

Global Warming

Urgent Action to Stop Climate Change and Reduce Resource Depletion

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INTRODUCTION

There is now, no doubt that we must take urgent action to stop climate change and slow resources depletion.

Following many years of denial and delay by us all, we must now wake up. The Intergovernmental Panel on Climate Change (IPCC) report does not pull its punches and we must all take responsibility, act urgently, and lobby the Government and Local Authorities where Regulations, Legislation and strategies must change.

The inevitable counter, as always, is that environmentally sustainable change is unaffordable. Sadly we have reached the point where it will be unaffordable not to stop rampant Global Warming.

Another common counter argument is that there is no point in us doing anything because others, such as China or India are not doing enough. The fact is that the Industrial Revolution, which was the initiator of our Global Warming started in Britain. Therefore, we as a country, have a responsibility to lead the world out of Global Warming. In doing so we will be ahead of the game and gain from helping others to respond positively.

BACKGROUND

This looming catastrophe has not just crept up on us all. We have been warned over many years. It's just that we have not been listening.

As long ago as 1896 the Swedish scientist Svante Arrhenius predicted that change in the carbon dioxide (CO₂) in the atmosphere could change our temperature.

In 1938 Guy Callendar established that global temperatures had risen by 0.3 degrees centigrade over the previous 50 years. He argued that it was carbon dioxide from industrial processes that were that responsible. However at the time his idea was generally dismissed.

In 1958 Dr Charles Keeling provided evidence that carbon dioxide in the atmosphere was still rising. As a result of analysis he was able to demonstrate that the rise was attributed to the use of fossil fuels.

In 1968 Dr John Mercer warned that global warming could cause ice caps to melt and result in rising sea levels.

In 1985 the ozone hole in the atmosphere was discovered. This did result in the banning of chlorofluorocarbons.

In 1988 the IPCC was established by the United Nations. This provides the research into climate change and provides reports about the state of the environment. Since 1990 regular

reports, based on detailed research, have found that the earth is warming and that Greenhouse gases, emitted by us, are responsible. This has led to the most recent report with its dire warnings.

As you can see it has been a slow burn. However further delay is not an option.

Set out below are actions that can be taken to tackle climate change and increase sustainability.

CHANGE HOW WE VIEW AND MANAGE WASTE

Our traditional linear economy must urgently move to a circular economy. This is where wastes are recognised as resources and not destroyed. The waste industry should become the Resources Management Industry. Council Waste Sections or Departments must become Resources Management Departments. This will help policy makers, designers, industry, manufactures, commerce, and consumers, to understand the value of what used to be called waste.

RESOURCE PRESERVATION HIERARCHY

The traditional Waste Hierarchy needs urgent updating. This was updated in 2011 and started with Prevention followed by Preparing for Reuse, Recycling, Other Recovery and finally Disposal. We need to recognise waste as what it really is. It is wasted resources. The Resource Preservation Hierarchy must concentrate on avoiding the unnecessary loss of valuable resources and recover the financial and environmental value wherever possible. Resource depletion must be dramatically reduced. The world currently gets through some 100 billion tonnes of materials per year. Clearly, eventually we will run out. The demise of some crucial resources is not that far away. More concerning, in the short term, is that digging them up, processing them, and then disposing of them contributes significantly to global warming.

Set out below is a suggested **Resource Preservation Hierarchy**:

1 Resource Avoidance

This is avoiding making things that are not essential and avoiding doing what is not necessary. As an example avoiding the use of plastics saves nearly 3 times their weight in global warming emissions. In our current commercially driven economy this is currently difficult to achieve. The reason for this is the cost of production, use, and disposal does not include the true cost of the product or service.

Somebody else pays for the disposal. The financial cost of environmental damage during production and use is not counted. There is no payment to future generations for the loss of non-renewable resources. Future generations will rightly say that former generations either burnt valuable resources or disposed of them.

The simple solution to this is to make the bad expensive and the good cheaper. Currently about half the tax income raised, in the UK, is related to the work of people via Income Tax, National Insurance and in part VAT. It is suggested that we create Environment Protection Taxes and transfer the tax burden to non-renewable resources and global warming emissions and away from work and labour related taxes. Making resources and global warming

emissions more costly will make designers, industry, manufactures, commerce, and consumers more sparing in our use of them.

Reducing labour related taxes will give working people more disposable income to afford the essential things. It will also make labour more competitive in the march of Artificial Intelligence (AI). The taxes raised from such environmental taxes can be used to give more help to low paid and vulnerable people.

