

TINGLE CONSULTING
WRITTEN SUBMISSION

Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013 - 2027

This response focuses upon the considered effectiveness of the proposals and policies within the draft RPP2. All the committees are impacted by the comments to a greater or lesser degree, as would be expected in matters relevant to such a major key sector such as energy. The energy sector would be considered as nearly as important as the water sector which is first amongst equals in infrastructure terms. The four elements of water, energy, land and air, are heavily interdependent, which demands that a fifth element of communication via GIS is essential, and must now be developed, really quite rapidly.

One general but significant point of concern stands out, which is the perceived lack of joined up thinking and working, within and between sectors, as stated within the draft RPP2. Whilst the draft RPP2 is commendable in its breadth of coverage of the energy sector and beyond, there is a perceived lack of connection between the energy sector and other major sectors, especially the water sector.

This is understandable in many ways because the water sector has been riven with sectoralism in the past, more commonly known as silos, across all levels of governance, and across many technical areas, where the purity of one sector and/or subsector has often been sought, at the expense of others.

The key issue to be addressed therefore is how to implement simple connective links from this energy sector draft RPP2 to the water related sectors. Plans for sustainable flood risk management etc., being developed at present under the new Flood Risk Management Scotland Act 2009, already require “any function” of public bodies to have regard to these Plans, and requires by statute, that named public bodies both co-operate and co-ordinate. It would therefore seem appropriate for a similarly wide requirement to be applied to energy management, from different sectors / bodies.

One of the simplest connective links is to make use of boundaries of areas developed for surface water management, such as ArcHydro, which is a free ESRI GIS tool that can quickly set out small catchments and groupings of such catchments as well as the existing and virtual watercourses across the landform. GIS also underpins the planning process across Scotland and is widely used at all levels of governance, albeit separately. It is also a very powerful data visualisation and communication tool that is far harder to sanitise and/or subvert than say council policy board reports or public information bulletins, which is perhaps why its wider use has been carefully under-utilised to date.

It is recommended therefore that the key major sectors or Water, Energy and other sectors the committee(s) deem appropriate, be identified, and the communication links demands required between data sets from these different major sectors are made manifest to all. Such communications links must be transparent, and freely available via GIS to all, including the citizen.

The decision of the Scottish Government to avoid centralisation, for flood risk matters, and to go still further by removing the ring fencing of finance for LA's ensuring funding for flood risk management was provided through the general settlement to LA's, was fundamental in starting the moving of ownership towards the citizen, though it needs to go further.

Devolving the power, data and communication still further to the citizen has been put forward by some infrastructure practitioners but has not progressed as fast as generally hoped for. In contrast, the push for energy efficiency has made great strides in connecting national priority with the citizen, via grants etc., controlled at the end-user interface, i.e. energy company/energy utility/citizen. It is clear that the current process must evolve further but must not be diverted back to LA control, but rather LA's need to be spurred on to generate the connective communication links required for further energy efficiency roll out, as the transport/housing/surface water connections can be daunting.

There follows discrete comments upon section 5 Homes and Communities and Section 7 Transport.

Section 5. Homes and Communities.

Homes and communities is a traditional terminology, but we should not forget that a home is set within a property curtilage, and a community within a catchment. Boundary issues are perhaps the most important issue in joining up sustainable development across different sectors and sub-sectors, as they provide a common frame of reference.

Establishing an organic low carbon local economy, from which larger enterprises can emerge to benefit Scotland and beyond, is important in any Sustainable Housing Strategy. Such a strategy should not be subverted by seeking immediate virtual savings from large existing companies, outwith Scotland, so any central procurement of social housing, compliant with EU procurement rules, may not be desirable, without new and appropriate guidance.

This suggests that any social housing procurement may require a more prevalent use of social enterprise companies, with money for low carbon social housing following the citizen, and suggests that the Scottish education system must focus on training citizens ready to play their roles as technically adept employees, in such an organic economy.

Any route map for a Scottish Housing Strategy requires early buy in from all sectors, at the scoping stage else it becomes a top down process, where choice becomes limited and decisions made, are in expensive isolation to other sectors.

