

SUCCESSFUL TESTBED TRIAL OPENS DOOR TO DESIGN OF LARGER VEHICLES REQUIRED BY MARKET

Next; To introduce zero carbon models utilizing compressed air



Testbed railcar undertaking trial running at the Rail Technical Centre at Long Marston, Warwickshire, on 22nd July, 2020. The red coloured section of underframe houses the bogie-length driveline mechanism.

Work on the testbed railcar was severely held back in the period March to June 2020 due to the lockdown of an engineering works in Alcester associated with the Coronavirus

measures. PPM technicians were finally permitted access to resume work on the vehicle later in June. Over 20 mainly West Midlands firms contributed to the highly successful

project supported by Dudley College of Technology and BCU with operator involvement of PreMetro Operations and supply of coachwork and components by Sustraco.

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SHAFTS OF SUNLIGHT BETWEEN A ROCK AND A HARD PLACE



Comment by John Parry MBE

A great deal of stress is being inflicted upon organizations in the rail industry and after years of passenger growth firms have slammed on the brakes. The nations of the world with very few exceptions are between a “rock and a hard place”. The rock being the Coronavirus pandemic.

The “hard place” is Global Warming which is causing extreme weather events to occur ever more frequently. The consequence is out-of-control forest fires, unusually powerful storms, which with the melting of the ice fields, cause sea levels to rise, increasing the occurrence of disruptive flooding, inland and in coastal zones.

The “shafts of sunlight” will come from ingenious technical innovations putting right the problems caused by excess greenhouse gases, mainly carbon-dioxide and methane entering the atmosphere. Another “wrong” to be put right is the lack of gainful employment for millions of impoverished people in developing countries. Providing work opportunities for people based on worthy

tasks has always been a big challenge. Obtaining firewood by cutting down trees is understandable but destroys woodlands which are closely adjacent to human settlements. Renewable forms of energy such as solar and wind have not been adequately exploited simply because the means are not available for storing this free energy until it is needed. Here lies the challenge for intermediate technology. Intermediate Technology Ltd already exists as a company in incubation, with a Chair, Mike Kneen and a handful of shareholders. It is now time to get down to work with the emphasis on projects in developing countries. A new consultancy unit has been formed within the firm, PPM Foresight which is assembling a panel, mainly of outside specialists with backgrounds in rail and transport.

NEW KID ON THE BLOCK

Parry People Movers now have a Business Development Manager who is me, Di Cooke. Here I am having joined John Parry and his team after being inspired by an encounter with designers and engineers who do not just talk the talk but walk the walk of environmental responsibility. Much of my life spent with the NHS as a nurse and midwife was concerned with the health of people but how can it be that the Planet is increasingly being harmed by human activity? This group of technologists is unusually applying the lessons of the “Small is Beautiful” study of economics as if people matter. Having myself created two successful small businesses, I relish the challenge of turning the inventiveness of Midlands engineers into solutions that will benefit the Planet and provide livelihoods at affordable levels of capital.



Diane Cooke

RESTORATION OF LOCAL RAILWAYS RAISES QUESTION OF ACCESS TO FIRE AND RESCUE SERVICES

When disasters happen, the emergency services are expected to be in attendance straightaway. Even when the crew of Apollo 13 on its way to the Moon radioed, '*Houston, we have a problem!*', Ground Control's instruments had already sounded the alert and the situation was being addressed.

But when on 12th August 2020 at 09.38 a.m. a train crashed and caught fire in Scotland, for quite a long time nobody knew. The railway authorities were only alerted when an injured passenger walked a mile along the track and was then able to use her phone to report what had happened. Diesel fuel from the locomotive's tank had ignited into a fierce fire. Smoke became visible from several miles away.

PM GETS THE WIND UP

Massive Commitment to Offshore Wind: But How to Store It?

