DUAL MARKETS for HYDROCARBON

– The Post Carbon Age

INTRODUCTION

This ***dual market scheme*** sets out a route to a new and different solution of the problems, which lead to man-made Global Warming. The scheme entails dividing fossil fuels (hydrocarbons) into two market classes, and offers opportunities to develop detailed solutions to this important threat. Such a concept is needed because the existing methods of remediation contain well-known problems and inconsistencies (covered in Appendix II – Past Problems).

The ***dual market scheme*** aims to engage everyone in new discussions but it is particularly relevant to professionals already involved in business and commerce including those who are directly involved with the hydrocarbon industries, the energy industry and the climate issue.

This paper is arranged in four main sections + three appendices:

1. Critical aims
2. The summary outcome
3. An introduction and précis
4. A section setting out some of the arguments both supporting the introduction of the two class system and identifying aspects still to be resolvedPast Problems

Appendix I: MARKET MODEL
Appendix II: PAST PROBLEMS
Appendix III: FINAL WORD

CRITICAL AIMS:

- To reduce CO2 emissions overall to zero or to a tolerable level
- On a practical, long term & sustainable basis
- In an acceptable time frame
- On the basis of commercially available capital investment
- Using a market driven system, independent of the public purse
- Absent – competitive/discriminatory, taxes and public subsidies
- Whilst delivering energy prices that people can tolerate and accept

SUMMARY of the OUTCOME:

Simply by creating a ***Dual Market Scheme*** for hydrocarbons (***HC***), dividing them into two distinct types ***Black*** and ***Red*** and voluntarily or by edict, gradually capping the ***Black*** variety over time (c. 50 – 100 years) the carbon problem can be resolved so that:

- CO2 emissions are reduced along a planned decline trajectory until (almost) eliminated.
- The ***traded volume*** of ***Black HC*** trends down but its ***market*** price trends up.
- The ***traded volume*** of ***Red HC*** trends up but its ***market*** price trends down.
- All ***HC produced*** in is available to serve either ***Black*** or ***Red*** market demand
- The total volume of ***HC*** traded is only affected by ***overall demand*** for ***Black*** + ***Red HC energy***.
- ***HC energy*** prices both ***Black*** & ***Red,*** compete with each other (and other forms of ***Cfree energy)*** and so trend towards price comparability.
- Subsidies and special tax regimes no longer apply to either the ***energy*** or the ***HC*** market.
- *Governments are not involved* in pricing. The markets alone rule the price of ***energy*** and the price of ***HC production****.*

- - - - AND VITALLY IMPORTANT *- - - -*

All types of ***Cfree energy*** *(including* ***Red HC energy)*** *become* **INVESTIBLE** so that**:**

- *All types of* ***Cfree energy*** *are able to compete with one another.*
- *Commercial/ private investment alone supports the* ***Investment Coordination Plan*** *without state aid.*
- The investment potential of the ***HC*** industries' and its expertise is preserved and available for the fight against climate change.

- - - - Whilst - - - -

- In their own vital interests, ***HC*** industries become important investors in ***Red HC energy.***

INTRODUCTION & PRECIS

Three facts stand out:

- *Hydrocarbons (**HCs**) have the greatest and most concentrated conventional store of easily harvested inexpensive energy*
- *Carbon emission from burning these hydrocarbons in the normal way ("**Free Burn" HC**) with subsequent release of Co2 has become unacceptable but requires extremely large investment in energy supply alternatives to counter it.*
- *The **HC** industries need markets for their product to survive and prosper.*
- *The **HC** industries have large capital resources, large-scale experience, expertise, human resources and intellectual property.*

Present schemes to counter Global Warming (ETS, subsidies & taxation etc.) are simply not fast enough, not at the necessary scale and simply not working. It is politically inconceivable that world governments will be able to tap their taxpayers to raise the massive investment resources that are required to effectively counter the global warming threat. The necessary capital investment therefore must come from conventional capital sources; markets, banks, commerce and from industry which means that any investment has to generate a proper return.
In other words, each the individual projects must be: **INVESTABLE**

Overall, this is an extraordinarily large enterprise and it has to be accomplished in a short time. It is possibly the largest and most concentrated non-military enterprise that the world has ever embarked upon[1].