Making sure no-one in Scotland has to live in fuel poverty, infers a reduction in total cost to the consumer, with their fuel costs not simply passed to food, rent or other taxes, across other sectors. It's dangerously easy to look good or even exemplar, in isolation from any cross sector viewpoint, and therefore connectivity issues have to be identified now, at least at the scoping level.

Delivering a step change in provision of energy efficient homes to 2030 through retrofit of existing housing, and improved building regulations for new build homes, if we are considering the level of development that LA planning would normally expect, could bring about 7% of housing stock into a new energy efficient state by 2030. This rate of development is coincident with development considered in modular surface water management strategies. Such a relatively low % gives rise to concerns that measures will have to greatly exceed available development areas.

Enabling the refurbishment and house building sectors to contribute to, and benefit from, Scotland's low carbon economy, and to drive Scotland's future economic prosperity, is one of the key areas to be addressed. The organic economy must be explained in a local context, to drive local engagement.

De-carbonising the heat sector by 2050 requires a switch to electric, very local inputs and energy storage, as gas currently provides 70% of heating and is first choice for many. The local provision and storage of energy especially at night is a problem. There may need to be a much greater use of locally stored water in water features, which store surplus energy as available water head. The costs of the gas grid etc. remain, and may mitigate significant savings from shifts to electric power.

Projections suggesting 0.5M additional homes will be needed by 2035, follows the current regime of the young leaving the nest, and starting a new home whilst the most elderly start life in a care home. Cross sector multi-function measures to readily enable property enlargement, and the greater use of the home within the curtilage, may be able to reduce this energy demand significantly, as well as the demand on the current working/employment location(s).

Existing detached houses with generally high emissions are often more readily adaptable for extension and finance. EPC's may need to have house core, and extension components, to deal with component energy ratings and improvement, within a normally large private curtilage. Existing tenements with the lowest emissions are generally more difficult to adapt and have a typically small private curtilage, but potentially make the greater use of low energy transport. In the summing of energy efficiency therefore it may be appropriate to determine an adult individual's total energy use, in respect of funding allocation. This means that any EPC needs to be inclusive of such cross sector matters, if to be relevant to the benefit of the house occupier(s).

Energy Assistance Package Schemes should be clearly related to more detailed EPC's. Property half way areas at entrances, as sealed porches, or through conservatory, or similar would make a huge difference to energy loss, but the weather does have a considerable effect, especially prolonged cold wet weather.

Better demand management can be as simple as properly balancing the radiator thermostats with boiler temperature and house thermostat boiler demand switch. This could be a useful item in any C/H system service, related to the house EPC.

One key aspect is the degree to which the ground in contact with the property is saturated and forming an efficient heat sink. Surface water management requires

that the ground generally should have a capacity to absorb greater proportions of rainfall, and so there is yet another sectoral interconnect to address here. Diffuse surface water storage within any urban surface water catchment will likely lead to local “wet” areas which are helpful in allowing efficient energy transfer from ground to air to property.

Information on energy use requires more than leaflets or meters, and how warm a house should be, depends on the needs of the occupiers. By inference this suggests that the EPC should reflect the 4 essential stages of family i.e. Adults, Adults with children, Adults, and Elderly.

The Energy Assistance Package offer energy efficiency advices to anybody who calls the Home Energy Scotland Hotline or makes contact, but people are being put off by sales pitch assaults from every direction. This perhaps leads again to the EPC process being expanded to be inclusive of more advice.

Boiler scrapage Schemes are essential, but perhaps the service agreements can be extended towards “cradle to grave” renting inclusive of upgrades and updates. This would mean the energy companies’ self-interest could be better mobilised beyond the Energy Saving Trust managed delivery of the national retrofit programme package in partnership with a range of advice providers. Energy utilities could perhaps also incorporate the universal home insulation scheme, to not simply insulate walls and insulate lofts, but to suggest the full use of lofts, thereby reducing the need to have more houses.

We also need to enable this scheme in conjunction with EST to get to grips with garages either built in or remote, that offer potential conversion into en-suite accommodation for elderly/young or office working, encouraging low car use/ownership.