2 Resource Reduction

Where it is essential to make and do things, we must ensure our very clever designers and manufacturers minimise resource use and harmful emissions. Planned obsolescence must be a thing of the past. Products must be made to last, be easily repairable, appropriate parts be available, and have the potential for reuse and be readily recyclable at the end of their useful life.

Textiles are an example where short lived and used items can result in premature replacement and disposal. Reducing the textiles, such as fast fashion items, that need to be replaced following short use, will save some 23 times their weight in global warming emissions.

As above making resources and harmful emissions more expensive will help to drive this.

The Government's plan to introduce Extended Producer Responsibility for single use packaging will do a great job for Resource Avoidance and Reduction by making the user responsible for any waste management rather than Council Taxpayers. It supports the Polluter Pays Principle.

We need to encourage the Government to seriously consider applying this great principle to all single use, short life, and plastic products. This must include disposable nappies that should be recycled rather than being disposed of.

3 Resource Reuse

Ideally, when essential products produced have used minimal resources and minimised global warming emissions, where practical items such as packaging should be reusable. Products need to be easily maintainable and repairable to extend their life as long as possible. We also need the skills to put them back into service.

There needs to be greater use of hiring little used equipment. Places like Charity shops and jumble sales are good at reuse. There are a range of online options that all help.

Some local communities could have a swap and use arrangement for rarely used equipment.

Obviously making resources and carbon more expensive will help drive this.

4 Resource Recycling

Recycling, for products that have genuinely reached the end of their useful life, has a vital role in ensuring valuable resources are not destroyed or lost. For all practical purposes it will not be possible to avoid, reduce or reuse all resources so recycling will continue to be important. For example, some plastics can still be successfully recycled many times, particularly where some limited virgin materials are combined.

It is recognised that it will be very difficult to replace all plastic quickly. There must be much more work on recycling currently non-recyclable flexible plastic. Where householders recycle all they can, plastic currently makes up most of the volume of our household residual waste at home.

It is also essential that food waste and vegetable garden waste is all recycled to keep the nitrogen, phosphorus, and potassium (NPK) essential soil nutrients and provide valuable soil conditioner. Therefore, where appropriate composting and Anaerobic Digestion, which also produces non-fossil fuel energy, should be included within this category.

Making Resources and Carbon emissions more expensive will help to ensure more materials are recycled rather than being condemned to the waste bin.

The Governments Plastic Tax will help to drive research and a, hopefully, home grown market for recycling this very clever material. As an example recycling plastic will save its own weight in global warming emissions.

5 Resource Destruction

Resource destruction by incineration must be reserved for products or materials that genuinely cannot be recycled or where there are sound health or environmental reasons to do so. This includes certain clinical waste or products containing Persistent Organic Pollutants (POPs)

The energy recovery category of the Waste Hierarchy has traditionally been dominated by waste incineration. Low thermal efficiency waste incineration is in some cases more environmentally damaging than landfill.

Where practical and safe, biogenic material must be recycled rather than incinerated. Where biogenic material is directed to energy recovery there must be no carbon offset. The justification for such an offset has been that biogenic carbon is renewable. Regrettably the atmosphere does not distinguish between fossil-based carbon and renewable carbon. In addition we can't wait 20 or 30 years for the replacement. We need reduction now to avoid a catastrophic climate tipping point.

There is an urgent need to apply an Incineration Tax to all low thermal efficiency energy recovery systems. This will help to deter valuable resources being dropped from the higher levels of the Resource Preservation Hierarchy and permanently destroyed. The typical thermal efficiency of basic waste incinerators generating electricity is in the order of some 25%. Typically, electricity generated by gas is in the order of 55% efficient. If you add the rapidly increasing renewable electricity into the mix, it makes the efficiency of low thermal efficiency waste to energy look ridiculous.

Currently the threshold required to define energy recovery incineration (defined as R1) can be met with thermal efficiencies as low as 16.5%. Anything below this is defined as disposal (defined as D1). The R1 definition is obviously far too low and should be abolished. In its place the thermal efficiency of any incineration must, at least, match the level of centrally produced energy be that fossil fuel based or renewable or a combination of the two.

An Incineration Tax will also help to drive research and development into more efficient energy recovery and where possible resource recovery techniques.

In the meantime we must ensure that every effort is made to recover resources from the process. This includes capturing the waste heat and carbon dioxide for use and not just storage. Piping these to greenhouses is one example.

Valuable metals must be recovered from the bottom ash. The bottom ash must be reused productively.

Several years ago there was research into the use of super critical carbon dioxide. It focused on enhancing the strength of cement products and enabling the use of certain industrial wastes in products. It was found to accelerate the natural carbonation process. There are also potential other processes where this may be beneficial. Perhaps this could be reviewed.