The overall investment envisaged within this enterprise is so large that it is impossible for it to be made by any single entity. However, investment for each individual project will only be forthcoming from commercial investors, if the return on their capital is sufficient to cover all of their costs and the risks involved[2]. Therefore, such investments cannot be reliant upon the whim of long-term government subsidies and/or discretionary taxation.

Also, as the world approaches the Post Carbon Age, the continuing industrial health of the hydrocarbon (***HC***) industries (comprising oil & gas and coal) depends upon the maintenance of a thriving ***HC energy*** industry. Therefore it is in the long-term interests of the ***HC*** industries to be the principal investors in ***Cfree HC energy***.

In these circumstances, a Grand Bargain can be envisaged between the commercially strong and capital rich ***HC industries*** on the one hand[3] and ***world governments and economic blocks*** on the other to gradually reduce ***HC*** available for energy purposes that emit CO2.. Such an ambitious plan is unlikely to be realised at world-scale in the short term. However, a large economic block could lead the way by becoming "first mover" and then be followed by others. (Such an opportunity could be an ideal policy for adoption by the EU or the US).
Such a Grand Bargain would be structured so that within the economies adopting the ***dual market scheme*** and over a period of years the world, the ***HC industries***[4] agree to designate and manage their extraction and importation of hydrocarbon on a basis of certified end-use:

- ***Black HC*** (serving dirty carbon emitting end-uses) and
- ***Red HC*** (serving certified clean end-uses which do not emit carbon)

The production or import of ***Black HC*** would be managed by the **HC** industries to meet a ***tolerable carbon target*** e.g. the IPCC scientific consensus on the necessary target for *annual decrease in anthropogenic carbon either voluntarily or by edict..*
The **HC** industries can support the achievement of this by **investing** in capacity to progressively convert **HC** end-use from reliance on ***Black HC*** to reliance on ***Red HC***.

[1] The power sector alone (generating c.17% of Co2 emissions) comprises c. 10,00 major power plants @ 1 -$4bn each = $20tn

[2] No mater which mechanism is adopted, these costs of de-carbonization MUST eventually fall on the cost and therefore the price of energy and other products of HC but as long as these affect all, it will quickly be absorbed in exactly the same way that the oil shocks of the '70s were absorbed.

[3] This is particularly the case if oil prices remain subdued and conventional investment opportunities for HC industries decrease.

[4] Worldwide or initially within the designated economic area

HC DUAL MARKET – SUPPORTING ARGUMENTS

In order to achieve the an ***HC Dual Market scheme***, with free and open markets without bureaucratic/political management, each of the existing world hydrocarbon (***HC***) markets[5] will be divided in two, designated the ***Black HC market(s)*** and the ***Red HC market(s)***. These designations will be according to the certified or committed end-use of each particular trade/parcel/shipment.

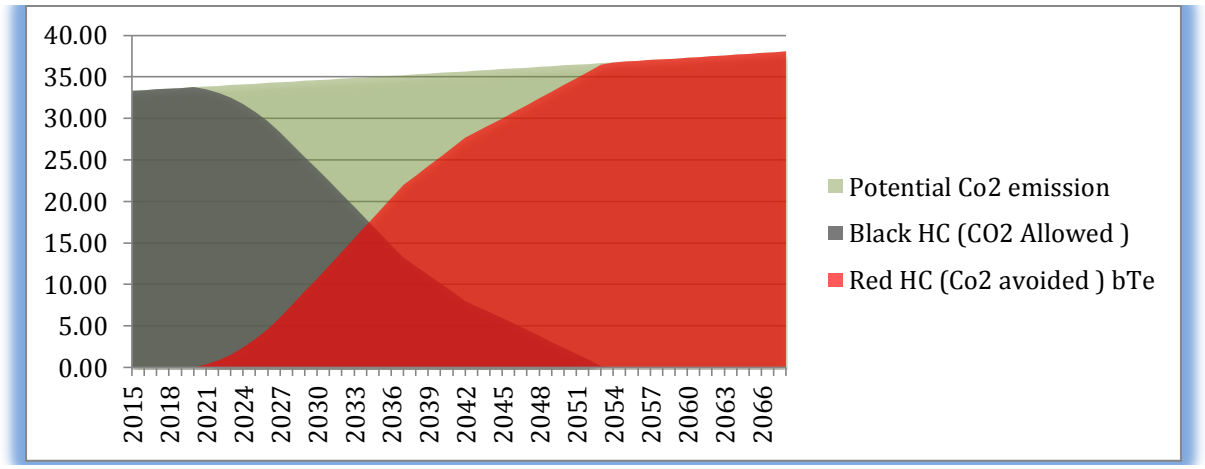
The markets' rules will be:

