implemented. For example it is a well known practice in India of vapour absorption air conditioning which saves up to 92 percent of electricity consumption using vapour compression methods. When one walks into the Delhi Macdonalds one sees vapour absorption cooling at work! See <http://changetovapourabsorptionacnow.rediffblogs.com/>

If practices like these penetrate malls and offices in Bangalore, will there be any need for Chamalapuras? Similarly, the thodaemaelayas should be run by pedal power driven generators plugging in homes and offices. These should be run by officers and workers with beautiful paunches so that the need for another few thousand megawatts of Chamalapuras just vanish!

Jai Chamundeshwari! Give the policy makers food for thought.

At the begin of the 20th century Mahatma Gandhi warned: The East can meet the West when the West threw overboard almost the whole of modern civilization; the East can also meet the West when the East embraced modern civilization; but that will be an armed truce.

Given enough time modern civilisation will destroy itself.

Chamalapura!	Sutta iddilu	Thodaeyamaelae
Mysoorannu ulisi	Haraduva vishavu	Nadasakke namshakti
Anuvishadim!	Jeevathinnatthe	Eisothermal ree!
Eisothermal	Bhoomithinnatthe	Ee bhoodiyinda
Eekaladalli baeku	Chamalapuradinda	Maaduva Ittigeyim
Eddilu baeda	Haaruva bhudi	Janara saavu

The case for a normal civilization

A mall of a good size like the ones in Bangalore or Mumbai, spends 1300 to 1400 kWhrs(units) of electricity a day. 70 percent of that is for air conditioning and refrigeration- vapour compression type. If they used vapour absorption cooling(with associated lining up of low quality energy), 92 percent of the electricity consumption for air conditioning can be saved. The implications for climate change of this substitution are significant indeed. See an account of the forgotten technology given by Dr MN Saha in his book on heat published 70 years ago(M.N.Saha et al 1936). For a quantitative commercial application on a crash basis, reputed firms and technocrats and managers will surely come forward like Thermax and others. Especially when a power saving of some 50000 MW- fifty thousand megawatts can be effected by such means. Imagine the destructive and unsettling power stations that will not be built, if we have the wisdom to make wise choices. According to **An Air Conditioning System Using Solar Energy, A Short History, and Description of an ICPC/2E Chiller as Designed by Solargenix Energy, E. Thomas Henkel, Ph.D Solargenix, Energy, LLC,June 22, 2001**(Solargenix Energy at www.solargenix.com):

Every 1000 tons of installed solar/natural gas absorption air-conditioning equipment permanently relieves the electric power grid of an average of 1 MW of demand. This is 70 percent average saving of electrical demand based on 1.4 kW per ton refrigeration.

This follows from the present electricity scene: 120000 MW capacity. Out of which, 80000 MW for air conditioning and refrigeration is the demand. With vapour absorption units instead of vapour compression systems in place, the electricity demand for this would be only 24000 MW! Thus 56000 MW would be transferred to other legitimate uses. The real need would come down to 120000-56000 or just 64000 MW. Six times this would be some 384000 MW by 2030, not 800000 MW AS CLAIMED IN THE REPORT OF tnn AND agencies. 2006! Note that conservation and substitution potentials in other areas have not been even considered in this estimate. Indian industries are pioneers in such applications. See for example how total energy systems are getting credit for demand substitutions in India (Examples: The Tata Chemicals and Bharat Petroleum).

Maal nadasakke Vaperabsorption baeku Kampressar baeda!	Three Mile Islandnal Risipot: korardha paaka Belge breakfastge!	Thomatharnagni Himalaya kargsi neer Kudiyakkill!
Ee vaatanukool Shaekhada Thombathherdu units ulsathhe!	Chamalapuradalli Iddilu athvaa anu Sthaavara baeda!	Thodaeyamaelay Nadesuvadakke plug Nimmashakti ree!
Kolata saaku Anusthavaravoo No! Jeevathinnavu!	Kolata saaku Nooru kolinda naaku Upayogavu!	Voodisi Afees Isothermal genratrim Cyclim hotte hoith!

Table CEC ya Chamalaatkaaravannu noodii!

