

CONSULTATION PRIOR TO IMPLEMENTING PLAN OF ACTION

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DEVASTATING VIRUS LOCKDOWNS IMPACTING ON WESTERN ECONOMIES.

Long Memories

The Wuhan Microbiology Institute, which later became part of the WIT located in Xiachongshan in the Wuchang District of Wuhan in Hubei Province of China, was founded in 1956, 3 years after the end of the Korean War. At that time China had accused the United States of using germ warfare against its troops when the Peoples' Volunteer Army was threatening to sweep the United States and all its allied forces off the Korean Peninsular. The war ended in stalemate.

The WIT is a BSL-4-standard research institute with international links to equivalent facilities in several Western countries. In the 1950s the prospect of biological agents being used for military purposes was not so controversial as it is today. A mere five years earlier over 200,000 Japanese died as a result of radiation poisoning released by the atomic bombs which fell on Hiroshima and Nagasaki. That mass poisoning of civilians was considered a legitimate way of quickly ending a war against a ruthless enemy. The Hiroshima fatalities were mainly civilians on their way to work.

Chinese leaders have many historic grievances against Western nations. One is recorded at the

recently modernised National War Memorial in the city of Dandong in which China sided with North Korea with evidence of disease materials items said to have been dropped from the air infecting Chinese troops.

To employ poisons and pathogens as a means of inflicting maximum harm on an opposing army is part of 20th Century history. In the first World War, Mustard Gas was used quite frequently without warning so that there would be no time for defenders to put on their gas masks.

Hiroshima After Pearl Harbour

No assertions have been presented that the emergence of Covid-19 viral infection in Wuhan was anything other than accidental. But China's strategic position has been massively strengthened because the International economic lockdown damage the pandemic has inflicted is far greater than that of the amazing surprise attack by Japan on 7th December 1941 against Pearl Harbour which brought the USA, a neutral country, into the Second World War.

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Battle of Britain II

Faced with a situation without precedent but great threat, concentration of defensive measures against Covid 19 have been on vaccines and face coverings. Little attention so far has been given to the possibilities of applying *engineering* means to deal with the infection whilst it is still in the air, its main means of transmission. In World War II 400mph V1 cruise missiles seemed nearly unstoppable, flying faster than planes. Engineers at Rolls Royce applied technical innovations to increase the power of Spitfire engines so they could catch the V1s and shoot them down.

Former adversaries are now on our side. Work being done at Germany's Ulm University of Applied Science on Inactivation of Covid 19 using hospital procedures has pointed the way to an engineering solution. (See page 8)





MEANWHILE IN BURTON UPON TRENT

At Clayton Equipment's factory, despite 'lockdowns' and supplier problems, production has been continuing at a frantic pace serving customers in South America, Germany, Canada and Russia, as well as industrial customers in the UK. In early December a meeting between Executive Chairman, Steve Gretton (left), PPM's John Parry and Jeremy Burden (right) of Capital for Colleagues, a financial services company, concluded the strategy through which as part of Clayton's manufacturing expansion it will manufacture PPM's Affordable Trains equipped with TRIBRID bogies adapted from the successful Class 139 railcar design.

In the extraordinary year of 2020, unprecedented circumstances profoundly altered the transport context in recent months and as of 1st January 2021 will alter it some more.

- *The Coronavirus has impacted on the productivity and capacity of trams, trains and buses. Means must now be found to provide much more space accommodation using technologies which avoid huge cost escalations.*

The consequence otherwise will be re-engaging the advocates of private car travel to try to reverse four decades of public transport progress.

- *Concerns over Global Warming are no longer expressed just by radical voices. The real impact of the wrong kind of gases permeating the atmosphere is being experienced in woodlands, forests, glaciers, flood plains, tundras and near everyone.*

Biblical catastrophes creating famines are a cause of population movements and local wars begin which then tend to get out of hand.

- *Government funding is being prepared to assist British industrial consortia and individual manufacturers to take forward their ideas for more affordable forms of passenger rail transit.*

In September 2018 the DfT started on a 'Root and Branch' review of the Railways chaired by Keith Williams which was to be complete at the beginning of 2020. The UK railways have since fallen into an economic black hole with passenger journeys reduced by at least half. Firms that would normally be specifying or ordering rolling stock cannot even be sure of their own futures unless significantly able to proceed with export activities.