Black HC production & import volume – *is specifically permitted* for any end-use, including those end-uses, which result in "free burn" (i.e. those end-uses which emit CO2). Its overall importation or extraction for sale within the controlled region, is controlled on the basis of its overall carbon content across all uses to which it is to be supplied and must be progressively reduced year by year, based on a scientifically agreed "***tolerable carbon target***" which might be the IPCC's generally accepted downward trajectory. ***Thus, Black HC availability will decline over time***.

Red HC production & import volume – *is un-restricted* but *may only* be used for end-uses which do not emit carbon i.e. "Cfree" end-uses. These approved "Cfree" end-uses can include chemical, medical, lubricants, industrial feed stocks and crucially, in the case of energy creation and other heavy industry, only those where the CO2 is prevented from entering the atmosphere e.g. by CO2 re-sequestration, or conversion to CaCO3 or by other means[6]. These would all be accredited[7] applications.

PROJECTIONS FOR THE HC INDUSTRY

In the ***Red HC*** market scenario the size of the ***Black HC*** market inevitably declines in accordance with the ***tolerable carbon target***. The overall size/growth of the total ***HC*** extraction/production industries will therefore increasingly depend upon the demand generated for ***Red HC.*** This demand can only grow through investment in new ***Red HC*** energy and other heavy industry capacity i.e. investment in capacity, either directly or by 3rd parties, which specifically includes re-sequestration or other ***Cfree HC*** mechanisms. (model outcome):



It therefore becomes very much in the vital interests of the ***HC extraction industries*** to become ***principal investors*** in ***Red HC energy capacity*** and gain economic value from the margin between ***Red*** and ***Black HC*** market price.

HC ENERGY CAPACITY LIMITS

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[5] Hydrocarbon (***HC***) in this context, is the stuff that comes out of the ground; Coal, Crude oil or Natural Gas. It is designated either ***Red*** or ***Black*** depending on whether its end-use purpose, actual or intended is one which emits CO2 or not.

[6] Red HC can also be supplied where the CO2 re-sequestration etc. will be incomplete and only achieves "near zero" emissions. In such cases, the HC responsible for the excess carbon will be classed as ***Black HC*** and measured for inclusion against the agreed "***tolerable carbon target***".

[7] The accreditation of end-use can be handled on a commercial basis by existing certification agencies Lloyds, ABS, DnV…….

Black HC production & import, will be required to decline over time, which leads inevitably to a parallel downward trajectory ***Black HC energy***. This will become a boutique industry catering for special priority needs where ***at that date***, no realistic "***Cfree***" competition of any sort ***yet*** exists.
Red HC production & import will not be limited in any way. The resulting and unrestricted ***Red HC energy*** will compete freely in terms of price and deliverability with all other sources of "***Cfree***" ***energy*** including renewables and nuclear (fission and fusion). It will do so without subsidy or special taxation being applied to any of the competing energy sources. The energy produced from the competing technologies will be able to challenge one another in terms of reliability, diurnal and seasonal delivery patterns, despatch capability and competitive market prices.

ENERGY COST/PRICE
As ***Red*** and ***Black HC energy*** are in competition with one another, the market sales price of ***Red and Black HC energy*** will become essentially ***identical***.
But, the cost of producing ***energy*** from ***Red HC*** will be higher than the cost of producing ***energy*** from ***Black HC*** due to the extra step – de-carbonization.