Area based strategies are key to the success of the NRP. It would be best if these areas were naturally subdivided, as they would be for modular surface water management, using ArcHydro or similar related free tool for GIS, so that very local public engagement was possible, and the energy demands sat alongside water sector related demands. Agreed water management plans are required by 2015 from public bodies and many should really cover overlapping energy or potentially energy related infrastructure if possible.

Local authorities can simply play a key strategic role in identifying fuel poor areas and stock that requires upgrading on GIS. It would be better to utilise the majority of the £65M amongst the other incentives. A vastly improved, transparent, and freely accessible LA GIS improvement for cross sector use will require between £2M to £4M for Scotland. Area based Local Area Committees will need to develop their scrutiny role, re energy efficiency, and do require an increased funding stream. This carrot would be useful in encouraging the GIS metadata to be set into natural bounded areas, if we are to seek overlapping multiple benefits, and break down independent sectoral approaches, changing them to small area multi-sector approaches.

The Warm Homes initiative is tremendously important. We must all be aware of the failure of SPP6 to generate activity within Local Authorities, in so far that they did not see this as part of their core business. There has been a similar on-going issue with large reservoirs being regarded as liabilities and being mothballed or even abandoned/breached. These are not only of great benefit to flood risk management but to micro generation also. They are assets, and should be fully and sustainably utilised. Their maximum contribution to energy demand occurs in the wettest windy days, in respect of energy from peak water flow, but their bulk water stored can also act as a heat sink or source, dependent upon the time of year.

The alternative of breach followed by redevelopment simply shifts financial demands and benefits around the public bodies. The inference from this is that for multi-benefit schemes we should not ring fence the benefits just to energy efficiency, or local authority housing, but encourage joint plans, joint benefits and joint funding streams.

The switch from personal capital investment to paying via power bills for a fixed period of time should encourage greater take up, but we should not forget the individuals with capital to invest in "safe" banking products such as ISA's. It may be that inheritance etc. could provide an alternative capital investment option, whether through RBS or other banks, or whether a lump sum option was possible via the energy utility.

It should be possible to have tax free investment in energy efficiency. There does need to be clarity on the fixed nature of how many years of contribution, and possible VAT changes, as well as on changes in circumstance, such as social care related financial demands / regulation. We need to consider whether the green deal follows the individual(s) or property, or both in the optimum and/or proportionate manner. There is also the question of tariff comparison within such fixed term investment. The matter of developing social enterprise to offer a local service rather than a national utility service needs to be considered, as well as whether it is possible to develop a combination.

The ECO requires energy supply companies to deliver energy efficiency measures to homes, with a twin focus on reducing heating costs for vulnerable consumer groups, and saving carbon in hard to treat homes. There is a lifespan to some energy saving products, whether in terms of reduced efficiency, or end of function. This must be addressed now in any agreements, so that we enable continuous improvement within utility bills, or we must consider that the maintenance aspect is to be a separate sector. The issue of changing energy providers within any period, of cost free, up front energy improvement needs to be addressed in respect of transfer value. The transfer value of installed energy efficiency or generation would have to be clear and transparent, as well as be workable.

In Scotland, Green Deal finance providers working through the Sector Skills Councils, the Scottish Qualifications Authority and Certification bodies should ensure that there are sufficient qualified assessors and certified installers available to install the energy efficiency improvements in our homes, through social enterprise as well as energy utilities. Making full use of developed GIS based registers of buildings to

support the delivery of the Green Deal and ECO, needs to unify the digital framework with common reference, and this should be based upon the most widely used planning product i.e. ESRI GIS. This requires a decision not dissimilar to selecting MS Windows as the main operating system across the whole public sector.

The electronic register of buildings should be referenced to GIS, as this is the common system used for local and national data / planning etc. We need to be able to not only look at what we have done, but at where demand still exists, in a cradle to grave timeframe.

The Green Homes Cash back scheme needs to reflect both the cost of enhanced EPC's and the data amassing, and widespread access to such data via GIS.

New homes need to be built to very low carbon standards, but also need to be resilient against solar and climatic activity. We cannot afford to build so cheap that in future we face major power outages, resultant from solar or climate issues. If we are not likely to be manufacturing bolt on PV panels en masse in Scotland, we should consider the carbon content of both tile and pv panel in the low carbon equation, and possibly consider the benefits of pv tile combinations, and invest in this line of manufacture.