However, important changes in government's policies very much influenced by the political pressures in the run up to the December 2019 General Election included the concept of 'leveling up' the economic and social wellbeing of different areas of the country. Voters in the Midlands and Northern areas of England, assumed to be reliably in favour of anti conservative candidates, were susceptible to the Prime Minister's pledge to correct that bias.

The Election was won with a substantial majority including many Northern and Midlands constituencies. The Department for Transport was quick to implement a £500 million programme titled 'Restoring Your Railway'. By the end of 2020, over 25 reopening schemes put forward by local groups, including privately owned heritage railways, had been awarded sums of money of around £50,000-£60,000 to begin preparatory work ultimately aimed at restoring part of the former branch line network.

Local organizations contemplating the initiation of public transport services on tracks which have been mothballed for decades or purely used for running enthusiast trains for visitor enjoyment will not naturally turn these into extensions of the heavily regulated national rail network which over recent years had adapted highly specified European methods. On enthusiast run railways, less onerous procedures will need to be devised and the highly derogated but safe and economic methods applied on the pathfinding Stourbridge Town branch service are being scrutinized for potential use as a template.

THE IRONBRIDGE GORGE COULD FEATURE STRONGLY IN THE UK AND OVERSEAS IN AFFORDABLE TRAIN ROLL OUT

Two Schemes Appear Eligible

Among the requests for the Department for Transport's £0.5 billion 'Restoring Your Railway' financial support are two which relate to the former branch lines situated in and around the Ironbridge Gorge.

One bid for funding of a prior study comprises the reactivation of an already open freight line which will bring Ironbridge, Coalbrookdale and a new major-housing plus-commercial development from a now closed power station site to the main line at Telford. Reported in full in the November 2020 issue of *Heritage Railway Magazine* is a project which has been promoted over several years for a line running on the southern bank of the Severn River which at one time was the northern stretch of the SVR, one of Britain's most accomplished preserved railways. This now links the towns of Kidderminster and Bridgenorth.

Scattered over 10 locations in the Ironbridge Gorge with the distinction of a UNESCO World Heritage Site accolade, are historic production works and foundries and even a Victorian Town. They provide a complete insight into how the determination, ingenuity, get-stuck-in attitudes and practical aptitude played a major part in bringing about the Industrial Revolution which changed the World.



(left) Telford steam railway operate rolling stock, potentially connecting line to Horsehay to the west

As quoted in *Heritage Railway*, PPM describe the prospects as 'a sensational opportunity sited sympathetically and for the joint Ironbridge Railway Trust/PPM solution to be recognised internationally as a model for environmental, economic and community improvement'.

The environmental measures could become a *pathfinder* in the application of sustainable energy technology to railways which fits comfortably with enquiries coming from overseas - one of the most significant from East Africa. Here, rather dismissively thrust aside by Asian railway promoters who have been installing heavy duty standard gauge lines, are considerable assets, many still intact from being built a century earlier by surveyors and engineers from this country which can be adapted to provide suburban systems.

These can circulate round the periphery of existing 'mega cities' in a hub and spoke' arrangement. The affordable railway based on old and new technology will connect to the main line serving the centre while providing the opportunity for a 'String of Pearls' with satellite towns, hotels and lodges, industrial and commercial zones and public parks made accessible to city dwellers.



Arriving at the Gorge at the Victorian town of Blist Hill. Railway structures are in place providing a connection to Coalport.



Limited loading bridge at Coalport crossing the Severn would need strengthening



On the South bank of the River Severn the track bed of the SVR is suitable to bring back into rail use.



GWR carriages used for visitor accommodation next to the former track bed.

THE PPM Class 139 IS READY FOR STRETCHING INTO A LIGHTWEIGHT TRAIN



Introduced partway through 2009 followed by the eleven full years operation between 2010 and 2020 PPM's flywheel hybrid light railcar fleet have provided exemplary service on the West Midlands rail network with over 6 million passenger journeys provided.