Therefore, the price that a ***Red HC energy*** producer can afford to pay for ***HC*** whilst still remaining competitive, is less than the price that ***Black HC energy*** can afford to pay.
HC production (Coal, Crude oil & Natural Gas) itself is ubiquitous and can ***sold as*** either ***Red*** or ***Black HC*** through either the ***Red*** or the ***Black HC*** markets.
As ***Black HC*** production & import is gradually restricted according to the decreasing ***tolerable carbon target***, so the availability of ***HC*** production and import to supply ***Black HC*** energy shrinks. Over time, ***Red HC*** energy becomes increasingly predominant in filling the overall ***HC*** energy demand and in competition with other "***Cfree***" energy it is ***Red HC energy*** that will increasingly become the dominant market for unrestricted ***HC*** production.
Critically therefore, ***HC*** overall demand will only stabilize or grow if ***HC*** production industries ***INVEST*** in ***Red HC*** energy***.*** In the first phase the likely technology to achieve this will be Carbon Capture & Storage - CCS.

HC MARKET MECHANISM
The design of the market mechanisms for the new ***HC*** production markets will be crucial to success[8].
Black HC markets will be able to perform in similar fashion to present ***HC*** markets. This market will be driven either by firm bids for spot or options with trades being predominantly a spot/dated delivery or by short-term hedge transactions to protect against market volatility. Longer-term transactions will still be made to support the conventional investment decisions. The market will however operate within the overall ceiling set by the ***tolerable carbon target*** controlled by ***end-use*** customers who have acquired the rights to annual quotas (see below).
Red HC markets will be predominantly long-term forward deals to protect the capital investment decisions required to deliver ***Red HC energy*** infrastructure.

CONTROL OF THE PROCESS
In the last analysis, ***Red HC*** is **defined** by its *designated use in* ***Cfree*** *circumstances.*

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[8] *One fundamental question will be whether a viable HC market mechanism can be put in place just for a single economic zone such as the EU whilst the rest of the world carries on with business as usual or whether a first move to the new* ***Red/Black HC*** *market must involve a larger segment of the world economy.*
It would be possible to envisage a mechanism where a number of large economies (e.g. EU, USA/Canada/Mexico, China, ASEAN…) initially EACH adopt a ***Red/Black HC*** *market solution with rules and parameters suitable to their own circumstances so that eventually the overall* ***tolerable carbon target*** *for the first time appears to be genuinely within reach. Then over time, other countries irrespective of their stage of development can confidently adopt the new market approach, on their own terms, as they feel able to do so.)*

The essence of the ***dual market scheme*** is that ***Red HC*** is a distinct market from ***Black HC*** and each market sets its own market price according to the demand/supply market behavior in each distinct market. Once purchased as ***Red HC*** with the cost benefits from the lower priced ***Red HC*** market, it can't be made normally available to a ***Black HC*** end user or a middleman[9].

> *Note: There might be a technical possibility that expensive **Black HC** could be re-sold as cheaper **Red HC** but this would be a loss making transaction for the original buyer and the reclassification of the **HC** as **Black HC** would need to be factored into the overall **Black HC** annual limit.*

An accredited ***Cfree*** user (e.g. a CCS electricity plant or a paint manufacturer) can purchase ***HC*** on the ***Red HC*** market but a "***Free Burn***" electricity plant or a refinery supplying an airline cannot because it or its customers will burn the ***HC*** and emit Co2.
An accredited middle man can purchase ***Red HC*** if he gives an undertaking to sell it (maybe in smaller parcels) exclusively to accredited ***Cfree*** users or other accredited middle men and so on. At each transaction the purchaser provides the supplier with a certificate of end use as being ***Cfree***. The last purchaser in the chain must always be an actual accredited ***Cfree*** consumer.
So end users are either accredited for purchase of ***Red HC*** (at a lower market price) or they purchase ***Black HC*** (at a higher market price) but from the ***Black HC*** market which has diminishing availability as time goes on.
There are many opportunities in this mechanism for secondary markets to develop and for displacement deals where the ***Red HC*** could be supplied to a "***Free Burn***" end user (airline etc.) as long as that end user provides a certificate of end use to the supplier of ***Red HC*** obtained through a 3rd party capture of CO2 of equivalent size. But of course, the actual 3rd party operation providing that cover has to purchase its actual ***HC*** on the ***Black HC*** market at ***Black HC*** market price as the access to the ***Red HC*** market can only apply for one actual capture of Co2.