The buildings, and where possible, the sites should be equipped with photo voltaic cells to produce renewable energy. On some sites it may be possible to capture wind energy.

6 Resource Loss

Properly applied the Resource Preservation Hierarchy should minimise the amount of resources directed to landfill and effectively lost. The chances of finding these lost resources in future in an efficient environmentally benign manner is extremely low. The potential of pollution to water courses and local emissions will effectively rule this out.

It is more important now that biogenic waste is prevented from entering landfill. Biogenic waste in landfill produces methane. It is often assumed that methane from landfill is 25 times more damaging than carbon dioxide. However, this is based on a 100-year period. Over a 20-year period it is 80 times more damaging. We clearly don't have 100 years to stop global warming.

However, methane is a valuable resource and must be captured and used efficiently to prevent it leaking into the atmosphere. It can be used to produce electrical energy or hydrogen. Closed landfill sites need to be reviewed to reduce the potential for methane escape.

In the short term only, if any plastic cannot be preserved, there is an environmental case to direct it to landfill rather than low thermal efficiency waste to energy systems. Plastic burnt in a low thermal efficiency waste to energy facility immediately releases its own weight in Global Warming emissions. If placed in a landfill the emissions would be minimal. However this must be a last resort or at best an interim option. Plastic must be avoided, reused, or recycled.

Wherever possible these sites should be used to capture solar and wind energy.

ENVIRONMENTAL PROTECTION TAXES

If we are to quickly move to a circular economy and move to Resource Preservation, there will need to be financial drivers to pave the way.

Currently, some half the tax that the Government raises comes from labour related taxes including Income Tax and National Insurance contributions, as well as VAT. It is proposed that an Environment Protection Tax, Resource Tax or Carbon Tax be introduced to be applied to all non-renewable resources and global warming emissions. This would enable labour related taxes to be reduced. In doing so, all but the very highest earners would be free from labour related taxes. This would make labour cheaper and massively reduce the cost of recovering the tax. In turn the cost of resources would rise. The increased cost would make

designers of products, services and processes reduce their use and look for alternatives. This would help to preserve these resources for future generations.

It would also make Britain a world leader in the green circular economy. Part of the income raised from the Environment Protection Taxes could be used to help those on low incomes that may be adversely affected by the changes. Reducing the cost of labour would help to create more worthwhile jobs for people that will inevitably be affected by the march of Artificial Intelligence (AI).

Such taxes could be seen as trade barrier, but it would make our labour cost more competitive. It would also help if we could encourage wider adoption of the principle. Although the collection of such taxes could be more complex the development of appropriate systems along with AI and of course cheaper staff costs would help.

To ensure we are doing the right thing we must have Life Cycle Assessment.

LIFE CYCLE ASSESSMENT (LCA)

It is essential that we have independent, trusted, comprehensive, equitable Life Cycle Assessment for each, product, service, process and building project. This is to ensure that the design and development of our sustainable future is based on sound evidence and help to move from the linear economy to the circular economy. It is appreciated that it is not easy and will be costly, but it will help to prevent unintended consequences and cost.

In simple terms, if you can't measure it, you can't manage it.

LCA must be comprehensive to be effective and not just look at operational emissions. It must include capital emissions. These include the emissions associated with the construction of buildings, plant, equipment, and vehicles. Any end-of-life emissions also need to be accounted for.

It must also include all emissions not just climate change. These include:

- Global Warming
- Abiotic Resource Depletion
- Human Toxicity
- Water Toxicity
- Acidification
- Eutrophication

In some LCAs carbon emitted from plant-based carbon, from waste incineration, is currently counted as neutral, known as biogenic offset. The atmosphere does not distinguish between fossil-based carbon and renewable carbon. This must be ceased to show the true impact of carbon emitted. All carbon contributes to global warming. We urgently need any replacement plants trees etc to maximise as much carbon capture as possible, not just replace the biogenic carbon burnt. Replacement can take 20 Or 30 years. This is time the environment does not have to be safe.

CEASE BIOGENIC CARBON OFFSET

The treatment of biogenic carbon in some LCA assessments is different, depending on whether it is disposed of in landfill or low thermal efficiency waste incineration facilities.

When placed in a landfill some carbon such as lignin will not degrade in anaerobic conditions and becomes sequestered. Some will degrade and produce carbon dioxide and methane. Methane is some 80 times more harmful to the climate than carbon dioxide over a 20-year period and 25 times more harmful over a 100-year period. Consequently, biogenic carbon placed in landfill counts against landfill. However, in modern landfills some of the methane will be captured and used to produce electricity or for other purposes. The harm that landfill does to the environment has resulted in the application of a landfill tax which is currently some £102 per tonne on top of the gate fee.