In his address to the 2020 Conservative Party Conference on 6th October, Prime Minister, Boris Johnson, made the surprise new announcement that investment in the production of renewable energy, particularly wind generated would, within 10 years, result in sufficient zero-carbon electricity for all UK households. This would include the charging of the batteries of electric vehicles. The announcement did not refer specifically to rail services. While there is already a commitment to electrify heavy railways used for main commuter flows and trunk routes, a problem will remain with lightly-used -lines, including the newly reopened Beeching routes. Also more significant is the fact that the wind blows when the wind blows which in no way relates to the times when use of electric power peaks due to the day/night contrasts in power consumption. A very significant increase in the means of *storing* renewable energy will need to accompany the stepping up of generating capacity by the renewables sector.

POTENTIAL FOR 2020 TO BEGIN A NEW ERA OF RAIL TRAVEL ON SMALL LOCAL LINES

When, during the December 2019 election campaign the Prime Minister pledged the first £ half billion of funding to kick start the reopening of 'Beeching Closure' lines, the commitment of actual money meant that this could really be going to happen!

The diesel locomotive-hauled train which had provision for 250 seated passengers was virtually empty due to the Coronavirus Pandemic. The two man crew perished and a solitary passenger who was in the front of the train. The last train crash in which locomotive fuel caught fire was in 1999 at Ladbroke Grove. Over 400 injured people were pulled from the wreckage and there were 31 fatalities. Railway routes in Britain mainly surveyed in the 19th Century follow alignments which were heavily influenced by the contours of the land. Even a gradient over 1 percent was considered steep for locomotive-hauled trains.

For the first 100 years of railway history almost all were steam loco-hauled. Then, lightweight i/c engine-powered cars and buses became available. Gradients not being so much of a problem, new roads took more direct routes to centres of population. A consequence of the different technologies, roads and railways are routed quite differently rarely within access to each other. It therefore seems advisable for passenger trains running on lines which extend beyond the reach of fire and rescue services, not to carry large tanks of combustible fuel but to be powered by other means. PPM's TRIBRID technology can provide the means for trains being able to run zero carbon and without combustible fuel on board (see Page 8).

Whatever happened to the Rail Review?

We have learned the long awaited Williams Rail Review is still scheduled to be adopted as a White Paper at some point, and the proposal in that is to create a new 'Central Guiding Mind' that is entirely separate from Network Rail. Railways have a distinguished history in Britain, like a Great Religion deeply rooted in long standing procedures and wary of heresies. But the reviewers recognised the current need is to encourage innovation even when disruptive.

IRONBRIDGE AND SURROUNDING AREA MAY SERVE AS PATHFINDER FOR RAILWAY REOPENING VENTURES

The anticipated spurt of activity in branch line reopening using central government finance (Restoring Your Railways Fund) calls for pathfinder projects where best practice can be developed to form the basis for an *Intermediate Rail Standard*. The area round the historic town of Ironbridge which in 1985 became a UNESCO World Heritage Site because of its significance as a 'cradle' of the Industrial Revolution contains

10 Museums showing the great variety of designs and manufacturing that took place in Victorian and Pre Victorian Times. Thomas Telford built the first and very famous iron bridge and the prosperous new town of Telford nearby bears his name. Railways ran in many directions from Ironbridge, all but one suffering the Beeching axe. The Trust which looks after 10 Museum sites is keen to demonstrate how by re-establishing fixed link services,

scattered venues and bringing visitors from far afield could benefit not just the Museums, but all of the hospitality, retail and logistical support ventures of the area. It is under negotiation to commission PPMForesight to work on a plan and to see how it can collaterally accommodate the interests of a large property developer which has acquired the nearby redundant power station site and has made a planning application for a 1000 dwelling and mixed use development of that site.

PROPOSED ZERO CARBON MIDLANDS INNOVATION ZONE

Exploiting the unique attributes of the Midlands dating back to before the Industrial Revolution

The 'Borderlands' between the West Midlands and Wales could be turned into a Zero Carbon Innovation Zone where community organisations host interesting trials and pathfinder projects with strong publicity and encouragement enabling them to thrive while still in the pre-commercial experimental stage.