The both markets will require detailed design, which will be carried out by market analysts and professional market operators.

ALLOCATION OF RIGHTS
Clearly the rights to produce/import and sell ***Black HC*** will be critical.
The allocation of ***annual quotas*** to produce/import ***Black HC*** within the ***tolerable carbon target*** can be achieved through an auction process.

The ***annual quotas*** to produce/import ***Black HC*** will be for un-defined purposes, but will be made available in ***defined usage categories*** prioritised by the perceived absence or difficulty of viable energy alternatives for that ***category*** which is perceived to exist at future dates along the ***tolerable carbon trajectory***. Subsequently, these ***annual quotas*** can be partitioned and sold through secondary markets to resellers or end-users. ***Black HC*** producers/importers will be invited to competitively bid periodically for these ***annual quotas*** for any specific year (up to 20 years ahead?)
Within their quotas, successful bidders may then either produce ***HC*** locally or purchase ***HC*** on world markets and use it to fuel their business intentions. These may include resale as ***Black HC*** to a certified end user.
Annual quotas, whilst being annual and pre-purchased, cannot carry over into following years. So, whilst an ***annual quota*** can be traded, it will expire at year-end, so will be: ***"use it or loose it".*** *The actual downward trajectory of **Black HC** will* therefore always be maintained or bettered.
The money raised through these ***quota*** auctions could be used for many purposes, such as an industry fund to subsidise overall energy prices across the economy or less developed areas of the world.

PRICE EFFECTS
In the this dual market system, the total demand for ***HC*** production is the combined ***Red/Black HC demand*** but the price that each customer will be willing to pay for ***Red HC*** is lower than that for ***Black HC*** so the ***Black HC energy*** demand will always be satisfied first. Thereafter, once

[9] (It would be possible that there could be a retrospective adjustment back along the chain but it would be a tortuous process to establish which transactions took place and what the ***Black HC*** market price would have been applied at each stage. So at the moment that this would probably be a non-starter.)

Black HC availability is exhausted, the ***Red HC energy*** demand will compete for the residual ***HC*** production capacity.

It is possible to build a ***Dual Market*** model to gauge the effect. (One very simple example is attached in Appendix I)

APPLICATION

The ***dual market scheme*** is characterized ultimately as a WORLDWIDE scheme but it would be perfectly possible to introduce the ***Dual market scheme*** in individual economic areas such as the EU/US/China…etc. or even in a single country. This could be achieved by each introducing its own individual ***tolerable carbon target*** and controlling all ***HC*** produced or imported, in accordance with that trajectory.

Gradually as more countries/economies join this ***dual market scheme***, each of their individual targets could be set/agreed allowing for their current stage of economic development. This is an achievable aim and as the top10 countries/economic areas in the world account for 95% of all anthropogenic CO_2 the result would be entirely satisfactory.

Depending upon the pace of adoption, a potential could arise in that companies or whole industries may be tempted to de-camp to non-conforming or "soft" economies.

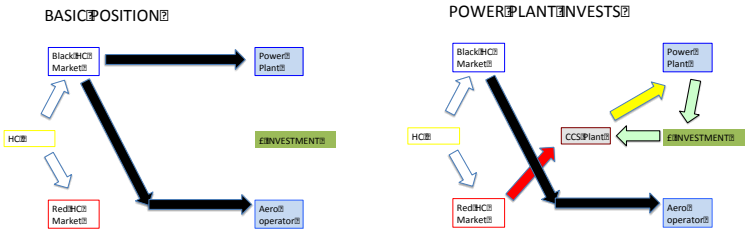
This would be counterbalanced by the fact that the non-conforming countries would not have access to the ***Red HC*** market and thus they would suffer higher costs for ***Black HC*** feed-stocks.