Table CEC : Annual Cancer Risk Estimate for Proposed 1000 MW Thermal Power Station at Chamalapura, Near Mysore.				
1	Chamalapura			
2	Population affected at a radius of 88.5 km around the plant			6581352 Assumed.
3	Estimated population density			267
4	Proposed plant capacity, Mwe			1000
5	Expected Plant Factor			50 Assumed
6	Coal use T/d/MWe			14 Assumed
7	Ash content, %			31 Assumed
8	Radioactivity Bq/kg ash			
9	Radium 226			104 Mean of
10	Thorium 228			145 Values
11	Potassium, K40			374 Ref2
12	Conversion factors Bq/kg	Ra226	0.462	Ref 1
13	to absorbed gamma	Th228	0.604	
14	dose rate in air, nGy/h	K40	0.0417	
15	Absorbed gamma dose rate, nGy/h			150.9258333
16	Conversion factor to Effective Annual dose rate	8760x. 2x .7x10^-6	0.001226	
17	Effective Annual dose rate mSv/y	External		0.185095442
18	Conversion factor for	Ra226	1	
19	Ra226 Eq activity, Bq/Kg	Th228	1.43	
20		K-40	0.077	Ref1
21	Ra226 Eq, Bq/kg			339.4727222
22	Kg ash produced/y 4x 5/100x 6x 365x 7/100x 1000			797166260.8
23	Total Activity of Ra226	9*22	Bq	82905291119
24	Total Activity of Th228	10*22	Bq	1.15589E+11
25	Total Activity of K-40	11*22	Bq	2.9814E+11
26	Ra226 Eq Total Activity	21*22	Bq	2.70616E+11
27	Extreme Proximity Activity Load on all persons in 88.5 km radius of plant distributed uniformly		Flyash roads, pavements, malls, offices, schools, housing, railwaysleepers, hospitals, hotels, park lanes, railway stations,	soils, vegetation, foods, water, ,milk, air
		100%		
28	Ra226 ECRR dose coeff. for ingest and inhale dose	Adults	Sv/Bq	2.80E-07 Ref 3
29	Corresponding integrated personSv	26x 28	personSv	7.58E+04
30	Assured fatal cancer dose	Ingested+Inhale		3 Ref 4
31	No. of fatal cancers/y	Sv	Gofman	2.53E+04
32	Increase in fatal cancers per 100000 of pop	31/2	Annual	3.84E-03
32	Increase in fatal cancers per 100000 of pop		Annual	3.84E+02
33	Present cancer rate all cancers per 100000 of pop	South Central Asia	Annual	72.55 Ref 5
34	Relative Risk	32/33		5.29E+00
35	Interpretation	Cancer	Epidemic	Expected.

Sources:					
1	Natural radioactivity of ash and coal in major thermal power plants of West Bengal, India				
	T. Mondal, D. Sengupta* and A. Mandal				
	Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur 721 302, India				
	CURRENT SCIENCE, VOL. 91, NO. 10, 25 NOVEMBER 2006				
	pp1387-93				
2	Lalit, B.Y., Ramachandran, T.V. and Mishra, U.C. Radiation Exposures due to Coal Fired Power Stations in India. Radiation Protection Dosimetry. 15:197-202(1986).				
3	ECRR. 2003. Recommendations of the European Committee on Radiation Risk. Health Effects of Ionising Radiation Exposure at Low Doses for Radiation Protection Purposes. Regulators' Edition: Brussels, 2003. Annex A: Dose Coefficients for the main isotopes of radiological interest. p185.				
4	Gofman, J.W. 1981. Radiation and Human Health. Sierra Club Books.				
5	Max Parkin, D., Pisani, P. and Ferlay, J. 1999. CA Cancer J Clin. 1999;49:33-64. Table 3: Estimated Age- Standardised Incidence and Mortality Rates per 100000(World Standard) by Type of Cancer, World Totals.				

Aakaala chandavo
 Ee kaalachandavo
 Yochaneyamaadi
 Neenae Haelu jaana!

Living Energy!
 Enjoy in full kindly use!
 There's enough for you!

Reforestation!
 Let reverdure be your call
 Employ everyone!

In India fifty thousand megawatts of living energy for the eternal wheel of life! A health cost audit of the coal fired plant of the best design is in <http://www.geocities.com/rakumra/broadisasmalltowninchinathatsellsnonelectricalairconditioning.pdf> informing that the health costs are several orders of magnitude more than the profits from the plant.