Most of Greater London and the 'Home Counties' that surround the main conurbation have a remarkable degree of rail connectivity. However, unlike many of the World's major cities which have just spread destroying the surrounding countryside, South East England has been protected while permitting diligently located new towns to become established and former hamlets and villages to expand to accommodate commuters

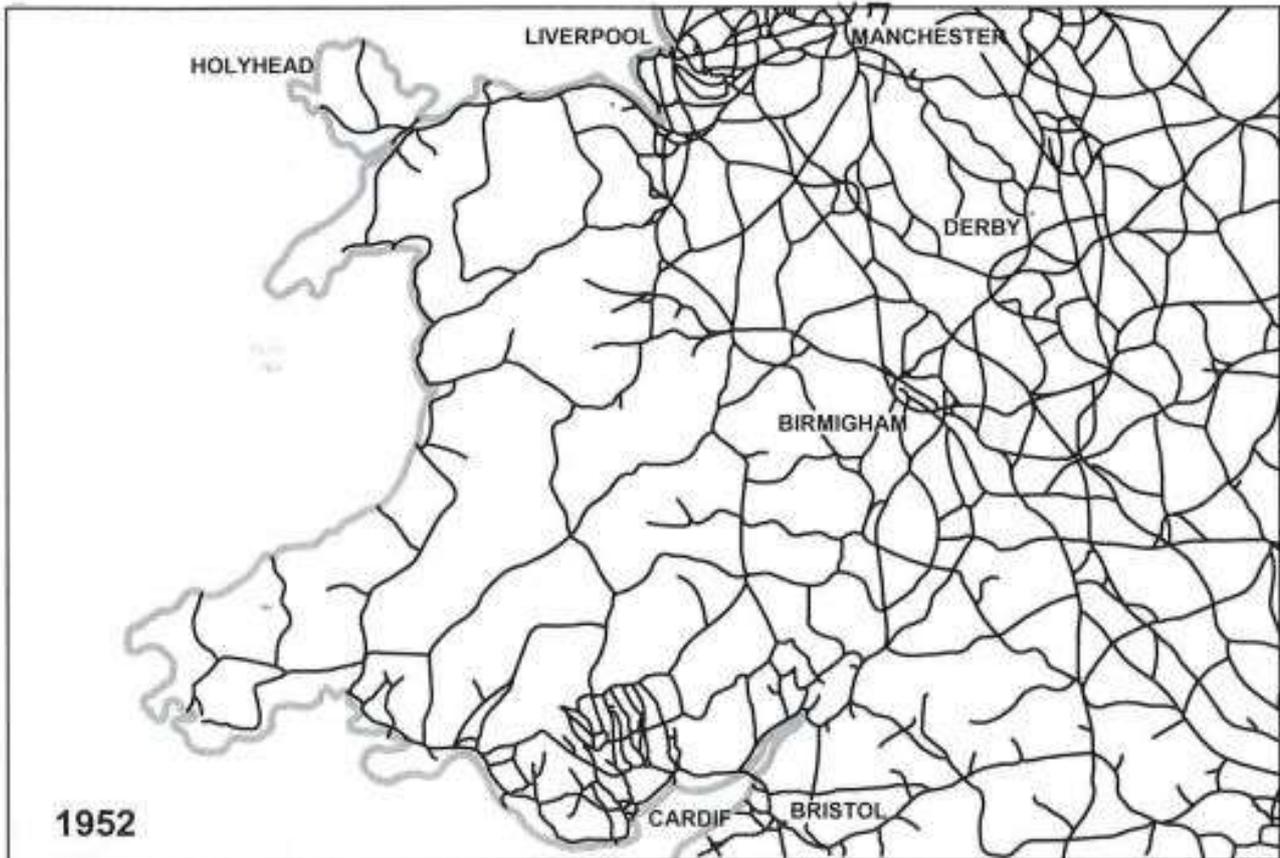
who use trains to get to work. Levelling up has become a central plank in national policy, but the driving force of white collar service activity cannot now be expected to spread countrywide. There will need to be a lot less scribbling and tapping the keys of laptops and a lot more *doing* if a Green Revolution is planned for the economy. But not in isolation, connectivity is vitally important in innovation - 20 heads (not 2 heads) are better than one.