Encouragement via the Greener Homes Innovation Scheme is fine, but Developers have a reputation for doing as little as possible, where this reduces profit margins. Developers need to have stated requirements at 3 levels namely, desirable, absolute minimum and departure from standard, which need to be recorded on a publicly available database, which references these levels, and delivers the data, via location, and by developer. In effect compulsory advertising of the developers' green credentials.

Smart meters show up exactly what a large bill shows up, and do not represent good value. Enhanced EPC's on a frequent basis would be more efficient and useful. Utility companies have ready access to the bills they send to consumers, and can simply guide their most needy customers to EPC guidance, without meter installation costs.

It is vital to join up opportunities for measures such as reversing disrepair, and new energy saving measures within a national retrofit programme, and this could be best served using GIS, nationally and locally.

It is important that solar panels are integrated into the fabric of buildings, so that we use PV tiles on roofs as opposed to attaching large PV panels to parts of the roof, and the electrical infrastructure required should be automatically added at the building stage. Regulation via development controls and/or utility, EPC controls will be required.

In respect of any sustainable housing strategy, it should still be possible to start a register of properties new and old, with EPC existing and likely data, and other data sets, both to influence the setting of absolute minimum standards, as well as desirable standards, and any departure from standards that may be unavoidable.

New build domestic energy standards by 2014, inclusive of heat recovery are absolutely essential, and must be seen to be readily available to DIY enthusiasts as this would develop the information transfer amongst those most likely to take up

such measures earliest. We must not get locked into master planning leading such matters, as opposed to a more diffused immediate uptake.

We need the citizen to demand the most heat efficient homes from house builders. So we need the citizen to know and understand what to look for. Once the new house market energy efficiency issues are understood by the citizen then the 2nd market will see energy efficiency measures in houses as a selling point. EPC as it stands is not really enough. We should have a 3 tier efficiency banding which takes into account the measures taken and available, i.e. if red for poor, then the potential may be affordable for excellent, but maybe not.

Pervading this RPP2 are many different measures that are all worthy, but many will not be recognised. This reminds me of the difficulties in surface water management of getting all the relevant sectors to understand their responsibilities, and the needs of all. SEPA have tried to take a controlling role, but a top down centralist quango approach is only now trying to control/expedite the important local surface water management plans that should have been largely in place in 2011. Some LA's have in effect been given an opportunity for relative inaction over this period. We cannot afford such inaction in respect of energy management, so it is essential to keep devolving ownership to the lowest level at or close to the citizen.

It's the transfer of risk and uncertainty onto the installation owner that reduces uptake. Receiving dozens of offers to reduce energy costs in amongst PPI and general improvements to kitchens etc. does not provide the certainty that there are only honest brokers out there. Choice is fine but it limits uptake, and an approach similar to public consultation for flood protection schemes, or urban design Charrettes, could be used to present the issues locally to a set area, preferably defined by small surface water catchments, to bring other aspects/ infrastructure funding streams into play, and to encourage uptake of energy efficiency measures. A house by house EPC could follow after the general community presentation, followed by a final community presentation. The measure of success would be by the uptake of detailed quotes from the vetted suppliers. This suggests some screening and a form of framework agreement to take part in this process. Normal marketing would no doubt carry on in parallel. The benefit would be a build-up of data sets for new assets (with owner's permission) which would effectively asset manage the "nation's" privately owned infrastructure.

We should take note of the Chaos that the EU started in the energy interconnector sector when it wished to massively raise nation contributions, so that it could fund more of the interconnector assets. This was very disruptive and unnecessary as the private/public bodies were moving ahead nicely. Sector based intervention in local infrastructure, highlights a perceivable need to group citizenry together in local areas to roll out Renewable Heat Incentive incentives an area(s) at a time. This suggests that Local Area Committees require their limited scrutiny role of joined up working, to be enhanced, including financially.

The District Heating Loan Fund would be best delivered by energy utilities and social enterprise companies; else there may be too many disparate funding streams.

The budget for Home Renewables Loans needs to shift multiple sectoral approaches to area approaches with interdependent sectors.