Additionally, energy intensive products imported into conforming economies could be identified with the amount of ***Black HC*** that was used to produce it and that ***Black HC*** would then have to be counted against the ***tolerable carbon target*** of the ***importing*** country and counted within the ***Black HC annual quota*** of the importer.

Finally, levies could be charged on imports from non-conforming economies, which use ***Black HC*** in products, which would normally require ***Red HC*** in the receiving economy but this is probably unnecessary and would require government action to implement.

DISPLACEMENT SCHEMES

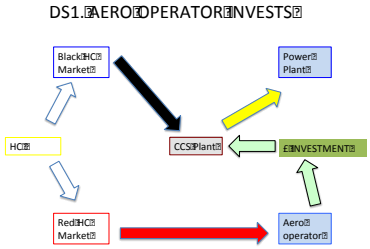
This is the normal situation: There is no ***Red HC*** and there is (almost) no investment in carbon reduction. All ***HC*** users buy from the same market. This changes with the introduction of ***Red HC***



A business that is able to eliminate its emissions can buy ***Red HC***

DS 1:

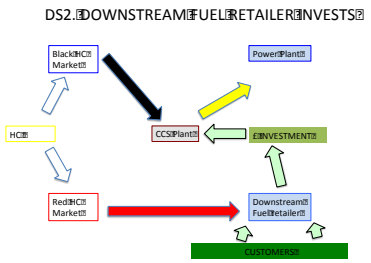
Within any conforming economy, ***Red HC*** can also be designated for supply to any facility where the owner, the purchaser of the ***HC***, continues to emit Co2 ("***free burn***") but he invests (capex+opex) in 3rd party facilities to remove equivalent Co2 from that "free burn" ***HC*** process and renders it "***Cfree***". Any number of Displacement Schemes (***DS***) can be set up:



The value of a ***DS*** is that this 3rd party facility physically removes or sequesters the Co2 but does not itself derive the benefit of being able to purchase ***Red HC*** and continues to consume ***Black HC*** but ***Red HC*** could be used as feedstock for production of the investors other interests e.g. fuel for Aero or other transport uses and this could be marketed as ***Red Aero*** and in this way, get marketing gains and attract investment under a number of scenarios such as airline operation

DS2:

An alternative displacement scheme could be couched within a consumer scheme more or less identical to existing green energy schemes. In this displacement approach a motor fuel retailer could sell ***Red petrol*** or a gas supplier could sell ***Red gas*** at a premium price to domestic customers and through various financial models the premium would finance the ***Cfree*** removal process investment at the 3rd party facility.



SUMMARY OUTCOME

Simply by creating a ***Dual Market Scheme*** for hydrocarbons (***HC***), dividing them into two distinct types ***Black*** and ***Red*** and voluntarily or by edict, gradually capping the ***Black*** variety over time (c. 50 – 100 years) the carbon problem can be resolved so that:

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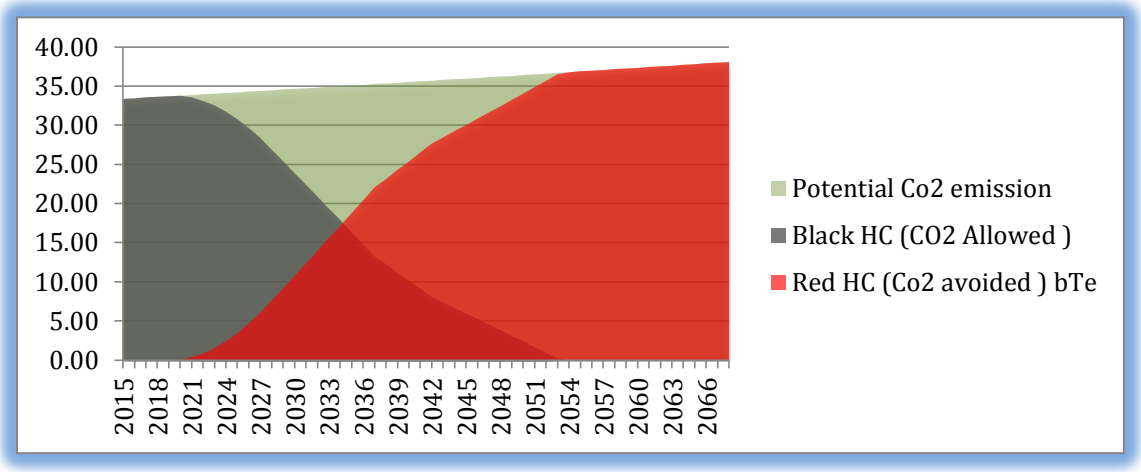
Appendix I: SIMPLE MODELING



T.B.A.