When biogenic carbon is placed in a low thermal efficiency waste incinerator producing only electricity all the carbon dioxide is immediately released into the atmosphere. These incinerators are generally some 25% thermally efficient. The electricity produced replaces centrally produced electricity, which from gas is up to 55% thermally efficient. Increasingly gas is being replaced by renewable sources such as wind power. Therefore centrally produced electricity is becoming even more thermally efficient with much reduced carbon emissions.

The surprising thing is that biogenic carbon in low thermal efficiency incinerators is counted as neutral in some assessments. It is known as biogenic offset.

If biogenic carbon is treated in the same way for both management methods, it is likely that the climate change potential would be seen to be similar, and in some cases, low thermal efficiency incineration will be more damaging to the environment than landfill. In future this situation will get worse as more biogenic carbon such as food waste is avoided or recycled. It will also be worse if the percentage of non-recyclable plastic increases.

We need to ensure LCA does not give a misleading picture and lead to a less sustainable strategy. It is therefore important that the practice of using carbon offsets for biogenic carbon be ceased.

As centrally produced electricity continues to decarbonise the environmental benefits of low thermal efficiency incineration will decrease even further.

The LCA for these systems needs to be urgently reviewed. It is likely that such a review will make a strong case for an Incineration Tax on low thermal efficiency energy recovery.

INCINERATION TAX

With the true environmental burdens associated with low thermal efficiency incineration being close to, or as likely, increasingly worse than landfill it is time to resolve the inequity. An Incineration Tax applied to low thermal efficiency incineration would have several advantages. In the same way Landfill tax incentivised recycling, an Incineration Tax would give a boost to the current stalled recycling rates. It would support the Government plan to make segregated food and vegetable garden resources collection mandatory. It would encourage more environmentally efficient treatment systems, particularly for non-recyclable plastics. It would

also encourage more heat recovery schemes where it is still considered essential to burn certain resources.

END THE USE OF FOSSIL FUELS

It is essential that we work urgently to end the use of fossil fuels. Investment must be shifted from fossil fuels to renewable energy. This includes solar, wind, hydro, wave, tidal and biogas. We also need energy storage. This includes, pumped hydro, gravity systems, green hydrogen, biogas and of course batteries.

The Resources Industry and Councils are well placed to deliver some of the much-needed renewable energy. There are extensive depots, buildings, and sites where solar and wind energy can be captured. There is of course methane from landfill and biogas from anaerobic digestion. There is also the potential to investigate the production of syngas if it can be done sustainably.

CEASE THE PRODUCTION OF NON-RECYCLABLE PLASTIC

There are currently huge amounts of non-recyclable plastics, particularly, in household residual waste. Typically, a family of 4 that fully recycles all it can, are able to easily manage with some 90 litres of residual waste collected fortnightly. Most of this volume will be non-recyclable plastic.

There needs to be urgent action to stop the production of such plastics. Hopefully Extended Producer Responsibility will help. In fact there is a strong argument to apply Extended Producer Responsibility to all plastics. If this does not work, we need to urgently come up with practical economic ways to recover this material in a fully sustainable manner. Burning this material in a low thermal incinerator is no longer acceptable. As mentioned earlier, if all else fails landfill, in the short term only, would be more environmentally beneficial.

ENVIRONMENTAL EDUCATION FOR A SUSTAINABLE FUTURE

It is our children, grandchildren and ongoing generations that will be faced with the major changes that our rapidly altering climate will bring, along with, the inevitable depletion of non-renewable resources and other environmental issues.

It is essential that they are equipped with the knowledge to face, slow, and manage these changes. Currently, environmental issues and climate change are generally only formally covered in the geography syllabus. Not all children opt for geography. Although it is understood there are plans to introduce a Natural History GSE subject. Environmental issues must be built into the formal required syllabus of a whole range of subjects. This can be done at minimal cost.

The Department of Education and schools should consider working with the National Association for Environmental Education (NAEE). This organisation provides practical information and resources for teachers in primary and secondary school settings to build environmental issues into various subjects of the curriculum. The urgent requirement is that teachers are equipped with the knowledge to teach in a new way to prepare the next generation for the changes that are coming. As you are no doubt aware educating our children will do much to help spread the word to the older generations.

It would be very helpful if an Environmental Education Pack could be produced for teachers. This would be designed to link in with the syllabus of various subjects at various levels. It should also contain suitable resources to assist teachers in practical ways.