There is a balance to be struck with respect to grown timber product in biomass. We need to be quite wide in our sustainable timber product considerations. For example, we could consider the increased housing demand as part of the energy balance, and our approach to extra insulation in roof spaces spanned by multiple timber trusses. If we use more sustainable timber, to utilise these roof spaces as living space, then we might reduce the energy demand associated with new property demand.

Heat mapping should be added to existing GIS data sets and must be fully licensed for freely available use, by the citizen. Such heat mapping needs to be complemented with lighting mapping, especially for key travel corridors which are affected by surface water management issues. There will be and should be some areas that are lit more than others because of the local footfall requirements/demands.

Access to information is vital to help people make low carbon decisions from transport through to energy efficiency in the home from a network of Energy Saving Scotland Advice Centres (ESacs), and an enhanced E.P.C. would deliver greater local understanding.

Sustainable development demands can be conveniently ignored as potentially difficult, or kept under wraps from the citizen and their representatives, unless loaded onto freely accessible GIS to ensure integrated working is adopted where possible. E.P.C.s require enhancement for both household and non-domestic property. Some energy providers are getting close with web based apps comparing energy use, but it is still somewhat an after-thought, and it would be helpful if every citizen could do their own rough EPC, to get a better idea of their financial issues. Every property should have an EPC on GIS.

Challenge funds can be time consuming to prepare, but even if not successful the knowledge gained can be translated into a rolling and integrated capital programme of works, which can be set in GIS for reference by others.

The Junior Climate Challenge Fund provides essential citizen learning, and is heavily dependent upon the skill of any mentors provided, and should include a quality assurance course, as an introduction to the question processes required for the existing sectoral environment.

We should not be alarmed that some property is more difficult to decarbonise. What we should do however, is map this on GIS so that the remaining areas are shown, and it is clear just what demands additionally fall to other areas.

The nomination of specialist decarbonising local organically grown firms is difficult in an EU context, but approved lists can be used for specific specialist functions, and it may be possible to start up local social enterprise bodies.

French job creation at £58,000 per thermal renovation job seems high on the face of it, but join this with other issues material to building assets and their curtilage, and

the costs proportionally lessen. For example a potential LA capital receipt of £3M with surface water problems, that sorted in the development would cost close to £3M, looks desperate, but if asset managed in another LA asset upstream, may cost only £0.25M, then that is what is required. What we should not do, is sectoralise sustainable development, further limit the potential solutions, and unnecessarily increase costs to the citizen. The development in question would now offer greater affordable flexibility in respect of decarbonisation.

Reduced costs from increased energy efficiency are best delivered from the bottom up. Economies of scale are often put forward by administrative centres as a reason why they should control the work. No administrative centre can monitor delivery like the mobilised self-interest of the citizen.

The insistence of energy efficient boilers is commendable and citizen friendly. There will of course be a need to monitor and enhance other sustainable background heat inputs, to reduce the use of gas in the future. This brings in another consideration of energy security, because as we reduce the spread of energy use between minimum and peak, we could become less resilient to peak demands. We should note that after the loss of 33kv substations in the English floods of 2007, power grid utilities sought information from LA's re flood risk of similar assets in Scotland. Not the 11kv assets though, and it became clear from overland flood routing maps generated in 2008, that these assets had not taken flood risk into account during development. It is not clear what the impact would be of such potential outages, should significant micro-generation be situated in and around such areas.

There are other water related asset failure matters in the recent past that threatened the gas supply to a significant population centre, and a key power link from a nuclear station, that would require a shutdown of the facility. This highlights that the financing of energy efficiency cannot be in isolation, but does in fact require a financial refocus within other sectors in parallel. Ensuring such asset's transferable risks are known across various sectors via GIS is important.

Loft insulation is important and highly visible to the citizen. We do however need to consider alternative insulation strategies to encourage loft conversion, if we are to keep new builds to a sustainable level.

Section 7: Transport

To control traffic emissions we need to have a coherent and co-ordinated sense of direction. Public bodies concentrating staff in centres remote from multiple public transport routes requiring major personal car use, are not helping, nor are other public bodies closing/centralising local schools, hospitals, clinics etc.