Appendix II: PAST PROBLEMS

Over the past >10 years, two fundamentally different methods have been attempted to directly target CO_2 emissions by subsidizing ***Cfree ene***rgy or by taxing or penalizing ***HC energy***. Subsidising ***Cfree energy*** has been pursued through a plethora of publically provided but heterogeneous direct subsidies (e.g. RO, CfDs etc.) intended to decrease energy costs/prices of ***Cfree*** energy from specific projects. Whereas, schemes intended to increase the cost of ***HC energy*** by taxing or penalizing ***HC energy*** have been pursued through ***carbon*** emissions ***tax*** or ***ETS*** schemes to allow other forms of ***Cfree energy*** to compete. Thus far, penalizing emissions approach hasn't worked. It is unlikely to work in the future. The reasons why, are quite straightforward. Running both types of scheme simultaneously is perplexing and destroys investor confidence.

So far, at a large cost to the public purse, ***publicly funded*** subsidy schemes have achieved some investment. Unaided***, ETS*** and other penalizing schemes have not yet promoted any ***Cfree*** investment. It is likely that these are doomed to continuing failure.
For political/consumer acceptance reasons, the baseline adopted for subsidised energy price competition has been to target prices as closely as possible to the current price of "***free burn***" ***HC***. However if we succeed in our aim is to eliminate ***Co2*** emissions, then this ***"free burn" HC*** at any appreciable scale is doomed to eventual near extinction. So, if we continue subsidizing ***Cfree*** on this basis, we will be left with low energy prices across the board but ***all permanently subsidised by comparison with what is then a non-existent historic competitor***. This would be a frail and ***unacceptable result.*** And, if once started, we ever stop subsidizing ***Cfree*** energy then the original recipients of subsidy will benefit unfairly over later entrants.

If we then look at taxing or penalizing ***HC energy,*** which has been pursued through ***Carbon*** emissions ***tax*** or ***ETS*** schemes, we encounter similar problems. Both aim to increase the cost/price of ***HC energy*** to allow other forms of ***Cfree energy*** to compete.

The intent is to encourage ***Cfree*** investment. Thus, both ***Carbon*** taxes & ***ETS*** schemes apply immediately to the whole ***HC energy*** market and potentially impose, huge costs upon participating economies. Ultimately, these additional costs will become inevitable to any CO2 emissions solution, but in both these "pre-payment" schemes they act first but do not trigger immediate investment let alone immediate Co2 reductions. This is not economically efficient as the economic cost (NPV_{10}) for either can be shown to be c. 20 times the cost of subsidising individual investments as they happen.

But the ***Emissions Trading Schemes*** (***ETS***) as well as sharing the economic inefficiency of ***Carbon*** taxes are ***actually worse.***

During the past ten+ years ***ETS*** schemes have suffered all the same problems as ***Carbon*** tax and have racked up government receipts whilst never ***directly*** incentivising a single ***Cfree*** energy investment. (NER300 was a gallant attempt to utilize some of this government income to incentivize investment) However, more fundamentally, ***ETS*** schemes operate in a ***false*** market which is illogical[10] and cannot work.
This is because:

- it isn't a ***carbon*** market,
- it isn't a ***carbon emissions*** *market*,
- it ***is*** a ***carbon emissions permissions (CEP)*** *market*

Looking first at the **demand side**:
CEP demand is only marginally affected by energy market conditions, for example when a new ***HC energy*** provider comes into the market or an existing ***HC energy*** provider leaves the market. So other than a small secondary market in ***CEPs*** the demand will be relatively static, as it will take a long time to replace the world's installed **HC energy.** (In electric power alone, it constitutes >5000GW or approx. 9000 major (c.600MW) power plants). Thus, for many years, the ***CEP*** price will be determined almost completely by the supply side. (i.e. the printing press)