There were once many small rail lines in English and Welsh border counties, some now converted to footpaths or cycle tracks. Railway and sustainable energy projects can include compressed air recharging stations supplying this as clean non-combustible energy to the train operators.

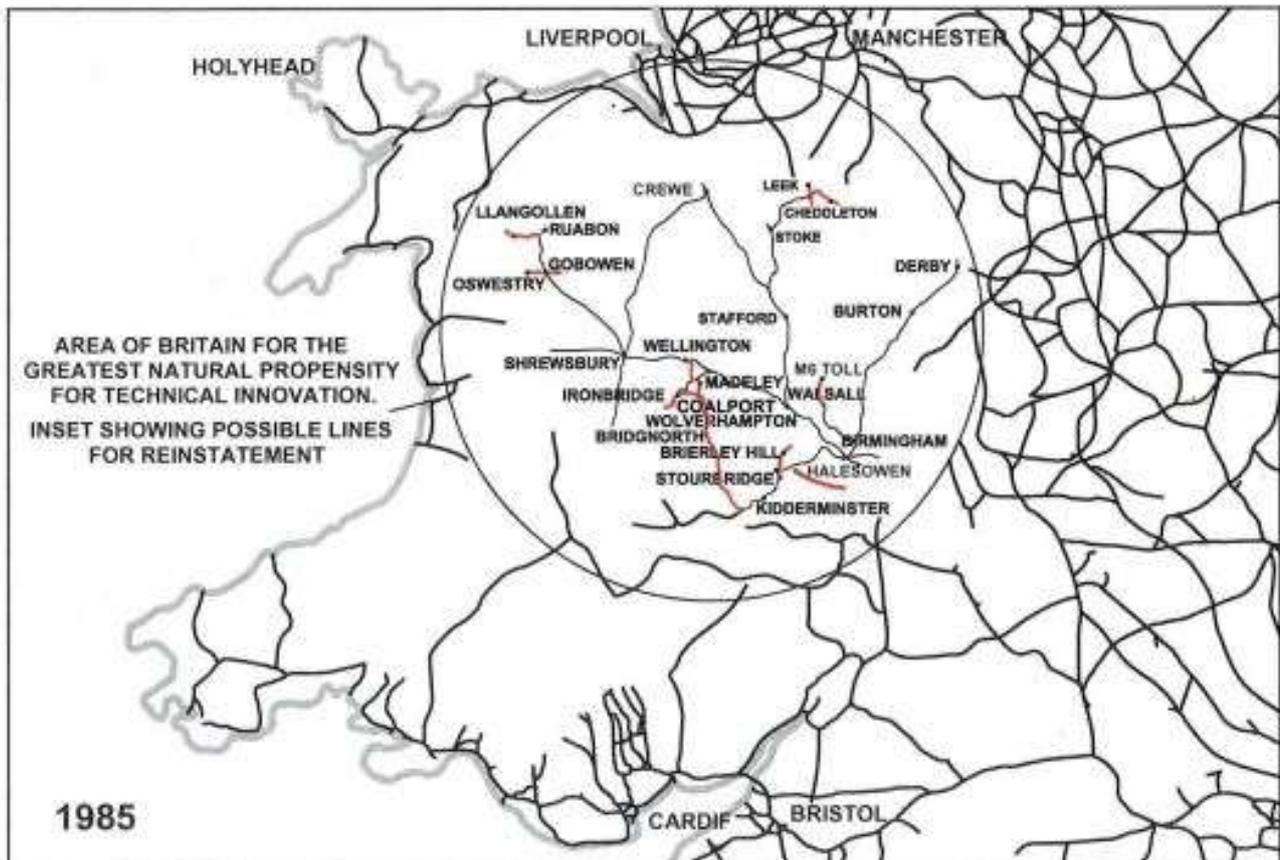
The depopulated rural hinterland of central Britain, with Birmingham as the focus, could become as prosperous as the Home Counties belt around London, based not on finance but technical innovation.