Equally important is that the current generation fully understand the science and skill up to prevent disaster.

COUNCIL DUTIES TO DELIVER ENVIRONMENTAL SUSTAINABILITY

All Councils must have clear legally binding duties and targets to reduce climate change emissions arising from their inhouse as well as their contractors' operations and services in their areas. There must also be duties and targets to improve sustainability through resource avoidance, reduction, reuse, improved recycling levels as well as well as moving to non-fossil fuels and energy conservation. These actions to be designed to save money and enhance the environment.

This will require close, positive engagement with the public, commerce, and industry to provide full awareness and motivation to deliver effective outcomes. This will require all services to have common goals and objectives.

It is fully understood that this will come at an initial financial cost. However, there will be financial savings in moving from a linear economy to a circular economy as well as reduction in environmental burdens.

CONCLUSION

1. Change How We View and Manage Waste

Until we all recognise waste for what is really is, rapid progress will inevitably be slow. Waste is a resource and if we are to move from a linear economy to a circular economy, we must change our terminology. The waste industry should become the Resources Management Industry. Council Waste Sections or Departments must become Resources Management Departments. This will help policy makers, designers, industry, manufactures, commerce, and consumers, to understand the value of what used to be called waste.

2. Resource Preservation Hierarchy

We must urgently move from our wasteful linear economy to a circular economy. Waste must be a thing of the past – it is a resource. We need change the traditional Waste Hierarchy to a Resource Preservation Hierarchy as set out above in detail with the following headings:

- Resource Avoidance
- Resource Reduction
- Resource Reuse
- Resource Recycling
- Resource Destruction
- Resource Loss

3. Environmental Protection Taxes

To drive Resource Preservation, it would help to make the bad more expensive. This could be done by the introduction of an Environment Protection Tax, Resource Tax or Carbon Tax. The aim would be to move the tax burden from labour related taxes to non-renewable resources and other environmentally damaging products and services. Making resources and damaging emissions more expensive will make us all more sparing in their use and reduce damaging environmental emissions.

Such taxes should be viewed positively, leading to a circular economy and sustainable future.

4. Extended Producer Responsibility

Extended Producer Responsibility effectively places the full lifetime environmental cost of products onto the user. It supports the principle of the Polluter Pays. This must be applied to all single use packaging, products, as well as short life items and plastics.

5. Viable Markets for Recycled Materials

As well as making resources more expensive there must be viable home markets for recycled materials. This will provide push and pull economy for our essential resources, keep the value here and reduce the environmental and economic cost of export and import.

6. Life Cycle Assessment (LCA)

To ensure we have a sustainable future, based on sound evidence and avoiding unforeseen consequences, we need comprehensive LCA. It should be applied to all products, services, processes and building projects. Put simply, if we can't measure it, we can't manage it.

7. Cease Biogenic Carbon Offset

Biogenic Carbon Offset for low thermal Energy Recovery must be ended to show the true impact of the carbon emitted.

8. Incineration Tax

There must be an Incineration Tax on all low thermal efficiency incineration, to recognise the true environmental impact, and incentivise more sustainable resource preservation and treatment alternatives.

9. End the Use of Fossil Fuels

We must end any subsidies to fossil fuels and rapidly move investment to renewable energy. The Resources Industry and Councils are well placed to deliver some of the much-needed renewable energy. There are extensive depots, buildings, and sites where solar and wind energy can be captured used and stored.

10. Cease the Production of Non-Recyclable Plastic

There are currently huge amounts of non-recyclable plastics, particularly, in household residual waste. Burning this material in a low thermal efficiency incinerator is no longer acceptable. There needs to be urgent action to stop the production of such plastics.

11. Environmental Education for a Sustainable Future

Our children, grandchildren and future generations must be equipped with the knowledge and skills essential to prevent climate change tipping points, the depletion of non-renewable resources, and achieve a sustainable future. Equally important is that the current generation fully understand the science and skill up to prevent disaster.

12. Council Duties to Deliver Environmental Sustainability

All Councils must have clear legally binding duties and targets to reduce climate change emissions arising from their inhouse as well as their contractors' operations and services in their areas. There must also be duties and targets to improve sustainability through resource avoidance, reduction, reuse, improved recycling levels as well as well as moving to non-fossil fuels and energy conservation.

To succeed there must be close cooperation between inventors, designers, policy makers, industry, manufacturers, commerce, and the public. We need to pull together.

Change is urgently required. We must act very quickly to move from a linear economy to a circular economy.

Literally, there is no time to waste.