



1st June 2010

Energy Efficiency CO₂ Systems

By: Blackharvest Trading

No.	ID	Parameter
7	D7	Energy Efficiency : Demand /Input

Energy Efficiency : Demand Input

Energy efficiency as things are looking right now could only be achieved by coming up with new technology one which could be more advanced compared with the present one. High energy demand is consumed in various places. E.g. domestic usage, commercial and industrial use. It would be a challenging task to invent a new technology that would suit all of these sectors and their subsectors because all of them are unique and consume energy in different rate.

Commonality: there is seven things that those sectors are in common with:

Refrigeration

Water Heating, Water Cooling, Air Conditioning, Ventilation & Food Storage

The sectors above directly or indirectly use two to three of the seven applications on a daily basis. The equipment to provide these services is available however they are a burden when it comes to energy demand input.

Alternative: I can proudly say that there is an alternative technology and equipment which are of low energy efficiency, effective and environmentally friendly too. Carbon dioxide has been refined and it was discovered that it has more qualities to do the work of equipment such as geysers, refrigerators, water coolers, air-conditioning ventilation and many more advantages.

Energy efficiency (demand Reduction)

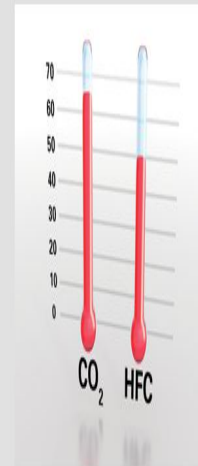
I have attached a table below comparing old cooling and heating equipment energy usage. You will find that when using the new system you save a whopping 33% of energy. I have further attached copies as manufactures (OEM), specifications to attest to my theory. I would conclude by saying substitutes for high energy consuming equipment are here with us, however the question is, is the system ready to adopt and take advantage of the new technology.

_ Energy efficient air to water heat pump technology

- Highly efficient CO₂ heat pump for domestic and commercial use
- Heating capacity of 4.5kW to 9kW

ENERGY EFFICIENT AIR TO WATER HEAT PUMP TECHNOLOGY

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EXAMPLE ONLY

$$\begin{aligned} \text{Formula: } P &= 1 \times v \\ &15 \times 230 \\ &= 3.45 \text{ kW/h} \end{aligned}$$

HEATING AND COOLING EQUIVANT OF Co2 REFRIGERANT ANT HEAT RESISTANT METHOD:
DOMESTIC RAANGE

OUT				IN			
Description	Volts	Amps	Qty	Description	Volts	Amps	Qty
Geyser 150lt capacity	230	20	x 1,000,000	Eco cute	230	15	x 1,000,000
Split Air- conditioners	230	20	x 50,000	Eco cute	230	15	x 50,000
Beverage coolers	230	15	x 100,000	Beverage cooler	230	10	x 100,000
Vending machines	230	15	x 10,000	Vending machines	230	15	x 140,000
Dairy fridges	230	20	x 1,500	Dairy fridge	230	15	x 1,500
Electric bar heaters	230	15	x 1,00,000	Electric heaters	230	10	x 1,000,000
Total Energy out put (Amps)			105 x 11,611,500	Total Energy in put (Amps)			70 x 11,611,500
			= 1,219,208 M/W				= 812,805 M/W
Demand side output: Scenario							
Consumption by Co2 systems				812,805			
Consumption by Resistance heating equipment				÷ 1,219,208			
Energy Saved				=33.33			

EXAMPLE ONLY

COMMERCIAL AND INDUSTRIAL SYSTEMS

OUT				IN			
Description	Volts	Amps	Qty	Description	Volts	Amps	Qty
Cold & Freezer rooms	380	25 x	2,500	Cold freezer room	5-15kW	380	20 x 2,500
Supermarket Island				Super market Island			
Freezers	4-10 kW	380	30 x 1,000	freezers	25-60kW	380	22 x 1,000
Chiller plant	7.5- 35kW	380	30 x 1,000	Chiller plant	10-17kW	380	22 x 1,000
Calorifiers	1000lt 5kW	380	30 x 5,000	Eco cute	82lt 100kW	380	22 x 5,000
Electric resistance heaters							
Units designed for duct installation	380	40 x	500	Eco cute	1,000kW	380	22 x 500
Total Energy output (Amps)		155 x	15,000			108 x	15,000
		= 2,325	M/			= 1,620M/Amps/hr	

(2) Demand side output: Scenario

Consumption by Co2 systems 1,620
 Consumption by Resistance heating equipment ÷ 2,235
 Energy Saved = 30%

Energy Saved by Co2 Systems

Total Energy Saved from Example 1. 812,805 M/W h
 Total Energy Saved from Example 2. 1,620 M/W/h.