There is something very special about this area. According to Peter Colegate at the Patent Office, *'in the years up to year 2000, of the 4000 inventions copyrighted annually, 2800 came from within a 35 mile radius of Birmingham. It is impossible to explain, but people in the area seem to have a remarkable ability to come up with and have the dedication to exploit ideas'*. Shouldn't Britain be taking more advantage of this extraordinary Midlands propensity to develop new technology creating manufacturing jobs? Of course we should!

RAILWAY SYSTEM IN CENTRAL ENGLAND AND WALES IN 1952 BEFORE WHOLESALE CLOSURES AND IN 1985 AFTER THE CLOSURES CAME INTO EFFECT



BEFORE THE CLOSURES, PUBLIC RAIL SERVICES PROVIDED CONNECTIONS TO SCORES OF VILLAGES AND SMALLER TOWNS WITH AN INTERCONNECTING NETWORK MAKING MAIN LINE SERVICES ACCESSIBLE.



AFTER CLOSURE, LARGE AREAS OF COUNTRYSIDE IN EFFECT CEASED TO BE ON THE RAILWAY NETWORK LEADING TO POPULATION LOSS AND ECONOMIC ACTIVITY LIMITED TO MECHANISED FARMING WHICH CREATES FEW JOBS. IN 2020 LIVING IN COUNTRY AREAS IS BECOMING MORE POPULAR WHERE THERE IS GOOD PUBLIC TRANSPORT CONNECTIVITY. ELSEWHERE DEPENDANT ON THE ROAD SYSTEM, EXPECT 'JAM TOMORROW'.

INTERMEDIATE TECHNOLOGY LTD'S AMBITIOUS AGENDA

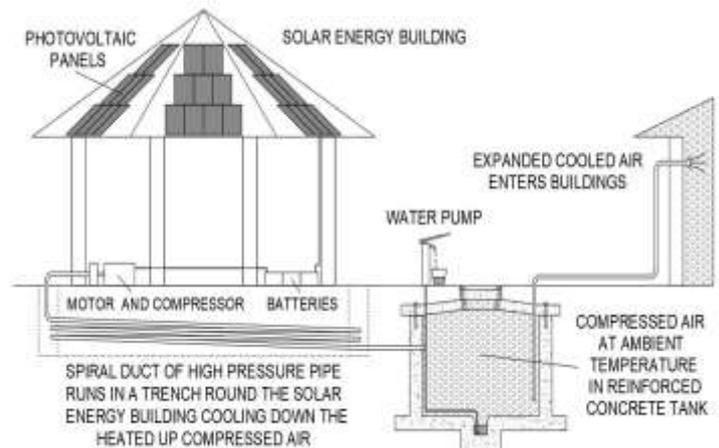
Millions of people in developing countries lost their livelihoods in 2020 due to the Coronavirus pandemic. Intermediate technologies are being devised which create a variety of economically viable processes enabling people to harvest “renewables” replacing forms of energy that harm the environment. The orthodox approach to the creation of new enterprises tends to avoid the “human factor” . Employment of people is treated as a high cost to be eliminated if at all possible. There is a valid case for automation in New York for example, but not in parts of the world where a day's labour may cost less than 1% of New York pay. Labour-intensive activity can fulfil a *double* role if technology can be applied to benefit key environmental goals such as saving trees and eliminating emissions of greenhouse gases. Intermediate technology can in effect “throw out the bath water while keeping the baby” in other words focussing on what is really important. Carbon reduction and more livelihoods.