Initially being envisaged as a simple stretch from 10m length carrying 60 passengers to 18m with capacity for 120, the transport authorities were beginning to look at new routes with greater passenger capacity requirements. After the onset of Covid 19 in early 2020 a more spacious accommodation is indicated even to carry the same number of passengers separated by "social distancing" stipulations.

Further development work is needed to create far greater passenger capacity demanding the development of bogie running gear as originally described in the Parry 2008 patent. Funding to test manufacture the bogie, having been secured in 2019, an early PPM railcar "Car 10" owned by Sustraco was successfully designed and tested with the additional feature of altering the prime mover fuelling from hydro carbon to a sustainable form of energy, Biomethane. Once bogie running gear has been finalised with the help of Clayton locomotive engineers and adapted to loco-standard torque requirements, it will be possible to take orders for lightweight trains with passenger carrying power cars at each end and up to 5 unpowered coaches in-between.

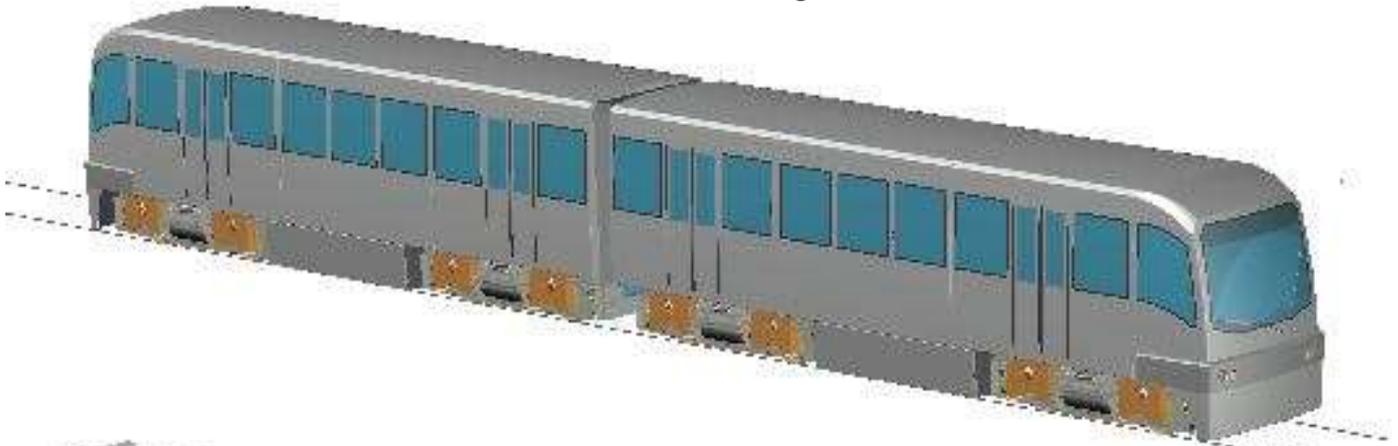


The A Train is coming

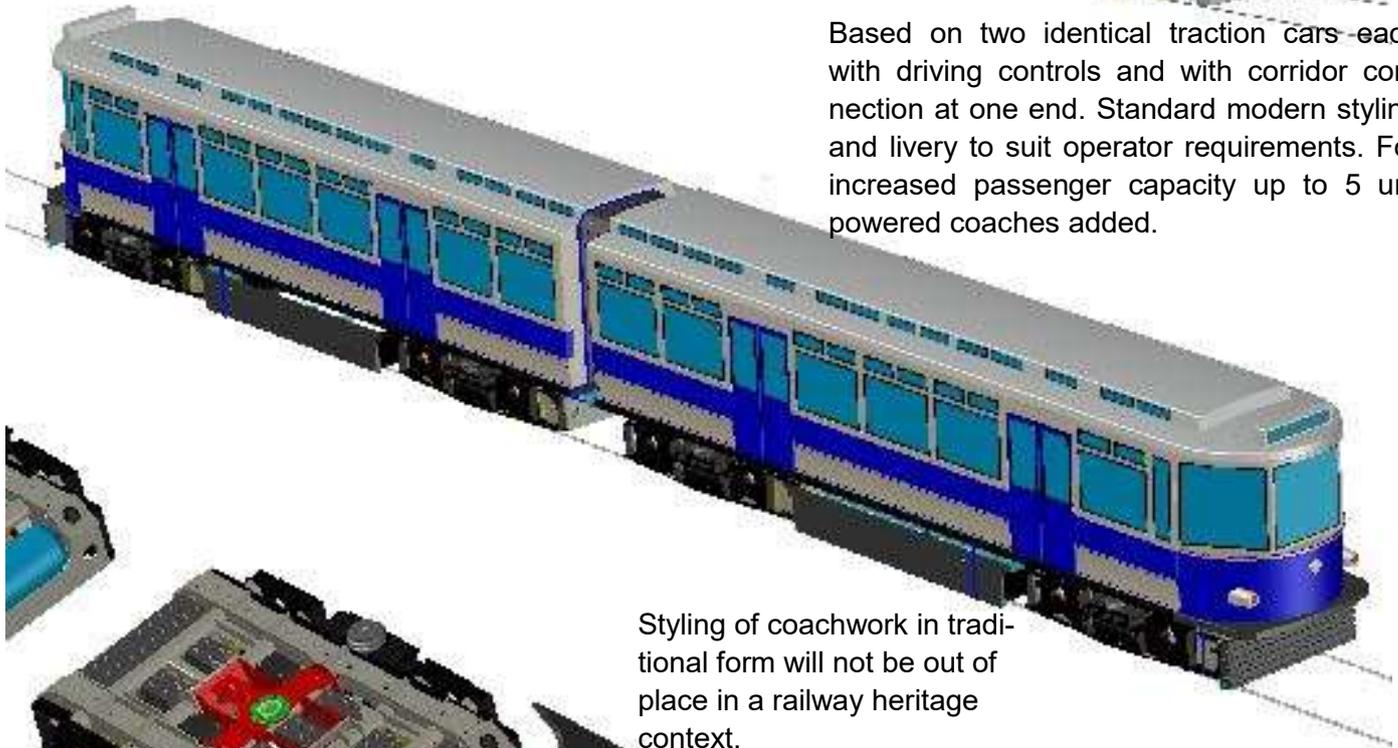


THE "A" TRAIN: AN AFFORDABLE TRAIN WITH ANY STYLING TO SUIT APPLICATIONS

Mounted on standard chassis frames with compressed air or bio-methane prime mover and lead acid batteries in TRIBRID bogies for traction



Based on two identical traction cars each with driving controls and with corridor connection at one end. Standard modern styling and livery to suit operator requirements. For increased passenger capacity up to 5 un-powered coaches added.



Styling of coachwork in traditional form will not be out of place in a railway heritage context.