All Voltages = 814,425 x 24 = 19,546
 = 20 x 365 = 7,300 M/W per annum

The use of Co2 systems in various sectors and residential areas could shave off 7,300 M/W output per annum in five years time from 2011. To calculate the advantage of Eco-cute system in monetary terms, one should assume that Co2 systems make reasonable impact in next 3 to 5 years time frame. From this deduct 7.300 M/W from Eskom annual output or 41,539M/W from 2023 to 2030. This will result in a moderate 17.5% which the country stand to save through the use of Co2 systems. From this point one realise that Eskom is a huge liability to the tax payers.

1. Eskom generate electricity for the country but pump M/tonsCo2 into the environment for the public to mob up.

2. Eskom uses outdated heat resistance equipment for its air-conditioning, ventilation, water heating and refrigeration for the public to foot the bill. An audit should be carried out to determine how much non energy efficiency equipments is using and how many M/W is used on them and how much does the tax payer pay towards them. An estimate be done to see how much of that energy and expenses could be saved if Co2 energy effect systems have to be used instead.

3. Eskom is not only a major carbon monoxide emitter in Africa, environmental polluter in other forms but also an **OZONE LAYER DEPLETER** through use of CFC refrigerates in their internal operations.

➤ Climate change scientifically is a phenomenon believed to be caused by greenhouse gases. These gases are being produced by industrialised, first world countries even some developing countries like South Africa, China and Brazil. They take a form of carbon monoxide from coal fired power station. These gases when discharged into the atmosphere, they raise the atmospheres temperature by between 2 to 3°C. This temperature change set off the chain reaction of host of environmental imbalances including acid rain that kills vegetation and cause parts of arable land to become semi-deserts. It also causes the glacier in the South Pole to melt. It also raises the oceans water levels to swell and flood the low laying costal areas.

Co2 refrigerant operating equipments are going to make an impact in your life just like computers does. *Co2 heat pump is 3-in-one appliance.*

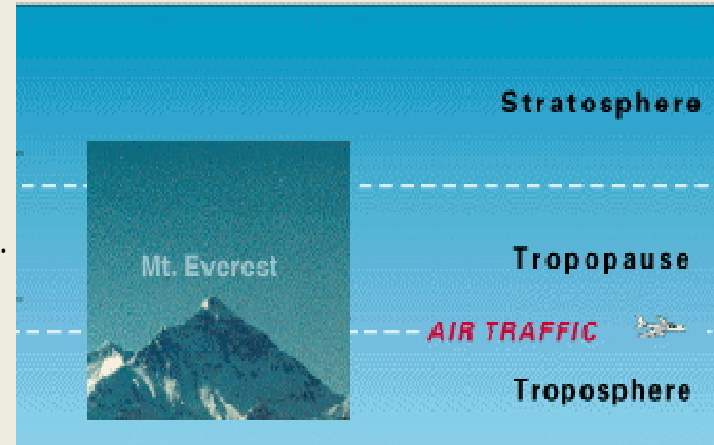
➤ This is helping us getting rid of HFC and CFC refrigerant gases that are ozone polluting agents. CO2 is 97% environmentally friendly gas and sustains the ecosystem

In a view of prevention of global warming I'd like to offer 3 proposals below.

Promotion of nature working fluids aggressively in the proven industry field.