Waste plastic used as aggregate. Using the Parry “Stabilite” technology, thermally insulating walls can be built of bricks which incorporate lightweight “EPS” waste plastic packaging as a proportion of the aggregate in the concrete. EPS packaging, commonly used for electrical consumer products can be retrieved from waste tips by “classifier” operatives.



The incredible floating brick

Solar energy used to provide Air Conditioning Although tropical sunshine is hot it can be converted to electricity to run a compressor which increases the density of air. When compressed air is diverted through a simple heat exchanger (passing through the soil below ground level) it loses its heat. Subsequently, when released into an occupied building it expands, returning to normal pressure becoming cold, so lowering the temperature of the room. All done by solar energy.



The objective being to obviate the need to forage for firewood or to use power produced by diesel gensets. An illustrated catalogue of R&D tasks could be drawn up specifying the kind of newly designed equipment which could produce compressed air or compressed methane. This would provide a source of energy technology for small businesses in poorer urban areas or villages in developing countries.

- Compressed air canisters (as used by scuba divers) as equivalent to rechargeable batteries .
- A development of a cycle rickshaw with compressed air booster to assist acceleration from rest (the principal difficulty for rickshaw operators)
- A business based on production and delivery of hot water, cold water and ice around settlements without electricity or water supply who presently consume firewood as a heat source.

Intermediate technology could not only initiate and guide this design and development work but could also create a business model by which goodwill agencies and individuals in the West could enable local groups in developing countries access the technology that they need.

CUTBACKS BY SCHUMACHER-FOUNDED CHARITY Poverty-Alleviation Work Income Squeezed By- Covid19 And Other Factors

Founded over 50 years ago by the visionary development economist, author of 'Small is Beautiful', Dr EF Schumacher CBE, the charity Practical Action is understood to have just now reacted to external events by implementing savings of £2m per year from its unrestricted funding. This move follows years of almost uninterrupted growth in donations which had brought turnover to over £30 million a year. Practical Action operates from a centre in Warwickshire and has offices all over the world in countries where communities are said to benefit from the services that the organisation provides. Programmes cover subject areas such as:-

- Cities that are fit to live in
- Energy that transforms lives
- Farming that works for smallholder farmers, and -
- Building resilience for people whose lives and livelihoods are threatened by natural disasters and climate change.

A decision taken to cut back activities and make staff redundant in Peru and Malawi with the possibility that Nepal, Sudan and other countries will follow, comes at a time that the need for poverty alleviation measures, far from reducing, is more acute than ever. Described by the Chairman, Yvonne Pinto, as 'heart breaking and difficult decisions' will include the organisation phasing out its Development Education work at the end of the current financial year. The focus now is on fundraising and business development in order to raise vital income.

The managers of Practical Action believe that the organisation is 'weathering the storm much better than others'. With a global recession looming, there is concern about being able to sustain unrestricted income growth in the medium term in order to support existing programmes.

Although emphasising the importance of innovation, the prospect for R&D activity does not seem good.

NEW TOWNS & VILLAGES OF ETHNIC CHARACTER *American style immigrant clusters may add value to rural areas*

'Chinatowns' exist in London and Liverpool as in US cities. In Brooklyn, Queens and Manhattan in New York City there are 24 'Little India' enclaves. Czechs and Mexicans have established communities with their own character including the town of New Prague, Minnesota which was originally laid out in 1856. Polish immigrants formed ethnic concentrations in Posen and Pulawski in Michigan and several towns in Wisconsin. The people in these ethnic communities have not become "un-American" but take pride in their new nationality while retaining their old cultures. Relationships with adjacent communities are generally good and the examples of ethnic character create visitor interest.

Why not in Britain?

Instead of assuming that immigrants will head for the economically disadvantaged urban areas as places of high immigrant concentration, a programme of new village and even new town construction could be encouraged as a component of rural repopulation. The key would be to avoid isolation by creating public transport connectivity. The 'String of Pearls' concept of creating new human settlements along reopened rural rail lines might hold out opportunities for adding an 'ethnic sparkle' to rural Britain.