We need as citizens, to take up walking to work, utilising public transport to more distant destinations. We really need the surface water management plans to identify/scope corridors of environmentally friendly routes, which satisfy drainage requirements, add shared senses of place, be particularly well lit and safe, to have public focussed buildings along these routes, and to keep a minimum pedestrian flow

going for key periods through the day. Basic cleansing of pedestrian routes and building upkeep and the maintenance of a walkable surface would be a good place to start.

Such an approach needs to be quite basic but wide ranging, and joined up enhanced maintenance measures may have to take the lead instead of new capital works. Bringing separate sector funding streams, to area based demands will have to be developed.

The key milestone missing in decarbonising transport is related to at home parking and car storage. We are now at the stage where the cost of public transport is about the same as the cost of a car journey, albeit the car annual costs are incurred whether used or not. What incentives can be provided to further reduce the number of cars especially multiple car ownership? One option would be grant aid the conversion of the built in or standalone garage, to an energy efficient office or extra accommodation unit.

The electric charging of public transport in the low energy demand periods looks capable of bringing the storage of energy onto our streets. One key component driver would be the promotion of greater vehicle servicing and inclusion of energy saving oils, greases and tyres. EPC's for cars might be a step forward.

To reduce emissions, there should be a review of charges/taxes on flights so that hub centred flights as opposed to point to point flights are more expensive.

What we need in respect of vehicle size and shape is variety. What we do not need is the built in obsolescence of the body and chassis. In addition to the possible EPC for car servicing, an EPC could be demanded for the body and chassis. The de-icing processes on Scotland's roads take a huge toll on cars in terms of lost embedded energy, as well as the environment. If we import fewer cars then we do not require the growth and resource consumption to earn so much, and our national deficit would reduce, releasing funding for further carbon reduction.

Power charging EV cars at homes would be a useful retrofit for existing homes as part of a package.

Using tidal range sourced power locally at ports, to power shipping looks excellent, and of course the water bus/taxi potential along key waterways such as the Clyde could be enhanced, especially more direct cross river/estuary traffic.

We need to address high energy loss driving issues such as speed bumps. Initially brought in to physically slow cars down, else the police would not enforce some local speed limits; these locally raise energy use and fumes. Speed limits need to be reduced generally to 20 and 30 mph in urban areas. We should also note that road design guidelines for development will tend towards walls at the sides of relatively high speed limit roads. Changes to speed limits offer a potential for softening of landscape to complement shared streets etc., enabling an increase in green landscaping in the urban areas, and the reduction of embedded energy.

Sustainable communities maximise “through ticketing” Oyster style passes. This also enables monitoring of public transport use, for targeting any further incentives for car owners to not use the car, they have already paid for.

Working from home in a sustainable community is a possibility but does require discrete facilities; else it can be easily disrupted. Conversion of lofts and/or garages, and communal use of empty converted shops as local office hubs, can reduce repeated daily travel, as well as bringing benefits to high streets and village centres. The removal of this daily travel by car may be the tipping point for car replacement or not.

There are peripheral items such as proximity to local schools, and care homes and shops etc. that need to be taken into account. This raises the need for interdependent policy making by public bodies, not merely grouping single sector approaches to measures and funding streams, which is more like a last stage liaison/notification. Perhaps the directorates of public bodies would benefit from an EPC centric audit on their organisational structures.

Given a choice of public transport to get into a City, as either a frequent bus from the house to town 40 minutes, or a 20 minutes frequent train service after a 20 min walk, some would choose the healthy train option. The old would get the bus and use their energy walking in the City. Bus travel is essential to keep old fold active, and the Cities busy in the off peak periods, and should be free.

Scottish Planning Policy can influence the location, density and form of development, to make access by public transport and active travel easier, and reduce travel demand, but often at great cost to the overage component of capital receipts. The means to redress such capital receipts reduction, the value of the land with planning permission must be enhanced, by making strategic interdependent decisions for catchment based areas surrounding such areas. Designating green corridors based upon ArchHydro boundaries would be a good place to start.

The boundary(s) of a community needs to be clearly defined and drive linkage with other sectors, and should be surface water based.