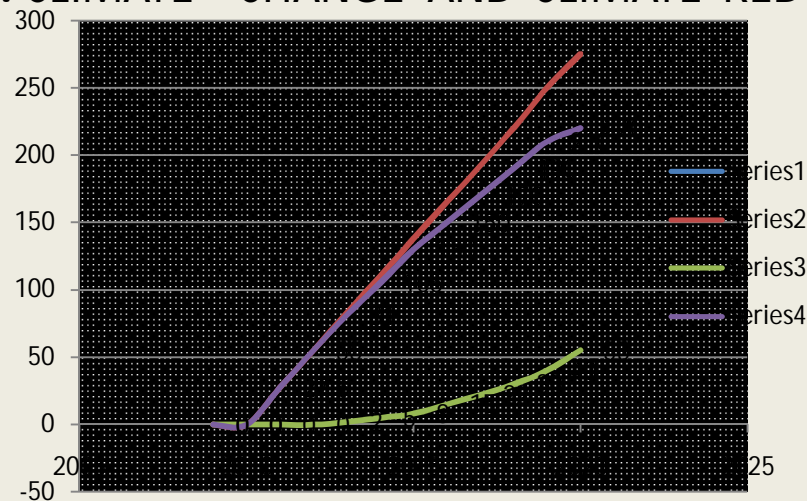
Introduction of natural working fluids in the feasible commercial and consumer fields.

Promoting CO2 refrigerant for air-conditioning and car air-conditioning.



21%	OXYGEN (O ₂)
78%	NITROGEN (N ₂)
0.04%	CARBON DIOXIDE (CO ₂)
~0.9%	ARGON (Ar)

PARAMETER : CLIMATE CHANGE AND CLIMATE REDUCTION



➤ The country can reduce carbon dioxide in bigger volumes than the 34% projected for 2010 to 2025. Given that 1 M/ton produce one ton of Carbon dioxide then 7,300 M/ton would reduce 7,300 M/tonCo₂ of carbon emission every year. The carbon tax regime look into restricting the carbon emission from 275 M/tonCo₂ from 2009 through to 2025 at the rate of 34% over the period. However this scenario is about to change after the introduction of 7,300 M/tonCo₂ reduction .

➤ The country would no longer be facing the 275 M/tonCo₂ emission target any longer but a new trajectory of 220 M/tonCo₂ is envisaged . This is new figure is accurate because Eskom has arrived at the same number of 221,7M/tonCo₂. (See Eskom's abridged annual report 2009) The ushering in of the eco-system would be accountable for a fair 20% or 55MtonCo₂ reduction in this regard. The Department of Energy's forecasted 5% to 10% reduction in emission from 2020 to 2025 from other technologies will improve the situation even better.

No.	ID	Parameter
24	EX2	Carbon Tax

It is known that, the developed countries such as Britain, Denmark, Germany, France, Italy and Brussels have already passed bills in their respective countries in order to clamp down on to carbon emission. But the law its self is problematic since those who depend on carbon usage for production are not offered alternative methods and technology.

South Africa should not fall in the same trap of levying carbon tax to its citizens before providing an alternative solution. Should the government go this road it would fail to monitor and control the programme. Take for example people leaving in developed residential areas have running water and electricity which they pay for, but the lot leaving in an informal settlement nearby don't have running water and electricity.

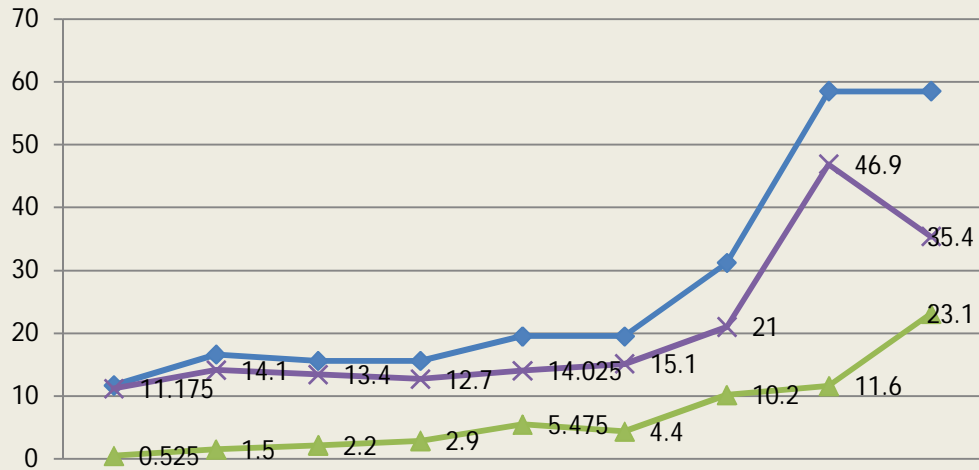
Equipment that tend to re-cycle carbon dioxide instate of emitting it. Those few who will insist on employing carbon emitting methods and equipment should bear the brand alone. To start with you should have a greenhouse inventory management system keep credible emission forecast. Stop the culprits from passing the tax to the consumer.