The front bogie contains the prime mover, flywheel and traction motors driving all four wheels.

The rear bogie contains a large pack of DC traction batteries providing current to the wheel motors in the front bogie.

Below the car's central area of floor are the pressure cylinders which hold 3cuM of compressed air or methane gas.

SCHUMACHER'S WORLD CHARITY TAKES AN INTEREST IN FRESH AIR - COMPRESSED IN ORDER TO STORE ENERGY

CAES can be a Substitute for Chemical Batteries

Progress in discussion

Correspondence between the executives of the prominent international charity, Practical Action which was founded 60 years ago by Dr EF Schumacher, CBE, author of 'Small is Beautiful', a world policy-influencing commentary on technology, poverty and the precarious state of our Planet, is considering a new intervention related to natural forms of energy. Examples including solar, wind, wood used for fuel and bio gas retrieved from decaying organic matter.

Regarding wood, Practical Action's CEO, Paul Smith Lomas, writing to John Parry emphasises that it is not just a matter of energy:-

'Inefficient solid fuel cooking is a major contributor to climate change, and deforestation, and indoor air pollution which is one of the biggest causes of premature death, especially among women and children.

Practical Action already have an active 'clean cooking' programme, exploring a range of solutions that might be taken to scale, including the supporting of clean cook-stove manufacture and sale, bio gas production, and the field-testing of some new high efficiency electrical stove technologies. We are always interested in new sustainable alternatives though.

The idea of cooking using compressed air generated through excess renewable energy is interesting with its potential to store excess energy from renewable sources. Batteries, as we know, are inefficient and costly'.