As told by God(The truth is):

Brief on Chamalapura coal fly ash & smog disaster. Prevent a cancer epidemic and millions of infant mortalities and still births all over India

Is there a disaster? ... **Yes, a slow yet 'silent' deadly disaster.**

Is it well known? ... **No!** This 'silent' environmental disaster is not known generally by the majority of public. The public will hear of these problems from time to time. However, the powers that be use media and industrial psychology to falsely cover or distract from the truth.

What is this disaster? ... **Massive production of poisonous fly ash and smog from burning coal.** The inadequate disposal of fly ash in Chamalapura is causing (He sees!) long term poisoning. Note that coal is one of the most impure of fuels.

Where is the source of this disaster? ... **Chamalapura Power Station.**

What are the 'powers that be' doing about this? ... **Very little!**

Why "*very little*" ? ... **Adequate disposal is very costly.** It is cheaper to keep the many environmental problems concealed from the general public.

What is coal fly ash? ... **It is fine particulate ash** resulting from the combustion of coal, and discharged as airborne emissions whereby much is recovered by solidification while suspended in the exhaust gases, being collected by electrostatic precipitators or filter bags. As the particles solidify while suspended in the exhaust gases, fly ash particles are usually spherical in shape and range in size from 0.5 - 100 μm .

What is this smog? ... **It is a result of the poisonous gases** containing nitrogen oxides and sulphur dioxide combining with other pollutants to form the most noxious parts of this smog. Note that these gases cause acid-rain damage. Acid rain is a broad term referring to a mixture of wet and dry deposited material from the atmosphere containing higher than normal amounts of nitric and sulfuric acids. Prevailing winds can blow these compounds over hundreds of kilometres.

What pollutants does fly ash consists of ?

It consists of inorganic incombustible matter present in the coal that has been fused during combustion into a glassy amorphous structure. Coal can range in ash content from 2%-30%, and of this around 85% becomes fly ash, with the remaining 15% called bottom ash which isn't lifted up by the flue gases. Fly ash contains silicon dioxide, aluminium oxide, iron oxide, and **heavy metals** including nickel, vanadium, arsenic, beryllium, cadmium, barium, chromium, copper, molybdenum, zinc, lead, selenium and **traces of radioactive materials.**

As large amounts of fly ash are produced, a tremendous amount of **radioactive waste** is generated. This radioactivity is due to the elements in the decay chain of uranium and thorium; the radium is of concern as ^{226}Ra decays to form radon (^{222}Rn) which has a half-life of days and is able to form mobile daughter radioisotopes. This type of radioactive material often is known by the code name NORM. Note that when you inhale radon 222, it converts to **deadly radioactive polonium 210**, a solid: which cannot be washed out of your lungs! Remember **Litvinenkov?**

Producers of fly ash contend that this ash is harmless and has similar properties to soil. This is not correct!

It has been estimated that about 7 million tonnes (Mt) are disposed of annually in Australia, 40 Mt in the United States and **hundreds of megatonnes in India and China.** As a result, the disposal of fly ash is a growing concern.

What does Chamalapura Power Station propose to do with its fly ash?

Collected ash is disposed in ash ponds and landfills, while some is sold for use in the cement and other industries. Ash would be seen on adjacent land to Chamalapura Power Station, like in Raichur a result of being blown by wind. Small amounts no doubt must blow for hundreds of kilometres over the years.

*"Stop the poisoning.
Poisonous gases and fly ash*

*blowing in the wind make
me sick."*

What does the Ontario(Canada, not KannadaNadu!) Medical Assoc. (OMA) say about smog (air pollution) ?

Burning coal produces smog and harms our health -

Estimates are that air pollution costs Ontario more than \$10 billion per year in health care costs, lost work time and other quantifiable expenses, as well as killing an estimated 2,000 Ontarians each year. The OMA has declared **air pollution "a public health crisis"** in Ontario. **Coal-fired power plants are the single largest industrial contributors to this crisis.** These plants are major producers of nitrogen oxides, which combine with other pollutants to form ground-level ozone, one of the most noxious parts of the smog brew. Sulphur dioxide, which contributes to the yellow haze that hangs over Southern Ontario is a major factor in causing acid-rain damage to lakes, rivers and forests.

Mercury can, in even tiny amounts, have a devastating impact on the human nervous system, especially for children and the unborn. Exposure to mercury can cause brain and kidney damage and even death. Mercury exposure has also been linked to impairment of children's reasoning skills.