OVERSEAS AID AS IF LIVELIHOODS IN THE UK ECONOMY

MATTER

Many young minds have been educated to think that what is good for 'wealthy' Western countries is inevitably bad for the people in the 'poor South'. As with the first bicycle makers of Birmingham and Coventry, few children would imagine that Mr Singer, the designer and exploiter of the meticulously-engineered Singer sewing machine probably contributed to more poverty alleviation than all the efforts of Oxfam, Save the Children and Action Aid put together.

ZERO CARBON TRAINS: THE SCOPE FOR USING COMPRESSED AIR

Climate change is not just a theory. The impact is being seen nearly every day that passes. PPM is working on a rail vehicle bogie that can operate without carbon emission using proven components and simultaneously give a smack in the eye for pestilential viruses

Compressed Air Motors, a Thriving Species

Compressed air motors are far from rare in every day life. On the very small scale, dental patients hear the high pitched whine of the drill which clears away decay. Somewhat larger, the loud 'zip!' sound as the technician tightens up the wheel nuts of your car during tyre changes. At airports large air motor starters rotate the aero engines before the aviation fuel is ignited and takes over. The advantage of using air rather than electric motors is partially because for providing the equivalent torque the air motors are simpler and more compact. Additionally, unlike with the use of electricity, air motors emit no sparks - an important feature when petroleum products including combustible gases are all around.

Perhaps the most widespread use of compressed air is in off shore gas and oil. Here air motors power the winches that lift heavy items from support vessels and also move personnel in 'man rider' pods vertically or horizontally between work stations.

In general use in many North Sea rigs are many types of tough, reliable air motor, including ones made by UK firms.



Air motors can be very simple with long service intervals and are more straightforward to maintain than other rotary engines.

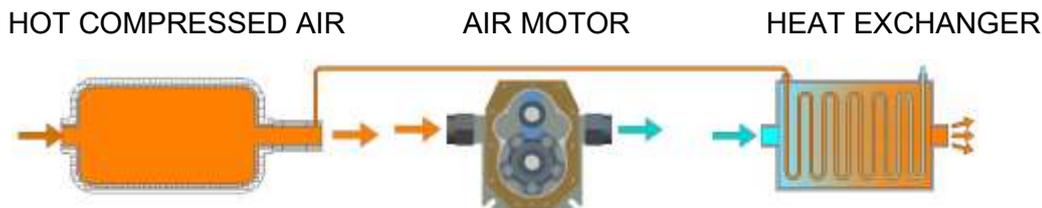
Compressed Air Kills off Germs

Further work by the designers of the TRIBRID bogie has revealed a potential spin-off prospect which could partially or wholly eliminate pathogens in the air of passenger compartments of vehicles.

Research by PPMForesight staff and associates into the *enemy at the gate*; air-borne Covid 19 viruses, have concluded that while medical science *might* reveal 50 ways to combat them, engineering measures are capable of delivering the killer punch by completely sterilising the air entering the passenger compartments and enclosed spaces.

Having considered various counter-attack methods, including ultra violet light, the technical discussions considered deep freezing, vibrations and high pitched sounds. But favouring simplicity, the best and simplest solution may turn out to be heat.

Question: how to create heat in order to sterilise air ? - Answer: compression. As air is compressed its temperature rises, a well known example being during the compression stroke of a diesel engine. (The fuel is ignited by the high temperature of the air in the cylinder without need of a spark plug.)



Virus Elimination

All harmful aerosol-borne germs having been neutralised, the air entering the cabin will be accepted as 'fully sterilised'.

Piped on board the vehicle the compression process will already have made the air quite hot enough to destroy all forms of pathogen

Passing through the motor the expanding air will transmit drive to propel the vehicle

The expanded air will be very cold, but warmed up by heat drawn from the high pressure tank before venting into the passenger compartment