Scope exists for Practical Action and PPM's Intermediate Technology unit to proceed with different aspects of valuable work in a non contractual arrangement. As if on parallel lines, aiming for the same goal, IT Ltd have the means to define a scope of work to produce a specification and design, build and test prototypes leading to a first-of-kind, then market-facing product or system. Practical Action, while not with an organisational remit involved in engineering development, have the means to field trial systems, analyse outcomes and disseminate findings where there is scope for wide take up using marketing skills.

The vision that PPM's Intermediate Technology entity is putting forward, supported by a Technology Foresight Panel is not for individual households to try to harvest and utilise renewable forms of energy, but consider instead the role of the existing thousands of small entrepreneurs that earn a living cutting down trees to produce firewood with the equally-common practice of burning it to produce charcoal, frequently an illegal trade, but reluctantly tolerated.

Small businesses and livelihoods depend on firewood and so rather than try to wipe them out, a concept is being explored how the undesirable aspects of the activities might be encouraged to change from being dependent on cutting down trees to harvesting *renewable forms of energy* converting these into forms in which they can be stored and called for and distributed when required. Intermediate Technology methods should be applied throughout.

Discussions are continuing which could result in a new breed of local *energy entrepreneur* skilled in manipulating every kind of naturally occurring energy into storable, physically distributable forms:- ice, hot water, hot bricks even and compressed air. A further call for innovation will be for the transport technology (probably enhanced-performance cargo bicycles or tri-cycle-based) and designs for domestic appliances which convert renewable energy supplies into light, heat, cold and electric current which hitherto depended on wires or batteries.

The prospect is inspiring, but inspiration is not enough.

Getting the Message Across

There are long-lived relationships with organisations in local government, academia and financial services who have, in effect, been standing by waiting for promising technical efforts to 'gel' into more market-ready forms. Business support guided by the 'Dragons of the Den' has no time for aspirational prospects:- 'What's in it for me?' being the culture, it is often left in the care of Friends, Family and the Foolish people who listen to dreams.

Hard business logic may however have got us all to where we are at the beginning of 2021, but Covid 19 might some day be renamed as 'The Great Comeuppance when people came to their senses!'

Intermediate Technology Ltd can be put into a form in which it can take in investment capital and working capital, but key stakeholders will need to support this.

THINKING WAY OUTSIDE THE BOX, COMPRESSED AIR AS CURRENCY

If Governments instead of meeting expenditure out of tax create money by printing it, buying bonds or other devices, this darkens the economic skies in the future. However confidence is lost in the currency and hyper-inflation happens. Personal experience by Parry Associates going out for a beer in 1987 Uganda, a local counterpart remarked "you better take enough money" - which worked out to be two wads of bank notes as big as house bricks. For a time in Zimbabwe when going to the shops a wheelbarrow was seen as handy to carry the money. In January 1923 in Weimar Germany the

price of a loaf of bread reached 200 million Marks. Printing presses just produced bizarre bank notes. Gold is a store of value - but there is lots left to dig up.

Compressed air, if verified as having been produced by renewable, natural means, could become of immediate value e.g. an agreed price of a few pence for a litre container, a few pounds for a cubic metre. With simple small air compressors placed at high points with blades rotated by the wind, people could be organised to collect the flasks and sell the air to the local *renewable energy*

entrepreneur to store in concrete tanks awaiting sale. (Scuba divers buy refills of air for around £4.50.) Just as liquid natural gas is now (see ship) compressed air could be traded Internationally. If the ships carry refrigerated cargos, freezing could be provided by the air engines at no cost.



A shipload of air?

THE BLACK COUNTRY GETS INVOLVED WITH MANAGING INNOVATION

The long-awaited £24 million Very Light Rail National Innovation Centre in Dudley is under construction at last with work in progress by contractors to lay 2Km of standard gauge test track, between Cinder Bank and Castle Hill. This investment keeps Dudley at the forefront of ground breaking engineering work which began over a decade

before with the innovative PPM flywheel powered light railcars beginning trials on Stourbridge Town branch line. VLRNIC is now under the control of Dudley Council and WM Combined Authority's rail activities and is being launched by the Black Country Innovative Manufacturing Organisation, CEO Dr Nick Mallinson.