Lead, which is also particularly harmful to children can cause brain damage, impair growth, damage kidneys and cause learning and behavioral problems. See the lead story of Chandigarh below, which may be reenacted around Chamalapura.

Heavy metals, including cadmium and chromium are known cancer-causing toxins. The pollution coming out of Raichur's giant smokestacks is the equivalent of the pollution produced by 3.3 million cars. Its emissions contribute not only to the choking smog that lies over Raichur every summer, but also to the devastating impacts of global climate change and to the well-known problems caused by acid rain.

Bangalore continues to grow rapidly and coal combustion would become the dominant fuel source for electricity(sic) in a business as usual scenario. Naturally occurring radioactive species released by coal combustion are accumulating in the environment along with minerals such as aluminum, iron, lead, magnesium, titanium, boron, chromium, mercury, arsenic, silicon, calcium, chlorine, lead and sodium. Add to this the problems of acid rain and so **the long term problems of these released materials will one day be of such significance that they should not be ignored now(Ref 2.)**

Moreover only 2% of the energy in the coal is converted to useful goods and services. The remaining is wasted blazing and heating up the globe causing glaciers to melt and converting perennial rivers like the Ganga to seasonal rivers. Also the sea level rise will displace millions to high rises in Bangalore, where they will perish without water!

NOTE THAT THIS IS ENTIRELY UNNECESSARY! As shown above!. Kanadigas arise and Mysoorannu Ulisi!

Chamalapura Power Station may sell 300,000 tonnes (perhaps 40 percent of Chamatkara Power Station's annual ash production) to Cement Industries in India by 2014/15 for use in the concrete industry, and some may be sold for ceramic, paint and insulation products. **This means over 3 million tonnes of ash may be produced during 2014/15, perhaps in Karnataka alone.** Based on an average of 85% being fly ash, this equates to Chamalapura and other stations producing over 2.5 million tonnes of fly ash. Subtracting the 300,000 tonnes sold, and allowing for other sales such as ceramic production(Oh! My! My flooring are ceramic tile, and my house is of the flysh bricks!: God save me Chamundeshwari) there could be millions of tonnes of poisonous fly ash inadequately stored at Chamalapura and other stations proposed.

Imagination:

1. Aerial photograph of Chamalapura Power Station.

Note the large white areas which consist of the dumped poisonous fly ash. Photo by P. Bhima.

2. Aerial photograph of Chamalapura Power Station.

Close-up view of the electricity generation plant. Photo by Alan Johnstone.

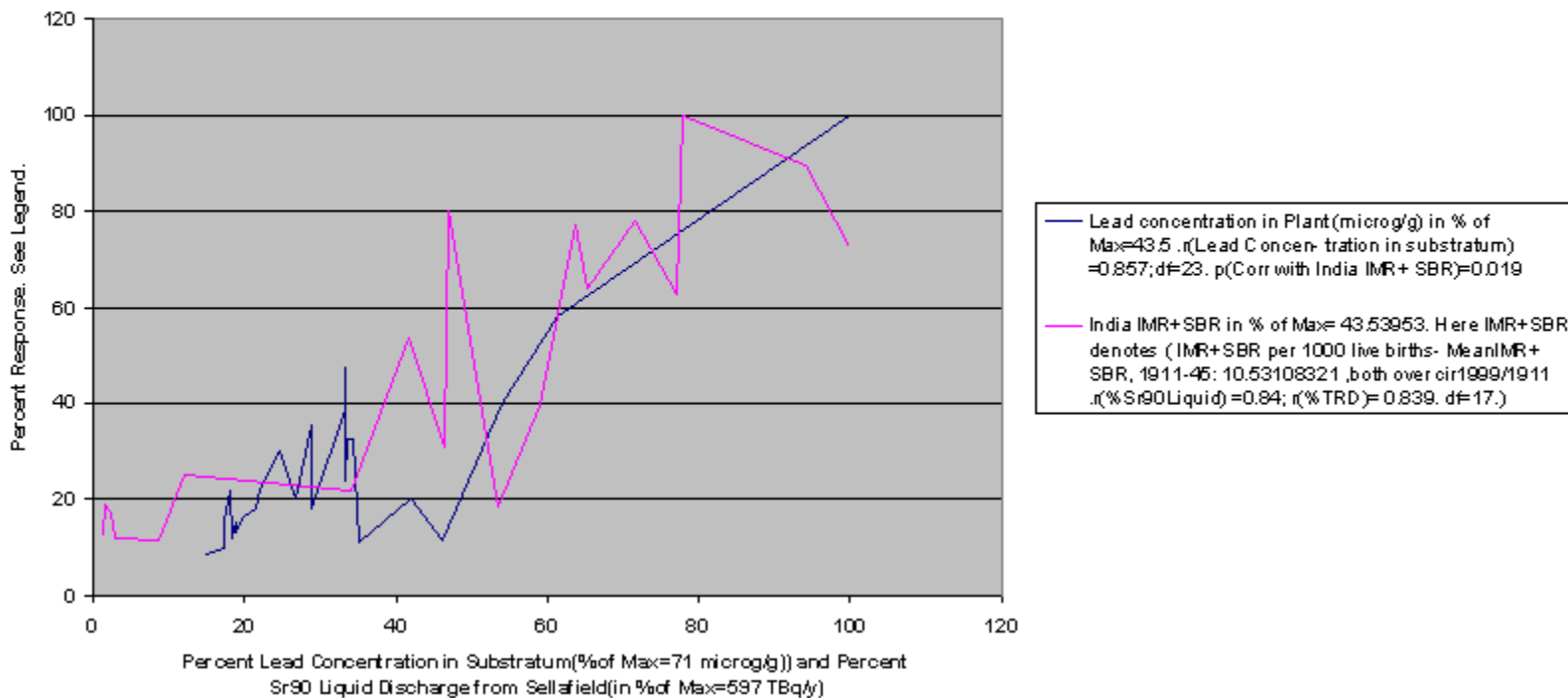
THE END OF IMAGINATION IS THE BEGIN OF REALITY!