I recommend the following;

- **Legislation of Carbon Tax**
- **Carbon Tax incentive**
- **Import tariff increase on CFC and HCFC refrigerant commodities**
- **Import and export duty relation on Co2 compliant commodities**

Therefore, I would recommend tightening of regulation of HFC and encouraging the funding for the prevalence of refrigerants systems using natural gas and its development and skills training. The funding could be taken from carbon tax levy.

Carbon Tax
Carbon Tax Emission /ton @ R100.00/t
Carbon Tax Incentive Energy efficiency /CO2 @ R50/ton



- I am convinced that the purpose of this IRPO is to have the public and expert's knowledge, expertise and views about this situation we find ourselves in regarding environmental issues.
- The government plans to introduce carbon tax and generate R58,5m in the process. I would like to suggest that if the government go ahead and introduce carbon tax it must be followed by the introduction Carbon Tax Incentive in the next three years to encourage those who are concerned about their environment to come the party and participate. I strongly believe that a lot of people will take part because of this idea. I predict that the people could recycle about 55M/ton of refrigerant gas and other forms to the tune of R23,1m while the state share R35.4m for clamping down on 220M/tonCo2 (see the graph of parameter 24 Ex 2 above) .
- This will put us in the business as usual scenario. The forecasted duration for this operation is 10 years bust due to Carbon Tax Incentive (CTI) the duration would probable shorten to between 7 and 8 years.

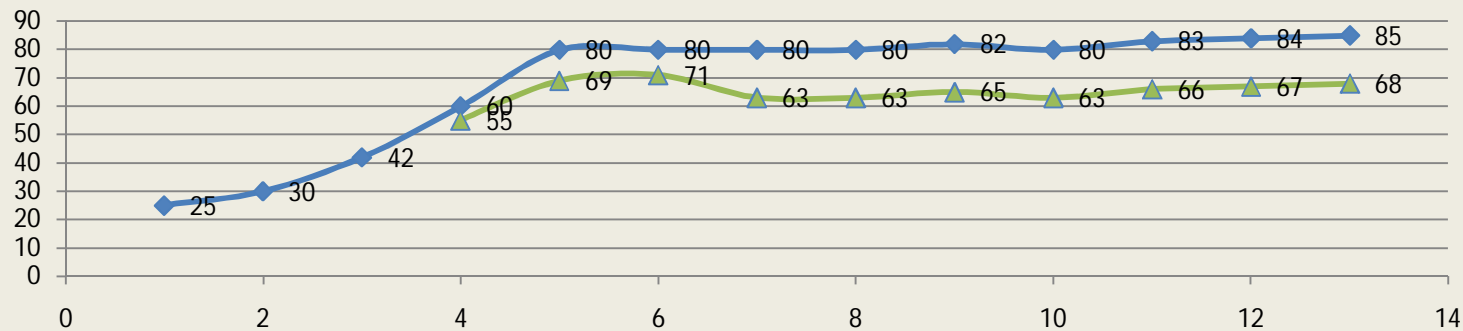


“GO GREEN”

No.	ID	Parameter
28	Output 2	

Generation Cost Cone (MYPD2) 2009 to 2024

Real Domestic Price (c/kW/h Rand)						
10	11	12	13	14	15	18
18	19	20	21	22	23	24-30



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1. Eskom could reduce tariffs from 41% yearly down to 33% in 2012 and 2013 and keep the other 8.5%.
 2. Eskom could retain 8.5% and reinvest it in its aging heat resistance cooling and heating as well as CFC equipments by replacing them with Eco cute system.
 3. Eskom could use the excess revenue to off-set the 14billion Capex funding shortfall referred to in (Funding & Financing Input parameter information sheet No 22 ID S12 and stop borrowing in the future.)
- The retaining of the 8.5% tariff will help Eskom generate over R28, 000,000 in one year's time.