The newly constructed test track where it passes through Dudley Tunnel

WORKING ON EMBEDDED TRACK

One innovate light rail project which has been making some progress comes from the lifelong experience of Major (rtd) CB Holden OBE the former HMRI senior official who is a consultant to PPM's Board. The centre portion of a conventional sleeper plays no part in supporting the rail and "Concrete pots (Individual concrete blocks below a standard chair) joined by a steel bar have been in use on the continent for many years. This form of track relies on the rail being sufficiently strong in bending to carry the wheel load between successive pots. Brunel's concept of putting a wooden beam below the rail meant that, in the era that rails were not in

themselves strong enough in bending, much heavier wheel loads could be accommodated. This was the foundation of Kit Holden's concept of a modern form of waybeam track being developed by Carpet Track Ltd, one of the Parry "family". Interim "Waybeams" have been fabricated at Cradley Heath. Conventional railway level crossing materials will provide embedded track which street vehicles can cross. An idea under test is for instead of providing for a permanent slot in the road surface—the flange-way, resilient rubber type inserts will spring back and fill the slot removing the possible hazard.



Above, Lengths of beam channels made at Cradley Heath metal fabricators, Oakham.

INTERCEPTING AND DEACTIVATING VIRUSES DURING AEROSOL TRANSMISSION.

Researchers at Ulm University Indicate Practical Pathogen Deactivation

This is serious

Being in effect in a state of war against a relentless invader, we have resorted to reducing infection by keeping people apart while vaccines are developed. But the ability of the Covid 19 virus to mutate at will presents future risks and calls for a fresh approach, engineering based.

Britain has been under threat before. Sir Francis Drake in 1588 and the RAF squadron leaders in the Battle of Britain had the benefit of *engineering innovations* leading to faster ships and planes than the other side had. In both conflicts the threatened invasions never took place because naval or air superiority was achieved by the defenders. Engineering innovations which created means of effective interception of attacking forces twice changed the course of history.

Especially with the recent fast-propagating “mutant” Covid 19, it seems highly likely that the increased infectiousness relates to being able to move in the form of air-borne particles. This is being followed up by the environment and modelling group of SAGE under Prof Catherine Noakes.

Our engineering perception is the most effective measure for dealing with aerosol infection is to apply lethal measures to the enclosed atmospheres through which the infections are passing. This air should be extracted and processed in a way that reliably inactivates all micro-organisms. Structural proteins and enzymes of viruses should be irreversibly

denatured and coagulated into non functional particles of matter before reaching their targets. *Autoclaves like pressure cookers*, raise the temperature up to 134 degree C using superheated steam as a *vector*. Research performed by scientists at Ulm University in Germany has shown that it is the *high temperature* that actually kills micro-organisms, not the steam..

UV Radiation

South Korean medical technology based on ultra-violet-radiation is said to be especially effective sterilizing surfaces. Electromagnetic “Plasma” electrifying the air destroys also living things such as pathogens and even flies. This does not provide for *purging and replacement* of the air.

Strictly Compressed Air

A simpler, more direct approach is to apply a surge of heat by compression of the air. There are ways of achieving that. Our concept for an R&D initiative involving engineering innovation considers not needing to use water vapour as a vector as in an autoclave, but heat.

The air itself is momentarily heated by compression and cooled and returned to ambient in a fully-sterilized form by using equipment specially designed to

operate at a high temperature above 200 degrees C. This will require high temperature lubricants able to operate in a total vacuum—“Space Grease”.

Resources to specify and design a pilot unit are being assembled.

Technology Foresight Panel

Individuals with special knowledge are available to guide and assist specify a fully engineered air sterilization device. Their experience and access to hardware combined will lead to a pilot unit to handle the separate steps in virus interception and destruction in an enclosed, occupied compartment.

Compressing air on a continuous flow basis will automatically become heated to a temperature that will eliminate all pathogens within one third of a second and will be transferred to a chamber that will sustain the high air pressure for that time.

Decompressing the air back to ambient will create a sharp reduction of temperature and need to avoid risk of “frosting”.

Air circulation arranged in the passenger compartment at positive pressure will carry out the purging of stale air to be replaced by sterilized air from the new apparatus.