Table LUBPC10200322004 Lead Uptake in Plants Chandigarh: October 2003 to February 2004.				
	pH	Mosses		Site Number
		Substratum (microg/g)	Plant (microg/g)	
Control Sample. (Lowest concentrations)	Away from industrial area. 6.9	10.7	3.8	18
Other Samples.				
1	6.6	20.4	15.4	13
2	6.7	19.1	8.8	4
3	6.7	13.1	5.2	14
4	6.8	17.6	13.1	12
5	6.8	25	5	19
6	6.9	15.3	7.8	7
7	7	12.3	6.8	16
8	7.1	71	43.5	21
9	7.2	13.5	5.8	8
10	7.4	20.4	7.8	15
11	7.4	24.4	14.1	17
12	7.7	38.4	17.4	25
13	7.8	23.6	16.9	24
14	8	23.6	20.7	5
15	8.1	15.7	9.7	1
16	8.1	43.6	25.3	2
17	8.1	13.4	6.7	23
18	8.2	32.8	5.1	22
19	8.4	29.8	8.8	10
20	8.5	14.2	7.1	6
21	8.6	12.2	4.4	3
22	8.6	23.6	10.5	20
23	9.1	23.9	14.1	9
24	9.1	12.8	9.5	11
	Max	71	43.5	
	STDEV	13.1491107	8.61554775	
	n	24	24	
	95%CI	5.904912163	3.8690109	
	Mean	23.32083333	12.0625	
	LoMean	17.41592117	8.1934891	
	HiMean	29.2257455	15.9315109	
LoMean/ReLoMean		1.627656184	2.15618134	
HiMean/ReHiMean		2.731378084	4.19250287	
	F-Ratio	2.329308309		
	p(F)	0.024004866		
	Pooled sd	11.35498608		
	sem	3.277902135		
	dm	11.25833333		
	dm/sem	3.434615455		
	df	46		
	p(dm/sem)	0.001267056		
		Substratum	Plant	
95% CI	LoMean	1.627656184	2.15618134	
	Mean	2.179517134	3.17434211	
	HiMean	2.731378084	4.19250287	
Comment: Risk of lead uptake by plants is more than trebled compared to control sample away from industrial area. The corresponding risk for the substratum is more than doubled. The extremes for the Relative Risk are 4.19(Plants) and 1.63(substratum). The relative risk plant to substratum is therefore a maximum at 95% CI of				
			2.57579144	

THE CHANDIGARH LEAD STORY will be repeated in Mysore!
 CHANDIYA KATHE: There is a trebling of the risk of lead uptake in plants in polluted areas compared to a control area least polluted: The risk of uptake in plants compared to the substratum like the soil is a maximum of 2.6. These are true measurements- whole earth epidemiological evidence not to be ignored for Chamalapura and others. How about mercury pollution and arsenic? All these together with radioactive internal body contamination may result in synergistic deaths - omnicide!