So, on the **supply side**:
In a ***carbon emissions permissions*** *market*, the ***CEPs*** (e.g. EUAs) are printed by government agencies. ***CEPs*** are in effect just tokens or currencies (and share some of the characteristics of currencies such as speculation and inflation/deflation). The number of ***CEPs*** available for sale is almost entirely a result of government's policies.
So if governments allow the supply of ***CEPs*** to be too generous, their price will be low and there is ***no incentive*** for ***Cfree*** investment. But if governments restrict the availability of ***CEPs***, then their price will rise. Once the ***CEP*** price reaches the point at which it incentivizes investment in ***Cfree*** **energy** it has reached the **tipping point.** This is a ***Success!***

Unfortunately this is **not so** in the ***CEP*** market
Look at the **demand** side again. Each successful investment in replacement ***Cfree energy*** *reduces* demand for ***CEPs*** and this propels the ***CEP*** price **lower**.

This is the ***wrong*** direction! - Each investment success, reduces the potential for future ***Cfree*** investment - ***this is therefore a false market*** and this knowledge massively deters INVESTMENT

ECONOMIC EFFECT
For a ***Carbon*** tax or ***ETS*** to be able to remove the competitive advantage of ***HC energy*** over ***Cfree*** energy and trigger ***Cfree*** investment:

- The cost of ***HC energy***, post-tax or after purchasing a government ***CEP***, must rise to or above the price of ***Cfree energy*** i.e. the ***price tipping point***.
- This ***price tipping point*** for ***Cfree*** with ***HC energy*** must be somehow confidently expected to be maintained at that level irrespective of government action until the investment has matured,
- The ***price tipping point*** of ***HC energy*** must be based on normal market confidence, not upon gov't controlled printed tokens such as EUA.

Both ***Carbon*** taxes & ***ETS*** schemes fail to meet these fundamentals, and absent these designated: a ***Black HC market*** and a ***Red HC market*** fundamentals, neither ***Carbon tax*** nor ***ETS*** is an ***INVESTABAL*** proposition. As a result, neither ***Carbon*** taxes nor ***ETS*** has single headedly promoted any significant ***Cfree*** investment.

We have an elephant – and it's still in our room!

[10] In a ***proper*** market (e.g. potatoes or grain) the market price is determined by tension between supply and demand. So if potatoes are in short supply the market price goes up and this moderates demand so that the price falls again until there is equilibrium. ***This is not so in the so-called "carbon market"***

Appendix III: FINAL WORD

DISPLACEMENT TRADES - ADDITIONAL NOTES
The de-carbonization of a ***HC*** burning plant e.g. a power plant can be financed by another business, say an airline operator in a displacement trade. In this scenario, the airline operator invests in the additional CAPEX & OPEX of the de-carbonization of the 3rd party power plant, which generates electrical power.
The power producer would normally then be able to purchase ***Red HC*** but in this case the airline and the power producer agree to class an equivalent amount of ***HC*** that fuels the suppliers of primary party business as ***Red HC***. The primary party then benefits from using the ***Red HC*** market for his own purchases and gains the ***Red HC*** accolade in his marketing[11].

However, the ***Red HC*** created of by Co2 capture can only be used once.
The plant which actually captures the Co2 will not be able to buy ***Red HC*** to fuel its own operation and its own output will not be classed a ***Red HC***. This may render the electricity that it generates less competitive in the electrical energy market. Also the total Co2 captured applies to only 50% of the total burned in both so at best the arrangement would leave 50% of total CO2 emissions across both operations. This is better than zero in the short term. It could be even better, c.100% if the primary plant manufactures ***Cfree*** aero fuel rather than electricity.

Ways to cover those fundamental transactions with financial products will definitely be born and it may be possible for them to cover DISPLACEMENT TRADES.

END

PS: Last Last word:
The darkest places in hell are reserved for those who maintain their neutrality in times of moral crisis.
Dante Alighieri 1265 - 1321

[11] The commercial and provenance aspects of such transactions are covered later.