Implementing a wide range of infrastructure investment plans sounds good, but the move towards adequately maintaining surfaces fit/safe to be traversed, must come first. This is likely to require adding sustainable drainage to the road network, both to treat runoff and to maintain the integrity of the road construction. This will need to link to a process of disconnection from the combined sewer system prevalent in our urban areas. Such matters would be expected to divert some 10% of the total road funding available annually, in respect of drainage and a similar amount in respect of enhanced surfaces, and clearly the implications on other budgets are significant.

Green corridors implemented properly will be a huge visual improvement, and encourage sustainable travel to work, but many sustainable measures will remain unseen, and perhaps not as vote worthy as Fastlink in Glasgow, and the Edinburgh tram airport link. Prior to sustainable development, estimates of just how long it would take to bring all roads up to current standards of repair, at one time reached 400 years, based upon the funding stream allocated from the general LA settlement.

Road asset management needs to have its Red Amber Green determinations placed upon GIS to enable multi sector funding and interdependent sector measures to be planned / programmed.

Scotland's railways would benefit from further electrification of the rail network, but also from strategic analysis of their relationship with overland surface water flow between the railway and adjacent land, and surface water assets. Reduced volumes of polluted water, emanating originally from carriage toilets and diesel engines, leaving railway tracks would reduce others' energy requirements to treat such water. Railway tracks do have ponding problems but also have the potential to move surplus surface water between catchments where relief is required, especially where such relief would allow developments that would encourage low car use. It is the interdependent detail that is needed, which suggests that Scotland's rail network requires to be making full use of LA, and SW GIS datasets.

It is arguable whether high speed trains are low or high energy consumers, on the same lines as the argument for low (50mph) motorway speeds. However, linkage between Scotland and the North of England does require careful consideration, in respect of the joint local hub approach of Manchester, Leeds, Edinburgh and Prestwick airports and their rail links, if the north of England is to be regarded as a hinterland of Scotland plc.

It should be noted that if we applied security checks to high speed trains similar to those at airports the passenger volumes would not likely transfer from the airports. Where ICE trains succeed on the continent of Europe they are well linked to a reliable regional/local service. Any up-front funding of high speed train travel is likely to fall on the citizen, during a long period, when frequent increased capacity train travel, could be shifting the public away from car purchase and car travel.

The decarbonisation agenda offers a real opportunity to re-focus Scotland's expertise towards a "fully maintained" economic unit, which drives down the cost of all manufactured / processed goods, and added value technology.

The £20 million contract for new hybrid ferries awarded to the Ferguson Group is a good example of low carbon transport and increased connectivity.

It is fantasy that electric vehicles would become cheaper to run net, than petrol/diesel cars. Any increased vehicle usage, thus congestion, could not be tackled through vehicular traffic management, which is why we require incentivising the vehicle reduction in housing and non-housing development. To suggest otherwise highlights just how far we need to travel to join up sectoral approaches.

Car sharing is a niche market for those almost ready to use public transport. Generally the provision of cycling and walking infrastructure will have to be part of programmed redevelopment, or by transference of a proportion of the existing Road and footway assets, which is another reason why increased EV usage must not contribute to a net increase in vehicle traffic, as the available road surface will be reduced. Locally based contractors are more likely for enhanced maintenance works, than for large scale new build, but we need to include local training requirements within any procurement.

Funding/subsidising the end user by assisting the shift to LCV's looks to be appropriate.

Cycling requires boosting, by providing a safe surface on the roads that would dominate safe travel corridors to any facilities at any time of day. Squandering funding substantially on high profile new cycle paths whilst the roads become usable only for off road cycles is headline grabbing, but inappropriate, at this time. The safe surface has also to have reduced urban speed limits, and needs to be considered a cycle catchment at a time, and in conjunction with preferred bus routes, and preferred walking corridors.

There are significant road centre traffic calming measures that now require removal to enable cycle only pathways to be located at the edges of the carriageways, and the vehicle tracking lines to be shifted out of the cycle route, as this loading coupled with a lack of drainage leads to broken surfaces unfit for cycling. Funding needs to be refocused to a whole catchment approach, which must integrate with other sectors at the scoping stage else it will be unaffordable.

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