The corresponding minimum ratio is	1.266766404	
This is therefore statistically significant at the 95% level.		
Reference for raw data:		
Alok Sharma & Sunita Kapila.2007. Mosses as bioindicators of lead pollution in Chandigarh. Phytomorphology 57(1 &2) pp. 45-50, 2007		

Figure RRPCPO: Comparison of Lead Uptake in Plant(Mosses) in Chandigarh(Oct 2003 to Feb 2004) with Indian Pregnancy Outcome(Infant Mortality Rate + Still Birth Rate) to Sr90 Liquid Discharges from Sellafield, 1971-89. Extremely significant(See Legend).



The toxicity of lead in plants depicts similar behaviour to internal contamination of living beings (ex: humans).

Thus see Figure RRPCPO: Two opposing effects are seen in both the uptake of lead into mosses and of pregnancy outcomes in India in response to internal radionuclide contamination:

One effect is the toxicity due to lead accumulation in nuclei of the cells of plants and the other is the response of the cell to combat it. This is a series of biphasic responses as the lead dose from the substratum increases. Similarly in humans, the deposition of energy in the cell as the Sr90 radionuclides (and others) decay causes induction of cell repair/mutation effects and the battle between these two opposing effects causes a biphasic response. In such a chaotic setting it is wise to apply the precautionary principle. And note that as the dose increases, of highly toxic lead due to coal fired plants or the release of radionuclides by both coal fired plants and nuclear power plants, the health of all life adversely degenerates with time. This is illustrated by lead poisoning, where above a certain limit (about 46% in lead in mosses) the living being exerts no more resistance to the toxicity. The precautionary

principle means that when we are unsure about the risks of a certain industrial process we should not allow it to proceed until we can be sure that it is safe.

Source for Sr90 data: <http://deathdealersnukes.blogspot.com>

A wise use of Chamalapura

A forest with 20kg/m² dry biomass density over Chamalapura would mean at 1000 MW/km² at least, some 13600 MW equivalent of power flow through the forest. Thus the forest commons will give at this rate a whole set of products for all time, preserving its fertility, and giving pure air, water and a diversity of life- beautiful! How can a fertile area like Chamalapura be used to produce and use power at just 4 MW per km², that too only till the life time of the plant? Industrial production of goods and services overall is just about 20 percent of legitimate goods and services. The overall efficiency of the thermal plant is just 40%, fuel to electricity delivered at most. Thus the end use efficiency is just .4 x .2*100= 8%. This is for a full year. But a plant use for 50% gives 4% efficiency of resource use! This a use of 2500 MW power in coal to 4% = 100 MW actually used. The remaining 1250MW- 100MW=1150MW of coal will set the world ablaze because it would have been combusted! No wonder the arctic is melting, the glaciers are melting and sea levels rising and climate is a changing! The entire GDP growth of the world is being annulled because the policy makers have externalised these costs! Reforest! That should be call of the people’s co-operatives that may be formed in Chamalapura!

Result: GDP growth for the last fifty years being annulled by climate change owing to reckless damage to the biosphere			
Table 1:	Wise Use of Chamalapura		
	Land Use	Using 3000 acres.	
	Forest		Coal
Acres/acres/Ha	3000/2.2	MW	1000
Ha	1363.636364	MW/km ²	73.33333333
Km ²	13.63636364	Coal/Forest	13.63636364
MW	13636.36364	(Land Use	
MW/km ²	1000	Ratio)	

Thus the energy audit of fertile land use by coal fired power plants is adverse, the coal fired power plant is a net consumer of energy.

See also <http://modernandnormal.blogspot.com>

And regarding the multi input multi output permanent wholesome health of forests over man-made disasters like coal fired power or nuclear power see

<http://solutiontodroughtsandfloods.rediffblogs.com/>

References.

Refl. Daey Ouwens C.1976. Does Solar Energy Demand More Land Surface, and More Materials or Energy Investment than Nuclear Energy or Fossil Fuels? In Solar Electricity. March 1-5 1976. International Conference, Toulouse. p 1011.

Ref2. Fallows.J.2007. Mr. Zhang Builds His Dream Town.The Atlantic Monthly. March. Vol. 299. No. 2. p92.